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Pollutants	Sources	Effect
→ CO	Incomplete combustion of fuels, Automobile exhaust, Burning of coal, Blast furnance, Tabacco smoking	respiratory problems, blood poisoning, toxicity
→ CO_2	Complete combustion of fuel, jet engine	toxicity, breathing proble
→ SO_2	combustion of coal petrolium products, sulphuric acid factories, oil refinery, power house, metallurgical operations	suffocation, asthma, bronkait breathing problem
→ Hydrogen sulphide (H_2S)	cokeovens, petrolium industries, oil refining, sewage treatment plants	headache, respiratory disorders, irrit of eyes.
→ Oxides of Nitrogen (Nitrous oxide)	automobile exhaust, fertilizer industries, explosive industries power station	respiratory irritat Bronchatics, hea ache, corrosion teeth

→ O_3 (oxidants) (ozone)	Photochemical rxn in atm. involving organic materials	irritation of lungs, eyes & respiratory track.
→ Dust	Asbestos factory, cement, ceramic industry, mining	respiratory diseases, toxicity from metallic dust, lung-cancer

Effects of air pollution:

→ Damage to materials.

→ Damage to vegetation

→ Damage to farm animals

→ darkening of sky & reduction in visibility

→ Effect on human health & activities.

Control Measures:

There are 5 ways to control air pollution.

→ Controlling air pollution at the source

→ site selection or zoning

→ Controlling air poll^n by devices & equipments.

→ control by growing vegetation

→ Control by fuel selection & utilization

WATER POLLUTION

Presence of any contaminent in water in such concentration and for such duration of time that human beings, animals and other organisms can't enjoy the beneficial qualities of water is called water pollution.

Characteristics of Potable water:-

→ It should be colourless, odourless and tasteless

→ It should be free from turbidity and other suspended impurities.

→ It should be free from germs and bacteria and other pathogenic organism.
(disease causing)

→ It should not contain toxic dissolved impurities.
(Ex- pesticide, chemical)

→ The pH value of water is neutral i.e 7 to 8

→ It should be soft having hardness in the range of 50-100 ppm.

→ It should not be corrosive to the pipe line.

Types of water pollutant :-

Organic pollutants :-

1) Oxygen demanding waste :-

→ (domestic & agricultural waste)

This includes domestic and animal sewage, biodegradable organic compounds, industrial waste from food processing plants, slaughter house (the place where cutting of chicken)
Paper meals, agricultural runoffetc.

Diseasing causing waste.

Oil spill

synthetic organic compound :- man made
(ex - detergent, medicine, pesticide)

inorganic poll? - Acid, metal, heavy metal (toxic)

suspended solid & sediments :- soil erosion, mining activity
fly ash.

Radioactive pollutants :- Uranium, Cadmium

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Effects of water Pollution :

BOD Effects :-

BOD stands for Biochemical Oxygen Demand
When bio-degradable organic substances are present in water they create BOD and deplete the dissolved oxygen present in water.

Eutrophication :-

Runoff from agricultural fields and waste waters from fertilizer industries when reach water courses they add nitrates & phosphates to water. This causes over fertilization algae and growth of aquatic weeds. This process is called Eutrophication which results in BOD & depletion of oxygen.

Bio magnification :-

Several pesticides like DDT, aldrin enter the water courses through runoff and wind. These chemicals enter the food chain get metabolized and are absorbed in the consumer's fat tissues. These pesticides are bio magnified in the aquatic food chain.

Health Effects :

All water cause diseases.

Ground water pollution :

Control Measures:

→ Scientific techniques to be adopted for pollution control of catchment areas of rivers, ponds, lakes and streams.

→ Treatment plants should be constructed for domestic sewage & industrial effluents.

→ Possible reuse and recycle of treated sewage effluents and industrial wastes should be act encouraged.

→ Instead of throwing waste in water recycling should be ~~should~~ be done for better use.

→ Industrial plants should be leased on recycling operations.

→ Min quantities of insecticides, fertilizers & pesticides should be use.

→ Public awareness for water poll^n must be there.

→ Economic use of water resources.

→ Conservation of forest and more plantation.

→ New & improve techniques for removal of water poll^n should be encouraged.

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Soil Pollution

Sources of soil pollution:

→ The major sources of metallic contamination of soil are mining, smelting (separation of minerals), sludge, fertilizers, pesticides etc.

→ Indiscriminate Dumping of industrial waste and municipal waste which leads to seepage of toxic substances into the soil and pollution of ground water.

→ Fly ash from thermal power plant, fly ash generator fro, industrial waste, mining waste, non-bio degradable pollutants, contaminate the soil.

→ Commercial and domestic waste such as plastic, glasses, metal cans, waste papers, fibre, rubber etc.

→ Human & animal excreta, farm wastes, radio-active wastes also cause soil pollution.

Effects:

→ Due to use of synthetic fertilizers may result in the following undesirable effects:-

1) Reduction in protein content of the crop.
2) Accumulation of nitrates in the soil which may contaminate the ground water.

3) Toxic effects in cattle.
4) Eutrofication of water body.
5)

5) Reduction in quality of fruits & vegetables

→ Effect of Pesticides :-

1) Infertility of soil.
2) ~~Toxicity~~ Increased toxicity of soil
3) Contamination of ground water.
4) Increased Toxicity of fruits, vegetables & crops.
5) Tendency of harmful chemicals to enter into food chain causing diseases & disorders.
6) Pesticide poisoning the farmers & farm workers.

→ Effect of industrial effluents :-

1) Heavy metal contamination of soil.
2) water / ground water pollution.
3) degradat^n of quality of soil
4) Release of pathogenic bacterias
5) Ground water contamination

→ Effect of urban wastes :-

1) Reduc^n in fertility & productivity of soil.
2) Land & soil poll^n due to open dumping of wastes.

Control measures :-

→ Launching afforestation & community forestry / forestry programmes.
→ ~~reclamation~~ Declaration of poll^n control programmes
→ Effective implementation of poll^n control designation.
→ Public awareness to educate people regarding environmental poll^n.
→ Banning the use of toxic & synthetic, chemical pesticides, use of bio pesticides, soil-conse
→ Soil conservation programmes
→ Proper treatment of domestic sewage
→ Proper disposal of municipal waste
→ Proper waste treatment method for industrial waste.
→ ~~Avoid~~ Avoiding excessive use of chemical fertilizers.

MARINE POLLUTION

Sources :-

→ River water carrying wastes such as domestic sewage, industrial effluents, agricultural wastes etc. joining the sea.

Waste from

→ Cities & industries situated along the coast line, sea

→ Ships accidental spillage / leakage from ships carrying toxic substances, oil, fuel, chemical etc.

→ Testing of atomic weapons, space crafts and other radio active wastes when dumped in seas cause heavy loss of aquatic ecosystem.

→ Pollution due oil drilling, tourism activities etc.

Effects :—

→ Marine pollution effects the food chain in seas which leads to serious diseases in human beings.

→ Oil spillage is a threat to marine life, it affects the vegetative flora & fauna.

→ Plastic materials when dumped into sea enters the food chain of animals causing them harm.

→ Heavy metals & other factory wastes are a threat to marine life.

→ Heavy loss of economy after getting polluted animals from polluted sea.

Control measures:

→ Introduction of anti-pollutant majors by court authorities & postal cards.

→ Various research organization & institutes to check the marine poll^n.

→ Taking effective majors to check oil leakage from ships & tankers.

→ Discouraging the dumping of wastes from human activities in the coast line areas.

→ Drainage of Industrial effluent shouldn't be done to the river

→ Minimizing the nuclear activities in sea.

→ Minimizing development activities in coastal area.

→ Creating public awareness.

Q-12-9-19 NOISE POLLUTION

It is defined as an unwanted sound at a wrong time & wrong place.

measurement of noise:- frequency (Hz), intensity (decibel)

decibel → logarithmic ratio bet^n 2 intensities

$$= 10 \log \frac{\text{sound intensity measured}}{\text{reference sound intensity}}$$

frequency = (20-20,000 Hz) ; pitch

pitch of normal conversation = 60 decibel, 200-300hz

Sources:-

~~Heavy~~ traffic

Avg. city traffic = 70 dB

heavy traffic = 85 dB

motorcycle = 90 dB

jet fly = 103 dB

Rock band = 111 dB

jet plane takeoff = 150 dB

Rocket (space) launching = 170 dB

threshold of pain (that hurts our ears) = 140 dB

Effects of noise poll^n:-

→ Psl physiological (body) effect

→ Psycological (mental) effect

→ Hearing loss

→ other health effects

Physiological Effect:-

At sound levels in the range of 120-150 dB effects on respiratory system, dizziness, disorientation, loss of physical control and other physiological changes resulting from stress and vomiting may be caused,

Loud sound can cause hormonal imbalance in the body.

Psycological effect:-

Loud noise reduces the working efficiency, interfer
interferance in communication, increases the freque
of errors, sometimes accidents, reduces mental
capability & creates emotional disturbance.

Hearing loss.

At about 150 db noise immediate permanent loss of
hearing may be caused.

People working in noisy places often suffer from
temporary loss of hearing.

other Health effects:-

Loud noise affects sleep, concentration & work
performance of an individual. It make us
headache and irritability, Long time expose to noi
affects our vision & our Cardio-vascular system.

Control measure:

-> Reduction of noise at the source of it's origin.
-> Application of sound proofing techniques to muffle
down loud noise.
-> Establishment of residential localities away from
noisy industries, ~~dirty~~ busy highways, aerodroms
etc.
-> Enforcement of strict rules & regulations against
noise pollution.

Q-13-9-19

THERMAL POLLUTION

Thermal poll^{n} can be defined as addition of excess undesirable heat to water, that makes it harmful to man, animal, plant or aquatic life.

Sources:-

=> Nuclear powerplant
=> Coal fire powerplant
=> Industrial effluents
=> Hydro electric power
=> Domestic sewage

Effects:-

=> Reduction in dissolved oxygen
=> Change in water properties
=> Increase in toxicity
=> Interfearance with biological activities
=> Increased ~~Vulnerability~~ to diseases
(easy to catch disease)
vulnerability

+ Bio Chemical oxygen demand

Control measures:-

=> Cooling pond
=> Spray ponds
=> Cooling towers

18-9-19 SOLID WASTE MANAGEMENT

Sources of Solid waste:

1) Residential :- Food waste, Rubbish, household waste

2) Commercial :- Hotel, restaurant, office, market place

3) Industrial :- Paper industry etc.

4) Agricultural waste :- Chemicals, plants, roots, animal excreta

5) Municipal waste :- school, college, medical

6) Open areas :- parks, market, open field

7) Hazardous waste :- medical waste, nuclear waste, laboratory, research, chemical industries

8) Construction waste :-

Types of solid waste:

There are 7 categories:

1) Garbage - Food products
2) Rubbish - Combustible / Non combustible other than food
3) Ashes & Residues - after burning
4) Demolition & Construction waste
5) Agricultural waste
6) Hazardous waste - any waste which have tendency to harm
7) Special waste - dead or decaying animal, Road side

Effects :-

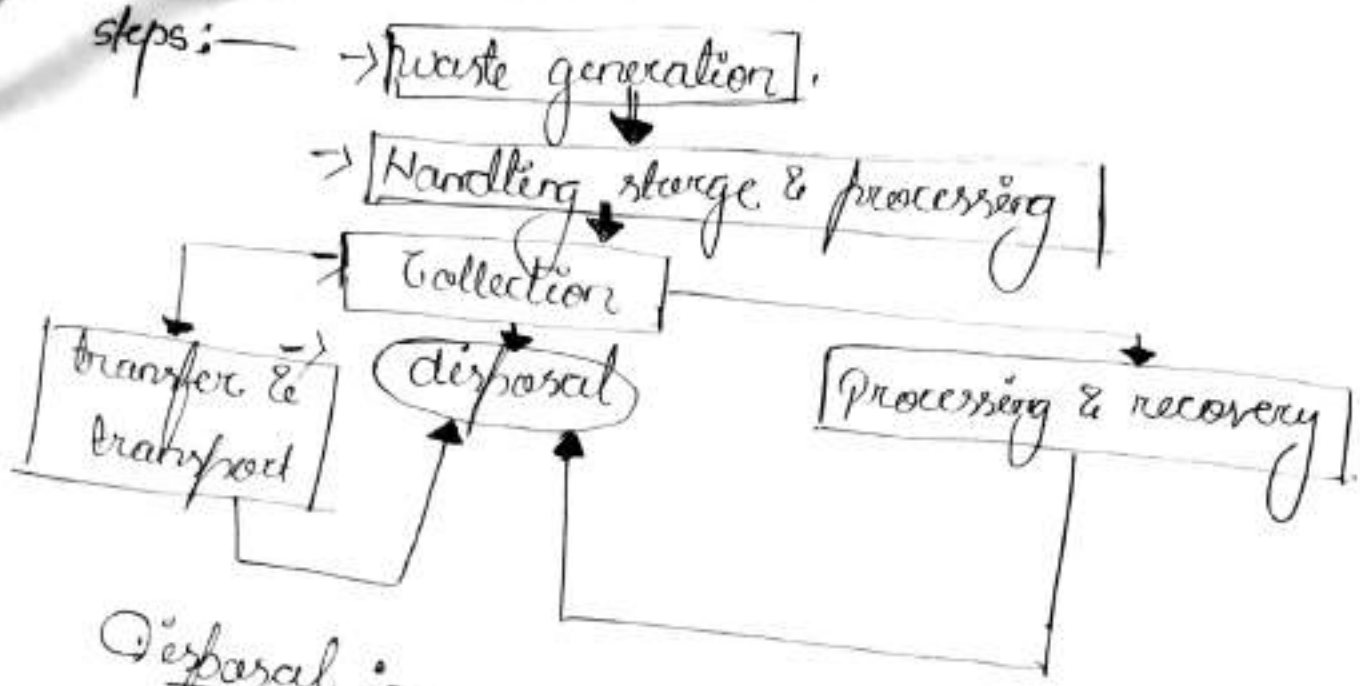
- The accumulation (gather) of waste at any place is a bad & risky situation.
- various micro organisms like bacteria, fungi, viruses etc. worms, breed in the waste & start its decomposition & grow in number.
- various types of germs which develop in the waste reach us through air, water & food.
- Most of the infection diseases like diarrhea, cholera etc spread in this ways.
- waste accumulation is responsible for air, water & soil pollution.
- improper disposal of industrial waste cause serious hazards. Ex:- Heavy metal such as mercury can cause Mina-Mata disease.

i) Asbestos can cause asbestosis
ii) Disturbance in the drainage system
iv) Contamination in ground water
v) foul smell & breeding of insects

Solid Wast Management :-

They activities involved in the management of solid waste from the point of generation to final disposal.

steps:—



Disposal :-

There are 3 popular methods of waste disposal.

1) Sanitary Land filling
2) Thermal process
3) Dumping

3R Technique :-

- Reduce
- Reuse
- Recycle

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DISASTER MANAGEMENT

→ Flood
→ Earthquake
→ Cyclone
→ Land slide

Disaster :-

It is an event that causes a lot of harm or damage.

Types of Disaster :-

1) Geophysical - Earthquakes, Landslides, Tsunamis, volcanic activity.
2) Hydrological - Avalanches, Floods
3) Climatological - Extreme temperatures, Drought & wildfires
4) Meteorological - Cyclones, storms / wave surges
5) Biological - Disease Epidemics, Insect/Animal plagues

Disaster Management :-

Disaster Management is defined as the organisation and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response & recovery in order to lessen the impact of disaster.

Disaster Prevention :-

These are activities designed to provide permanent protection from disaster. Not all disasters particularly natural disasters can be prevented, but the risk of loss of life and injury can be mitigated with good evacuation plans, environmental planning and design standards.

Disaster Preparedness :-

These activities are designed to minimise loss of life and damage i.e by removing people and property from a threatened location and by facilating timely and effective rescue, relief and rehabilitation.

Preparedness is the main way of reducing the impact of disasters. Community - based preparedness and management should be a high priority in physical therapy practice management.

Disaster Relief :-

This is a co-ordinated multi-agency response to reduce the impact of a disaster and it's long term results. Relief activities include rescue, relocation providing food and water, preventing disease and disability, repairing vital services such as telecommunications and transport, providing temporary shelter and emergency health care.

Disaster Recovery :-

Once emergency needs have been met and the initial crisis is over, the people affected and the communities that support them are still vulnerable. Recovery activities include rebuilding infrastructure, health care and rehabilitation. These should blend with development activities, such as building human resources for health and developing policies and practices to avoid similar situation in future.

D-18-10-19

FROM UNSUSTAINABLE TO SUSTAINABLE DEVELOPMENT

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

Aspects of sustainable development :-

1) Intergenerational equity (equality)
2) Intra generational equity

Intergenerational Equity :-

1) This enthesizes that we should stop over exploitation of natural resources, reduced waste generation, pollution and mentain an ecological balance. So, that we can hand over a safe and resourceful environment to the future generation.

Intragenerational Equity :-

This entherizes that technological developments should support the economic growth of poor countries so, as to reduce the developmental gap within and between the nations.

Majors of sustainable development :-

⇒ To promote environmental education and awareness.
⇒ The 3R approach
⇒ Adopting ecofriendly technologies.
⇒ To utilize resources as per carrying capacity of the environment.

D-23-10-19

Urban Problems Related to Energy

The main causes of energy problems in urban areas are : i) Increased use of energy for domestic & commercial purposes due to increase in population and industrialization.

ii) Industrial plants using big proportion of energy to

iii) Decrease of non renewable resources of energy such as coal, petroleum, natural gas etc.

iv) Increase of means of transportation.

v) Decrease in production of hydroelectricity due to insufficient rain.

vi) Transmition loss due to defected power distribution system.

Steps to solve the energy related Problems :-

1) Control Urbanization.

2) To develop renewable energy resources. Like. solar, wind, bio-mass, etc.

3) limited use of non-renewable energy resources.

4) Effective measure majors for transmition loss and energy theft.

5) Creating awareness programmes to save energy.

WATER CONSERVATION

RAIN WATER HARVESTING & WATER SHADE MANAGEMENT

Important steps to be taken for Conservation of water :-

→ water economy reseuse and recycling :-

→ If water meters are installed and charged properly the consumption of water in domestic establishments live stock managements (domestic animals) and industries sale shall drastically declined.

→ The heated water from thermal power plants may be utilized somewhere else after proffer cooling.

→ Agricultural agricultural runoffs from fields : this can be used to irrigate crop land down the stream while an efficient use of water by proffer

drainage can reduce the agricultural runoffs.

→ Effecient water distribution systems :-

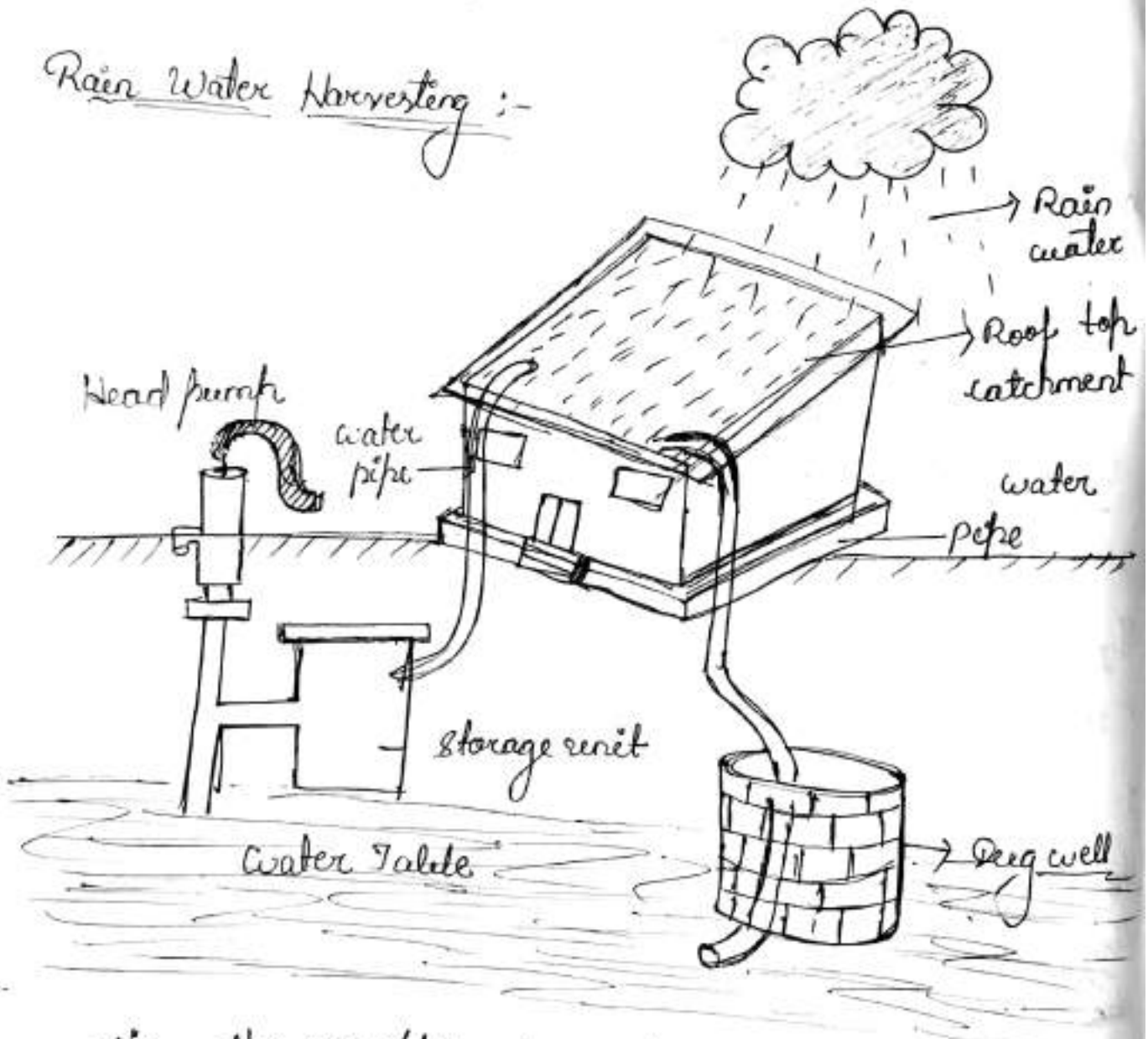
→ Enhancement of surface storage capacity

→ Reduce evaporation loss

→ Improvement of underground storage capacity :-

→ afforestation and Reforestation

Rain Water Harvesting :-



this the example of roof top RWH by

i) through hand pump

ii) through deep well

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Rain water harvesting is control or utilization of rain water close to the point rain reaches to earth. It is categorised into domestic rain water harvesting & rain water harvesting for agriculture errosion control, flood control & aquifer replanishment.

Rain water harvesting system consists of 5 basic components.

→ Catchment area or roof surface upon which rain falls
→ Gutters & pipes which are the transport channels from catchment to the storage area
→ Leaf screens and roof washers
→ Storage tanks where rain water is stored.
→ water treatment the felters & equipments as well as disinfectants

Main objectives of RWH:

→ To restore the ground water depleted ~~to res~~ due to over exploitation.
→ To store excess water for use at subsequent times
→ To improve physical & chemical quality of ground water.

→ To reduce storm water runoff and soil erosion.
→ To increase hydrostatic pressure of soil.
→ To prevent soil salinity in coastal areas.
→ To convert traditional water harvesting structures into ground water recharge facilities.

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Advantages:

→ Rise in ground water levels.
→ Increased availability of water in wells.
→ Reduction in use of energy for pumping water & the cost of it.
→ Reduction in flood hazards and soil erosion.
→ Improvement in water quality.
→ Preventing salinity in water.
→ Mitigating (reduce) the effect of droughts.

WATERSHED MANAGEMENT:

watershed is a geo hydrological drainage area on earth's surface from which runoff resulting from precipitation flows past a single point into a large stream, a river, a lake or an ocean.

The area can range from a few square metres to a few thousand square metres.

Water shed management is the rational use of land & water resources for optimum production causing min^m damage to resources.

Objectives :—

→ Rational utilization of water, soil & vegetation

→ To increase agricultural production.

→ To minimize the risks of flood, drought & land slides.

→ To manage the water shed for developmental activities like domestic water supply, irrigation & hydro power generation.

→ To develop the rural areas & their life style.