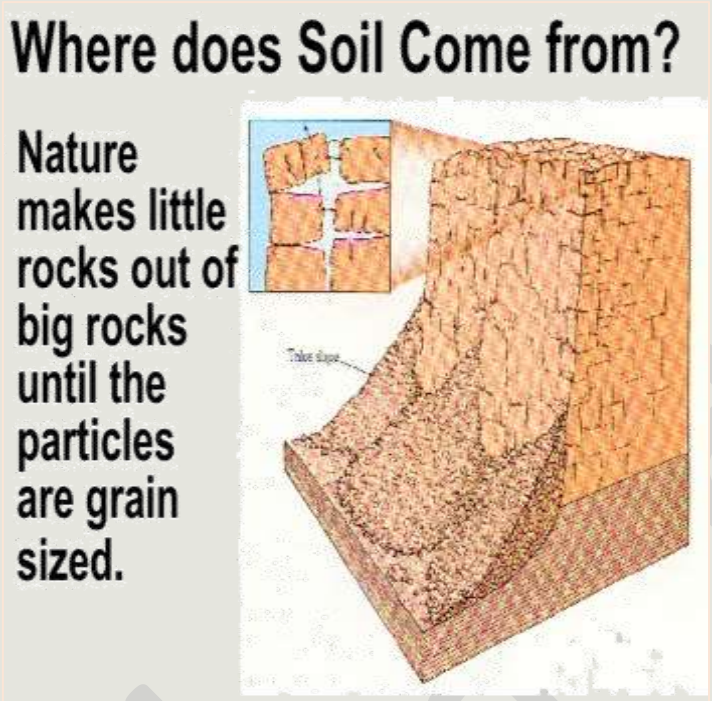
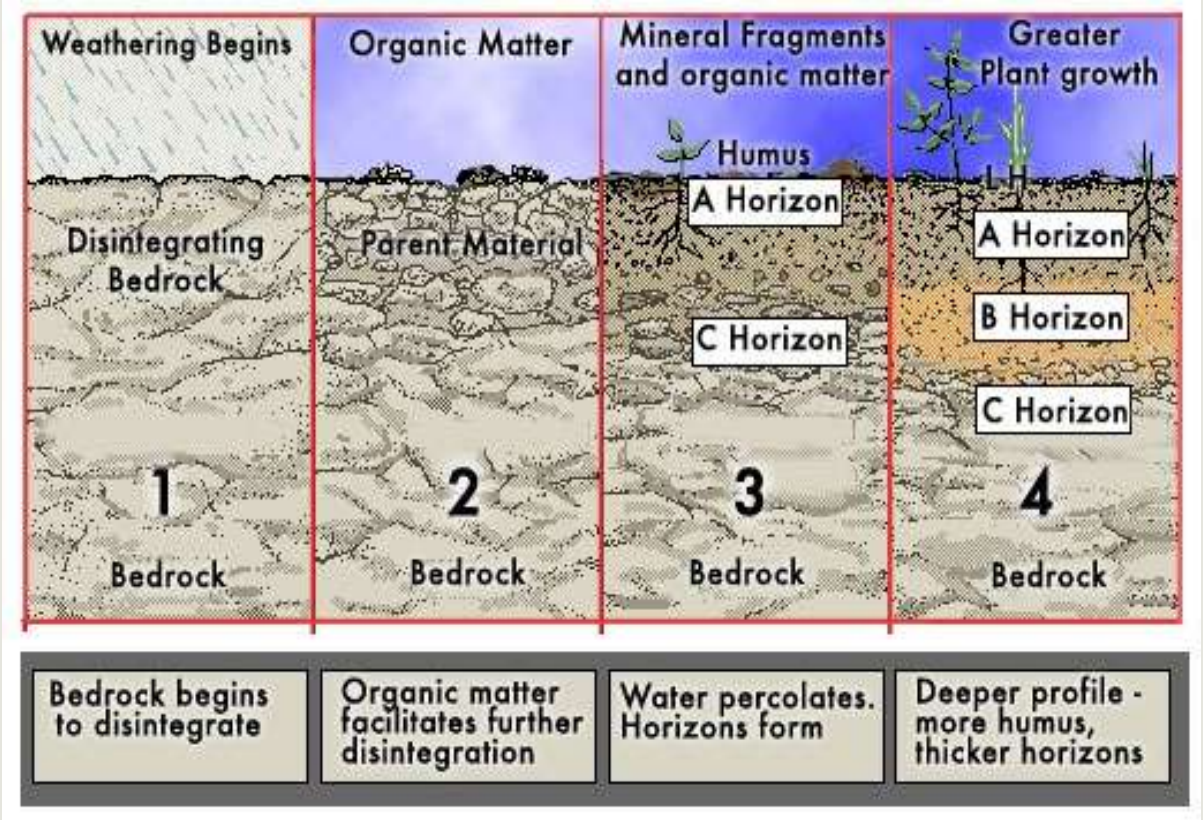
SOIL


Where does Soil Come from?
Nature makes little rocks out of big rocks until the particles are grain sized.

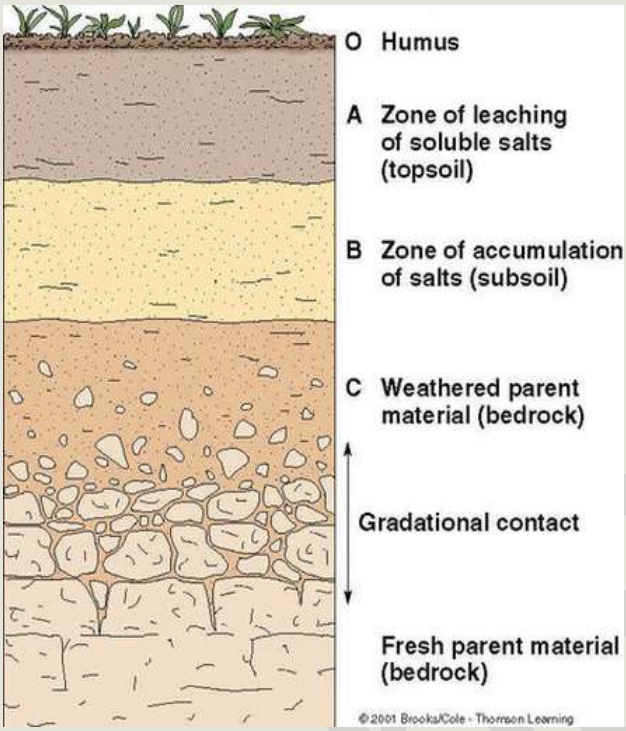

Weathering Begins
Organic Matter
Mineral Fragments and organic matter
Greater Plant growth
Humus
A Horizon
Disintegrating Bedrock
Parent Material
C Horizon
A Horizon
B Horizon
C Horizon
1
2
3
4
Bedrock
Bedrock
Bedrock
Bedrock
Bedrock begins to disintegrate
Organic matter facilitates further disintegration
Water percolates. Horizons form
Deeper profile - more humus, thicker horizons

- **Most important renewable natural resource**
- **Medium of plant growth and supports different types of organisms**
- **A living system- constant changes occur**
- **A mixture of rock debris and organic material on earth's surface**

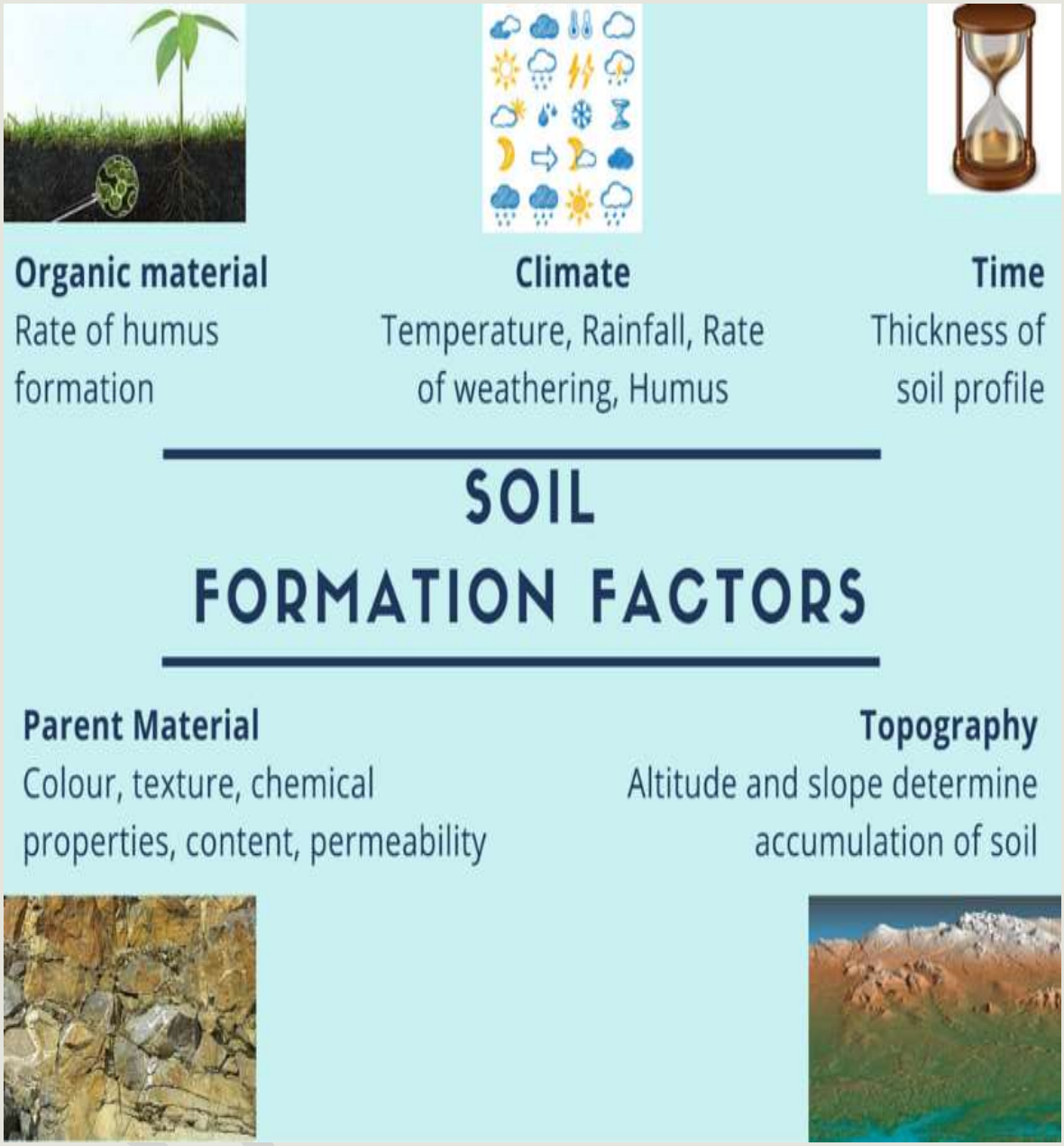
IMPORTANCE OF SOIL

Medium for plant growth	Habitat for organisms & insects	Surface water filtration system	Maintenance of atmospheric gases
Supports roots and keep them upright for growth Provides essential minerals and nutrients Provides air for gaseous exchange between roots and atmosphere Holds moisture and provides adequate aeration	Insects and microbes live in soil and get food from it Home to diverse range of organisms like worms and termites which breakdown organic matter Breeding place for insects and rodents	Rainfall, melted snow seep into soils during runoff. During seepage, gets filtered from dust, chemicals and other contaminants Filtered water to plants results in better growth	Helps regulating C02- acting as carbon store During **Humification**, sometimes breakdown is not complete. This results in accumulation of organic matter which is high in carbon content Nitrogen, phosphorous and other nutrients are stored, transformed and cycled into soil

SOIL PROFILE= ARRANGEMENT OF SOIL LAYERS



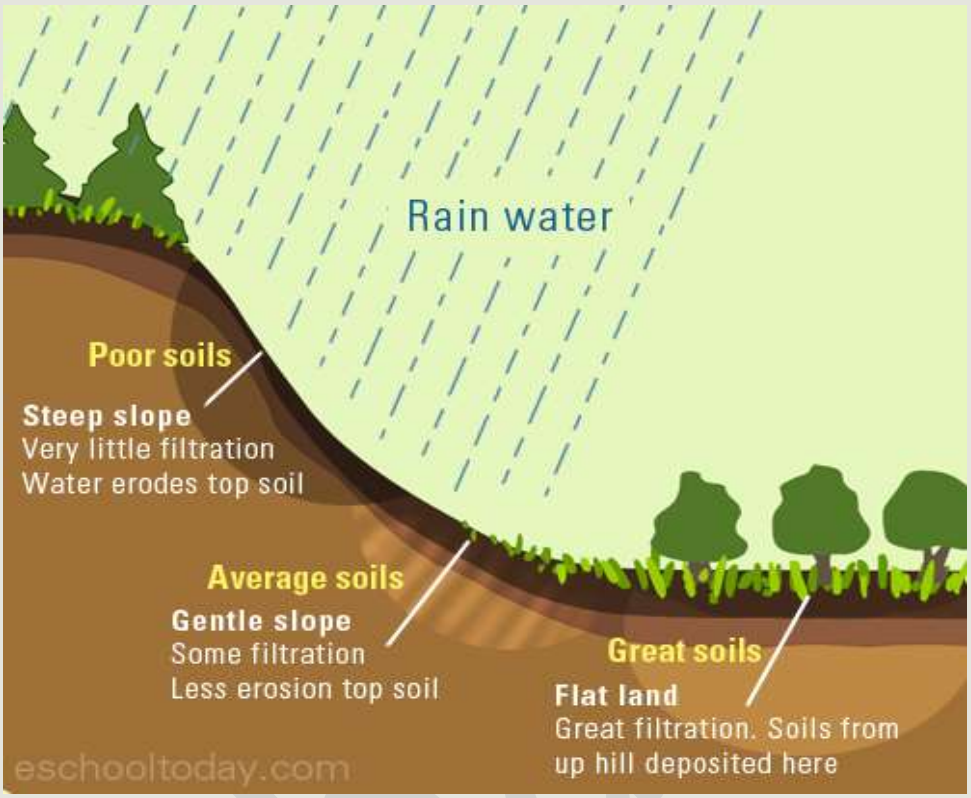
Horizon	Features
O	Vegetative cover, humus, often black or dark brown in colour due to organic content
A	Topsoil, vulnerable to wind and water erosion
E	Eluviated soil, nutrients leech from O and A, transitional zone
B	Sub soil, some organic content but doesn't support plant life, roots of big trees here
C	Weathered parent material, no organic material, First stage of soil formation- Called **Saprolite**
R	Bedrock, Unweathered parent material, rock types found- granite, basalt, limestone



1. **Parent Material**
    a. Soils carry their characteristics
    b. Colour, texture, structure, mineral composition

2. **Climate**
    a. Most important factor in formation
    b. Temperature and precipitation are key components
    c. Determines rate of weathering and organic content
    d. Moisture determines chemical and biological reactions occurring as soil forms

3. Relief



1. It is the landscape position (with the slope)
2. It determines accumulation of soil

4. Organic material

a. Micro-organisms , flora and fauna affect the rate of humus formation
b. Plants provide vegetative residue that are added to soils
c. Fungi, Bacteria, Earthworms help in **soil aeration**
d. Animal droppings, dead insects and animals provide organic matter after decaying
e. Micro-organisms help with nutrient and mineral cycle and chemical reactions

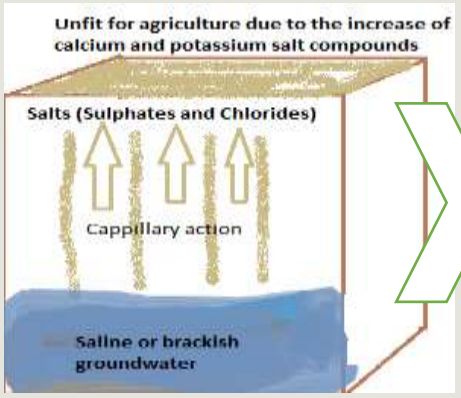
5. Time

a. Determines thickness of soil profile
b. Millions of years to make one inch of soil
c. Younger soils have characteristics of parent material
d. Ageing soil changes its feature due to addition of organic matter, exposure to moisture and other environmental factors

SOIL FORMING PROCESSES

Addition	**Materials added-decomposing vegetation, organisms and through wind and water**
Losses	Plants and organisms taking up minerals, erosional activities
Transformation	Chemical weathering of sand and formation of clay, coarse organic material into humus
Translocation/ Transportation	Movement of soil constituents within the horizons. Visible as alteration of colour, texture and structure takes place

Types of Transportation in soil

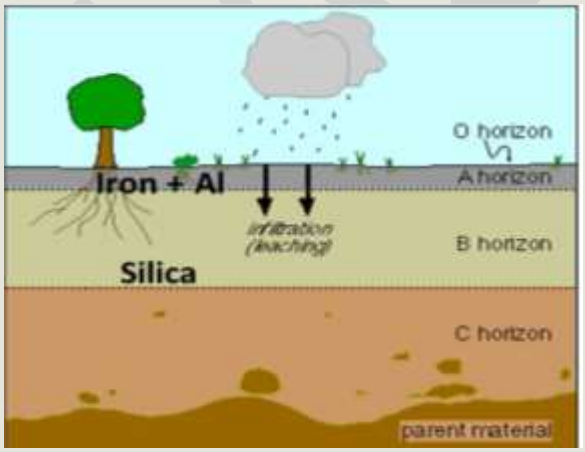


CALCIFICATION (CAPILLARY MOVEMENT)

-Hot and dry climate
-Upward movement of minerals: Faster evaporation->Calcium salts in soil come up -> Soil Salinity

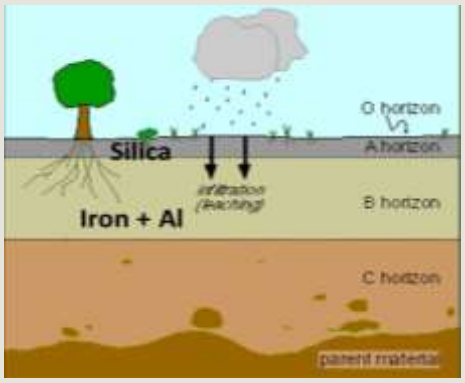
LATOSOL

-Hot and humid climate
-Heavy rainfall->Silica goes down in soil, Iron and aluminium remain at upper layer
-Acidic, sandy, clayey and yellow-reddish soil
-Lateritic soil



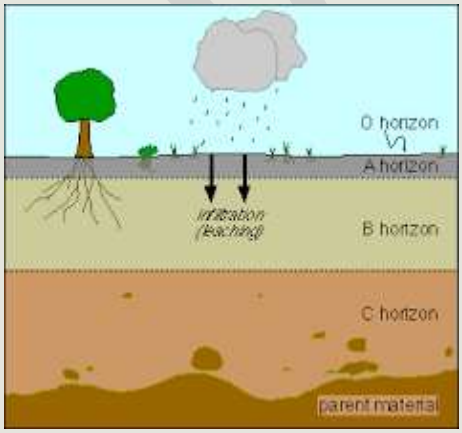
PODZOL

-Cold and humid climate
- Iron and aluminium go down, Silica remains at upper level
-Grey colour, low fertility
-Podzollic soil



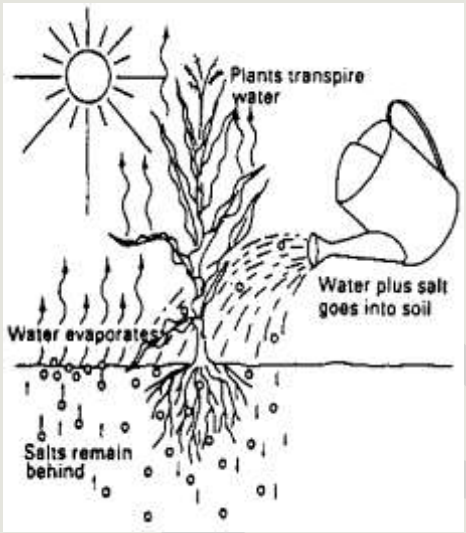
LEACHING

-Humid climate
-Downward movement of minerals like sodium, potassium, humus from A-horizon
-Upper layer acidic and mineral deficient



SALINIZATION

-Arid and semi-arid areas, coastal areas
-Accumulation of soluble sodium, magnesium and potassium salts in soil
-Salt pan formation- wrongly timed irrigation with excess water followed by long dry spells->upward movement of salts



GLEYISATION

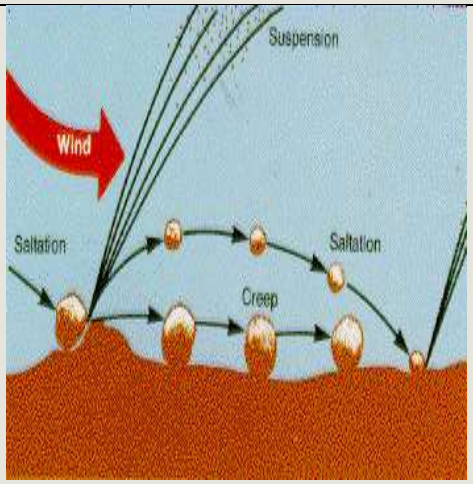
-Heavy rainfall areas
-Reduction of iron in anaerobic or water logged environment
-Forms grey-blue colour
-Gley soil for rough grazing and forestry

SOIL EROSION

- Destruction of soil cover and subsequent washing down is soil erosion
- Soil formation and erosion occur simultaneously with a balance. Sometimes, such balance is disturbed by natural or human factors, leading to greater removal of soil
    - **Human induced:** Deforestation, overgrazing, overuse of chemical fertilisers, construction, mining, defecting methods of farming
    - **Natural:** Wind, water(gullies→Badland/Ravines; Sheet erosion), glacier, rain wash, landslides, flood
- **Soil erosion involves-**
    - Detachment,
    - Movement and
    - Deposition of soil particles
- **Soil erosion-**
    - Reduces cropland productivity,
    - Pollution to adjacent watercourses, wetlands and lakes
    - Soil compaction,
    - Low organic matter,
    - Loss of soil structure,
    - Poor internal drainage,
    - Salinization and
    - Soil acidity; are other serious soil degradation conditions that can accelerate soil erosion process
- The effects of soil erosion go beyond the loss of fertile land. It has led to increased pollution and sedimentation in streams and rivers, clogging these waterways and causing declines in fish and other species. Degraded lands are also often less able to hold water, which can worsen flooding
- Half of the topsoil on the planet has been lost in the last 150 years. In addition to erosion, soil quality is affected by other aspects of agriculture. These impacts include compaction, loss of soil structure, nutrient degradation, and soil salinity. These are very real and at times severe issues (WWF)

CAUSES

Deforestation	No plant cover. No strong binding of soil. Loss of fertile soil	
Overgrazing	Natural ecosystem turned into pasture land harmful in long run. Reduces: - Ground cover, - Ability of water penetration - Survival of soil organisms to provide minerals	
Overuse of agro-chemicals	Pesticides and fertilizers increase yield but overuse changes soil composition and balance of microorganism in the soil. Stimulates growth of harmful bacteria at expense of beneficial kinds	
Water erosion	Surface water runoff occurs when there is excess of water on slope that cannot be absorbed into the soil or trapped in the surface.	
a) Sheet erosion	Occurs evenly over a uniform slope and goes unnoticed until most productive topsoil is lost. Deposition of soil is at bottom of slope or lower areas. Light coloured soil, changes in soil horizon thickness and low yield are indicators	

b) Rill erosion	Occurs when surface water runoff concentrates, forming small yet well-defined channels. These distinct soil eroded channels are called rills. Often rills are filled in as part of tillage operations	
c) Gully erosion	Advanced form of rill erosion. Surface channels are eroded to the points where they are nuisance for tillage operations. Soil becomes unfit for cultivation, thus bad lands are formed. Soil instability of gully banks, usually associated with seepage and groundwater, leads to sloughing and slumping (cave-in) of bank slopes. Gully erosion is usually a result of improper outlet design for local surface and subsurface drainage systems	
d) Bank erosion	Progressive undercutting, scouring and slumping of natural streams and constructed drainage channels which act as outlets for surface water runoff. Poor construction practices, inadequate maintenance, uncontrolled livestock and cropping too close lead to bank erosion	
Wind Erosion	Occurring in mostly flat, barren areas; dry and sandy soils or any soil area which is loose, dry and finely granulated. Soil particles move in three ways, depending on soil particle size and wind strength- **Suspension, Saltation and surface creep**. Lack of windbreaks (trees, shrubs, crop residue), lack of permanent vegetative cover, soil surface roughness due to faulty tillage practices, changes in climate cause wind erosion.	

Tillage practices	Ploughing up and down the slope is defective method of farming. Redistribution of soil through tillage causes down-slope movement of soil, causing severe loss of upper soil. Promotes water erosion	
Agriculture	Natural vegetation replaced with agricultural fields exposes topsoil and dries it out. Diversity and quantity of micro-organism to keep soil fertile may decrease and wash out important nutrients either by wind or water.	
Coastal erosion	Natural factors like cyclone, waves and tides as well as anthropogenic activities like human settlements resulted in loss of mangroves and coastal vegetation.	

IMPACT

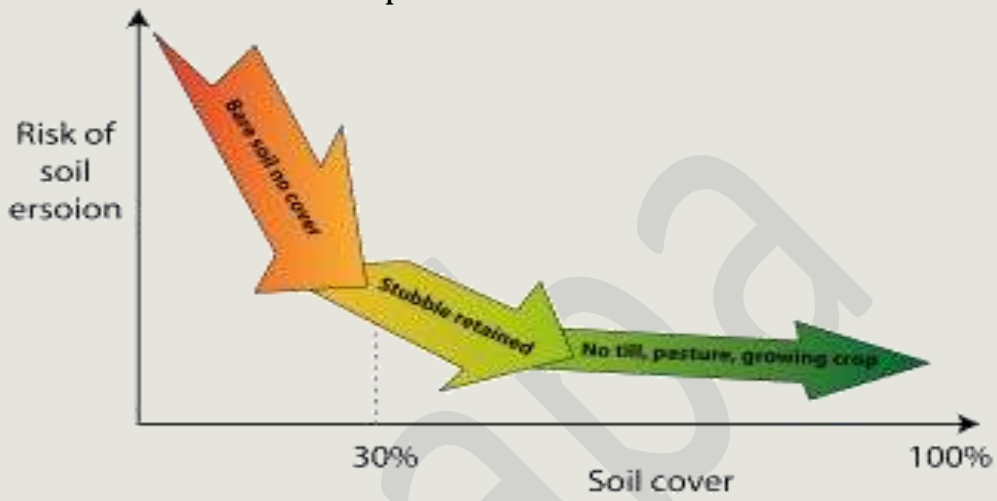
Loss of arable land	Practices used in growing crops can lead to loss of topsoil and destruction of soil characteristics that make agricultural possible	
Desertification	Characterised by draughts and arid conditions that land endures due to human exploitation of fragile ecosystem. Land degradation and loss of biodiversity occurs	

Clogged and polluted waterways	Soil eroded from land, along with pesticides and fertilizers washes into streams and waterways. This sedimentation and pollution can damage freshwater and marine resources and local communities depending on them	
Increased flooding	Land is often transformed from forests and natural landscapes such as wetlands and floodplains into crop field and pasture. The converted land soaks less water, making flooding more prominent	
Ground water level reduced	Soil reduces its water holding capacity. Less water seepage into the ground and thus depleting groundwater resources	
Siltation	Water sources get laden with soil particles eroded from land. Affects the marine ecosystem, damages the dam constructions, proliferates bank erosion and increases level of floodplain in lower areas	
Frequent landslides	Lack of vegetation cover has low water retention capacity which results in loose soil holding capacity.	

SOIL CONSERVATION

Principles behind controlling soil erosion are:

1. Use of land according to its capability
2. Protect soil surface with some cover
3. Control runoffs before it develops into erosive force



STRUCTURAL SOLUTIONS

Slopes	
Retaining walls Holds soil sliding away from structure	
Stone pitching Vegetation inter-planted between stones Generally used on steep slopes for upland paths Provides a sustainable surface that can withstand flowing water on top	

Wire netting Low netting that slows or traps run-off water and become a productive vegetative belt across degraded area.	
COASTAL AREAS—	
1. Tetra pods Dissipate force of incoming waves by making water flow **around them** rather than against them. Due to their design, they remain **stable** even under extreme climatic conditions. Together they form **interlocking and porous barrier** to dissipate waves and currents	
2. Groyne Embankment type structures Constructed transverse to river flow to protect bank by deflecting current away from bank	
3. Multi-purpose dams (Rivers) Control river floods Prevent soil erosion & generate hydroelectricity Development of irrigation Construction of canals as waterways	

NON-STRUCTURAL SOLUTIONS

Forest Protection

1. Afforestation

Establishment of forests in area where there was no forest.
Reforestation- Re-establishment of forest cover; can be natural or human induced process

2. Agro-forestry

Combines crops and trees on same land to create more diverse, productive, sustainable and healthy land-use systems

Agricultural Practices

1. Contour banks/Barriers

Contour banks intercept runoff before it concentrates and starts soil erosion

Safely channels it into stabled grassed waterways or natural depressions

2. Contour Farming/Bunding

Growing crops "on the level" across or perpendicular to a slope rather than up and down the slope

Conserves rainwater

Prevent surface erosion

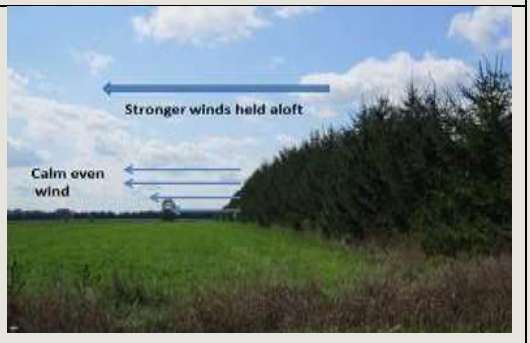
Facilitate tillage and planting operations on contour

3. Terrace Cultivation

Steps cut out on slopes

Prevents landslides and transportation of soil to lower areas

4. Strip Cropping A method of farming which involves cultivating a field partitioned into narrow strips which are alternated in a crop rotation system Helps prevent wind erosion Increases moisture retention	
5. Rock Dams Rocks are piled up to slow down the water flow Prevents gully formation and soil loss	
6. Intercropping Cultivation of two or more crops simultaneously on same field Stabilises cropping system Reduces fertilizers use Increases in yield due to exchange of nutrients among crops	
7. Mulching Protective layer of materials (grass, straws) spread on topsoil Conserves moisture Prevents weed growth Provides organic matter to soil on decomposition Increases infiltration of water	
8. Crop Rotation Oldest and effective method Involves changing the type of crop grown in one area on regular basis Heart of organic farming Includes 'rest' period before being ploughed Adds to fertility Prevents pests and diseases	

9. Relay Farming Planting of succeeding crop before harvesting the preceding crop like a relay race where crops hand over the land to next crop in quick succession. A type of double cropping	
10. Organic Farming Crop production involves no fertilizers, pesticides, genetically modified organisms, antibiotics or growth hormones Uses techniques like crop rotation, green manure, compost and biological pest control	
11. Use of bio-fertilizers Bio-fertilizers are carrier based preparations containing efficient strain of nitrogen fixing or phosphate stabilising microorganism	
12. Hollows Facilitates water infiltration on bare capped soil surfaces Traps windblown plant litter and seeds	
13. Shelter Belts Shelter belts are vegetative barriers designed to: Reduce wind speed Provide sheltered areas on leeward and windward sides of barrier	

SOIL SALINITY

Salts occur naturally within soils and water and the salt content in the soil determines its saline levels

Salinization: The process of increase of salt content in soil

Salinity observed: By spotty growth of crops and presence of white salt crusts on surface

REASONS

Natural	
Excess present of soluble salts Such as sulphates of Sodium, Calcium and Magnesium	
Low annual rainfall and **high rate of evaporation**	

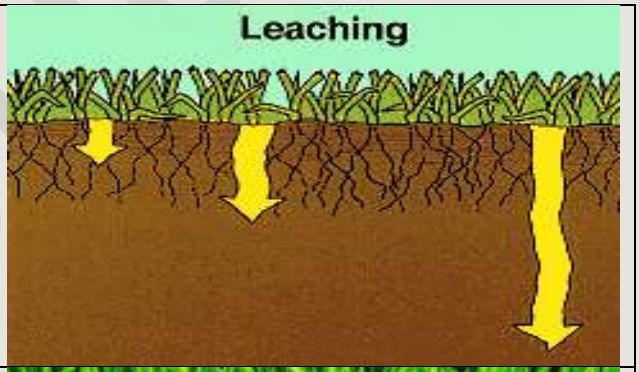
Sea water seepage- low lying areas along coast	
High water table Underground salts reach the topsoil	
Human induced	
Irrigation Inappropriate timing Inappropriate amount of water Water is consumed by crop and salts remain on top.	
Faulty agro practices Improper fertilizer management practices Wrong tillage operations (ploughing up and down)	

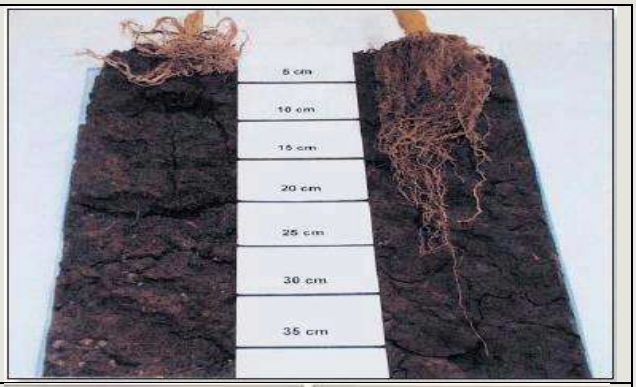
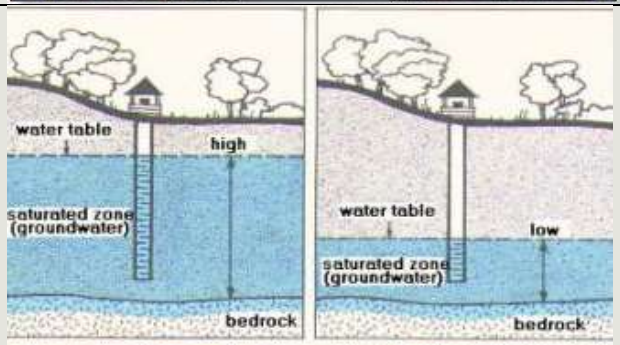
Bad drainage Drainage problems arise from **lack of large-size pores** in soils Soil is clogged by salts and thus **does not allow infiltration of runoff water**.	

IMPLICATIONS

1. Reduces intake of water by plants
2. Salts of sodium, calcium and magnesium deposit on top layer
3. Reduction in soil fertility
4. Choice of crop becomes limited
5. Quality of fodder reduced

SOLUTIONS

Leaching Additional water on soil percolates down into ground, taking salts with it; though it **shouldn't be in excess**	
Regular **vegetation canopy** and litter reduces evaporation	

Addition of **organic matter and its deep root penetration** improves soil structure and endures good drainage	
Maintaining **low water table** by not over irrigating. Usage of **artificial drainage** system, whenever required	
French drains A ditch like trench is filled with rock/gravel with pipe at bottom- Catches water runoff and directs it away from structure that can be damaged	
Scrapping Removing accumulated salts on the surface by mechanical means Helps in temporary improvement of crop growth, **but disposal of salts is a major problem**	

Flushing Washing away the accumulated salts by flushing water over the surface. The amount of salts to be flushed away is very small, hence this method doesn't have much practical significance	

Crop/Plant tolerance towards salts concentration in soil

Highly tolerant	**Moderately tolerant**		**Sensitive**	
Date palm	Wheat	Onion	Red clover	Almond
Barley	Tomato	Cucumber	Peas	Apricot
Sugarbeet	Oats	Pomegranate	Beans	Peach
Cotton	Alfalfa	Fig	Sugarcane	Orange
Asparagus	Rice	Olive	Pear	Prune
Spinach	Maize	Grape	Apple	Plum
	Flax	Potatoes		
	Carrot			

DESERTIFICATION

The United Nations Convention to Combat Desertification (UNCCD) defines the tem desertification as '**land degradation** in **arid**, **semi-arid** and **sub-humid** areas resulting from various factors including climatic variations and human activities'

Desertification is a process of land-degradation by which a region becomes progressivly drier and drier-eventually transforming into a desert.

Tibet turning into desert

Assessment report by the Chinese Academy of Sciences (CAS)—

Large parts of Tibet are turning into desert

Tibet is warming **two times faster** than the global average, and scientists predict that temperatures on the plateau will increase by up to 4.6 degrees C by the end of the century

Intensifying Water-cycle- Indicated by the shrinking glaciers, expanding lakes and increased river flows

TAKE NOTE

2,511

sq km

Area of dense forests lost in India since 2013

Source: Forest Survey of India, 2015

REASONS

Natural	
Climatic variations High and sustained temperatures lasting for months with infrequent and irregular rainfall, leads to drought with the effect that vegetation has difficulty growing	
Violent winds and heavy downpours Destroys the vegetation, which is then carried away by sudden gushes of water	
Human induced	
Over cultivation exhausts soil	

Over grazing removes vegetation cover that protects it from erosion	
Incorrect irrigation practices turns crop **salty**	
Increasing human population- Forced to **overuse** environment to fulfil needs	
Deforestation destroys the trees that bind the soil to land	

Extractive industries advances land degradation by • lowering ground water level, • disturbing land • accelerating soil erosion	

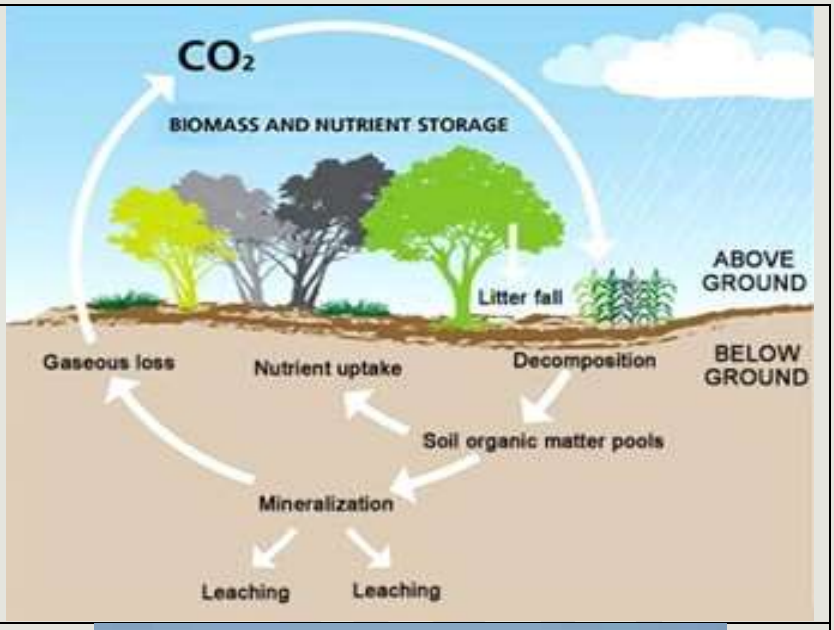
IMPLICATIONS

Deflation loss of stabilising vegetation and topsoil	
Less, irregular and unpredictable **precipitation**	

Soil salinity rise	
Reduce ability of land to support life- Affect human lives, wild species, domestic animals, agricultural crops	

SOLUTIONS

Soil conservation	

Carbon sequestration Long term storage of carbon in any form to avoid radical climate changes. Hence, lower climatic variation affecting desertification	
Check on population of animals	
Sustainable land management	
Awareness and capacity building at various levels	

Diverse crop production		
Use non-wood energy products-solar, wind, biogas		
Zero-tillage farming Method of ploughing where soil is not tilled The crop is planted directly into seedbed which has not been tilled since the harvest of previous crop		
Cultivation of trees To reclaim desert as well as to prevent any advancement		

Sand dunes stabilization Cultivation of grass on sandy soils	
Constructing windbreaks	
Root-up Green House Uses basic materials like bamboo and ropes. Polycarbonate pyramid walls, funnel made from bioplastic and storage cistern. Traps humidity from air and coverts into water through condensation Triggers dew formation in funnel and direct droplets into cistern. Thus possible to harvest dew that would otherwise be evaporated. Water can be used for irrigation as well as drinking	

SOIL POLLUTION

Soil pollution- When humans introduce harmful objects, chemicals or substances, directly or indirectly into soil in a way that causes harm to other living things or destroys soil or water ecosystems.

Soil pollutants-

- Include a large variety of contaminants or chemicals (organic and inorganic), which could be both naturally occurring in soil and man-made.
- In both cases, the main soil pollution causes are the human activities (i.e. the accumulation of those chemicals in soil at levels of health risk is due to human activities such as accidental leaks and spills, dumping, manufacturing processes, etc.).
- Accumulation due to natural processes is also possible, but it has only been recorded in few cases (such as the accumulation of higher levels of perchlorate in soil from Atacama Desert in Chile which is purely due to natural processes in arid environments)

Main reason why the soil becomes contaminated is due to the presence of ***man-made waste***. The waste produced from nature itself such as dead plants, carcasses of animals and rotten fruits and vegetables only adds to the fertility of the soil. However, human waste products are the full of **chemicals** that are not originally found in nature and lead to soil pollution.

REASONS

1. **Construction sites**- presence of various chemicals that gets mixed with soil
2. **Industrial activities**- Amount of mining and manufacturing has increased rapidly. Industrial waste (by-products of industrial activities lingers) in soil as they are not disposed of, in a safe manner
3. **Agricultural activities**- Increased use of pesticides and fertilizers has polluted the soil with chemicals—they seep into ground, mix with water and reduce soil fertility.
4. **Waste disposal**- Biological or industrial waste is not disposed in efficient manner; Land fill sites are creating soil pollution.
5. **Non-biodegradable materials**- Soil is continuously exposed to plastic which is non-biodegradable—releases toxins over period of time which harms the soil fertility.
6. **Accidental spills**- During storage or transportation, accidental oil spills occur which has the potential to harm the soil through chemicals present within it.
7. **Acid rains**- The polluted rains when mixes with soil, it dissolves important nutrients and thus, changes the structure of soil as well as reduces its productiveness.

IMPLICATIONS

1. **Health risks**- People living near polluted lands have higher incidences of small and terminal illness, children often suffer from development problems and weakened immune systems
2. **Effect on growth of plants**- Ecological balance gets affected due to widespread contamination of soil. Plant unable to adapt to changing soil structure and chemicals present within. Such widespread contamination may lead to famines in longer run.
3. **Decreased soil fertility**- The toxic chemicals present in soil decreases soil fertility and thus decrease soil yield.
4. **Toxic dusts**- Toxic dusts and foul gases emanating from land fill sites pollutes the environment and causes serious health effects on people and animals
5. **Changes in soil structure**- Death of important organisms of soil may change the soil structure.

SOLUTIONS

1. **Pollution Regulation**- Strict pollution regulation levels for industries
2. **Safe disposal**- Proper disposal of industrial and agricultural waste
3. **Waste management**- Waste management projects should be scientifically carried out
4. **Organic farming** *(Mentioned above)*
5. **Recycling**- Recycling paper, plastic and other materials reduces burden on soil
6. **Reuse**- Reusing materials instead of 'use and throw'
7. **Plantation**- Encouraging small plants plantation programmes.

The growing Waste—

Solid waste management today forms a basic public service which every citizen must have access to, for health as well as to ensure a good quality of living.

NIUA (2015) reports— Urban areas in India generate more than 100,000 MT of waste every day

Analysis of waste disposal by FICCI (2009) had shown that 14 out of 22 cities sends more than 75% of their waste to dumpsites, indicating a lack of adequate treatment and disposal facilities

Waste Management refers to:

- Recognizing the issues and policy defects
- Solution centric approach- Approaches & Technologies (ICT + Incineration)

Issues with regard to Waste management:

- Absence of segregation of waste at source
- Lack of technical expertise and appropriate institutional arrangements
- Lack of Capital & Resources
- Continuous upgradation of technology and services
- Improper collection, inadequate segregation, transportation, treatment and disposal systems
- Not-in-my-backyard (NIMBY) Syndrome
- Concept of Recycle & Reuse needs to be established

Kerala shows the way—

Focussed on alternative models of waste management:

I. **Household:** Segregate waste (Dry-Wet)→ Importance of Segregation at source

II. **Segregation at Source:**
- Helps the working of Waste-to-Energy Plant
- Reduces the cost required to attain the stringent standards for pollution control

III. **Waste: A hidden resource-** Recycle & Reuse

Waste into Wealth

Issues:

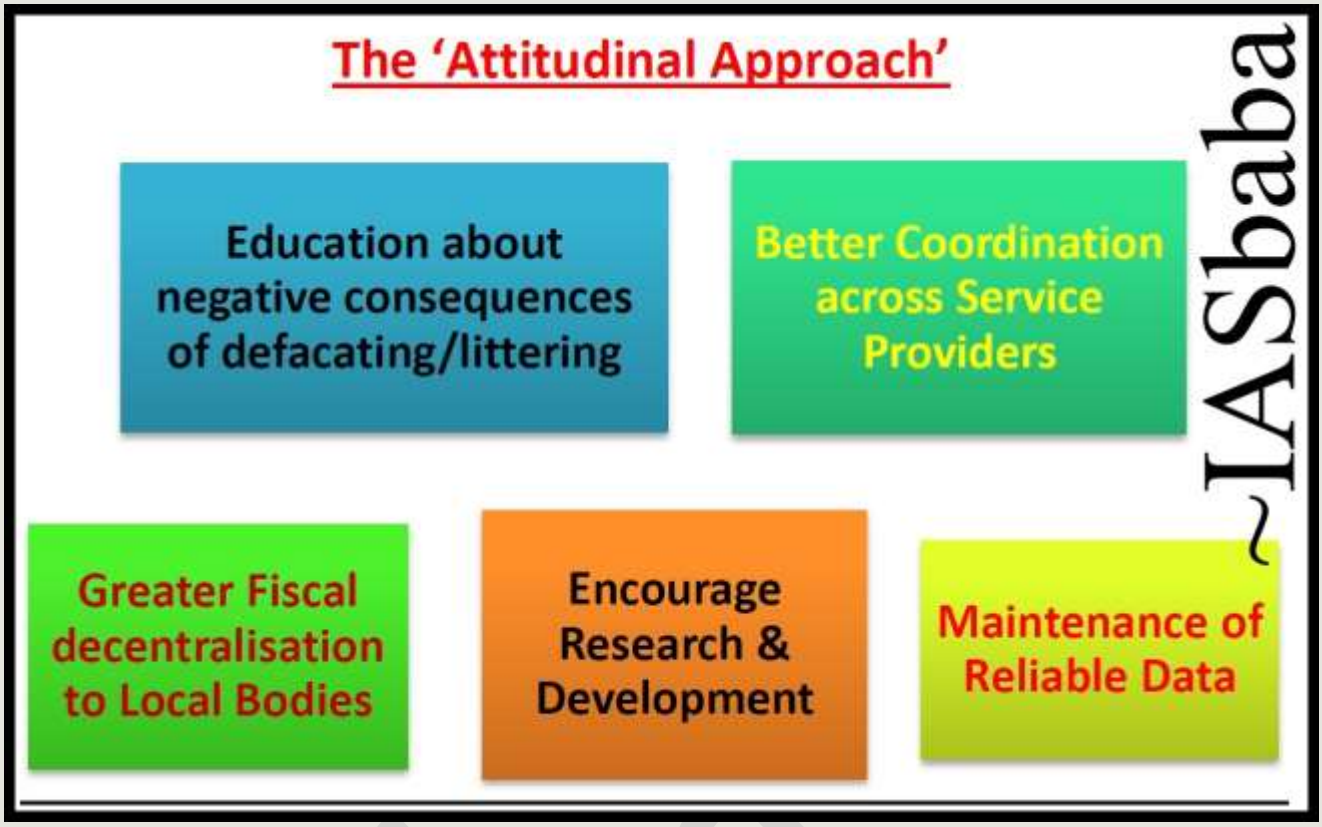
- Lack of Research & Innovation in everyday basic yet important Sciences
- Political Participation to ensure the needs of the poor to be met

Way Ahead:

- Encourage Research and Development
- Employ skills of Recycling and Reusing- Generation of 'safe' livelihood opportunities
- Incentives to informal Recycling Industry for better optimization of the inherent strengths
- A proper market for the recycled products

ICT Innovation

- Installation of tracking devices at different sanitation points— GIS location & co-ordinates of bins and dumping sites
- Participation & discussion on sanitation-related issues
- Training for segregation and basic household Recycling & Reusing
- **Elimination of Human factor:** CCTV Cameras, GPS enabled vehicles, automatic generation of status of collection and segregation of wastes, online monitoring and interactive systems→ ensure real time monitoring of the vehicles plying to improve their performances multi-fold
- **Availability of Data-**
  - Involvement of local people- Participation + Awareness
  - Development of thematic digital maps – Updates on data
  - Cutting down on the 'Human Element' & Focus on 'Automated Systems'
  - Monitoring/Evaluation of Performance + Real time monitoring of Vehicle productivity
  - Grievances Redressal Mechanism



THE CURIOUS CASE OF 'TOXIC TIME BOMB'

United Nations Environment Programme (UNEP)

40 million tonnes

Electronic waste produced around the world finds its way illegally to Asia and Africa every year

Primary Origin of E-waste

- The European Union
- The U.S.
- Japan

DESTINATION

- China,
- India,
- Malaysia
- Pakistan
- Africa (Ghana + Nigeria)

INCINERATION

Waste treatment process involving the combustion of organic substances found in the waste materials

Reduction of solid mass— around **95%**

Conversion: Waste → Ash + Flue Gas + Heat

Heat: Used to generate electric power

Ash + Flue Gas: Undergoes initial treatment (eradication of harmful pollutants)

Concerns regarding the technology— INCINERATION

Adverse Health Effect: **Emission of Fly ash, Dioxin, etc.**

Emission of Heavy metals: **Asvanadium + Manganese + Chromium + Nickel + Arsenic + Mercury + Lead + Cadmium**

Recycling Industry: **Destruction of the reusable & recyclable waste**

Waste cannot be put directly into the Incinerator, unless specifically

Only unrecyclable products to be put in

CPCB + MoEF— Prescribe specific guidelines for emissions from incinerators

1st effort: Composting of wet waste

2nd: RDF being used as power generation fuel

The impediments....

...to formalise the informal e-waste sector

The E-Waste (Mgmnt and Handling) Rules, 2011—Producers/manufacturers of electrical and electronic equipment (EEE) and Waste EEE (WEEE) have to set up authorised collection centres to ensure maximum collection of e-waste, under the Extended Producer Responsibility

→ Ensure environmentally sound disposal of the collected waste

But they fail...

- Lack of collection centres
- Non-recognition of the vast informal sector, who can become the last mile connect to collect e-waste from individual households
- Absence of mass awareness programmes on the need to manage discarded e-waste
- Lack of authorised recyclers who undertake end-to-end recycling

Refuse-derived Fuel (RDF)

Called: Solid recovered fuel/specified recovered fuel (SRF)

Produced: Shredding + Dehydrating solid waste with Waste converter technology

Process:

- Shredding
- Size screening
- Magnetic Separation
- Coarse Shredding
- Refining Separation

Application:

- Electricity generation
- Cement Industry
- Fed into Plasma arc gasification modules-pyrolysis plants