POLLUTION

Definition – Pollution is the contamination of the environment by addition of impurities called pollutants in such amount to constitute danger to health or natural resources.

Pollutants are various noxious chemicals and refuse materials which damage the purity of water, soil and even the atmosphere.

Pollutants produced as a result of industrial and agricultural activities, which are man made in origin while those produced as a result of natural processes like volcanic eruptions and excretions are natural pollutants.

Many pollutants cannot be broken down into simple harmless substances by an known biological process e.g. plastics, glass tins, cans and metal scraps and are referred to as **Non- biodegradable pollutants**. All pollutants that can be recycled are called **Biodegradable pollutants.** They include all products of living organism like excreta, dead, plants and animals which are removed by cycles that operate in nature.

Some pollutants like salts of heavy metals (Mercury & Zink, certain insecticides and pesticides are released in small concentrations into the environment; they tend to accumulate in living organism and eventually reach toxic level.

The parts of the environment that can be polluted are water, soil and air.

Air pollution

Air pollution results largely as by – product of combustion of coal, oils and natural gases, the chief pollutants include oxides of carbon sulphur and nitrogen, hydrocarbons, particulate matter (dust), various photochemical substances, noise.

Type	Names and nature of pollutant	Source	Effects / problems
Air	Carbon monoxide (Co)	Incomplete burning of fuels, the motor exhaust is the main source of this pollutant e.g. air in big towns like Lagos, PH, Kano	- Poisonous to man because it combines readily with haemoglobin in the blood - This reduces the O2 carrying capacity of blood the respiration process sin affected – causing harmful effects to the body metabolism /suffocation.
	Carbon dioxide (CO_2)	Produced when fuels and other carbon compounds are burnt in plenty air – decay and respiration	When built up in the atmosphere lead to warning of earths atmosphere resulting in the melting of the polar ice caps with a related

			rise in sea level. This affect crops adversely.
	Sulphur dioxide SO_2	Electric power stations and factories that use coal as fuel. Low grade petroleum fuels (common at Ajaokuta, Enugu Coal mineral	- Dissolves reading in moisture to form acid which irritates and damages lining of the eyes clungs. - Reduces growth of vegetation - Dissolves metallic structures in buildings
	Smog	Combination of smoke chemical pollutants and water droplets	- Reduces visibility, irritates the eyes, nose and air passages - Damages vegetation
	Dust	Mining, industrial processes and quarries generation	- May contain bacteria/germ/spores which may trigger off disorders cause disease when inhaled.
			- May contain fur / pollen etc which may trigger off disorders e.g. asthmatic attack. - In water reduce quality of water for

			drinking. - May cause diseases - reduces visibility - May cause injury to the eye - Reacts with ozone converting it molecules O2 leading to the depletion of ozone layer that serves as a shield against ultra violet radiation. This leads to severe sun burn, cancer, wrinkle on the skin lower resistance to infections disease . - Interferes with photosynthesis.
	Noise	Noise environment - impairment of the air by noise form engineer, big amplifiers airplanes etc.	- Temporary and permanent defines - Temporary and permanent deafness - Irritation / emotional disturbance/ short temper

			- Anxiety/ fright - High blood pressure

Other air pollutants include radioactive rays, particulate matter

Control of air pollution

Use of lead free petrol / fuel

- Strict regulation of exhaust emission of cars
- Building tall chimneys to release smoke high into the air.
- Passing waste gases and dust from industries through filters to remove pollutants before they are discharged into the air.

Water Pollution

Water pollution is caused by domestic refuse and sewage, industrial wastes, agricultural wastes crude oil spillages and heat. Only a few organisms live in polluted water. Most fishes will die. This is what Niger delta people are talking concerning their environment.

The presence and absence of certain types of organism indicate whether the water is polluted or not.

The biochemical oxygen demand [BOD] is used to test the degree of water pollution. This measures the amount of O2 bacteria need to breakdown the organic matter in a given water sample in a fixed period of time. Higher BOD indicates greater degree of pollution.

Water	Sewage biodegradable	Homes, city,	- Makes water

		sewage systems, slaughter, hospitals	undrinkable - Smells fouls due to high concern H2S from putrefaction - May contain pathogenic orgs. Causes diseases. - Growth of undesirable water plants.
	Non-biodegradable e.g pollutants phosphates, battery acids fertilizers pesticides insecticides	Detergents, metal industries masses from agric farms	- Poisoning / cancer - Renders water, unfit for drinking - Eutrophication - May cause death
	Crude oil	Oil well spillage accidental discharge by ships in the high seas	- makes water unfit drinking - kills aquatic organism and some birds
	Cassava peels	Soaking cassava in bodies of water	Produce poisonous acid which makes water unfit for drinking (cyanide) - Peels may blocks water ways
	Cleared vegetation	From faming activities	They decay and cause shortage of O2 in water

			body.
	Heat	Some machines in the factory - some use water bodies as coolants	It cause temperature of water to increase which reduces the amount O2 that will dissolve in water. This makes aquatic organisation to suffer and may move away.

Control of water pollution

(1) Sewage should be treated before being discharged into/ the rivers

(2) Industrial wastes should be recycled and its chemical content removed before being poured small amount at a line into the water body.

(3) Prompt clean-up measures to be adopted in care of oil spillage.

(4) Moderate application of fertilizers with ridges running in such a way as to check washing off of fertilizers by surface floods.

Land pollution

Land pollution also called soil pollution is caused by (1) erosion brought about by Agricultural practices, mining activities and deforestation (2) indiscriminate dumping of solid wastes.

Type	**Nature/name**	**Source**	**Problems/ effects**
Land	Refuse	Industries, market institution offices	- provide breeding sites for insects and animals. It

		& homes	harbors genus ugly site./ offensive odour.
	Poiosonous chemicals	Factories and laboratories	- Harmful to man when absorbed - Cause radioactivity which may lead to gene altetation - May not support vegetation again - May dissolve in ground water is may find its way to drinking water bodies
	Crude oil	Known source	Burns the vegetation renders soil infertile – kills usful orgs in the soil - May leak to wells and other bodies of water thereby contaminating them.

Control of land pollution

(1) Recycling of used metal and other materials

(2) Plastic and other combustible materials can be burnt under controlled conditions/ incinerators.

- Proper disposal of refused treatment of refuse
- Government should enact laws which of against oil pollution.

Problems of pollution / economic importance

(1) Pollution disturbs the delicate balance of the ecosystem.

(2) It makes the non-living environment undesirable or unfit for life.

(3) It threatens the health and existence of living organisation including man.

(4) It constitute a major problem on conservation of natural resources.

Past questions/ evaluation

- Nigerian conservation foundation
- Federal environmental protection agency (FEPA)
- Forestry and fisheries division of federal and state ministries of Agric and natural resources. .
- Games reserve authorities e.g. Yankari Game Reserve in Bauchi, Borgu Games reserve in kwara, Okomu sanctuary in Edo, Shasha River in Ogun State; Omo Forest, Mamu River in Anambra; Awba Hills; Sapobu Forest – Edo; Olomu forest Reserve Kwara Apoje Forest Reserve – Ogun ; Ijero forest reserve Ekiti;
- Zoological gardens e.g. U.T & O.A.U.
- River basin Development authority
- International whaling commission
- World wildlife fund

2. Conservation education
3. conservation laws

Questions

1a. Define the term conservation

b. State three reasons for conservation

c. List four methods of conserving each of the following
   (i) Water (ii) wildlife (iii) forest

d. Mention three forest or games reserve in Nigeria. List 3 agencies that are responsible for the conservation of natural resources. May./ June 1999 and Nov. Dec. 2000.

2. Give B ways by which soil can be conserved in Nigeria May/June 1998.

3. A man carrying a bag of leopard skin was arrested by immigration officers at eth airport, which natural resources has the man misused and how can this resources be preserved (self made).

The quantity mined is regulated as well.

Benefits

- Produces continues source of energy e.g coal for cooking and driving of locomotives , petrol for vehicles
- Provide raw materials for industries
- Earns foreign exchange when exported

PROBLEMS AND DIFFICULTIES OF CONSERVATION

- Limited sources of energy. Coal, cooking gas and electricity is available to a few, so majority resort to destruction of forests as they fetch firewood.
- Bush burning is an easier way to clear forest by lazy farmers. They also burn to kill animals which may lead to death of animals in large scale and extinction of some.

- Forests are cleared and fields ploughed to make land available for buildings, industries and agric development. It will be outrageous to stop development in preference to forest preservation
- Over fishing.
- Most fishermen are illiterate migrates and cannot be easily assembled to educate them on after effect of over fishing and chemicals poured into water bodies
- Over grazing by animals on land make vegetation scanty.
- These animals illegal killing of animas for commercial purposes e.g. elephants, rhinoceros.
- Inadequate guards
- Insufficient money and equipment for playing fields ways of ensuring conservation.
- Agencies are established to conserve natural resources.

They are: conservation of forests.

Forests are getting out of our prevailing biomes due to the indiscriminate felling of trees for several uses. To prevent loss of forest, we should establish laws that regulate the felling of trees. If tree must be felled, permission must be obtained from the ministry of agriculture and natural resources.

- Forest guards should guard and protect the forest against misuse
- Planting of new trees (afforestation)
- Forest reserves must be acquired by the government
- Burning of bush/ forests is forbidden
- cost of coal, cooking gas and electricity shoud be brought to affordable prices to prevent excessive use of firewood.

Benefits.

- Ensure preservation and continuous availability of timber and other economic trees.
- Pressure fertility of topsoil by preventing soil erosion
- Prevent desert encroachment (desertification)
- Preserve natura habitat of animals, hence ensure availability of animal protein (meat) for man.
- Acts as wind brakes to strong winds which can destroy man's properties.
- Some plants are used medicine, so their conservation will ensure continuous availability and promote good health.
- Trees purify the atmosphere by absorbing Co_2 from the atmosphere and replacing with O_2.
- Revenue is generated for government by granting licenses to timber dealers and hunters.

Conservation of minerals

They are irreplaceable, so careful management is needed to avoid running short of them. Only federal government agencies and few individuals / private companies are allowed to mine

Conservation of water

Very essential for life. Ways of conserving water are

- Repairing burst water pipes immediately to prevent wastage.
- Recycling of used water after treatment.
- Planting of tree to reduce evaporation of soil water
- Dammign of rivers to form lakes for good management

- Storing water in tanks, reservoirs etc.
- Locking of taps when not in use.
- Avoid dumping of poisonous chemicals in water bodies

Benefits

- Ensures good water supply for agriculture.
- Ensure preservation of natural habitats for fish and other aquatic animals so source of protein is ensured for man.
- Provides source of hydroelectric power
- Provide medium of transportation
- Water for domestic use
- Recreation like swimming

Conservation of wild life e.g. fish, frogs, reptiles, birds e.t.c.

Ways:

- Discouraging indiscriminate killing of wildlife (proachin)
- Establishment of games reserve
- Avoid poursing of poisonous substances in water bodies
- Avoiding the killing of young animals.
- Deforestation should be discouraged.

Benefits:

- Continuous sources of food
- Continuous source of raw materials like fur, hide and ksin
- Availability for study in their own natural environment
- Provides recreation for man e.g. pleasure is derived from hunting and fishing

CONSERVATION OF NATURAL RESOURCES

This is the wise use and safe keeping of natural resources for the good of mankind, to ensure their continuous availability and preserve original nature of the environment.

Natural resources are useful things provided by nature e.g soil, water, wildlife, forest, minerals etc. it can be classified into 2 categories.

Replaceable (Renewable) resources i.e those that cannot be replaced when initial stock is used up e.g petroleum, coal, gold diamond etc. these must be carefully managed to avoid their shortage until substitutes are found.

Conservation of soil

Soil needs to be conserved to avoid shortage of food and famine

Practices to help conserve soil were studied under soil (i.e ways of maintaining soil fertility edaphic factors in ecology). They are refers to Edphin factor. Avoid bush burning manuring cover cropping avoid erosion; shifting cultivation, crop rotation mulching etc.

Benefits of soil conservation

- Ensures preservation of soil nutrients there increase food for man
- provides healthy habitats for soil organisms which will in turn fertilize and derate the soil
- Prevents desertification
- Provides raw materials for some industries e.g clay for ceramic and brick industries.

A functioning Ecosystem used both energy and the inorganic nutrient. Except for the radiant energy used in photosynthesis, energy does not move through the biosphere in pure form.

It flows through the food claim unidirectional and is coupled with matter in the form of chemical bond.

The matter remains within the Biosphere, being constantly recycled between living and non living components.

The pathway that the matters follow through the non living environment through and the food claims of the Biotive community and back to the Abiotic (non living) environments form close loops called BIOGEOCHEMICAL CYCLES (Carbon, Oxygen, Nitrogen, Water cycle)

Once energy is used it is lost to the ecosystem energy cannot be recycled but the chemical nutrients can be used over and over again several nutrients are essentially important to the functioning of living things. Some of these nutrients include nitrogen, carbon, oxygen, various minerals salts like suphlur, phosphorus and water are important substances which aer necessary for the maintenance of life.

- All these substances are present in earth's environment informs which can be used directly or indirectly by living organism.
- The activities of various organisms contribute to the circulation of these substances in nature thus making tehm available to all living things.

THE CARBON CYCLE

- Carbon is continuous being added and removed from the atmosphere.
- Carbon is an element which can exist in different forms as solid in charcoal, cokes soot and diamonds.
- Carbon can occur as common gas e.g. Co_2

- Carbon occur in inorganic salts e.g. carbonates and bicarbonates of metals.
- Occur in organic compounds like carbohydrates and fats.
- Most Co2 dissolve in sea – lies sea and other water bodies act as reservoir for carbon.
- Green points are continuous by removing carbon Iv oxide from the atmosphere through the process of photosynthesis.
- The carbon of the CO2 is built into sugars and other complex organic compounds in plant tissues.
- When these plants are eaten by animals, the plant material is digested, absorbed and sugar is built into tissues.
- Respiration decay and combustion usually due to man's activities are the main process which return carbon to the atmosphere as carbon IV oxide that is
    i. Plants and animals respire all the time and when they do this, sugars are broken down in this process to literate Co_2 and water to the atmosphere.
    ii. When plants and animals die, decomposers feed on their remains and bring about decay. This sets free the carbon IV oxide from the complex carbon compounds that make their tissues and CO_2 is returned to the atmosphere.
    iii. Coal is from partly decayed remains of ancient plants that were buried million years ago.
    iv. Petroleum and natural gas were formed from decayed calcareous remains of tiny marine animals which accumulated on beds of ancient seas.

v. When fuels like wood, caols, petroleum's and natural gas are burnt, the carbon in them is oxidized to CO2.

IMPORTANCE OF CARBON

1. Component of all living organisms – All living thigns are made up of various elements most of which is carbon.
2. Components of food – all foods manufactured by plants and first formed from carbon compounds. Any substance that contain carbon is said to be organic "Hence all organism are organic in nature.

THE CARBON CYCLE

OXYGEN CYCLE

- This cycle is carbon in reverse
- 20-21% of atmosphere air is oxygen
- food is burnt in the presence of oxygen
- oxygen is liberated into the atmosphere during photosynthesis and removed fro it during process like respiration, decay and combustion

THE OXYGEN CYCLE

NITROGEN CYCLE

This involves the series of reactions by which nitrogenous compounds are soil fro the soil and replenished by natural.

- The element nitrogen is crucial to life because it is component of protein and nucleic acid.

- The reservoir of nitrogen is the atmosphere
- Nitrogen is biologically active and cannot be used in this form by plans and animals.
- Plants cannot absorb atmospheric nitrogen they obtain all the nitrogen they need for metabolism from nitrogen compounds in the soil in form of nitrates.

WAYS BY WHICH NITROGEN IS LOST

1. Through leaching - by the action of rain .
2. From cultivated soil as component of harvested crop, since nitrogen is essential to plants life and is continuous being lost from the soil, there most be a means by which nature replenishes the soil with nitrogen compound.

NITROGEN ENTERS THE CHEMISTRY OF LFIE PROCESS THROUGH

1. THUNDER STORM- During which nitrogen combines with oxygen to form gaseous oxides of nitrogen and this combines with form nitrous acids nitrous acids in soil plus mineral salts form nitrages.
2. NITROGEN FIXATION – Non symbiotic microbes symbiotic microbe

   - Certain bacteria such as azotobacter, clostridium, nostoc (blue green algae0 and rhizobium absorb nitrogen from atmsopehre and converts its to nitrogenous compounds such as protein.

3. PURE FACTION – By the action of bactaries and fungi, living plants and anies is add nitrogen to soil by giving out nitrogenous compounds as excretory roducts.
4. NITRIFICATION – Is carried out by nitrifying bacteria) nitosomonas, nitrobacter). They convert ammonia to nitrate.
    i. NItrosomona converts ammonia to nitrite and
    ii. Nitrobacter convers nitrite to nitrate
5. DENITRIFICATION – This process reduces the quantity of soil nitrates to gaseous nitrogen by deifying bacteria – Thiobacillus denitrifians, Escherichia coli.

- The nitrogen so formed escapes into the air where it becomes atmospheric nitrogen.

THE NITROGEN CYCLE

WATER CYCLE

- The most important of the biological processes.
- It is the continous movement of water from the earth to the atmosphere by evaporation and back from atmosphere to the earth by precipitation.
- Solar energy cause water to evaporate from the hydrosphere into the atmosphere.
- When water vaoru cools, it condense. A high attitude the condensed water forms clouds.
- The clouds precipitate as rain returning to the hydrosphere.
- Autotrophic and saprophytic activities micro organism
- Photosynthetic activities of green plants
- Respiratory and excretory activities of plants and animals.
- Various activities of man in agricultural and industrial fields.
- Non biological activities such as lightening and physical and chemical weethering of rocks also contribute to the supply of minerals to the soil.
- When main make use of the land for cultivation, chemical fertilizers aer used to replenish the minerals content of soil.

THE WATER CYCLE

- Water cycle is described as the driver of nature because.
  i. It is vital to life
  ii. It determines the structure and function of an ecosystem.

CONTRIBUTION OF PLANTS AND ANIMALS TO WATER CYCLE

- Aquatic organisms take water from their environment and excrete some back – when they die, the remaining water returns during decay.
- Terrestrial plants absorb water from the soil, some of the water is evaporated during transpiration.

- Terrestrial animal drink water, some of the water is returned to the atmosphere through excretion, recreation and perspiration (seating).
- The remaining water is returned to the hydrosphere by decay.
- Water circulates mainly within the abiotic environment, only a small proportion recycles through the living organisms.

IMPORTANCE OF WATER

- Compound of protoplasm – protoplasm contains a high percentage of water.
- Maintenance of protoplasm – water is essential for maintaining the protoplasm in healthy condition
- Photosynthesis – green plants which are primary producers of food use water for their photosynthetic activities.
- Ultimately, all life deepends on photosynthesis.

SOURCES OF WATER

i. Water in soil, rivers, lakes
ii. Water in glaciers and polar ice,
iii. Water in the amtsoheree in form of water vapour
iv. water in living orgnaisms.

SULPHUR CYCLE

- Sulphur being a very important nutrient in plants and animals nutrient undergoes a continuous cycle in nature.

- Sulphur is an important component of amino acids, protein, glycosides and enzymes.
- Plants absorb sulphrur from soil and water in form of sulphates. These absorbed sulphates are converted by bacteria like CHLOROBIUM and CHROMATIUM to sulphur salts.
- The sulphur salts present in plants are ingested by animals when they feed on plants.
- Excreton and death of animals and decaying remains of plants is converted by putrefying microbes present in the soil to sulphats.
- Also sulphates present in the soil and water can be converted to sulphide during reduction.
- Sulphur oxidation bacteria ions, which in turn is converted back to sulphate by sulphur oxidation bacteria such as THIOBACCILUS.

Sulphur is necessary for vital development and performance of plants.

CONTRIBUTOINS OF LIVING ORGANISM TO CIRCULATION OF ESSENTIAL SUBSTANCES

- The balanced activities of micro organism, green plants and animals help maintain all the cycles.

THE SULPHUR CYCLE

Question

1a. Make a diagram to illustrate the water cycle in nature. NOV/Dec. 2003 (WAEC)

b. What is the important of water to living things>

c. What are the sources of water.

2a. Name the gases of the atmosphere which are used directly by (a) plants (b) animals

b. Why is nitrogen important to flowering plants and how is made available?

c. Draw the carbon cycle?

FOOD PRODUCTION, FOOD SHORTAGE WAYS OF IMPROVING CROP – YIELD

Food and its availability are important factors in the total biology of living things. The heath, growth reproduction (general well being) of an organism is affected by the amount of food available to it. As a result of this, man has to produce enough food for himself as well as for economic purpose,. He also has to look for ways to improve his crop yield and storage of the foods.

FACTORS AFFECTING FOOD/CROP PRODUCTION

The environmental factors are

1. Climatic factors which include
   i. Rainfall ii. Temperature iii. Light iv. Humidity
2. Soil factors
3. Topography
4. Biotic factors
5. Economic factors

CLIMATIC FACTORS

i. **Rainfall**

- Each crop needs a definite or optimal amount of rain for proper growth.
- If this is not available during the crops growing season, it will not grow well e.g. ceral crops like maize, millet, guinea, corn do not need as much water as rice and sugar cane.
- The quantity and distribution of rain also determines the soil water content, kinds of vegetation and distribution of crops.

TEMPERATURE

Each crop gross well within a range of temperature known as the optimum temperature above or below which biological activities are slowed down leading to a reduction in crop production.

HUMIDITY

When relative humidity is low, there is a high rate of transpiration of crop plants.

A plant will grow well only if the rate of transpiration is balanced with its supply of water.

LIGHT

Green plant need light to photosynthesize. Some plants need a high intensity of light to do well while some need a short duration of light. The duration and light. Intensity determine the type of crops that will grow in a particular area hence the availability of such crops in the area.

SOIL FACTORS

For crops to grow well, the soil in which they grow must have good structure, texture and be well aerated have a good moisture content and a high degree of fertility.

These factors determines the kind of crop which could grow on the soil hence the soil distribution of crops.

TOPOGRAPHY

Some crops grow better on a gentle sloe thn a flat valley.

Topography will affect the type of cultivation and depth of soil and consequently the kind of crops that can be cultivated .

BIOTIC FACTORS

Plant diseases, animal and insect pests determine the success or failure on the growing of crops in any particular area.

ECONOMIC FACTOR

Whenever there is a greater demand for a particular crop farmers tend to concentrate on that production of that crop.

- Such crops may be grown in places where they cannot thrive properly just because of their economic value.
- Farmers also grow crops that are cheaper to produce.

Ways of improving crop yield /increasing food producton

1. Using fertilizers of manure extensively to raise the nutrient status of the soil and ensure high crop yield.
2. Development and use of high yielding varieties of crops.
3. Pest and disease control
4. Use of improved tools and equipment for farming and fishing.
5. Weed control measures – wee dare plants growing where they are not wanted and competing with planted crops for space and nutrients. They lower or cause poor crop yield. They can be controlled by physical, biological and chemical methods.
6. Adequate tillage practice – good tillage practice resuts in godo seed emergence, root development and prevention of destruction of soil structure and erosion.

7. Adequate water supply – insufficient rainfall can be supplemented with irrigation.
8. Providing a balanced and enriched diet for animals and plants under cultivation.
9. Crop rotation- This is a system of cropping whereby crops are planted on the same piece of ladn with each crop following the other in a definite sequence during the same farming season. The piece of land may be divided into five plots and different crops planted on these plot every yer in a definite order. Ensure that corps of the same family are not allowed to follow each other in the sequence. Deep rooted crops should follow shallow rooted crops and leguminous crop should be planted on the fallow plot in the sequence.

Causes of food wastage

1. Lack of efficient storage facilities due to tropical conditions of high temperature and humidity most agric products e.g. grains, fruits, vegetables, cannot be stored for a long time. Modern storage facilities like silos and cold store are lacking so the products get spoiled
2. Pest infestation pests are living things which do physical damage to crops. Pests cause wastage in store and in the field e.g. yams and cassava tubers are eatn by giant bush rats. Grains are destroyed by weevils.
3. Inadequate transportation

   Crops may deteriorate when not transported from farms to the markets or urban centers time after harvest. Some of the products go bad before getting to its destination.

4. Late harvesting and bad harvesting techniques cereal crops e.g. rice, maize, guinea corn are not usually harvested immediately after maturity this makes them open to pest infestation. Due to poor harvesting tools crop productions like yam tubers are destroyed.
5. Processing of agriuctlural products part of food is wasted during the process of converting them from one form to another e.g. process garri from cassava tubres.

Causes of food shortage

1. Over population
2. Use of low yielding seed
3. Infertility of sol
4. Unavailability of good fertilizers
5. Lack of irrigation facilities
6. Plant diseases
7. Lack of interest in farming by young generation.
8. Poor transportation of agricultural products.
9. Poor methods of preserving and storing food.
10. Lack of crop insurance and credit facilities

Effects of food shortage

- Leads to malnutrition among organisms . this makes them week, inactive and reduces their reproductive capacity.
- The entire food chain and food web is dust disrupted which ultimately affect the nutrient cycle in nature.
- Food shortage also affect population size by

a. Emigration i.e the departure of individual from a population leading to a drastic reduction in the size of the populaton.
b. Competition struggle for resources (food). This result in exclusive of extinction of some weaker individuals leading to survival fo the fittest. Ths also leads to a reduction in population size.

   Except in omnivorous animals which feed on a variety of food materials. They are adapted to situation of scarcity by feeding on what is available and their population size tends to remain stable.
c. Increase in mortality rate e.g. death rate leading to decrese in population size.
d. Cannibalism - It is the eating of one another on the habitat in order to survive. This reduces population.
e. Loss of weight – There is loss of weight by individuals which brings about low energy reduction in the resistance of organisms to infection.
f. Diseases- There is malnutrition due to shortage of food which result in deficiency diseases and reduction in the resistance of organisms to infection etc
g. Famine – little food is available to go round the population thereby resulting in severe famine

Questions

JUN 1988

1. What are the effects of food shortage on a population
2. Describe two method each for

h. Improving crop yield
i. Preserving and storing food

JUNE 1992.

1. State three causes of food shortage
2. Mention six ways by which – the government is contributing towards self sufficient in food production.

Answer to Q 2

i. Provision of land for agriculture

ii. Provision of improved seeds, cuttings and seedings to farmers.

iii. Research into proper method of storage of crops

iv. Provision of agricultural education to farmers through the extension workers or agents.

v. Granting of interest free or soft loans to farmers as a way o encouragement.

vi. Provision of fertilized, herbicides, pesticides, vaccines, fungicides and drugs to farmers at subsidized rate.

FOOD PRESERVATION AND STORAGE

Introduction

Causes of food waste a lack of efficient storage facilities

Preservation of food involves prevention of food from spoilage. Storage means holding food till consumption time. It could be for a long or short period, storage also prevent the food from spoilage.

Spoilage of food is usually due to

- loss of water
- chemical change result of oxidation and enzymes action
- growth of macro organism e.g. bacteria or fungi which causes decomposition.

METHODS OF PRESERVING FOOD

There are two groups of methods

- Traditional i.e drying, smoking, siding fermenting etc.
- Modern i.e refrigerating, freezing,, caning use of chemicals etc.

TRADITIONAL

1) DRYING:- This is done by spreading the food items in the sun. moern method use hot air direct heal and vacuum to dry food. Drying concentrate the nutrients in food and reduces its water content, this stops the activities of micro organism, because they require water to grow it also reduce the size and mass of the food making it easier for packaging and transportation e.g. groundnut, meal, fish, cassava, yam chips plantain chips and vegetables.
2) SMOKING:- This also reduces the water content of the food. Microbes on the outside of the food nutrient are killed by

poisonous. Substances such as phenol and carbon in the smokes with high temperature which increases the cosmotic pressure of the food. The food stays good as long as the outer surface is not damaged, after wards e.g. meat, fish, tobacco.

3) SALTING:- This raises the osmotic concentration of the food to a level which microbes can not tolerate and so ther growth stops e.g. meat fish e.t.c. sugar has same effect hence jams, and jellies are self preserving combination of salting, smoking and drying is called curing e.g. in meal. (Ham and Bacon).

4) FERMENTATOIN :- It is carried out by microbes under special condition, hence certain substances in food undergo changes which affect its flavour, odour and texture. This method is often combined with other methods like salting e..g in fruits and vegetable.

5) HIGH TEMPERATURE TRATMENT:- Like heating boiling, frying and roasting can also be used to preserve some food items for sometime as they kill microbes e.g. in meat, fish, soup etc.

MODERN METHODS

1) LOW TEMPERATURE PRESERVATION

a) REFRIGERATION (Cold storage):- The food is cooled below 4^0C. spoilage is slowed down but not prevented as microbes cannot multiply at low temperature e.g. fruits, butter cheese, egg, vegetables etc.

b) FREEZING:- The food is kept at temperature below – 18^0C. This preventing the growth of microbes and greatly slowing down

chemical changes. Such food can be kept for longer time that in refrigeration e.g. meat, fish,

c) FREEZE DRYING:- In this method the food is first frozen rapidly unclean vacuum pressure, then heated carefully so that the ice crystals sublime and evaporate off

2) CANNING:- Air is removed before the food is sealed in air tight containers. The containers are then heated to a high temperature for a given period of time before they are cooled. It eliminates oxygen which could quicken respiration, kill the microbes and keeps away air from the food, preventing any chemical changes e.g. fruts, meat, fish, beans. Bottling works under the same principles.

3) PASTURIZATOIN:- This involves heating milk to 72^0C for about 15 sec and cooling rapidly. This destroys mot of the microbes in milk allowing it to last for a longer time.

4) USE OF CHEMICALS/VINEAGER (PRICKLING):- Vinegar is acetic acid it is used to prickle vegetables. It gives a sour taste to the preserved food. Growth of mciro – organisms is slowed down by the acidic medium of the food e.g. cake, vegetable.

5) IRRADIATOIN:- This is the process of subjecting food to high energy radiation e.g. ultra violet rays. The rays prevent the spoilage of the food by stopping the growth of microbe and parasites and so can be used to sterile food items before packaging e.g. seeds, fruits, juice, ham (Treated pork).

METHODS OF STORING FOOD

These include silos, cribs, cold rooms, barns, underground trenches or pits, bag/sacks baskets etc.

1) SIlOS:- They are tall around looking tower made of aluminum or other metals. It is acid tight and the itms are protected from insects and rodents. Grains should be properly dried before they are kept in silos to prevent mould e.g. mage, rice, hlled guinea corn. Silos is a modern storage system.
2) CRIBSES:- They consist of side pole covered with wire mesh or split Bamboo. The floor is raised from the ground while the top is roofed. It is used to store grains e.g. unshed
3) maize cobs that are de husked. It protects grains from rodent and birds and keeps them from spoiling for a long time. It does hot however, product grains from weevils.
4) BARNS:- This involves tying yam tubers with twins to a small vertical pole supported with stronger horizontal poles which are tied to solid stages. Shade is provided to prevent excessive drying of the yam tubers. It safeguards the yam tuber fro being eaten by animals but they get dehydrated.
5) BOXES AND UNDERGROUND PITS OR TRENCHES:- Use in storing cassava and yam tubers for a short – time after harvest. Layers of palm fruits are laid at the bottom of the pit, then one or two layers of cassava tubers are arranged on top of the palm fruits. Another layer is laid and tuber on top. This done until and some quantity of sol in the case of

boxes, moist saw dust is used in place of palm fruits and saw dust is placed round and on top of the tubers.

6) BAGS AND SACKS (JUNE & POLYTHENE) :- Products like, rice, beans, maize garri etc can be stored in bags and sacks after moisture content has been reduced to a level where they can last. The bags are kept in rooms and raised from the ground level.

7) BASKETS:- Are used to store products such as fruits and vegetables for a short time.

8) UNDERROOFS:- Those of buildings and huts are also used to store unshelled maize with the husk used in hanging the maize cobs. Her they are protect from pests and wet conditions. However, only small quantity of grains can be stored with this method.

Nov/Dec 1996

1) List five methods of preserving food giving an examples of food preserved by of the listed methods.
2) Write down methods of storage food and give them example of food substances that can the stored using the method
3) Write down methods fo storage food and give the example of food substances that can be stored using the method mentioned
4) State the

May / June 1997

1) State the principle involved in the following method fo food preservation

RELEVANCE OF BIOLOGY TO AGRICUTLURE

Biology- The study of living things (plants and animals) agriculture – goring of plants and rearing of animals to provides our needs e.g food.

To practice agriculture very well a basic knowledge of biology is very necessary. The knowledge include

- Structures function and nutrient of plants and animals
- Disease and causative organism
- Ecological systems
- Soil and
- Genetics

CLASSIFICATION OF PLANTS

- Botanical classification
- Classification based on life cycle
- Agricultural classification

Remembers SS1 evolutionary in plants

- Habitat
- Body structure
- Reproduction

BOTANIC CLASSIFICATION

- Cry fogams – Plants with microscopic reproductive organs that produce spores

1. Non vascular cryptogams

a. Thallophta e.g algae

b. Bryophyte eg moss

- Vascular crptogams
- Tracheophyt -0 vascular plants

i. Pteridophyta – spore producing
ii. spermatophyte – seed bearing
a. Gymnosperm – no flowers, no fruits, seeds of naked seed boexes e.g. consifers (cycas, pinus)
b. Angiosperms – flowering plants
i. Menocytyledons – seeds have one cotyledoneg maizke, grass.
ii. Dicotyledons – seed have two cotyledons e.g beans, water leaf

2. CLASSIFICATION BASED ON LIFE CYCLE

- Annuals
- biennial
- Perennials

Annual- These are crops which complete their lie cyle in one seasons. i.e germinate, mature produce seas and die in on season, e.g. rice, maize, millet beans those which complete two life cycle within a growing season are called ehemerats e.g lettuce and okro.

Biennials

Plants which complete ther life cycles within two years during the firt year they develop their vegetative parts and store food while they reproduce and die during the second years eg. Carots and cabbage.

Perennial:- Plants that for several years.

Thy produce fruits every seosn or twice a season or once of several seasons.

- Important perennials, include herbaceous ones such as ginger and onion and woody ones like rubber, oil palm, mango and coconut.

3. AGRICULTURAL CLASSIFICATOIN

In agriculture, plants are classified based on their uses or product.

i. Legumes: are in important source of plant protein for animals e.g humans

They are grown for their seed e.g. cowpea, soya beans, groundnut etc.

2. Cereals: These plants belong to the grass family and they are grown for their grains. The grains have a high starch content e.g maize, millet, whet guinea corn.

3. Root crops: They are grown primarily for the food stored in their swollen roots e.g. cassava sweet, potato.

4. Tuber crops = These are underground stems which are swollen with food reserve e.g cocoyam, rish, potato,yam.

5. Vegetable crops- Plants grown chiefly as vegetables. The crops are rich of vitamins and mineral salts e.g. lettuce, cabbage, spinach, egg, plant, tomato.

6. Oil crops :- Crops grown mainly for the oil that coul be extracted from their fruit and supply vitamins mineral mango,

6. Oil crops – Crops, grown mainly for the oil that could be extracted from their fruits and seeds e.g coconut groundnut oil, palm.

7. Spices, used mainly to add special flavours to food e.g. weet or red pepper, ginger, sugar cane.

8. Forage crops – These are crops grown mainly to feed animals e.g. (legumes and grasses).

9. Edible or cultivated fruits- These are crops grown for their fruits and supply vitamins minerals add sugar e.g. orange, mango, banana, guava, pineapple.

Effects

1. It damages the liver resulting in of blood.
2. The animals becomes aneamic and death results.
3. Loss of weight leading to poor meat products.

Control.

1. Duck that eat te intermediate host (water snails) should be introduced to pools and streams. This deprives the miracidia of an inetrmdiate host and it dies within.
2. Pools and streams should be treated with copper sulphate to kilt the miracidia and cerariae.
3. All water snails on the grazing ground should be physically collected and destroyed.
4. Supply clean drinking water to animals.
5. Consult a veterinary doctor to treat infected animals.

Life cycle of a pig roundworm

The particular roundworm, which affected the intentine bloody urine. Adult liver flukes lives in the liver and bile, duct of cattle cattle, sheep and goat. Both have the same life cycle.

- The female fluke lays egg which are shed with whole or feaces into a damp place or water.
- After about 14 days egg hatch into ciliated larveae called Miracicdia (singular miracidium) after about 14 days.
- The miracidia, swim about in water looking for intermediate host which are usually water snails. The penetrate soft tisues of water snails inside the tissues the y develop into sporcysts which

develop into raidae. The radiae produce cereariae which burrow out of the tissue, of the water snail into water and swim about for a short time and coat thick protective encyst on aquatic vegetation when a grazing animal like cattle, sheep or goats eats grasses infected with the cyst the cycts are swallowed in the stomach of animals the cysts dissolve and the cercariae develop into adult flukes. These young flukes then burrow thro the walls of the small interesting and body cavity where they settle as adult flukes.

Effect of ticks son pest

1. Ticks cause irritation and itching of the body. This causes restlessness resulting in weight loss.
2. Sucking spots develop sores on the skin providing areas of disease infection.
3. Sucking of blood ersult in loss of blood consequently animals of become anemia, weak and unproductive.
4. Ticks transmit diseases such as relapsing fever and red water.
5. infestation of young animals results in retarted growth. Their attack lowers the values of the hides.

Control of Ticks

1. Keep the environment clean physically remove ticks from the body of animals and kill then.
2. Dip infected animals arsenic solution to kill the female before they are sexually mature.
3. Spraying animals house with inseciticide.

4. Rotation of the pasture and livestock (i.e livestock removed from infected areas to uninfected areas, larvae and nymph wile starve to death.

Liver flukes (Fasciola Hepaticae)

Flukes are parasitic flatworm examples are blood flukes and liver flukes. Adult blood fluke causes a disease called schistosomiasis or bilharziasis in man. Symptoms are poor health anaemia, inflammation of the bladder or intestine and consists of fouir stages.

The egg → larva → numph → adult each of these stages need a different host.

The adult female attaches itself to the skin of the host and sucks blood until it is full mature male crawls about until it finds a female and mating takes place.

- The male dies after mating after fertilization the female tick detaches itself from the host and drops to the ground it lays its eggs at the bottom of grasses and dies.
- The egg hatch into a larva having six legs. The larva crawls up the grass and fixes itself to the body of an animal passing by it pierces the skin of its hoist and suck blood. When it is fully fed, it drops to the ground again.
- On the ground, the larva develop into a nymph with eight legs. It crawls up the grass get fixed to a 2^{nd} host animal feeds on its blood and drops to the ground again where it maults into an adult tick.
- The adult tick crawls up the grass and get attached to a 3^{rd} host and the life cycle is repeated.

Animal pests

- The often parasitic on their victims. They can be ECTOPARASITE such as lice, ticks, tse-tse, flies, bugs, mites or ENDODARASITES such as liver flukes round worms and tapeworms.

Effects of animal pests

Most ectoparasites such blood causes loss of blood making animals unhealthy leading to low productivity. Pest, are also vectors and transmit dieases to form animals.

Endoparasites lower resistance of animal to diseases making them unhealthy. This can lead to death e.g.

Roundworms cause anaemia ticks cause redwater relapsing fever and anaemia lice and mites cause anaemia tse-tsefly causes trypanosomiais tapeworm causes anaemia.

Life cycle of ticks

Ticks are ectoparasites of many animals such as cattle goat, sheep horses, dags etc.

They live all their lives attached to the body of animal sucking its blood except during moulting and reproduction.

The life cycle of most ticks.

Effects of cassava mealybug

1. They suck the sap of cassava leading to stunted growth of shoot.
2. The shoots develop bunchy tops.
3. The leaves of the shoot die and drop.
4. Mealy bug infestation in pairs photosynthesis in cassava resutlign in low yield.

Control

1. Dip cassava cutting is 0.1% rogar or ultra cide solution for one minute before planting.
2. Life history of bean weevil callosobruches maculates male and female adult mate fertilized eggs are then laid in the repening pads in the farm. The eggs hatch into larvae which enter into the beam seeds before harvesting in the store the larvae feed on the cotyledons of the beans the larvae develop into pupa in the store. The pupa later develop into adult which flies away to mate again in the farm.

Effect of beans weevils

The larvae feed on the cotyledons of the seed thereby reducing the quality and value of the beans.

Control

Fumigate the store in which beans are stored with fumigants such as methylbromide.

Life cycle of grasshopper male and female mate and eggs are then fertilized internally.

Pest control measures

There are different methods

(1) Is the identity of the pets

(2) Presence of other pest

(3) Cost of the control measure

(4) Availability of the means of applying the control some of these methods are

1. BIOLOGICAL CONTROL

This is aimed at upsetting the balance in the habitat in biological control, the enemies of pest are used to destroy them. This could be predators, parasites or diseases of pests e.g fools can be used to contorl cotton stainers, spiders, prey on aphids, scale insects and some nymph wasp feed on stem borers some bacteria are parasites of caterpillar.

2. PHYSICAL METHOD

This involves the use of temperature traps and other physical methods e.g. temperature bulbs are dipped in hot water to kill off mites and nematodes, snails and caterpillar ca be picked, light and sticky traps for adult insects and some rodents burning and flooding

to destroy soil psts. Scare crow to keep birds away from farm e.g rice plantation. This method is used for small area at low infestations.

Chemicals used for pest control are known as pesticides, insecticides and nematocides.

The come in form of dusts granules, liquid suspendsions etc e.g. Garmalin 20 for controlling g/hoppers of cassavas and 2.5% Aldrin dust for controlling yam bactles cultural methods.

This involves modifying farming practice so that environmental conditions do not favour the development of the pest e.g crop rotation bush fallow system burning and tillage. Other are planting resistant varieties and early maturing varieties destroying of diseased plant materials planting healthy platn legislating between movement of crops between countries.

Modern methods today involve sterilizing male insect pests by chemical or radiation. Fencing and wire netting to keep out pests.

Life cycles of some crop pests

1. Cassava mealy bug (phanacoccus manihot). The female insect lays eggs without fertilization by the male. This type of reproduction is called parthenogenesis (recall pathenocarpic fruit).
2. The eggs hatch into larvae which are wind borne or carried with cassava stem cutting during planting. The larvae undergoes moulting stages beore adult stage. The life cycle is completed in about 22 days and the adult has a life span of above 145 days.

Flowers, fruit and seeds e.g. grasshopper

- Eat flowers thereby hindering development of fruit and seeds e.g pollen beetles.
- Eat or bore fruits and sees e.g. rice and maize weevils, pea-pod borers.
- Bore fruits causing them to fall prematurely or cause death e.g. mango fruit fly.
- Bore stem of seedling eat roots causing loss of water and nutrients bore tuber and corns causing reduction of the stored food e.g. yam beetles .

3. Damages caused by insects with piercing and sucking mouth parks. They cause loss of plant vigorous due to loss of sap to the pest leading to stunted growth or death e.g. aphids. Leaf curling and deformation e.g. aphids and black flies,. Premature leaf fall premature fruit fall e.g. bugs provides physical entry point for pathogenic fungi and bacteria which cause diseases.

Come common pests

Pest	Crop	Damage done	Control
Mealy bug	Cassava	Feeds on young shoot causing stunted growth	1. Destroy all affected plants 2. Use of resistant and early maturing varieties. 3. Early planting spraying insecticide
Cotton stainer	Cotton	Feed on collton seeds stains the lint	Spraying insecticides cage fowls in cotton plots to feed on bugs
Beetles	Groundnut	Eat leaves	Spraying insecticide
Midge larva	Sorghum guinea corn	Eats up tissues and developing seeds	Early planting use fo resistant vareiteis picking and destroying pests
Stem borer weevils	Maizes	Bore into stem and weaken at	Spraying insecticide early maize not followed by late maize
Stem berer larva of a moth rodent birds	Rice	Bore into stem and eat up plants rodents cause damage is nursing birds pierce and suk milky juice	Irrigate with water containing insecticide fencing and wire netting to keep out pests score away by shouting, beating drum
Yam beetle	Yam	Yam bettle	Dust yam sett with

		causes tuber rot, eel worm and nematode pierce yam leading to infection by fungi	insecticides before planting crop rotation to starve wel worms

PEST AND DISEASES OF AGRIC IMPORTANCE

Pest are organisms which cause damage to other organism particularly agricultural crops and animals. They cause loss sin yield or quality of crop and consequently loss in the profit expected by the farmer. There are crop and livestock pests.

Crop pests are insects such as grasshopper. Locust, stem borer, aphids, weevils, mearly bug, nematode rodents and birds.

<u>Damage caused by pests</u>

i.. Damage caused by bitting insects

- They eat leaves of crops thereby reducing growth e.g. grass hoppers.
- eat seeds destroying prospective. Other e.g. 2,4,-D (2,4, dichlorophenxoy acetic acid) kills weels wthi broad leaves (dicots) growing among cereals like rice.

iii. Non selective herbicides there are herbicides when applied to the leaves of plant or soil destroy all plants regardless of species e.g.

chiloracabon, disulphide. Herbicides provide convenience in terms of labour input in weed control on a large farm

- Herbicides can be injurious to man and crops if not properly used.
- Some add sustenance which are undesirable to the environment.
- Can be washed into rivers and lakes where they can endanger aquatic life.

Empty containers can be sources of poison when used as containers for food. Some useful herbs could be destroyed along with the weeds.

PESTICIDES

These are chemical sprayed to kill insect pests e.g. DDT can increase crop yield

- Most kills both harmful and beneficial organisms e.g. pollinating agents (bees, butterflies etc.
- Animals that feed on the pest e.g. birds and frogs are deprived of their sources of food (disrupts natural food chain).
- Some fall on the crops and so accumulate in the body of consumers to toxic levels
- Can be washed into bodies of water and cause harm to aquatic organisms.
- Wind erosion can distribute it to other areas.
- the soil and thereby reduces caillarity.
- It exposes soil organisms and may even kill some.

3. INORGANIC/ CHEMICAL FERTILIZERS

a. Simply fertilizers e.g urea,

b. Mixed fertilizers e.g NPK although it improves the soil fertility excess

- Makes the soil to loss its crumb structure and so becomes powdery leading to wind erosion.
- it makes the soil to lose its porousity and so become poorly aerated.
- It can make roots of plants not to be able to absorb mineral salts effectively and so lowers crop yield intensive use of nitrates in artificial fertilizers results in an increase of free nitrates in food plants and could endanger human health.
- It can be washed into nearby rivers and lakes (nitrates and phosphates) and so affect their ecosystem.

  (Eutrophication)

  Eutrophication is the over growth of microscopic aquatic plants e..g algae resulting from an excess nitrogenous and sulphate fertilizers reaching rivers and lakes.

4. HERBICIDES: These are chemicals used to control weeds selective herbicides. These are herbicides when applied to mixed plant population, would kill certain species of plants without harming

EFFECTS OF AGRICULTURAL
ACTIVITIES ON THE ECOSYSTEM

- Bush burning
- Tillage
- Use of fertilizers
- Use of herbicides and pesticides

BUSH BURNING

- Setting the bush on fire before planting
- The atmosphere is polluted with smokes
- It destroys the organic matter in the soil.
- Many soil micro-organisms are killed in the process .
- The land is exposed to erosion appearance of different sets of plants.
- It changes the ecology of the land.
- It gives the soil as slightly alkaline nature.
- The natural food chain is disrupted.
- It makes some animals to the become extinct
- It helps to break see d dormancy.
- Reduces the water holding capacity of the soil.

TILLAGES

Means turning the soil or making mounds before planting

- It loosens the soil
- It exposes the soil to erosion intensive tillage leads to lsos of soil fertility.
- It leads to poor vegetation.
- It leads to change in the ecology of the land.
- It changes the structure of the soil.
- It increases the porousity of

- Grazing of the land by farm animals reduces the growth of weeds.

- The farmer gets cheap animal proteins from the farm animals

Disadvantage

- Te farmer may be over grazed by farm – animals leading to soil erosion .
- The trampling action of arm animals may alter the physical nature of the soil thereby bringing about poor aeration of the soil.
- Farm animals may damage valuation crops.

PASTORAL FARMING

This involves the rearing of animals e.g. cattle, sheep and goat that feed on herbs (grasses and legumes).

There are two forms of pastoral farming

1. Ranching- Is the keeping of animals in fenced area of land containing the herbs for them to feed on (e.g. /Garra cattle ranch in Edo State).
2. Nomadic herding is the movement of grazing animasl from one place to another in search of food and water.

ADVANTAGE

- Enables the provision of animals protein.
- Labour requirement is less.

DISADVANTAGE

- It brings about exposure of land thereby causing erosion.
- This leads to land wastage and reduction in productive land
- When properly planned, it helps to prevent erosion.
- Maintains soil fertility

DISADVANTAGE

The farmer may not be too covenient to be out of crop at the period when the land is under grass.

CONTINUOUS CROPPING

This is the cultivation of crops cotninously on a piece of land for two or more years.

ADVANTAGES

- Different kinds of crops are planted in the same piece of land and so soil nutrient are utilized to the fullest by the crops.
- Labour to prepare the land is cheap as the land carries only small vegetation

DISADVANTAGE

- Crop yield will decrease with time.
- Fertilizers are needed to enhance soil fertility and this will involve extra monetary cost.
- If monocropping is practiced it encourages pests and diseases.

MIXED FARMING

- This is the practiced of cultivating crops and to rear animals on the same piece of land at the same time

ADVANTAGES

- The dropping and urine of animals increase the soil fertility.

- The left over of crops and grasses are used as animal feed.

ADVANTAGES

- The soil nutrients are fully utilized by shallow and deep rooted crops.
- It reduces the spread of insect pests and fungal dieases

DISADVANTAGE

- When all crops are harvested the soil is seriously depleted of nutrients

KEY FARMING

This is the practice of growing crops and pasture is alternation (crops are grown for a season and followed by pasture is the next one or two planting season before the areas is cropped again after it has been grazed.

ADVANTAGES

- Ley farming brings about high production of crops and animals by shallow rooted crops like maize, rice, melon.

Crop rotation

1st year cropping	A centrasemal fallow	B yam	C maize	D cassava
2nd year cropping	A cassava	B Fallow	C Yam	D maize

		(mucuna)		
3rd years of cropping	A Maize	B Cassava	C mucuna fallows	D yam
4 year of cropping	A yam	B maize	C cassava	D fallow

v. e.g. of a four year crop rotation plot. It is left to fallow during the 1st year cropping but put to cassava in the 2nd year maize in the 3rd year and yam in the 4th year – similar cropping sequences is formed is B,C,D.

ADVANTAGES

- Where there is scarcity of land, a piece of land can be used continuously.
- The plant nutrients in a piece of land is well utilized.
- Particular pests and diseases are not encouraged to flourish.

DISADVANTAGE

- When crop rotation is practiced the land is constantly cultivated and so long exposure the soil to erosion
- It involves continuous use of fertilizers which is expensive and affected the ecosystem.

MONOCULTURE / MONOCROPPING

This is a farming system of planting only one type of crop on a piece of land.

ADVANTAGES

- It makes the crop to grow efficiently as the soil nutrient are only utilized by the crop.

DISADVANTAGES

If practiced for a long time it depletes the soil of nutrients which the crop utilized while other nutrients are left unutilized. The pests and disease of the cultivated crop increase in population if this farming system is continued for a long period.

MIXED CROPPING

This is the practice of cultivating two or more species of crops on a piece of land at the same time e..g planting yam, beans, okro together.

This is a system in which a parcel of land is cultivated for one season and left to fallow fro some years before being cultivated again i.e a farmer cultivates a piece of land and plants crops on it for one or two years before moving to an uncultivated piece of land.

ADVANTAGES OF SHIFTING CULTIVATION

- During the fallow period the soil is enriched with the decay of organic maters and the fertility of the soil is maintained.
- Fertilizer are thus not necessary and so save cost for the farmer
- Soil erosion is not encouraged as soil is quickly covered by weeds.

DISADVANTAGES

There is a problem when there is scarcity of land (as there would be no alternative land to shift to for cultivation).

- Clearing of a fallow land involves hard labour and a lot of money is needed to have labourers.
- Valuables trees are destroyed during clearing. (i.e trees which would have been grown to timber size are burnt down

2. CROP ROTATION

Is a system of cultivation is which selected crops are grown on a piece of land continuously for years in a definite order e..g deep rooted crops like yam cassava, cocoyam, are fallowed

10. Beverages and drug plants. These are grown for use as beverages and making drugs e..g cocoa, coffee, kolanut, tea tobacco etc.
11. Ruber or latex crops. These latex is colecetd and coagulated to form rubber e.g para rubber.

    The latex is used for various industrial purposes such as making of tyers, tubes and plates.
12. Fibre crops. Cultivated mainly for their fibres. The fibres are used for

- Clothing e.g cotton
- Rope e.g. sisal hemp
- Sack making e.g. jute
- Paper making e.g meling

13. Wood crops:- provide

hardwood which is used mainly for making furniture or building material e.g ebony, mahiogany troko, some yield soft wood used for wood pulp and paper as well as for building.

DIFFERENT TYPE OF FARMING METHODS

There are different types of farming methods which affect the balance in the ecosystem some of this methods are

1. Shifting cultivation
2. Crop rotation
3. Monoculture
4. Mixed cropping
5. Ley farming
6. Continuous cropping
7. Mixed farming
8. Pastoral farming

1. SHIFTING CULTIVATION

Of pigs is a scoris lumbricoids it is usually pinkish or reddish in appearance, about the thickness of a pencil and about 30cm long.

After fertilization the eggs in the female ascaris, eth larvae develop inside the egg shells.

The eggs are deposited into the pigs interesting form where they are sent out with the feaces to the soil.

The egg can remain dormant in the soil for over 5yrs but die very fast if exposed to intense sunlight.

When the eggs aer ingested and swallowed by pigs, the eggs shell aer dissolved by the digestive enzymes. The larvae are liberated they bore through the intestine walls and entered the general blood circulation, 1st to the liver, then to the heart and the lungs.

- in the lungs, they pass into the bronchioles and up to the throat of the pig.

From here, the larvae are swallowed back into the stomach through the gullet on reaching the small intestine the larvae develop to mature adult worms and the life cycle is repeated.

Effects

1. It robs the animal of digested food resulting in loss of weight slow growth and general weakness. The migratory worms may damage lungs making breathing difficult.

Large infestation of the adult worms of the intestine may block the digestive tract and cause digestive disturbances like diarrhea, vomiting and jaundice.

The larvae may destroy organs such as the heart, kidney and the liver.

Control

1. The use of appropriate drugs as directed by the veterinary doctor.
2. maintaining good sanitation in the pets and buildings where pigs are kept.
3. Providign drinkable water for the animals
4. rotating the pastures and liverstock.

Diseases

A diseases can be described as an abnormal condition in health. Diseases cause damage to parts of plants and animals and in some cases death.

Plant Disease

Are usually caused by fungi, bacteria and viruses leading to poor gwoth and consequently poor yield

Effects or economic importance of insect pest in crop production

1. Insect pests destroy crops in the field through their biting chewing, boring, sucking and defoliation activities.
2. They cause reduction in the viability of stored produce.
3. site of injuries by insects may predispose crops to disease attack.
4. They increase the cost of production during the course of controlling them
5. They render vegetables and fruits unattractive and unmarketable.
6. some are carriers or vectors of diseases.
7. the profits of farmers are reduced.
8. They reduce the quality of produce either of the stored or of the filed.
9. They general reduce the yield of crops.

10. They can also cause total death of crop plants.

Life cycle of tapeworm

Tapeworm is a hermaptrodite it has bth male and female and reproductive organs as such it on fertilizes itself. When a mature and fertilized prolottis pulls off the body of

S/N	Name of diseases	Causative	Method of transmission	Symptom and economic input	Prevention and control measures
1.	Maizekor smut	Fungus	Air bone spore deposit on fruits	Reduced yield galls on ears, leaves which later turn blade	Destroy diseased plants like resistant variteis seed treatment.
2.	Maize rut	Fungus	Air bone spores deposited on leaves	Red spots on leaves reduced field death	Early planting crop rotation use resistant varieties
3.	Maize streak	Virus	By piercing sucking insect	Leaf surface discoloured in form of streets fumin g	