CHAPTER 4

OBJECTIVES

At the end of this chapter, students should be able to:

â—† state the meaning of agricultural pollution.

â—† identity pollutants or sources of agricultural land/pond pollution.

â—† discuss the effects of pollution on farmers and farming activities.

â—† explain how pollution of land/pond can be minimised.

4.1 Introduction

Waste products from homes and industries constitute a major source of pollution in the environment. The deposition of solid, liquid and gaseous waste from different sources has led to several negative effects on human beings, livestock and other living organisms. Such waste products are generally called pollutants. Examples of solid waste household materials or industrial pollutants include plastics, sachet nylon, waste empty tins, glasses, cans, salts of heavy metals, insecticides and metal scarps. Other wastes are liquid and gaseous effluents from homes and industries. Most often these pollutants are non-biodegradable, thus they do not decay and so constitute nuisance in the environment.

4.2 Meaning of Agricultural Pollution

Pollution is the introduction and/or deposition of contaminants in the environment which causes instability, disorder, harm and disruption of the ecosystem. The contaminants are usually called or described as pollutants. The pollutants can be in the form of chemical substances such as toxic wastes from industrial plants, radioactive substances and agricultural and household domestic wastes. Agricultural pollution is the careless and indiscriminate deposition of different kinds of agricultural produce, products and wastes generated from agriculture which constitute nuisance, instability and disruption to ecosystem. Such pollutants could be in solid form such as pod husks, rotten fruits and vegetables. Examples of liquid pollutants are liquid waste from garri processing industries, and abattoir wastes especially the washed discharges from the intestines and blood of slaughtered animals. Examples of gaseous agricultural wastes include gaseous emission from burning of farmlands, hoofs and bones from abattoirs especially when burnt with kerosene, smokes from chimneys and agro-allied industries.

4.3 Types of Pollution

There are three major types of agricultural pollution

4.3.1 Atmospheric pollution

This is the introduction of chemical substances, particulate matter and biological materials or wastes either in gaseous form

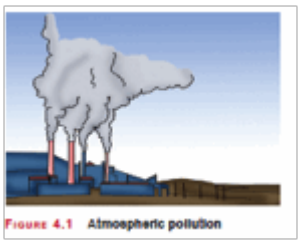

Figure 4.1 Atmospheric pollution

or suspended in the air which introduce or cause harm to human beings and other living organisms. Examples of atmospheric pollutants include pesticide sprays and dusts, smokes from burning of bush, animal remains and tyres, gaseous effluents from agricultural industries and chimneys.

4.3.2 Water pollution

This is the introduction or deposition of agricultural or industrial chemicals or chemical substances, particulate matter as well as household domestic wastes along or inside water bodies, water channels and reservoirs. The deposited materials become toxic to all living organisms in the particular ecosystem.

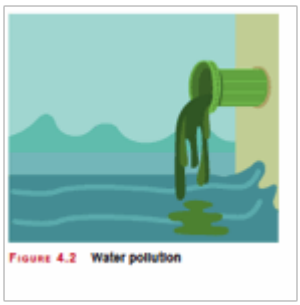

Figure 4.2 Water pollution

This is the introduction and deposition of pollutants such as agrochemicals, agricultural wastes, particulate matter, biological materials and all other types of contaminants into the soil. Some of the pollutants do not decay easily and so they are described as non- biodegradable. Examples of non biodegradable pollutants are plastic products.

Some pollutants release toxic by-products when they decay in the soil which disrupt the ecosystem.

Figure 4.3 Soil pollution

TABLE 4.1 Sources of agricultural pollution/description of occurrence/pollutant

Types of Pollution	Source of Pollution	How Pollution Occurs	Pollutants
Atmospheric pollution	• Large-scale aerial sprays	• Use of large volume pesticide sprays with aircrafts to kill pests such as birds, locusts and army worms	• Persistent agrochemicals, non-biodegradable agrochemicals, such as, gamma BHC, lindane
	• Small-/medium-scale pesticide application	• Use of boom sprayers such as knapsack sprayers, hand sprayers, mist blowers to apply pesticides on aerial pests of crops	• Persistent, non-biodegradable agrochemicals such as gamma BHC, lindane
	• Abuse of pesticides	• Unintended use of pesticides for other purposes	• Persistent, non-biodegradable agrochemicals such as gamma BHC, lindane
	• Vehicular emission and power plants	• Gaseous discharge form exhaust pipes of petrol and diesel engines and automobiles	• Oxides of carbon, hydrocarbon • Hydrogen sulphide soot and smoke
	• Burning of agricultural or related materials	• Burning of animal bones, hoofs and other wastes at abattoirs	• Oxides of carbon, soot, smokes, hydrogen sulphide
	• Livestock waste	• Animal dung and urine accumulation and break-down products	• Ammonia gas • Nitrogen dioxide • Methane
Water pollution	• Pesticide usage	• Direct application of pesticide to kill pests of aquatic organs	
	• Pesticide drift	• Pesticide drifts from nearby ponds and water channels	

Continued

TABLE 4.1 Continued

Types of Pollution	Source of Pollution	How Pollution Occurs	Pollutants
	• Oil spillage	• Broken pipelines and vandalised oil installations which discharge oil into water bodies	• Oil such as petroleum sprint
	• Erosion	• Erosion washes agricultural and industrial pollutants into water	• Non-biodegradable materials, e.g., polythene bag
	• Refuse and sewage	• Some agricultural and domestic refuse and sewage are emptied directly into water	• Defecating in water • Discharge of sewage into water
	• Industrial effluents	• Some industrial wastes are discharged directly into water	
	• Agricultural wastes	• Some agricultural waste materials are channelled into water bodies and canals	• Garri processing liquid wastes • Blood and other wastes from abattoirs
	• Drug disposal	• Containers of drugs given to animals either buried or left on soil surface	• Coccidiostat • Terranean
	• Animal dung and wastes	• Decomposing animal dung and urine leaves unsightly appearance and chemical odour	• Cattle dung • Poultry droppings • Urine
Soil pollution	• Pesticide application	• Direct use of pesticide on the soil	• Persistent pesticide such as organochlorine, e.g., gamma BHC, lindane
	• Pesticide drift	• Drift of pesticides applied on other materials	
	• Liquid waste/ fertilizer wastes	• Liquid waste that exudes from fertilizers packed together and caked	• NPK – 15:15:15 • Single super phosphate • Urea
	• Oil spillage	• Broken pipelines, vandalised pipelines and installations, leakages and discharges into soil environment	• Oil spills such as from petrol, kerosene and diesel
	• Industrial effluents/ wastes	• Solid wastes dumped on soil	• Solid wastes from industries such as cement dust, caustic soda
	• Spent oil	• Oil drain from petrol and diesel engines	• Used engine oil and diesel

Types of Pollution	Source of Pollution	How Pollution Occurs	Pollutants
	• Agricultural wastes	• Agricultural wastes from the farm gate and processing	• Cocoa pod husks • Maize husk, ground milk, walnut and cowpea pod husks
	• Refuse and sewage	• Domestic refuse and sewage emptied into soils	• Open refuse dumps • Disposed sewage • Damaged septic tanks • Refuse heaps
	• Erosion	• Solid wastes of industrial and domestic origin are washed by water or blown by wind on soils	• Several solid materials such as polythene bags, plastic materials, metals, etc. • Chemicals
	• Burning of agricultural wastes	• Animal parts such as bones and hoofs are burnt in abattoirs • Plant debris and other materials like plastics are burnt on soil	• Oxides of metal • Ash • Organic gases
	• Mining and exploration	• Heavy metals and other chemical containments are spilled on the soil surface during mining and explosion	• Heavy metals such as lead, cadmium, tin, coal

4.4 Effects of Pollution on Farming

4.4.1 Human Beings

(a) Disease to farmers such as cholera, typhoid, malaria, and that caused by guinea worm

(b) Terminal sickness such as cancer and kidney failure due to exposure to radioactive pollutants

(c) Renders water unfit for drinking and for domestic usage

(d) Can kill directly, for example, by consumption of contaminated food, fruits and water

4.4.2 Farm animals

(a) Can kill farm animals by direct consumption of contaminated feed and water
(b) Destruction of aquatic organisms such as fish, shrimps, crabs, and so on
(c) Inhalation of polluted gases causes respiratory disorders
(d) Farmers are out of job due to polluted sites and water; fishermen cannot fish
(e) It makes navigation difficult, especially on water
(f) Undue exposure of farmers to fire hazard due to spillage

4.4 Reduction of Polluted Land and Pond

A reduction of land, water and atmospheric pollution is very necessary in order to have a meaningful life and enough food for man. Agricultural pollution can be reduced in the following ways:
â Prevention of soil erosion by planting cove crops/grasses, constructing adequate water channels.
â Prevention of overgrazing of pasture. Herdsmen should practise rotational grazing so as not to leave vegetation bare.
â Good farming practices such as using poultry droppings and animal dung as manure and crop rotation.
â Green areas should be created.
â Proper disposal of waste materials.
â Reduction of water pollution through appropriate treatment of sewage and recycling for agricultural use.
â Organic waste should be converted into biodegradable forms and toxic compounds such as mercuric salts removed.
â Ensure maximum precautions to prevent spillage.
â Building nuclear waste silos for storing radioactive wastes, so that ground water does not become contaminated with radioactive materials.
â Contaminated water should be treated by boiling treating with chlorine.

Activities

1. List all the things that cause pollution of land and pond. Make a comprehensive list of areas in Nigeria where water pollution and oil spillage occur.
2. Set up three jars containing the same amount of water used for drinking. Place some small aquatic organisms like fish, tadpole and mosquito larva into each jar. Add a known pollutant, such as crude oil, insecticide or detergent into each jar and note its effect.
Record your observations.

SUMMARY

Pollution is the introduction or deposition of contaminants in the environment which causes instability, disorder, harm and disruption of the ecosystem.
â—† Agricultural pollution is the careless and indiscriminate deposition of different kinds of agricultural produce, product and waste generated from agricultural industries into the environment which constitute nuisance, instability and disruption to the ecosystem.
â—† There are three major types of agriculture pollution: atmospheric pollution, water pollution and soil pollution.

Pollution affects farmers and farming activities in the following ways:

âœ§ Diseases and terminal sicknesses due to exposure to radioactive pollutants.

âœ§ Renders the water unfit for drinking and domestic use.

âœ§ Death resulting from consumption of contaminated foods and fruits.

âœ§ Destruction of aquatic organisms.

âœ§ Inhalation of polluted gas resulting in respiratory disorders.

âœ§ It makes navigation difficult, especially on water ways.

âœ§ Undue exposure of farmers to fire hazards due to oil spillage.

REVISION QUESTIONS

Essay Questions

1. Define pollution.

(a) What are the major causes of pond pollution?

2. List three ways of controlling pond pollution.

3. What are the dangers of the overuse of pesticides and fertilisers on our farmland?

4. What are the effects of the following pollutants on the farm?

(a) Dust

(b) Spillage

(c) Sewage

(d) Carbon monoxide

(e) Erosion

5. List five ways of minimising land and pond pollution.

6. What is biodegradability?

Objective Questions

1. A constituent of the exhaust gases of motor vehicles which causes serious air pollution is

(a) water vapour.

(b) carbon dioxide.

(c) carbon monoxide.

(d) oxygen.

2. Water pollution is prevented by

(a) addition of oil.

(b) discouraging the decomposition of waste.

(c) addition of pesticide.

(d) addition of organic manure.

3. Soil pollution results in

(a) increase in yield of crops.

(b) improvement of crop yield.

(c) reduction in crop yield.

(d) increase in production.

4. The following are pollutants except

(a) hydrocarbons.

(b) oxides of nitrogen.

(c) oxygen.

(d) smoke.

Answers

1. c 2. b 3. c 4. c