UNIT 3 AGRICULTURE AND THE NATURAL ENVIRONMENT

CONTENTS

1.0 INTRODUCTION

In all agricultural production systems, the multitude of cultural operations which enhance optimum crop yields also impact on the farm environment in particular, and the macro-ecosystems in general. For instance, in subsistence agriculture farmers adopt uncontrolled burning to get rid of excess, aggressive vegetation before sowing their crops. Even in intensive agriculture, the advanced technologies of farming and livestock production such as land preparation, conventional tillage, pesticide and fertilizer application for producing good-quality crops also have adverse effects on the natural environment. In the poultry industry, extensive odours from huge piles of faecal droppings cause serious pollution of the environment.

2.0 OBJECTIVES

This unit is aimed at highlighting the various negative effects of agricultural activities on the natural environment of man.

3.0 MAIN CONTENT

3.1 Natural Environments are Fragile but Ecologically Stable

However, agricultural activities cause serious environmental problems because they alter the natural ecosystem, and in the process, produce harmful by-products. The ultimate consequence of the alteration is the degradation of ecosystems through the following adverse effects:

i. Loss of biodiversity. This arises from the reduction of forests and other habitats after farming as well as the reduction in genetic diversity and increased vulnerability of high yielding varieties to

pests which thus necessitate heavy pesticide use. Global forest cover has been reduced by 20% since the industrial revolution. Tropical forest areas are being deforested at a rate of nearly 50 000 sq. miles per year. The conversion of virgin temperate forest to plantation is similarly continuing unabated, especially in Russia.

ii. Increasing contamination of waterways and wetlands by excess nitrogen and phosphorus release to rivers and lakes.
iii. Fertilizer application leads to soil salinisation.
iv. Detrimental effects of inappropriate and heavy use of pesticides (herbicides, fungicides, insecticides, other biocides) such as contamination of food and environment, and health hazards to farmers.
v. Pesticides also kill the natural enemies of pests, which subsequently multiply rapidly and create considerably more environmental nuisance than when pesticides are not used.
vi. Pest resistance to agro-chemical pesticides is currently very appreciable, necessitating the development of more effective, but hazardous chemicals and their mixtures.
vii. Large-scale slash-and-burn techniques of subsistence farming result in nutrient-poor soil, especially in tropical forest environments. It is particularly ecologically destructive (of the forest integrity) where fields are not allowed sufficient time to regeneration before subsequent application, under high population pressure and under loss of a large number of vulnerable and endangered plant fallow species.
viii. Extraction of biomass in harvests of wood or charcoal diminishes further growth of any vegetation type due to poor residual soil productivity.
ix. Consolidation of diverse biomass into a few species.
x. Advances in agriculture technology require a large energy input, often from fossil fuel to maintain high levels of output.
xi. Increasing diversion of crop production strategies from food supplies to bio-fuel supplies.
xii. Heavy use of fresh water, depleting water supply for human consumption.
xiii. High dependence on technologies which further degrade the soil. For instance, in the United States a **dead spot,** due to fertilizer runoff into the Mississippi River has been discovered in the Gulf of Mexico.
xiv. Large-scale soil erosion is a major land degradation feature in tropical agriculture.
xv. Intensive agriculture depletes soil fertility over time, and potentially leads to desertification. Unfortunately, further growth

of any vegetation type is practically impossible for future generations.

xvi. Aggressive weed colonizers and associated pests, pathogens and dangerous animals (snakes, mosquitoes, etc.) are important environmental nuisance.

xvii. Extensive growth and surface cover of floating aquatic weeds is a menace to navigation. Also, eutrophication of water bodies by decomposing weed residues reduces the drinking and irrigation benefits.

xviii. Global climate changes, especially global warming due to excess CO_2 and NO_2 emissions into the atmosphere.

xix. In particular, the United Nations consider the livestock sector (especially cows, chickens, pigs) as one of the most significant contributors to most serious environmental problems, both at local and global levels. The sector is one of the largest sources of greenhouse gases, especially CO2, which accounts for 18% of the world's gas emissions. Also, it produces 65% of human-related NO2 (296 times more warming potential than CO2) and 37% of all human-induced CH4 (23 times more warming potential than CO2). The sector also generates 64% of the NH3, which contributes significantly to acid rain and acidification of ecosystems.

4.0 CONCLUSION

In this unit, you have learned that agriculture is a major contributor to diverse environmental alterations which threaten human existence on the planet earth.

5.0 SUMMARY

Agricultural activities cause serious environmental problems in water, on land and in the atmosphere. These problems strongly affect the ability of man to optimally explore the benefits of agriculture in producing food, feeds, fibre and other products.

6.0 TUTOR-MARKED ASSIGNMENT

1. In what main way does agriculture cause serious environmental problems?
2. What is the ultimate consequence of the adverse effect of agriculture on the environment?
3. Enumerate five ways through which agriculture causes environmental degradation.

7.0 REFERENCES/FURTHER READINGS

Human Appropriation of World's Food Supply.

http://www.globalchange.umich.edu/globalchange2/current/lectures/food_supply/food.htm

Agriculture, From Wikipedia, the free encyclopaedia. http://en.wikipedia.org/wiki/Agriculture