FUNDAMENTALS OF MODERN AGRICULTURE

(GENERAL PRINCIPLES)

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CHAPTER ONE

MEANING, SCOPE AND IMPORTANCE OF AGRICULTURE

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CHAPTER OBJECTIVES

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

1. Define and explain the meaning of the term Agriculture.
2. Identify and explain the different branches of Agriculture in modern times.
3. Explain the importance of Agriculture to mankind.

MEANING OF AGRICULTURE

Agriculture is usually defined as the tilling of the soil to produce crops and rearing of animals for man's use. Agriculture thus involves farm operations aimed at producing crops like maize, rice, cocoa, kolanut, sugarcane, groundnut, etc and the rearing of livestock such as poultry, sheep, goat, cattle, fishes etc.

This is the focus of agriculture in traditional societies. Modern agriculture is more than this. It involves the application of scientific skill into the process of producing crops and animals. In modern times, agriculture is both an art and a science. As an art, it involves skillful cultivation of the soil and rearing of livestock. As a science, it is an integrated discipline in which all areas of natural, physical and biological sciences are applied to the systematic production of crops and animals.

Modern agriculture relies heavily on the application of scientific methods and principles, and widespread use of technology. It also involves the careful application of economic principles and management techniques to crop and animal production. It therefore considers crop and livestock production from a commercial perspective rather than the subsistence orientation of traditional agriculture.

Traditional agriculture is usually referred to as farming. Farming is the process of tilling the land to produce crops and rearing of livestock, fishes etc. Such activities mainly take place on the farm which is a particular place in which crops and livestock are produced. Modern agriculture however includes many activities that take place outside the farm including activities carried out in the laboratory, classroom and workshop etc with the aim of improving farm production. Thus, a major point of difference between farming and modern agriculture is the fact that agriculture extends beyond the farm and farm activities.

The kind of agriculture that takes place in modern times can therefore be defined as the systematic production of useful crops and animals through careful application of scientific, economic and management principles and techniques to farm and farm related activities. This covers such activities as the efficient combination of productive inputs to obtain outputs, the processing and marketing of such farm produces, the manufacture and maintenance of implements and machinery for farm use and, the discovery and transfer of new knowledge about crops and animals and the methods of producing and utilising them.

SCOPE OF AGRICULTURE

Agriculture is wide and multi-disciplinary in nature. It has many branches. This is because it makes use of the principles and techniques of several different fields of life. Thus, it is constantly evolving. Broadly classified, the major branches of agriculture include:

1. **Agronomy:** Which is the branch of agriculture that deals with crop production, soil management, and related activities.
2. **Animal Production:** This is the branch of agriculture that deals with animal breeding and husbandry and related activities.
3. **Agricultural Engineering:** Deals with the invention, design, manufacture and maintenance of farm implements and machinery. It is a scientific application of engineering techniques to agricultural production.
4. **Agricultural Economics:** Is the application of management and economic principles to agricultural operations. It is concerned with how agricultural resources can be combined or utilized in such a way as to achieve efficiency in the production, distribution and consumption of agricultural products.
5. **Agricultural Extension:** Deals with the education of farmers, development and dissemination of agricultural information, the transfer of innovations and technology to farmers and the study of the life style and pattern of relationship in farming societies.

These are the main broad fields of agriculture. Each of these fields has several sub-branches and many other new areas are emerging daily due to the wideness of the discipline and the high rate of innovation that is taking place in our modern world.

Thus, Agronomy can be broken into Crop Production, Soil Science, Horticulture (vegetable production), and Crop Protection while Animal Production includes animal nutrition, animal breeding, animal health, animal physiology and anatomy, animal biochemistry etc. Agricultural Economics includes farm management, agribusiness management, agricultural finance, agricultural marketing, production economics, resource economics etc.

Agricultural Extension includes agricultural communication, rural sociology, home management, community development, agricultural education etc. Agricultural Engineering consists of farm power and machinery, crops and livestock processing and storage, soil and water conservation, land surveying and farmstead planning etc.

New sub-disciplines of agricultural production that are daily evolving or taking on new prominence include apiculture(bee farming), snail rearing, wine grapes production (viticulture), ostrich farming, trees and orchards cultivation (arboriculture), forest management (silviculture) etc.

IMPORTANCE OF AGRICULTURE AND ROLE OF AGRICULTURE IN NATIONAL DEVELOPMENT

Agriculture serves two basic roles to mankind. These are the:

i. Biological roles of provision of food and food substances to mankind for its nourishment and health.
ii. Economic roles of facilitating income generation and promoting trade.

Based on these two roles, the importance of agriculture to mankind include the following:

1. **It is a source of Food:** The basic biological role of agriculture is the provision of food for man and feed for animals. Food is basic for life and is required by man and animals for nourishment, energy, body maintenance and growth. It is through agriculture that sustained food production is achieved. Some of the food items derived from agriculture include crops products such as maize, rice, yam, fruits, animal products like meat, eggs, fish, milk etc and feed/fodder for livestock.
2. **It is a source of employment and income:** The major economic role of agriculture is the provision of income for farmers and farm workers. In early subsistence societies, this income was in form of food, shelter, clothing etc. thereby making man self-sufficient. In modern societies however, agriculture generates additional income for farmers through sale of crops, and crop products, and animals and livestock products. Agricultural workers also earn income through salaries. For many developing countries, agriculture is the major employer of labour. It is therefore the source of income of the greater majority of the people. Over 55% of the working

population in Nigeria, for example derive their income directly or indirectly from agriculture.

3. **It is a source of raw materials for industry** – agriculture provides the raw material needs of many industries. Many industries owe their existence largely to agriculture. These include:
   - *Canning factories which produce tomato purees, fruit juices, canned fish etc. using tomatoes, fruits of various kinds, and fish respectively.*
   - *Latex industries for tyres, foams and mattresses from rubber.*
   - *Beverage industries which uses cocoa, coffee, tea, etc.*
   - *Leather industries that uses animal hides and skins for shoes, bags, leather jackets, caps etc.*
   - *Cosmetic industries that produce soaps, body creams etc from palm oil and vegetable oil*
   - *Paper industry for papers using wood pulp*
   - *Tobacco industries for cigarettes and cigars from tobacco leaves.*
   - *Livestock feed industries which use cereals, other grains and farm by-products.*
   - *Drug industries in which chemical and soaps extracted from plant leaves, roots, branches etc and animal boches are used to produce injections, tablets, capsules etc for curing diseases.*
   - *Textile industries for clothing, threads, buttons etc using cotton, wool, naimal hooves etc.*
   - *Furniture industries which use timbers, leathers etc.*

   While attempts are being made to develop synthetic alternatives for some of these products, many of them

still rely heavily on the above agricultural raw materials for their operations.

4. **It is a source of income and foreign exchange for the government:** Agriculture provides the income with which government carry out development activities. Government generates income through tax paid by farmers and also through the activities of government owned farms and farm related organisations. Similarly essential foreign exchange is generated through the export of agricultural items. Conversely, scarce foreign exchange is saved through the local production of food products that would have been imported. Some of the major crops traditionally exported by Nigeria are cocoa, palm oil, groundnuts, cotton etc. However, with the discovery of oil, the export of agricultural products by Nigeria has fallen drastically.
5. **It provides materials used by men for shelter and household furnitures.**. These include timber, thatches, planks, woods etc which are used as pillars and roofing materials, and for constructing household furniture items like beds, chairs and tables etc.
6. **It is a source of fuel and power:** Many households use fuelwood as their main source of energy for cooking and keeping the house warm. Some industries such as saw milling and wood processing companies also rely on wood for their energy supply.
7. **It provides facilities for recreation, tourism and adds aesthetic value to life.** Parks, game reserves, flower gardens etc. beautify nature and the scenery. Horse racing, polo, bullfights, cock fights etc. are also games highly enjoyed by some.

8. **It provides herbs used for medicinal purposes.** Some societies rely heavily on leaves, barks, root etc of agricultural plants for curing many diseases. This is especially so in many African and Asian countries. In addition, the raw materials used to produce some of the drugs used in orthodox medicine are extracted from agricultural plants and animals.

EVOLUTION AND HISTORICAL DEVELOPMENT OF MODERN AGRICULTURE

Agriculture is as old as man. The earliest men were nomads, who gathered wild fruits and hunted wild animals to meet their food needs. However, as man started to live a sedentary life and he began to live in settlements, he noticed that some parts of the wild fruits he had thrown away after eating them were germinating into crops. He therefore started gathering and planting them. This was the beginning of farming. Man also realized with time that some wild animals could be tamed and made to live with man. This gave rise to the domestication of farm animals. This process of domesticating crops and animals was aided by the development of simple tools for digging and hunting made from chipped stones. It is generally believed that the domestication of many plants and animals started in America and Europe a long time ago. Many crops have now been domesticated but many wild plants and animals still exist which have not or could not be domesticated.

Agriculture started as an art through the practice of farming. However, as man's knowledge about his environment increased and he started to produce better tools from stone, wood and metals, he started to condition his environment to make it conducive for him. This he did by carefully studying the environment and

applying the knowledge gained to the production of crops and animals. This application of scientific principles to farming lead to improvements in the quantity and quality of farm produces, reduction in time required for crops to germinate and mature and reduction in the amount of effort required to produce crops and animals, among others.

Four historical stages of agricultural development can be identified. The first period extends from the time that man first appeared on earth to around 10000 B.C when settled agriculture was discovered through gathering and planting of grains. Period 2 covers the time of invention of settled agriculture to the evolution of traditional systems of farm production such as shifting cultivation and bush fallowing. The third stage was from the middle of the 19th century. It is characterized by the application of scientific knowledge into agriculture leading to mechanization of agriculture, development of chemical fertilizers and pesticides and improved crop varieties and livestock breeds, massive expansion in agricultural outputs and greater integration between agriculture and industry.

TYPES OF AGRICULTURE

There are two main types of agriculture. These are:

1. Subsistence agriculture
2. Commercial agriculture

Subsistence Agriculture

This is the type of agriculture in which farm production is aimed primarily at meeting the consumption needs of farmers and their households. In this case, farmers are not really producing crops and livestock for sale but mainly to meet their food needs. In general, subsistence agriculture is characterized by:

i. Poor, traditional and inefficient farming tools and methods.
ii. Relatively small, scattered and isolated farm holdings, and thus, little or no inflow of scientific knowledge and technology into the farming community
iii. High dependence on unpaid labour (usually that of the farmer and his family).
v. Very little use of modern machines and capital equipment.
vi. Strong effects of culture, tradition, superstitions, and/or religion on farm practices.
vii. Little reliance on purchased inputs such as seeds and fertilizers.
viii. Little specialization and farmers are often not price conscious.

Commercial Agriculture

This is the type of farming in which the primary aim of the farmer for producing is to sell the output for profit. The characteristics of commercial agriculture include:

i. Large part of farm output is for sale.
ii. Reliance on modern and improved tools, equipment and methods.
iii. Relatively large farm holdings.
iv. Dependence on purchased inputs and hired labour.
v. Intensive farming techniques and relatively large capital investment and management skill requirement
vi. Specialization of farming activities e.g. production of only one type of crop or animal.
vii. Reliance on market forces (i.e. forces of demand and supply) to guide farm decisions.

In real life, pure subsistence farming rarely exist. In most cases, small parts of the output in subsistence farms (usually less than

one-quarter) are offered for sale while the rest are consumed by the farming family. Similarly, parts of the produce in commercial farms are consumed by the farmer but a large percentage (usually over three-quarter) is for sale. Commercial farming may be of two types; small holder peasant agriculture in which the size of farm is relatively small and there is little application of modern farm machinery even though farm output are largely for sale, and plantation farming which involves large scale commercial farming with heavy reliance on modern machinery.

REVIEW QUESTIONS

1. Explain the meaning of the term agriculture.
2. How is agriculture in modern times different from that in traditional societies?
3. Identify and explain the major branches of agriculture.
4. What are the importance of agriculture to mankind?
5. Explain how agriculture facilitates the survival of industries through provision of raw materials.

REFERENCES

Akinsanmi, O. (1994) *Senior Secondary Agricultural Science*. Enugu, Otuson Nig. Ltd.

Amusan, O., Agbabiaje, J. O. and Akinwande V. O. (1998) *Developmental Agriculture*. Lagos. Egbado Communications Ltd.

Ekemode, K. O. (1999) *Introduction to Agriculture for Sustainable Development*. Lagos. NAAGRED.

Youdeowei et al (1986) *Introduction to Tropical Agriculture*. Ibadan. Macmillan