COP 112:
GENERAL AGRICULTURE 11

NATIONAL OPEN UNIVERSITY OF NIGERIA

COURSE GUIDE

COP 112
GENERAL AGRICULTURE II

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Introduction

You will recollect from the introduction to Cooperative COP 101 that cooperatives came to Nigeria through agriculture. That the first registered Cooperative Society was Gbedun Cooperatives produce and Marketing Society Limited, named after a village near Ibadan in 1937.

Cooperation is a noun derived from Latin word meaning working together. The International Labour Office (ILO) defines cooperatives as an association of persons, usually of Limited means, who have voluntarily joined together to achieve a common economic objective through the formation of a democratically controlled business organization, making equitable contribution to the capital and other inputs required and accepting a fair share of the risks and benefits of the undertaking in which members actively participate.

First, cooperatives are voluntary, self help organisation, set up to solve common problems of members. Second, Cooperatives are Institutionalized organizations which promote group action capable to competing with other business organizations. Third, Cooperation strive at improving the standard of living and general welfare of the members by meeting the economic, social and cultural needs and aspirations of members. Fourth, the word autonomous is the ICA (International Cooperative Alliance) recent definition that underscores the increasing realization of the need for withdraw 1 of government in the management and running of Cooperatives.

Study Units

There are thirty (30) units in this course which are divided into modules of five (5) units and it carries 3 Credit units. The modules are:

Module 1

Unit 1 Cooperatives in Agriculture
Unit 2 The Need for Agricultural Cooperatives
Unit 3 Agricultural Development Policy
Unit 4 Problems of agricultural Cooperatives
Unit 5 Agricultural Development Planning

Module 2

Unit 1 Agricultural Development Programmes
Unit 2 Agricultural Development Programmes (ADP)
Unit 3 Integrated Rural Development
Unit 4 Agricultural Credit

Unit 5 Agriculture Credit Cooperatives

Module 3

Unit 1 Problems of Agricultural Credit in Nigeria
Unit 2 Agricultural Marketing
Unit 3 Characteristics of Agricultural Marketing in Nigeria
Unit 4 Marketing Institution
Unit 5 Co-operative Marketing Organisations

Module 4

Unit 1 Problems of Food Processing Cooperatives
Unit 2 Storage of Agriculture Products
Unit 3 Major causes of Losses of Agricultural Produce
Unit 4 Method of Storing Agricultural Produces
Unit 5 Costs and Benefits of Storage

Module 5

Unit 1 Pasture and Forage
Unit 2 Common Weeds Founds in Farms
Unit 3 Cash Crops (Cocoa)
Unit 4 Cash Crops (Oil Palm)
Unit 5 Plant Diseases and Pests

Module 2

Unit 1 Fertilizer /Manure
Unit 2 Livestock Farming (Poultry)
Unit 3 Care and Management of Poultry
Unit 4 Livestock Farming (Cattle Production)
Unit 5 Livestock Farming (Sheep and Goat Production)

Assignment File

The assignment file will be made available to you. Inside, you will find details of the work you must submit to your tutor for marks. The marks you obtain for these assignments will count towards the final mark you obtain for this course. Any further information on assignment will be found in the assignment file. Assignments will nom1ally attract 40% of the final grade, while the formal examination also attracts 60%. The addition of the assignment and the final examination adds up to 100%, the assignment policy of the University as stated in the student handbook should be observed.

Application for extension should be submitted to the tutor. If the assignment is posted to the tutor, it is the responsibility of the student to check with his/her tutor to confirm the receipt of such assignment so posted. As a precaution you are advised to keep a copy of each assignment you submit. At the end of every 4 units i.e., at the end of 4,8,12 units, you should turn in answers to the Tutor-Marked Assignment (TMA) questions. You are advised to be very systematic in following the instruction as pertaining to your course of study.

Final Examinations and Grading

The final Examination of General Agriculture II will be question papers of 2 ½ to 3hrs duration and has a value of 60% as formerly stated of the course grade. All areas of the course will be examined. As a result, it is very important that you read through the whole course material as many times as possible as were permutation may disappoint you.

Working through this Course

Before you can have satisfaction of the mind that indeed you have completed the course, you ought to have read through all the study units contained therein, in addition, read the set books and read other materials provided by the University. The National Open University of Nigeria (NOUN). Each unit, as has been pointed out, contains self-assessment exercises, and at certain points in the course, you are supposed to submit assignments for assessment purpose, especially the TMA assignments. At the end of the course, there will be a final examination to you're your mastery of the course.

Tutor-Marked Assignment

There are tutor-marked assignments in this course. You are strongly advised to attempt and submit all assignments. Each assignment counts towards your total course mark. When you have completed each assignment, send it together with a TMA form to your tutor. Make sure that each assignment you turn in reaches your tutor on or before the deadline given. If for any genuine reason, you cannot complete your work, on-time, contact your tutor before the assignment is due to discuss the possibility of an extension for you. Extension will not be granted after the due date unless in exceptional circumstances backed up with good reasons.

Facilitators/Tutors and Tutorials

There are 60 hours of tutorials i.e. twenty 3-hour sessions provided in support of this course. You will be notified of the dates, time and

location of these tutorials, together with the name and phone number of your tutor, that is, as soon as you are allocated a tutorial group.

Your tutor will mark and comment on your assignments, keep a close watch on your progress and on any difficulties you might encounter and provide assistance to you during the course. You should always remember to mail your tutor-marked assignment to your tutor well before the due date as was earlier mentioned to you. They will be marked by your tutor and ret1lm to you as soon as possible.

Do not hesitate to contact your tutor by telephone, e-mail. The following might be circumstances in which you would find help necessary.

- You do not understand any part of the study units
- You have difficulty or problems with the self-tests or exercises
- You have a question or problem with an assignment, with your tutor's comments on any assignment or with the grading of an assignment.

Try your best to attend the tutorials, as this is the only chance to have face to face contact with your tutor and to ask questions if need be.

How to get the Most from this Course

Below are some points that could be of help to you, while working through this course:

- Read the course guide thoroughly
- Organize a study schedule, Note the time you are expected or should spend on each unit and how the assignments relate to the units.
- Once you have created your own study schedule, do everything you can to stick to it.
- Review the objectives for each study to confirm that you have achieved them. If you feel unsure about any of the objectives, review the study material or consult your tutor.
- After completing the last unit, review the course and prepare yourself for the final examination

When you are confident and satisfied that you have achieved a unit's objectives, you can then move on to the next unit. Proceed unit by unit through the course, pacing your studies and making the whole exercise easy for yourself.

Summary

COP 112 tries to introduce you to the Principle and applications of agricultural practices and systems. Base upon your understanding of this course, you will definitely be equipped with the basic knowledge about co-operatives as it relates to agriculture.

- The principles of Co-operatives
- The various types of Co- operation
- Agric Development Policy (ADP)
- Agric Marketing
- Storage of Agriculture products
- Cash crops
- Care and management of poultry etc

We wish you success in the course and hope that you will find it both interesting and useful.

Course Code COP 112

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CONTENT S **PAGES**

MODULE 1

UNIT 1 CO-OPERATIVES IN AGRICULTURE

CONTENTS

1.0 INTRODUCTION

This is the continuation of the introduction to agriculture dealt with in the last semester. This is the General Agriculture and we shall make all efforts to explain in details especially how agriculture is related to co-operatives.

During this course, you will discover that co-operatives came to Nigeria through agriculture and the need to study agricultural co-operatives. You arc going to spend at least two hours to go through it. While going through as we did in the introduction to Agriculture, there are exercises that will also help to learn this course faster. Please endeavour to go through them especially the tutor marked assignment which are meant for you. Try your hands on them so as to be self-assured that you have mastered the points raised.

Also during this course, there will be practical exercises to give a better understanding and the picture of agricultural practices which will enable your clear observations of various facts and practices of the farming system.

2.0 OBJECTIVES

By the end of this Unit, you should be able to:

- describe co-operatives as it relates to agriculture;
- understand the principles of co-operatives; and
- explain the various types of co-operatives.

3.0 MAIN CONTENT

3.1 Co-operatives in Agriculture

You will recollect from the Introduction to co-operation COP 101, that co-operatives came to Nigeria through agriculture and the first registered co-operative society was Gbedun Co-operatives produce and Marketing Society Limited named after a village, near Ibadan in 1937.

3.2 What are Co-operatives?

Cooperation is a noun derived from Latin word meaning working together. A cooperative has been defined in different ways. H. Calert (1951)) defines cooperatives as an organization wherein persons voluntarily associate together as human beings on the basis of equity for the promotion of the economic interest of themselves. The International Labour Office (11, 0) defines cooperatives as an association of persons usually of limited means, who have voluntarily joined together to achieve a common economic objective through the formation of a democratically controlled business organisation, making equitable contribution to the capital and other inputs required and accepting a fair share of the risks and benefits of the undertaking in which members actively participate.

In 1995, the International Co-operative Alliance (ICA), reviewing the values and principles of co-operatives, defines co-operatives as an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically controlled enterprise. In all these definitions four characteristics of co-operatives deserve attention.

First, co-operatives are voluntary, self-help organization, set up to solve common problems of members. Second, co-operatives are

institutionalized organizations which promote group action capable to competing with other business organizations. Third, co- operatives strive at improving the standard of living and general welfare of the members by meeting the economic, social and cultural needs and aspirations of members. Fourth, the word autonomous is the ICA recent definition underscores the increasing realization of the need for withdrawal of government in the management and running of co- operatives.

3.3 Values and Principles of Co-operatives

Co-operatives are legal, institutionalized and voluntary organizations characterized by the values of self-help, self-responsibility, democracy, equality, equity and solidarity. In the tradition of the founding fathers, co-operatives members believe in ethical values of openness, honesty, social responsibility and caring for others within their areas of operation.

The basic principles of co-operatives essentially distinguish co-operatives from other enterprises. The principles stated by the founders Rochdale pioneers were modified over the years owing to development within the global co-operatives movement and changes in the socio-economic environment in which they operate. Below are the ICA 1996 and 1995 co-operatives principles.

3.3.1 ICA 1996 Co-Operatives Principles

1. **Open Voluntary Membership**: Co-operatives are voluntary associations and membership is open to all without racial, political or religious discrimination.
2. Democratic Control of the Business Enterprises.
3. **Limited Interest on Capital**: The return on the owners invested capital is limited.
4. **Equitable Distribution of Surpluses**: The surplus from the business transaction is returned to patrons as bonus on patronage on an equitable basis.
5. Co-operative provides education to members staff, officers and the public.
6. **Co-operative among Co-operators**: There is vertical and horizontal co-operation amongst co-operative members.

3.3.2 ICA 1995 Co-Operative Principles

1. **Voluntary and Open Membership**: Co-operatives are voluntary organizations. They are open to everyone who is able to use their services and willing to accept responsibility of membership, without social, political, racial, and religious or gender discrimination.

2. **Democratic Control of the Business Enterprise**: Members control the co-operative enterprise by actively participating in formulating policy objectives and designing strategies through which the policies are achieved. Men and women who serve as elected representatives are accountable to the membership. Members have equal voting rights.

3. **Members Economic Participation**: Members contribute equitably to, and democratically control the society's resources i.e. capital etc. Members receive limited compensation on capital. They allocate surplus for developing their co-operatives, setting up reserves, bonus to members in proportion to their transaction with the co- operatives and supporting other activities approved by members.

4. **Co-operatives are Autonomous and Independent:** Co-operatives are autonomous and self-help organizations controlled by their members. However, when they enter into agreement with other organizations, including governments or financial institutions, they should do so on terms that ensure democratic control by their members, and maintain their autonomy.

5. **Education, Training and Information**: Co-operatives provide education and training for their members, elected representatives, and employees so that they can contribute effectively to the development of their cooperatives. They also inform the general public about the nature, practice and benefits of co-operatives.

6. **Co-operation among Co-operatives**: Co-operative members work together to strengthen the cooperative movement through local, national, regional and international structure.

7. **Concern for the Community**: Co-operatives ensure the sustainable development of their communities through policies approved by their members. The adoption of this 7th principle by the ICA further emphasizes the vital role of co-operatives in ensuring sustainable development of the communities in which they operate through their activities.

SELF-ASSESSMENT EXERCISE 1

i. Define the term Co-operative.
ii. State the I.C.A 1995 Co-operatives Principles.

3.4 Types of Co-operatives

3.4.1 Informal Co-operatives

Informal Co-operatives are traditional or indigenous organizations which were in existence before the advent of formal co-operatives in Nigeria. Self-help form outside the use of ineffective farm tools. Services provided by these organizations arc economic; social and cultural in nature. Among such organizations are the "Owe" and "Gaya" which are community age-groups common in the south western and northern states of Nigeria respectively. The groups engage in assisting members co-operatively in farm work by providing labour, rotationally in members' farms.

Credit institutions (Esusu "Ajo" Yoruba and "Adasi" Hausa) accumulate capital through member savings and provide savings and credit to interested members. Theses are sometimes, referred to as pseudo-co-operatives, pre-cooperatives or quasi- cooperatives, or traditional cooperatives in literature.

3.4.2 Characteristics of Information Co-operatives

1. They are traditional mutual aids associations
2. They have informal organizational structure
3. They are usually small in size
4. They are localized in scope
5. They are not registered hence without legal backing
6. They are familiar to all within their area of operation being indigenous association
7. No book of accounts or proper records.

3.4.3 Formal Co-operatives

The development of formal co-operatives started when few individual cocoa farmers formed the Agege Planters Union in 1907.

The objectives of this group briefly were:

- To extend credit to members
- To impact knowledge of improving the quality of their cocoa
- Provide infrastructure and where possible to organize direct sales of their products to the world market

Following the example of Agege Planters Union, other cooperatives associations, sprang up in wide areas of South Western Nigeria. The widespread nature of the cooperative associations, the pressure they

exerted on the government for improved cocoa prices coupled with the unstable world cocoa market and the exploitation of the various foreign cocoa firms attracted government attention. The government established fermentaries which became the nuclei of modern cooperative organization in Nigeria.

By 1928, the fermentaries were upgraded to marketing societies by the department of agriculture. The response from farmers was encouraging such that, at the end of the first year, there were 4,850 members and the quantity of cocoa handled was 1,600 tones. To give them a legal backing, a co-operative society ordinance was passed in 1935, accompanied by bye-laws on the recommendation of the Strickland commission. The bye-laws stipulated the following objectives.

i. Arranging for the sale of members cocoa to the best advantage
ii. Encouraging members to produce the highest quality cocoa
iii. Advancing loans to members
iv. Encouraging thriftiness among members by accepting their deposits
v. promoting the co-operatives spirit among members.

In 1935, an administrative, officer (E.R., Haig) was appointed to study cooperation abroad and eventually became the first Registrar of cooperatives societies. By 1936, a few African staff was appointed and the control of cooperatives was gradually transferred from agricultural department to the co-operative department.

3.4.4 Registration

The first registered co-operative society in Nigeria is the Gbedun Co-operative Produce and Marketing Society Limited, named after a village near Ibadan. Gbedun C.P.M.S was registered in 1937. Thereafter, formal co-operative spread rapidly from the western part to other parts of the country. Some features of the development of formal co- operatives are as described above include:

i. They were sponsored through government initiative and were part of a government ministry.
ii. This government initiative and active financial support became the key to the .success of the cooperative movement because of the acute shortage of owned capital inadequate trained personnel, and inadequate facilities for education of members and officers in the cooperative movement.
iii. The agricultural cooperatives perform mainly marketing, credit, supplies and production functions.

iv. Co-operative was originally and has predominantly been developed around agriculture. This implies that agricultural co-operative, which is just one of the different types of co-operatives is the most numerous and wide spread particularly in the rural areas.

SELF-ASSESSMENT EXERCISE 2

i Classify Co-operatives into various types.
ii. What are the characteristics of Informal Co-operatives?

4.0CONCLUSION

You have agreed that co-operative is an association of persons usually of limited means who have voluntarily joined together to achieve a common economic objective through the formation of a democratically controlled business origination, making equitable contribution to the capital and other inputs required and accepting a fair share of the risks and benefits of the undertaking in which members actively participate.

5.0 SUMMARY

A better understanding of co-operatives has been clearly explained through the definition and the various types of co-operatives which clearly revealed that co-operatives came to Nigeria through agriculture and that the 1995 International Co-operatives Alliance Principles of Co-operative is now better understood and that modern co-operation developed from these traditional forms of co-operation.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. Co-operative by I.C.A definition is an association of persons usually of limited means, who have voluntarily joined together to achieve a common economic objective through the formation of a democratically controlled business organization, making equitable contribution to the capital and other inputs required and accepting a fair share of the risks and benefits of the undertaking in which members actively participate.

ii. The I.C.A.1995 Co-operative Principles are:

1. Voluntary and open membership
2. Democratic control of the business enterprise
3. Members economic participation
4. Co-operatives are Autonomous and Independent
5. Education, training and information

6. Co-operation among Co-operatives
7. Concern for the community

ANSWER TO SELF-ASSESSMENT EXERCISE 2

i. Co-operatives may be classified into two groups:

- Informal - The Traditional Co-operatives
- Formal - Modern Co-operatives

ii. The Characteristics of Co-operative include:

i. They are traditional mutual aids associations
ii. They have informal organizational structure
iii. They are usually small in size
iv. They are usually small in size
v. They are familiar to all within their area of operation being indigenous associations.
vi. They are not registered hence without legal backing
vii. No proper records of accounts.

6.0 TUTOR–MARKED ASSIGNMENT

1. a. Define Co-operatives.
b. Give the 1995 I.C.A Principles of Co-operatives.
2. What are the types of co-operatives, state the characteristics of the informal co-operatives.

7.0 REFERENCES/FURTHER READINGS

Aweto, R. A. (1996). *Agricultural Co-operatives*.

Ijere, M. O. (1992). *Prospects of Nigerian Co-operatives*.

Calvert, H. (1959). *The Law and Principles of Co-operation*.

UNIT 2 THE NEED FOR AGRICULTURAL CO-OPERATIVES

CONTENTS

1.0 INTRODUCTION

This is a follow up to Unit 1 which spelt out Co-operatives in Agriculture. This Unit deals directly with the need for agricultural co-operatives. You will recollect from the proceeding unit that cooperatives came to Nigeria through agriculture and this is the need for us to examine agricultural co-operative at this stage and its contributions to the socio-economy of Nigeria.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- understand the need of agricultural co-operatives;
- explain the various types of agricultural operatives; and
- explain farmers' benefits as a co-operator.

3.0 MAIN CONTENT

3.1 Definition of Agricultural Co-operatives

Agricultural Co-operatives are autonomous associations of persons united voluntarily to meet their common economics, social and cultural needs and aspirations through jointly owned and democratically controlled agricultural enterprise.

3.2 The Need for Agricultural Co-operatives

From the various monitoring exercises and the extension services in the data collected, the following specific conditions of small-scale farmers necessitates collective action through the formation of agricultural co-operatives.

1. The individual small-scale farmer is often unable to procure and use efficiently inputs to production such as land, capital etc.
2. The individual small-scale farmer is too poor to bargain for discount in the input market and ensure regular supply.
3. The farmer alone is unable to take advantage of economics of scale, thus production units are underutilized.
4. The farmer is rarely able to withstand losses arising from natural hazards.
5. The farmer is unable to carry out marketing research required for efficient marketing of produce
6. The individual farmer cannot demonstrate to the appropriate authorities his/her need for public utilities and agricultural infrastructures for enhanced productivity.

3.3 Types of Agricultural Co-operatives

Different types of agriculture co-operatives, because they are not directly involved in production process. However, they provide services which are vital for effective performance of the members, who undertake agricultural production. There are various forms of auxiliary agricultural co-operative societies. Some of these are discussed below.

3.3.1 Auxiliary Agricultural Co-operatives

These are also referred to as service co-operatives, because they are not directly involved in production process. However, they provide services which are vital for effective performance of the members, who undertake agricultural production. There are various forms of auxiliary agricultural co-operative societies. Some of these are discussed below.

3.3.1.1 Agricultural Thrift and Credit Co-operative Society (ATCCS)

This society otherwise, called Rural Thrift and Credit Co-operative Society, accumulate capital through member's shares, savings etc. and external loan when necessary. The society encourages thriftiness amongst members and thus helps to save members' money. Fund created is disbursed to members as credit for productive purposes. A major benefit of this type of society is that members have easy access to credit facilities. The lending policy is devoid of the numerous bottlenecks prevailing with other formal financial institutions such as laborious paperwork, demands for collateral security, guarantor etc. It operates a character lending policy. Guarantors are another member. The interest rate is relatively low, with an average maximum of 10% interest per annum, compared with other credit sources. Members are also educated on the management of loan. Thus, a well organized and efficiently managed ATCS enhances members' solvency and solves their problems of indebtedness.

3.3.1.2 Agricultural Supply Co-operative Society (ASCS)

Agricultural Supply Co-operative Society pools members' resources to procure inputs of production such as farm tools, agro-chemicals (fertilizers. herbicides etc), improved seeds and seedlings and retail to members at fair prices. The society takes advantage to economies of scale and discount given for bulk purchase. This arrangement ensures easy, timely and regular supply of inputs to the farmers. The supply of inputs is also made to tally with seasonal requirements. When effectively managed, members are encouraged to increase and sustain their productivity levels. The Co-operatives Supply Association of Nigeria is a regional apex organization registered in 1951. It procures and distributes .agricultural chemical and equipment in Nigeria.

3.3.1.3 Agricultural Produce Marketing Co-operative Society

Agricultural Produce and Marketing Co-operative Society collects members' produce and sells same "on the market" at the best possible price. The proceed is passed on to the members. Through this collective

effort marketing cost is minimized, better prices are demanded, activities of middlemen are reduced and members' income are stabilized to a great extent.

Originally, marketing co-operatives was organized for cash crops (cocoa, cotton, groundnut, coffee, palm kernel, ginger, copra, chillies). Co-operatives has however developed to embrace food crops such as rice, palm oil, beans etc. Agricultural marketing co-operatives have a vital role to play in interstate commodity trade.

Other types of single purpose agriculture co-operatives include processing and storage co-operative societies.

SELF-ASSESSMENT EXERCISE 1

Explain the need for agricultural co-operative especially for the small-scale farmers.

3.3.2 Agricultural Production Co-operatives

There are three main types of agricultural production co-operatives. The degree of integration of members' activities is the main distinguishing factor. These are as follows:

3.3.2.1 Agricultural Production Co-operative Society Operated on Individual Basis

Members carry out actual production activities on their separate farmlands, at their own risks and responsibilities. However, since the objectives of this society is to produce best quality products at least cost possible, capital resources, are pooled together to purchase all inputs of production. It is often organized by farmers with contiguous farms. In this way, cooperative successfully avoids exploitation of the members. Members also readily have access to credit and market information. Modern technology or innovation is also readily dissemination to members for improved productivity cooperative, is essentially a multi-purpose cooperative society because it provides multiplicity of services to member

3.3.2.2 Agricultural Production Co-operative Society Organized Jointly by Members

This type of co-operative society is called by different names, in literature, such as community cooperative farm, cooperative group farming society, joint farming society etc. A very significant feature of this cooperative is that the farms are run on communal basis. All factors

of production, land, labour, capital, skill etc are integrated. The land is cultivated as a single farm with centralized management. The society plans the production programme, and provides security to the members. It is obligatory for each member to be actively involved in the production activities of the society based on the society's policy. All inputs of production are purchased jointly and hence farmers enjoy the benefit of economics of scale, avoid exploitation and ensure regular supply of inputs, the products of the society are sold jointly to the best advantage of the members.

Proceeds realized are shared amongst members after deduction of total expenses incurred and providing for all statutory reserves. This is shared in proportion to the member's contribution to society's activities.

3.3.2.3 Co-operative Tenant Farming Society

This type of agricultural cooperative society obtains land on freehold, divide same into suitable holdings and lease to members to cultivate as tenants, with the society as landlords. This is very important in areas where individual funds are very difficult to acquire land for agricultural production due to institutional barriers.

Each member pays a fixed rent for his or her farmland. While the cultivable land is farmed according to the society's plan, members are at liberty to produce desired crops and livestock. Depending on the byelaw, the society, any arrange for supply of other inputs of production required by members and marketing of members produce. The profit made after meeting all expenses and providing for reserves is shared among members in proportion to the rent paid and patronage by tenant members of the society's services.

SELF-ASSESSMENT EXERCISE 2

i. What is an auxiliary agricultural cooperative?
ii. Explain the term agricultural production cooperatives.

3.3.2.4 Agricultural Multi-Purpose Co-operative Society

This is organized by farmers with the objective of providing more than one service to themselves. The society performs at least two functions. It promotes integration of economic activities such as mobilizing capital to provide credit and inputs of production to members. It may also assist members with storage, processing and marketing of produce. The range of services provided by the society is determined by the members and the society's capability.

Agricultural multi-purpose cooperative enhances members' participation in the society and reduce disloyalty exhibited by members who belong to more than one society. However, for easy integration of the functions performed by a multi-purpose agricultural cooperative, the society should take off as a single purpose cooperative, with gradual introduction of other functions, one at a time. This allows for efficiency in the performance of the society. In this case, the success records in performing the single function provide the impetus for providing additional services.

Agricultural multi-purpose cooperative society has some significant advantages over single purpose cooperative society. These include the following:

1. A multi-purpose co-operative society has some significant advantages in that multi-purpose societies employ only one set of management staff i.e. one manager, secretary, book-keeper etc. this results in savings in money expended on staff emoluments.
2. The principle of diversification of enterprises employed ensures stability of the society and members' income.
3. It promotes linkage of economic activities
4. It reduces proliferation of subscription of shares, savings etc to various single-purpose co-operative societies.
5. Agricultural multi-purpose co-operative has greater capacity for promoting rural development by integrating many economic and social activities under on umbrella.
6. Suppressing and auditing of multi-purpose co-operative society is also cost effective compared with two or more single-purpose societies which offer similar services.

Inspite of these merits, multi-purpose co-operatives require great skill to manage due to the multiplicity of operations.

3.3.2.5 Farm Settlements Co-operative Society

A farm settlement scheme is a scheme designed deliberately to settle farmers outside their native homes where they will be taught and encourage to adopt new techniques of agricultural production instead of the traditional methods they re used to. Farm settlements are established by the government and given to farmers-settlers to manager. The cardinal objectives of the settlement are:

1. To provide employment to young school leavers who may not be absorbed by the public service and private sector.
2. To reserve the prevalent rural-urban drift by making rural life comfortable and attractive.

3. To ensure effective utilization of national and land resources especially in sparely populated areas where fragmented land holdings have been consolidated.
4. To increase and maintain agricultural production at a level to sustain the population.
5. To create awareness of the importance of agriculture in people and demonstrate that farming is as lucrative as white-collar jobs.

Often, the government provides the settles with dwelling places, contiguous land holding, while most inputs of production are supplied at the beginning, at subsidized rate. This is to stimulate participants' interest in the programme. However, the settlers pay for the resources provided including cost of housing over a specified period at fair interest rate. The setters, on completion of the repayment, become the owners-occupiers of their houses and other facilities on the terms of contract.

The factors that determine the sizes of settlers holding include:

a. Available family and hired labour
b. Size of family income
c. The extent to which the family can use in divisible inputs of production like tractors and machinery
d. Economics of scale in all the operators of the farmer

Farm settlement co-operative society is therefore formed when the settlers pool their resources together to undertake agricultural enterprises on co-operative principles.

3.4 Farmer's Benefits as Co-operators

A farmer derives both social and economic gains as a member of co-operative society. By belonging to an agricultural co-operative society, he/she learns such virtues as (1) orderliness (2) foresight (3) punctuality and (4) strict respect for engagements entered into, which are not necessarily profit-oriented. In addition, the farmers make socio-economic gains. These include:

1. The farmer is now a part of a social gathering identified by common needs and objectives.

2. There is usually a sense of belonging which makes him/her act in concert with others in matters affecting the group, in the decision making process and implementation of programmes. Thus, he/she is exposed to better opportunities for skill improvement.

3. The farmer-member has access to the tree training and functional education facilities provided by the society.

4. Economically, farming needs and problems of each member are the concern of the group e.g. he/she .could hire agricultural machinery and equipment from the society more cheaply than buying these as an individual.

5. Agricultural inputs (seeds, seedling, insecticides, fertilizers, fungicides etc) could easily be obtained and at cheaper prices by the farmers from the co-operative society.

6. There is also a great opportunity for capital formation. The farmer-members pool their financial resources together with a view to providing credit to members.

7. The equitable distribution of bonus to members from the society's annual surpluses is assured. Besides the share capital payable by each member is within the reach and control of members.

8. The members of co-operatives have easier access to government aid schemes for improved production and income such as agricultural loan facilities.

9. A member of co-operative society can also process, store and market his/her farm products more efficiently and for a lower cost through the use of joint facilities and services provided by the society.

10. Finally, there is significant increase in farmer's productivity, income and eventually increased standard of living, general welfare of the farmer and his/her family.

SELF-ASSESSMENT EXERCISE 3

i. Mention the various types of agricultural co-operatives.
ii. Give five benefits of farmers as co-operator.

4.0 CONCLUSION

This unit has really analyzed the various types of agricultural co-operatives and the need for these co-operatives.

5.0 SUMMARY

This unit gave a better understanding of the need for agricultural co-operatives especially the small-scale farmers which also highlighted the types of agricultural co-operatives to include the auxiliary, production, and multi-purpose. It also explained the farmer's benefits as co-operators.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The need for agricultural co-operatives includes:

a. The individual small-scale farmer is often unable to procure and use efficiently inputs to production such as land, capital etc.
b. The individual small-scale farmer is too poor to bargain for discount in the input market and ensure regular supply.
c. The farmer alone is unable to take advantage of economics of scale, thus production units are underutilized.
d. The farmer is rarely able to withstand losses arising from natural hazards.
e. The farmer is unable to carry out marketing research required for efficient marketing to produce.
f. The individual farmer cannot demonstrate to the appropriate authorities his/her need for public utilities and agricultural infrastructures for enhanced productivity.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

i. Auxiliary Agricultural Co-operatives are referred to as service co-operatives because they are not directly involved in the production process. However, they provide services which are vital to effective performance of members who undertake agricultural production. These are various forms of auxiliary agricultural co-operative societies. These include:

- Agricultural Thrift and Credit Co-operative Society
- Agricultural Supply Co-operatives Society
- Agricultural Produce Marketing Society

ii. Agricultural Production Co-operatives are those societies that specialize in the production of food, raw materials for the local industries. They all carry out production activities. The degree of member's activities is the main distinguishing factor. This includes:

- Agricultural Production Co-operative Society Operated on individual basis.
- Agricultural Production Co-operative Society organized jointly by members.
- Co-operative Tenant Farming Society.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

i. The various types of agricultural co-operatives include:

a. Auxiliary Agricultural Co-operative
- Agricultural Thrift and Credit Co-operative Society (A.T.C.S)
- Agricultural Produce Marketing Society (A.S.C.S)

ii. Agricultural Production Co-operatives:

- Operated on Individual basis
- Operated on Joint basis
- Operated on Tenant Farming Society
- Agricultural Multi-purpose Co-operative Society
- Farm Settlement

ii. Five benefits of Farmers as a Co-operator include:

- The farmer is now a part of a social gathering identified by common needs.
- There is a sense of belonging that makes then concern with others in matter affecting the group.
- The farmer member has access to free training and functional education.
- There is also a great opportunity for capital formation.
- Easier access to go government aid schemes.

6.0 TUTOR-MARKED ASSIGNMENT

1. a. Briefly explain the term farm settlement
   b. What are its objectives?
   c. State clearly the factors that determine the sizes of settlers holding.
2. Make a clear distinction between farmer's production co-operatives and farmer's services co-operatives.

7.0 REFERNCES/FURTHER READINGS

Aweto, R. A. (1989). *Agricultural Co-operatives*.

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UNIT 3 AGRICULTURAL DEVELOPMENT POLICY

CONTENTS

1.0 INTRODUCTION

You will remember that in Unit 3 of the introduction to Agriculture, we discussed extensively on agricultural development. In this unit, you will be going through the agricultural development policy. This will give you a better understanding of the government involvement in agriculture. This has greatly affected the development of both agriculture and agricultural co-operatives. Since the Nigerian independence in 1960, we have had almost 15 different types of governments with different policies in agriculture hence the development in agriculture has been nothing to write home about especially in being self sufficient in food production. The agricultural co-operative policy has also not been consistent hence this has also affected the growth and development of Co-operatives especially those that are agriculturally oriented.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the key points of agricultural development policy;

- understand the policy objectives; and
- examine the role of government in agriculture from the policy.

3.0 MAIN CONTENT

3.1 Definition

Agricultural development policy may be defined as statement of goals, ideals, objectives made by the garment about the agricultural sector of the economy. It is often based on the overall constraints or problems encountered within the sector. It is a declaration of the government of how to solve the identified agricultural problems or constraints. Agricultural development policy therefore indicated the attitude of the government to the agricultural sector witl1in a specified period of time. It outlines the agricultural activities to be undertaken, channels of implementation and systems of accountability. Policy contains targets to be achieved and the means of attaining them. It is referred to as policy objective.

3.2 The Policy Objectives

The primary agricultural policy objectives of any nation are to attain food security. Thus, the Nigeria's agricultural policy focuses on the achievement of self-sustaining growth in every sub-sector of the agricultural sector and the realization of the structural transformation required for overall socio-economic development of the rural environment. Generally, the policy objectives of the Nigeria agricultural sector include:

a. Attainment of self-sufficiency in all basic foodstuff particularly those which consume significant share of the country's foreign exchange but can be produced locally.

b. Acceleration of production and supply of agricultural law materials to meet the growing needs to expanding industrial sector.

c. Increasing the production and processing of export crops thereby enhancing the country's foreign exchange earning capacity.

d. Expansion of rural employment opportunities through improvement in infrastructural facilities in order to increase farmers income and absorb the increasing labour force in the rural areas.

e. Modernization of agricultural production, processing, storage and marketing through improved technology and management techniques, to enable the sector he effectively responsive to the changing demands of the other sectors consequent upon their development.

f. Improvement in the quality of life of rural populace through provision of basic social facilities such as improved health, educational and recreational facilities, electricity, feeder roads and regular portable water.

g. Provision of adequate infrastructures especially those required for combating drought, desert encroachment, soil erosion and flood. Besides, policies are formulated for the various sub-sectors (such as food crop, livestock, fishery, industrial crop, forestry and wildlife, agricultural by-products) and support services (agricultural technology development transfer and extension, credit, insurance, research, land resources. marketing, storage, preservation and processing co-operative etc).

Policies are reviewed periodically in consonance with the prevailing socio-economic conditions, problems and constraints.

SELF-ASSESSMENT EXERCISE 1

Mention four of the policy objectives.

3.3 Problems of Agricultural Sector

You will remember that prior to 1973 when oil emerged as the leading sector of Nigerian economy agriculture was her mainstay as it was the major source of employment, government revenue and foreign exchange. Agriculture's contribution to the gross domestic product in 1970, 1980 were 49% and 21% respectively. Inspite of the declining role of agriculture, it has always been recognized as an important sector in Nigerian economy. It is also an area in which the country possesses considerable comparative advantage. Hence, it offers the greatest potential for expanding the productive base for the nation and diversifying the sources of foreign exchange. With this in view the major problems, constraints and need experienced by the sector are identified and used to formulate policies, strategies and design programmes and projects for the development of the sector. The problems constraints addressed by the development policies are discussed below.

3.3.1 Shortage of Agricultural Inputs

Inadequate input of production is one of the major constraints of the sector. This problem stems from low-level of domestic production, insufficient input, inefficient distribution system and excessive devaluation of the Naira for imported inputs particularly fertilizers, agricultural chemicals, machineries and spare parts. The problem is further aggravated by the following:

1. The little quantity, of inputs available does not get to the farmers when needed.

2. Inputs are not available to the farmers in the correct quantity required particularly inputs such as fertilizers, improved seeds or seedlings, credit, pesticides and herbicides in the crop sub-sector and animal feed and drugs in the livestock sub-sector.

3. Agricultural machineries, spare parts and improved tools which are either imported or manufactured locally with imported components sell for very high prices which the farmers can barely afford.

4. The gradual reduction of subsidy on agricultural inputs and the prevailing high cost of credit tend to reduce new investments in agricultural sector of the Nigerian economy.

3.3.2 Inadequate Basic Infrastructures

The lack of basic infra structural facilities constitute serious constraints to increased production in the agricultural sector. The breakdown of the problem is given below:

1. There is inadequate supply if irrigational facilities such as dams, boreholes, etc which are required to increase production in areas prone to drought particularly in the North. Although, efforts of the government through the Directorate of Food, Road and Rural Infrastructure (in the past), River Basin Authority and Agricultural Development Projects in alleviating this problem through construction of dams etc has yielded some benefits, further development and maintenance of these facilities are becoming more difficult due to high cost of equipment and spare parts.

2. Inadequate processing, storage and marketing facilities are adversely affecting the preservation and effective marketing of agricultural products. Lack of on farm storage facilities couple

farmers to quickly sell their produce to middlemen and in most cases at very low prices.

3. Insufficient feeder reads network causes inaccessibility of rural Nigeria by roads. Thus, transportation and distribution of agricultural inputs and products to and from the farm are hampered.

3.3.3 Technology Related Problems

The level of agricultural technology employed by majority of farmers in the country is still low. Therefore, the agricultural sector still operates at small scale production level. The major problem is that results or research efforts are yet to be transmitted to and adopted by farmers.

3.3.4 Inadequate Extension Services

The problems of extension services and roles it plays in the development of the sector were extensively discussed in chapter two. However, it is important to note, that the problem of low level of technology is further worsened by ineffective transmission of improved technology and farming practices due to ineffective extension service.

3.3.5 Problems Related to the Environment

The crop sub-sector in particular is affected by unfavorable weather conditions such as severe drought (North) soil erosion and flood (South) and disease problems of crop and livestock. Drought and desert encroachment have decimated some crops and livestock which result in heavy losses to farmers.

3.3.6 Poor Implementation of Programmes

On the formulation of agriculture development policies, programmes and projects are devised to attain the policies. Often, the implementation of these programmes and projects are attended by operational inefficiency, due to poor co-ordination of the activities of implementation agencies, high overlap in services provided and unnecessarily high administrative overhead costs. Invariably, these lead to unduly high cost of providing services to the beneficiaries i.e. farmers.

3.3.7 Smuggling

Smuggling activities across the borders of the country is negating the policy of selective closure of Nigerian market to some imports such as

food and non-food items. The problems above reflect the socio-economic, technical, organizational and institutional needs within the agricultural sector. Thus, they provide the basis for the formulation of the policies and designing of strategies through which the policies may be achieved. The strategies are then transformed into programmes and projects of actions which are executed for attainment of the policies. To attain stated policy objectives, planning is imperative and proceeds .programmes of action. What then is agricultural development planning and plan?

SELF-ASSESSMENT EXERCISE 2

i. List the problems of agriculture.
ii. Discuss any two to them.

3.4 Agricultural Co-operative Policy

The Federal Department of Co-operatives in the Federal Ministry of Agriculture is the custodian of all Co-operative Policies in the Agricultural Co-operatives implementing the 1993 Decrees on Nigerian Co-operative Societies in using co-operatives as reliable vehicles for attainment of co-operative programmes as it specifically affects promotion of the development of co-operatives as participatory institution contribution to employment creation, poverty alleviation, income generating and improvement of socio-economic conditions in both urban and rural areas.

3.4.1 The Policy Objectives

The primary policy objectives of the Federal Government on agricultural co-operatives are:

1. To provide a conductive environment which will facilitate co-operative practice and its effective use in agricultural for social and economic development of the rural communities in Nigeria.
2. To promote the development of an effective, efficient and economic agricultural co-operative and use it as a machinery for rural transformation and development

3.4.2 Policy Strategy

In order to achieve these objectives, these strategies are pursued by the government.

1. Intensification of agricultural co-operative education, training and public enlightenment at all levels. This is to increase participation

and involvement of farmers and other rural people in co-operative movement activities. Besides it will hopefully enhance decision making process of the rural people in order to improve their general welfare.

2. To use agricultural co-operatives to achieve the macro-economic objectives of increased domestic production of food and cash crops, industrial raw materials, equitable distribution of inputs and. Production, farm products and other commodities, diversify export earnings and generation of employment

3. To widen the democratic base in the local communities through co-operative participation in the formulation and implementation of rural development programmes.

4. The methodical and gradual withdrawal of government's involvement in the management and running of the co-operatives. In this regard the government's role in co-operative development will be to create and maintain a conducive socio-economic and political framework and environment for co-operatives to thrive.

SELF-ASSESSMENT EXERCISE 3

Enumerate the strategies used by government in pursuing the policy objectives.

4.0 CONCLUSION

The agricultural policy is directed towards the attainment of food security while the co-operative policy is using co-operatives as reliable vehicles for attainment of co-operative programmes as it specifically affects the promotion of the development of co-operatives as participatory institution contributing to employment creation, poverty alleviation, income generating and improvement of socio-economic conditions in both urban and rural areas.

5.0 SUMMARY

The main point of agricultural policy is to attain self-sufficiency in food production of adequate raw-materials to meet the growing needs of expanding industrial sector. It has also been revealed that the government dictates the pace of agricultural development in Nigeria through the policy objectives.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The four policy objectives include:

a. Attainment of self-sufficiency in all basic food stuff
b. Acceleration of production and supply of agricultural raw materials to meet the growing needs of expanding industrial sector.
c. Expansion of rural employment opportunities
d. Modernization of agricultural production process, storage and marketing through improved technology and management techniques.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

i. The problems of agriculture include:

- Shortage of agricultural inputs
- Inadequate basic infrastructure
- Technology related problems
- Inadequate extension services
- Environmental problems
- Poor implementation of programmes
- Smuggling

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The strategies used in pursing the policy objectives include:

1. Intensification of agricultural co-operative education, training and public enlightenment at all levels.
2. Using agricultural co-operatives to achieve the macro-economic objectives of increased domestic production of food and cash crops.
3. Widening the democratic base in the local communities through co-operative participation.
4. The methodical and gradual withdrawal of government involvement in the management and running of the co-operatives.

6.0 TUTOR-MARKED ASSIGNMENT

1. Discuss the major problems militating against the development of agricultural sector.
2. Explain the term agricultural development policy.

7.0 REFERENCES/FURTHER READINGS

Aweto, R. A. (1996). *Agricultural Co-operatives*.

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UNIT 4 PROBLEMS OF AGRICULTURAL CO-OPERATIVES

CONTENTS

1.0 INTRODUCTION

This unit deals with the problems confronting agricultural co-operatives in Nigeria. You will recollect that in Unit 2, we dealt with co-operatives and make particular reference to agricultural co-operatives. These problems discussed in this unit retarded the growth of agricultural Co-operatives. Definitely if efforts are geared towards the solutions of these problems the rate of agricultural development will be increased and more food production will be noticed in the markets which will directly leads to increase in farmers' income and standard of living in the rural areas. The general effect will be self sufficient in food production, a final direct effect on the National Output and an increase in the foreign exchange earnings as it was the case in the early 1960s with agriculture in Nigeria.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the problems of agricultural co-operatives; and
- examine the problems with their solutions.

3.0 MAIN CONTENT

3.1 The Problems

Agricultural co-operatives allover the worlds are subject to problems that may hinder the growth and development of any group. Problems which are specific to farmers group in Nigeria will be fully discussed here. These include the following:

3.2 Inconsistent Policy

Government lack basic consistent policy on the establishment and management of agricultural co-operatives. What we have may be referred to as management statements based on projects which in themselves are planned and run on an ad-hoc basis. In this regard, any project initiated by a particular government regime is usually phased out with the exit of such a government. The Operation Feed the Nation (OFN) Programme gave way to Green Revolution Programme with change of government in 1979.

The instability of the Federal Department of Agricultural Co-operatives is another factor which hinders development of Agricultural Co-operatives in Nigeria. The Federal Department of Agricultural Co-operatives was carved out of the Federal Department of Co-operatives where it was a division in 1979. It was moved to the Federal Ministry of Agricultural Co-operatives Policy. The department provides institutional supports for effective performance of agricultural co-operatives in the country, through:

a. Provision of on-farm storage depots to farmers co-operatives
b. Effective distribution and marketing of inputs (fertilizers and agro-chemicals) and outputs through the National Agricultural Co-operative and Marketing Organization (NACMO).
c. Facilitating co-operative groups access to credit and security through the Nigerian Agricultural Insurance Company (NAIC) respectively.

In 1989, the Federal Department of Agricultural Co-operatives activities were almost grinding to a halt consequent upon its transfer to Directorate of food, Road and Rural Infrastructure (DFRRI) under the Presidency. The commencement of the Federal Government rationalization of ministries in 1992, returned the Agricultural Co-operatives Department to .the Federal Ministry of Agriculture. The frequent movement of the department hampered .the performance of its function within this period. There is need for consistency in the

implementation of the agricultural co-operative polity. Agencies responsible for the implementation of agricultural co-operatives development policy need be provided and enabling environment for effective performance and achievement of their laudable objectives.

3.3 Lack of Educational and Administrative Guidance

The poor performance of the agricultural co-operatives in Nigeria is also attributed to lack of administrative guanaco and inefficient management capabilities of members and elected representatives. Farmers willing to form co-operatives may lack knowledge of what to do and how to go about it. This dampens their enthusiasm and they revert to individual peasantry. Besides, the problems of extension services make it very difficult for extension officers to have frequent contact with the fanner co-operators.

Adequate planning need be made for continuing education of farmer co-operators. Farmers all over the world rely on extension agents for educational guidance on how to form and manage co-operative societies. They need to know the elements such as membership size personal character of prospective member of the society, co-operative principles, laws and values, management principles and functions etc.

This problem can be addressed through vigorous co-operative education and management training programmes at Federal, State Governments and co-operatives movement level.

3.4 Lack of Capital

The most frequently demeaned services by farmers is financial assistance. They actually need adequate capital to start any meaningful agricultural production. It could be recollected that so many studies have been carried out with facts and figures and came to the conclusion that capital is the basis of farmers joining the co-operative societies and only few i.e. below 45% have benefited from financial assistance of the society when really in need of fund.

This is an indication that co-operative societies are short of funds to meet the financial needs of their members. It therefore implies that co-operatives need to intensity efforts in sourcing for capital from other financial institutions in order to fulfill the aspirations of members. However, there arc difficulties in obtaining finance from those institutions especially in terms of collateral especially from the commercial banks.

3.5 Lack of Storage Facilities

Storage may be defined as the act of preserving and keeping agricultural produce or any commodity for future use without necessarily losing its quality. This problem is most critical in developing countries.

Until we address this particular problem over 70% of our food production will always be lost annually. The importance of storage is enormous and cannot be overemphasized.

SELF-ASSESSMENT EXERCISE 1

List four problems confronting agricultural co-operatives in Nigeria.

3.6 Lack of Process and Inefficient Marketing Scheme

You should remember our discussion of the factors in unit three. The main objective of farmers' co-operatives is to increase member's production through the provision of enabling services. However, due to absence of our inadequate storage, processing facilities and marketing outlets, increase production merely results in farmer's frustration. Hence, there is need for provision of adequate processing: storage facilities and marketing outlets for agricultural produce.

3.7 Lack of Infrastructural and Social Facilities in the Rural Areas

Lack of facilities such as transportation, electricity, water supply, health services, recreational facilities etc. constitutes a hindrance to effectiveness of agricultural co- operatives in rural areas. Existence of these facilities provides an enabling environment for agricultural co-operatives to thrive. Hence, the farmers should be provided with good access roads, good water supply (needed by people, livestock and crops), electricity, basic health care services and appropriate educational facilities. These will tend to stabilize the rural population thus arresting the rural-urban migration, (which is prevalent in the country because of greater wages and comparatively higher standard of living in the urban areas). Therefore, to have a sustained agricultural growth, the farmer (co-operator) should not only be white and blue collar job in tl1e cities) but also be assured of comfortable living conditions in his/her own rural area.

3.8 Lack of Patronage and Membership Qualities

Patronage by the farmer members is one of the key requirements of any co- operative organization. Therefore, the contribution of every member

of the co-operative society not necessarily in terms of money but in interest and active participation in running of the society is important for its success. In Nigeria, members patronage of their societies especially farmer's co-operative societies is very poor. Quite often, a high proportion of members are apathetic to the group activities. This may arise from a number of reasons among which include:

1. Farmers may feel that they spend too much time and energy on the activities of co- operatives and that the benefits they get are not commensurate with the time and energy expended on the society.

2. The returns from 1arms operated by farmers individually may exceed their own share from a co-operative enterprise.

3. Co-operative leaders may be authoritarian or government may exert excessive control on the co -operatives.

4. Farmer - members of co-operative society may feel that the surpluses or the society are not equitably disturbed to them according to their efforts. They also feel cheated if they discover any act of misappropriation of their funds by their representatives. Managers, Secretaries. Etc.

5. The society may be unable to meet its financial obligations promptly e.g. paying each for the farmers, produce .at the time of delivery. A study by Aweto (1984).revealed that about 46% of society's members do not sell all their produce through their society. It was discover that these farmers prefer selling a proportion of their produce to private licensed buying agent who pay cash for the produce when they are in need of money rather than sell to their society. This is due to the fact that the society is not able to make advance payment for the produce delivered by the members.

Another major fault in co -operative farming is the small size and qualities of the members. Members may be too few to make for effective farm operation. Besides, they may be too poor to make any substantial contribution to the initial share capital of tile society.

3.9 Fraud

Fraudulent and dishonest practices have been widely identified as the most serious all which hinders the growth of co-operative endeavors in the country.

Corruption and embezzlement could be widespread among co-operators themselves or amongst the co-operative fund. This consequence has made many co-operative societies or union bankrupt. Sometimes, the administrators or co-operative personnel such as co-operative officers exploit the ignorance of the members by embalming the society's fund. Corruption can also occur if there is not adequate auditing of the society's account.

This situation usually discourages farmer co-operators from participating fully in the co-operatives activities. Apart from this, it prevents potential co-operators from being involved in co-operative; activities .The problem of misappropriation of fund is further worsened by the numerous problems posed by the depressed economy. Thus, co-operatives should evolve management strategies such as internal check or control system for preventing fraud. They also need to ensure that their business transactions are well managed so as to alleviate the problems of their business transactions are well managed so as to alleviate the problems of their employees and members.

3.10 Failure to Employ Competent Staff

Many co-operative societies do not engage the services of qualified and competent manager, secretaries etc. The practice of employing a Senior Secondary School Certificate holder or worse still, a candidate yet to pass his examination, as secretary, manager, book-keeping is common with co-operatives societies and unions. The only co-operative education and training received by these "managers" etc is the three months in-service training organized at the co-operative union levels. This invariably resulted in the poor performance of these societies.

3.11 Poor Management

As a result of employing incompetent staff without adequate education training, there is bound to be poor management of the societies hence many members discouraged in forming or joining co-operatives especially the farmers. Most agricultural co-operatives have died a natural death due to the poor management of all its activities which has been well explained under 3.9 (Fraud) most of the business transactions are not all managed coupled with the books of accounts which are poorly handled.

SELF-ASSESSMENT EXERCISE 2

i. List all the problems confronting agricultural co-operatives in Nigeria.
ii. Discuss any two of them.

4.0 CONCLUSION

Unless these problems militating against the rapid growth of agricultural co-operatives are attended to, there could be little or no success recorded along this line hence there is need for adequate attention to the solutions of all these problems.

5.0 SUMMARY

The various problems confronting agricultural co-operatives have been identified and examined while there is the need for an urgent or immediate solution to all the problems from the government and the co-operative groups.

ANSWER TO THE SELF-ASSESSMENT EXERCISE 1

i. The problems militating against the development of agricultural co-operatives include:

- Inconsistent policy
- Lack of educational and administrative guidance
- Lack of capital
- Lack of storage
- Lack of processing and inefficient marketing system
- Lack of infrastructure and social facilities in the rural areas
- Lack of patronage and membership qualities
- Fraud
- Failure to employ competent staff
- Poor management

6.0 TUTOR-MARKED ASSIGNMENT

Examine the problems of agricultural co-operatives in Nigeria. In your own opinion, give some practical ways of solving the problems.

7.0 REFERENCES/FURTHER READINGS

Adeyemo, R. (1989). *Co-operatives and Development in Sub-Saharan Africa*. Ekopanverlag. Germany.

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UNIT 5 AGRICULTURAL DEVELOPMENT PLANNING

CONTENTS

1.0 INTRODUCTION

This unit will critically examine agricultural development planning which are a conscious, sustained and systematic attempts or efforts made by the government to utilize the available agricultural resources of the nation to the benefit of the farmers and the teeming population. Planning gives room for effective implementation of the programme. You will remember that in unit 2 we examined the need for agricultural co- operatives and the various types. This is a step further for the implementation of the agricultural programmes and projects. The vital role of the agricultural sector in the economic development of any nation has really prompted this unit to give a better understanding of this course hence effective panning is a major tool to proper or adequate implementation.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- identify the importance of planning in agricultural sector;
- examine the various reasons for agricultural planning; and
- understanding agricultural development plan.

3.0 MAIN CONTENT

3.1 Definition

Agricultural development planning is a conscious sustained and systematic attempts or efforts made by the government to utilize the available agricultural resources of the nation to be benefit of the farmers and the teeming population. The ultimate goal is sustained increase in the farmers' income, standard of living and food security of the country. It is a conscious effort to guide the development of the agricultural sector to accelerate economic development of the country.

3.2 Importance of Planning Agricultural Development

It is important to plan agricultural development of any nation for the following reasons:

1. The vital role of the agricultural sector in the economic development of a nation calls for adequate and effective planning of the sector's development.

2. Consequent upon the above, agricultural planning often forms part of the national development plan and this reflects the attitude and hence the objectives of the government or ruling class to the agricultural sector of the country.

3. It ensures that the whole country is evenly developed. All regions, states, local government areas, wards and villages are attended to.

4. Agricultural planning ensures that farmers particularly peasants have access to modern technologies such as irrigation facilities, which are beyond their capability die to lack of capital.

5. Agricultural planning ensures that the desired agricultural production pattern for the country is achieved. Production patterns should be left to market forces to determine. If market forces place high value on particular crops such as cocoa or rice, the tendency is for farmers to shift all resources to the production of these crops. This action will lead to scarcity of other crops and increase in their prices. Thus, the situation needs to be arrested through planning.

6. Planning also enables the economy to cope with problems of uncertainty in agricultural production consequent upon occurrence of natural hazards such as floods, drought, pest attack etc. Management of these risks necessitates effective agricultural development planning.

3.3 The Necessary Steps

The following steps are taken in planning agricultural development sector based on the sector's problems.

1. Identification of the social economic and institutional needs of the agricultural sector based on the sector's problems.
2. Formulation of realistic agricultural development policy objectives.
3. Design of strategies by which policy objectives may be achieved.
4. Estimation of the available agricultural resources with the performance of the agricultural sub-sectors' crop, livestock, fisheries, forest and wildlife etc.
5. Projecting the expected production and identifying the demand supply gaps.
6. Setting of achievable targets based on the above information.
7. Translating these into programmes of actions and projects to be executed.
8. The projects are monitored and evaluated in accordance with the set targets and the overall policy objectives.

3.4 Agricultural Development Plan

Agricultural development plan is the immediate output of agricultural development planning process. It is therefore and arrangement for agricultural development worked out or designed in advance such that the stated agricultural development policies can be achieved. It embodies the whole information, activities and the roles and responsibilities of the various tiers of government and private sector for achieving the policies. The information includes, identified problems, constraints, available resources and facilities, present situation of the sector, policy objectives, and policy instruments institutional arrangements for implementation of the policies, programmes, and projects and estimated monetary allocation for the execution of the sub-sectoral projects. The National Development Plan which used to be of 5 years duration now referred to as National Rolling Plan (2 year plan period) is in booklet form published by the planning office of the Federal Ministry of Budget and Planning.

SELF-ASSESSMENT EXERCISE 1

i. List four importance of planning.
ii. What is agricultural development plan?

3.5 Problems of Planning Agricultural Development

Problems of planning agricultural development are:

1. Lack of definite and consistent agricultural development policy.
2. Inadequate agricultural development planners.
3. Inadequate administrative and managerial machinery for effective implementation of agricultural development plan.
4. Lack of adequate data for effective planning.
5. Inability of farmers to keep accurate farm records.
6. Reluctance by farmers to keep accurate farm records in releasing same
7. Institutional problems of land tenure system in the country.

3.6 Perspective Plan

It was mentioned in the preceding section that policy and plan have definite beginning and period and period within which the stated objectives must be achieved. This is one of the criteria utilized in monitoring and evaluating the performance of the sector.

Nevertheless government actions to influence economic activities often go beyond the plan period. Hence, a futuristic approach to development plan is adopted. A perspective plan is a futuristic plan used as a mechanism of policy discipline to achieve the following objectives.

1. To enable the government link the past present and future policies in order to facilitate orderly transition or ensure smooth continuity.
2. Identification and resolution of possible conflicts among agricultural I development policy objectives and between agricultural objective and those of the overall economy.
3. It enables the government modify programmes and projects and identify areas requiring new strategies approaches.

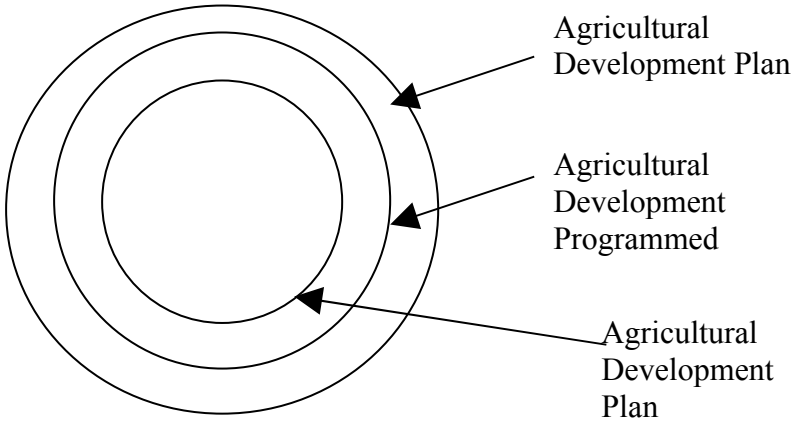
In perspective planning, the government projects beyond the prevailing economic conditions to ensure a more stable and healthy investment environment for economic and social development of the country. Perspective plans ensure that government goals in agricultural development are fulfilled in accordance with set objectives and operational modalities.

SELF-ASSESSMENT EXERCISE 2

What are the problems of planning agricultural development?

3.7 Relationship between Agricultural Development, Plan Programme and Project

The diagram below illustrates the relationship between plan, programme and project.



Agricultural development plan emanates from policy statement. .It is from plans that programmes are developed while projects evolve from programmes. Hence project is the smallest unit of the three representing a subset of programme which in turn is a subset of plan.

4.0 CONCLUSION

Agricultural development planning is a conscious effort to guide the development of the agricultural sector to accelerate economic development of the country.

5.0 SUMMARY

This unit has been able to identify the importance of planning in agricultural sector knowing fully the contributions of the agricultural to the economic development of the country. It has also examined the various reasons for planning in agricultural sector.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. The four important reasons for planning include:

1. Agricultural plays vital role in economic development.
2. It ensures even development in the country.
3. The desired agricultural production could be easily achieved.
4. It enables the economy to cope with the problems of uncertainty in agricultural prediction.

6.0 TUTOR-MARKED ASSIGNMENT

1. Discuss the major problems militating against the planning of agricultural development
2. a. What is agricultural development planning?
b. Enumerate five importance of planning agricultural development.

7.0 REFERENCES/FURTHER READINGS

Aweto, R .A. (1996). *Agricultural Co-operatives*.

Agricultural Policy for Nigeria. Federal Ministry of Agriculture, Water Resources and Rural Development Abuja.

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MODULE 2

UNIT 1 AGRICULTURAL DEVELOPMENT PROGRAMMES

CONTENTS

1.0 INTRODUCTION

In the last unit which is unit 5, you will recollect that our discussion centered on agricultural programmes which is a subset of agricultural plan hence agricultural development programmes emanated from agricultural development plan. In this unit efforts will be made to examine some of the agricultural development programmes right from the 1970s up till the end of 1999. One thing that is sure is the activities that fit into the overall policy objectives of the agricultural sector. It therefore stems from development strategies and plans derived from the

development policies. It is for you to note that all these programmes really contributed to the realization of agricultural objectives especially the food security particularly the attainment of self-sufficiency in all basic food stuff of those which consume significant share of the country's foreign exchange.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- understand the various strategies being undertaken to achieve the agricultural development programmes;
- examine the rapid improvement made within agricultural sector; and
- compare the usefulness of all these programmes.

3.0 MAIN CONTENT

3.1 Agricultural Development Programmes

Agricultural development programme is the totality of development activities undertaken by the government or other organizations in order to achieve the stated development objectives. The activities must fit into the overall policy objectives of the agricultural sector. It therefore stems from the development strategies and plans derived from the development policies. Some past and current agricultural development programmes include the following:

3.2 National Accelerated Food Production Programme (NAFPP)

The National Accelerated Food Production Programme started in 1872. The primary objectives were:

- To stimulate farmers to increase rapidly the production of grains (rice, maize, guinea corn, millet, wheat) and cassava to ensure abundance of food at low cost.
- To increase the farmer's income
- Acceleration of the rate of diffusion of new agricultural technology and service as a medium for testing and adopting agricultural results to on-farm situations.

The institutional arrangements for the implementation of the programme include the federal and state departments of agriculture selected research institutions (e.g. II LA) extension service experts, private farmers etc.

3.2.1 Activities of NAFPP

a. Establishment of agro-services centre designed to provide farm inputs within the reach of farmers and serve as a ready market and disseminations points for farmers agricultural products and information respectively.
b. Intensify research activities and training of agricultural experts.
c. Transfer of improved agricultural technology and services by providing effective link between research personnel and farmers through extension services.

The programme resulted in substantial increase in crop yield particularly during the third development plan period (1975 1980). However, it was not without problems.

i. There was lack of steady funding from the Federal government (main source of fund) and later the State government. Thus, local transport and travel claims of extension officers were not paid. It became very difficult to maintain vehicles and undertake seed multiplication for distribution to farmers.
ii. Non-payment of extension staff claims forced the staff to leave for other better paying jobs result in shortage of competent staff
iii. Late arrival of inputs and ineffective performance of the agro-service centers.
iv. Reluctance of peasants to adopt the recommended innovation packages
v. Lack of supervision by the responsible government authorities.

In spite of all these problems, the NAFPP spanned the various development plan periods. During the second National Rolling Plan 1991-1993, increased food crop production was promoted through the NAFPP. Under this dispensation, technical support was given by the Federal Department of Agriculture (FDA) to States to intensity activities in production of selected food crops in which they have comparative advantage in terms of ecological suitability.

Appropriate incentives were also given to both medium and large scale farmers. The rural environment was improved by providing essential infrastructural facilities such as feeder roads.

Presently, the NAFPP uses Agricultural Development Project (ADPs) as their implementation strategy. The ADPs assist small-scale farmers with farm inputs, extension services, to achieve the annual incremental food production targets. The DFRRI contributed to the programme through provision of necessary infrastructures such as dams. etc and expansion of irrigable and cultivable land.

3.3 Nigerian Agricultural and Co-operative Bank (NACB)

The bank was established in 1973 with the following objectives:

- Providing loan to agro-industrial firms and large scale agriculturists such as co-operative organizations, states and federal agencies, and private entrepreneur.
- Improving the income and welfare of farmers.
- Promoting rural development and
- Increasing the nations output of food and cash crops to meet the need of rapidly increasing population.

3.3.1 Activities of NACB

The activities include the following:

i. Financing all forms of agricultural projects which include arable crops, three crops, horticulture; livestock such as poultry, piggery, cattle, rabbitry, fishery; forestry and timber production
ii. It also provides credit for entrepreneurs engaged in agro-allied industry such as processing, storage of agricultural products.
iii. Provide loan for marketing of agricultural products.

SELF-ASSESSMENT EXERCISE 1

i. Enumerate the objectives of NAFFP.
ii. Enumerate the objectives of NACB.

3.3.2 Organization Structure of NACB

The headquarters of the bank is located in Kaduna with branches in all states of the federation including the Federal Capital Territory, Abuja. In order to bring agricultural credit to the door step of the farmers, the bank opened six offices in the local government areas of each state in the country in 1986.

3.3.3 The Operational Scheme of NACB

The different scheme includes:

1. The Direct Lending Scheme

Under this scheme, the bank relates directly with individual farmers and farms organizations without involving any intermediary or agency.

2. The On-Lending Scheme

Loan is disbursed to establish institutions such as co-operatives, state government agricultural credit organizations. Agricultural development projects etc. for on lending to small-scale farmers. This ensures easy recovery of loans.

3. Small Holder Direct Loan Scheme

This scheme was introduced in 1981, when it was realized that the small-scale producers were precluded from the programme. It was designed to serve millions of small-scale farmers who constitute over 90% of agricultural producers in Nigeria.

The security requirement such as certificate of occupancy of project land and other collateral applicable to the direct lending scheme are waived for the farmers. All that required of the farmer to quality for the loan is evidence of his/her active involvement in farming, a farm belonging to him/her or his/her family and two guarantors, to guarantee the loan.

4. Special Small-Holder Loan Scheme

This is a special on-lending scheme also designed to provide credit to small scale farmers as in the case of (c) above. The loan is disbursed to the farmers through the state ministries of agriculture and directly controlled by the offices of the State Governors, for on lending to the farmers in all Local Government Areas. The scheme has a maturity period of one year. The major difference between this and other on-lending scheme is the non-disbursement of more loans until the previous on is defrayed.

5. Worker's Scheme

This scheme is specifically designed to provide credit to workers or retrenched workers who intended to undertake agricultural business. The only security required is a guarantor of good standing.

6. Marketing Loans

Marketing loans are provided to peasants to enable them purchase excess crops during harvesting seasons, process and store them so as to reduce wastage, thus stabilizing, prices, The maturity period of this loan is two years, The interest charged on loans is ' often lower than the prevailing commercial rates. The interest rates of the above various schemes differ slightly. Besides, the bank prefers kind disbursement to cash disbursement where possible, in order to discourage loan diversion. The NACB also undertakes consultancy services on behalf of their clients, on agricultural projects as subsidized rates. This includes preparations of feasibility studies, training on effective management of loans, linking of farmers with organizations capable of providing technical services etc. Details of conditions of borrowing may be obtained in any of the NACB branches in Nigeria.

3.4 Operation Feed the Nation (OFN)

Prior to the OFN Programme, the Nigerian Farmers concentrated on cash crop production because past agricultural development policies passed to us by the colonial government encouraged farmers to produce cash crops for exports. Thus, farmers merely cultivate enough food crops to meet their family needs with surplus for sale.

The Nigerian Civil war coupled with the unprecedented natural drought in the early 1970s and flood made agricultural production very difficult for the affected areas shortly .after the war. The rapidly increasing population, movement of able bodied people from rural to urban areas further increased the food crop supply and demand gap. The worsed situation of food crop then called for urgent attention of the government to commission the “Agricultural Seminar” to bring together all experts in the field. On detailed examination and analysis of all aspects of agriculture in the country, the experts at the seminar concluded with the following warning signals.

a. That if the pace of food production existing then was maintained by 1975. Nigeria’s food demand would exceed supply by five million metric tons.
b. That by 1985, this deficit would exceed sixteen million metric tons.

3.4.1 Strategy

In order to forestall this food disaster the Federal Government embarked upon massive importation of food items maize, guinea corn etc to reduce the competing demands of human and livestock for these crops. Massive importation of livestock products (meat, poultry) was also undertaken to avoid any serious protein deficiencies in the people’s diet. These

involved expenditure of substantial amount of the nation's foreign exchange. Realizing that the pride of a nation depends on her ability to feed her population and maintain a healthy economy and to reverse her dependency on oil (an exhaustible resource), the government launched the OFN programme in 1976 with the following objectives:

i. Mobilization of the nation's population to increase agricultural production with a view to achieve self-sufficiency, self-reliance and food security.
ii. Encouraging the urban working and middle class (which then relied on buying all their food items) to grow some of their own food.
iii. Restoration of the dignity of farming to peasant communities to curb the rural youth migration to urban areas in search of white and blue collar jobs.

3.4.2 Organization Structural

The organizational structure of the programme comprised to the National Council, National Committee, State Councils and Committees and the Local Government Committees.

That National Council consisted of Federal Commissioners with the chief of staff, supreme headquarters as chairman. The council formulated national policy and co-ordinates the activities of the state councils.

The national committee consisted of professionals whose responsibility was to advise the national council on the technical and administrative issues affecting the OFN programme and implement the council's decisions at the Federal level.

The state council consisted of state commissioners whose ministries were directly involved in the OFN programme, with the military governor as the chainman. The council was charged with the responsibility of implementing the national policies and initiating other policies that may facilitate the achievement of the programme objectives.

Local government committee, was made up of all professional, local dignitaries and farmers under the chairmanship of chiefs, etc. the committees' primary objective was to implement the decisions of the state councils, mobilize the general public, assist in provision of agricultural land and undertake all activities that would facilitate the achievement of the programme's objectives.

The programme created a general awareness of food problems, the vital role of agriculture in a nation's stability and mobilize people of all walks of life namely farmers, urban dwellers (white and blue collar workers), members of the armed forces, housewives, students, etc. to participate in agricultural production.

3.4.3 Activities of the Programme

- Creating a generals awareness of the food problems in the country and mobilizing the populace towards self-sufficiency in food production through various information outlets radio, television, etc.
- Provision of agricultural inputs to farmers and all those participating in the programme, improved seeds were imported for multiplication and distribution

While massive importation of fertilizers was undertaken, local production was intensified the fertilizers were distributed to the farmers etc at highly subsidized prices. Participants were encouraged to use manure as substitute for inorganic fertilizers where the latter was not available.

- Control of pests and diseases was rigorously pursued.
- Storage facilities were provided to store surplus agricultural products.
- Day old chicks were raised and supplied to schools, institutions and interested individuals at subsidized prices
- Students of tertiary institutions were deployed to establish government and private farms to be directly involved in agricultural production during long vacations.

The programme lasted for a period of about three years and was replaced by Green Revolution Programme in 1980. Some of the problems encountered are mentioned below:

Inefficient distribution of input, particularly fertilizers, inadequate extension services, insufficient planning, poor communication and transportation system.

SELF-ASSESSMENT EXERCISE 2

i. List the agricultural programmes we have discussed in this unit.
ii. Enumerate the activities of one of them.

3.5 The Green Revolution Programme (GRP)

The Green Revolution Programme (GRP) was launched in 1980 shortly after the inception of civilian government, to replace the OFN programme and remove the deficiencies observed in the OFN.

3.5.1 Activities of the Programme

The activities of the programme are:

a. Establishment of new input procurement and distribution systems
b. Timely provision of inputs and appropriate technical advise to the farmers
c. Provision of input subsidies for attainment of crop sub-sector policies.

Apart from the usual propaganda which often characterizes the inception of political programmes. There were no visible additional benefits of the Green Revolution Programme over those of the QFN programme.

3.5.2 Problems

Problems of inadequate resources such as loans, fertilizers, farm implements were prevalent. The few available resources were allocated to people based on their political inclinations. Thus, there was mis-allocation of scarce resources. Inputs such as fertilizers and other agro chemicals find their way into hands of people with no interest in farming who resell them in the open markets.

SELF-ASSESSMENT EXERCISE 3

Enumerate the activities of the Green Revolution Programme.

4.0 CONCLUSION

All the various agricultural development programmes discussed above have immediately contribution to the agricultural development policy especially in the attainment of self sufficiency in all basic food stuff particularly those which consume significant share of the country's foreign exchange. The various strategies used in achieving the agricultural policy objective to attain food security especially through the agricultural development programmes, especially in the attainment of self sufficiency in all basic food stuff.

5.0 SUMMARY

This unit has been able to examine the various strategies used in achieving the agricultural policy objective to attain food security especially through the agricultural development programmes, especially in the attainment of self sufficiency in all basic food stuff.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. The objectives of the National Accelerated Food Production Programme include:

a. To stimulate farmers increase rapidly the production of grains and cassava
b. To increase the farmers income
c. Acceleration of the rate of diffusion of new agricultural technology

ii. The objectives of the Nigerian Agricultural and Co-operative Bank include:

a. Provision of loan to agro-industrial firms
b. Improve the income and welfare of farmers
c. Promoting rural development
d. Increasing the nation's output of food and cash crops to meet the needs of rapidly increasing population.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The Agricultural Development Programmes include:

a. National Accelerated Food Production Programme
b. Nigerian Agricultural Co-operative Bank
c. Operation Feed the Nation
d. Green Revolution Programme

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The activities of the Green Revolution Programme include:

a. Establishment of new procurement and distribution system.
b. Timely provision of inputs and appropriate technical advice to the farmers.
c. Provision of input subsidies for attainment of crop sub-sector policies.

6.0 TUTOR-MARKED ASSIGNMENT

Examine the past agricultural development programmes in Nigeria, highlighting reasons for failure or success of such programmes.

7.0 REFERENCES/FURTHER READINGS

Agricultural Policy for Nigeria, Federal Ministry of Agriculture and Rural Development.

Awete, R. A. (1996). *Agricultural Co-operatives*.

Nigerian Agricultural and Co-operative Bank (NACB) information leaflet.

UNIT 2 AGRICULTURAL DEVELOPMENT PROGRAMES (ADP)

CONTENTS

1.0 INTRODUCTION

You will recollect that unit 5 and unit 1 in module 2 have dealt with agricultural plans and programmes which are larger sets to agricultural projects hence project is the sma1lest unit of the three representing a subset of programme which in turn is a subset of plan. In this unit, l want you to focus your mind on agricultural development projects which is one of the major ways the government is using to boost agricultural production hence all efforts will be made to simplify the discussion for better understanding. As of today, agricultural projects are in all the 36 States including the Federal Capital Territory implementing one project or the other and contributing to the food production especially using the new improved technology. You will also discover that some of these projects are jointly sponsored by the World Bank. Federal and State governments. This has really made an effective performance of the projects in the various locations since the focus is on the peasant farmers.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- understand the various agricultural projects;
- identify the projects contribution to agricultural production; and
- examine the effects of their contribution on Nigerian populace.

3.0 MAIN CONTENT

3.1 The Focus of Agricultural Development Projects

Agricultural Development Projects (ADP) are derived from Agricultural Development Programmes. They are therefore the smallest units of economic activities undertaken to attain the overall policy objectives of the agricultural sector. They involve investing scare resources and creation of wealth sources capable of yielding future streams of income within the agricultural sector.

3.2 The Focus of Agricultural Development Projects

The focus of ADP is on the peasant farmers. All efforts are geared towards improving their standard of living. Projects have specified objectives of mobilizing small scale farmers to achieve aims of increased productivity, production, areas of expansion and increased income.

3.2.1 Operation

Agricultural Development Project started in 1975 and was partly financed by the World Bank. Presently almost all states in Nigeria including the Federal Capital Territory have ADPs. They are the implementing arms of the states' ministries of agriculture, though which the ministries reach the peasant farmers. They are semi-autonomous and jointly funded by the state, federal government and in some cases external sources such as the World Bank.

3.2.2 Objectives of ADPS

The cardinal objectives of the Agricultural Development Projects are:

1. To provide integrated rural development by providing Facilities fro intensive extension services, modern/improved agricultural inputs/supplies and rural infrastructures particularly feeder roads.
2. To increase the productivity of the farmers and their income
3. To increase the overall standard of living of the farmers and the rural dwellers.

3.2.3 Activities of ADPS

The activities of Agricultural Development Projects include the following:

1. Provision of credit facilities directly and indirectly through financial institutions by serving as guarantors or linkage for the farmers.
2. They assist financial institutions in the recovery of loans granted to the farmers.
3. Provision of technical advice to the farmers and dissemination of innovations, modern techniques of farming of farmers.
4. Distribution of inputs of production
5. Assisting farmers in the procurement of framing implements such as tractors and tractor driven machineries.
6. Undertake research activities relating to the specific problems encountered by farmers.

3.2.4 Operational Divisions

The extent to which these activities are undertaken varies from state to state or project depending on availability of resources. The above listed objectives and activities are undertaken by the under listed operational divisions of the ADPs.

1. Technical Services Division (TSD)
2. Commercial Services Division (CSD)
3. Engineering Services Division (ESD)
4. Planning, Monitoring and Evaluation Division (PMED)
5. Manpower Development and Training Division (MDTD)
6. Finance, Management and Administrative Division (FMTD)

The technical services division of the state ADPs consists of the applied research and extension units. While applied research conduct research on farmers' problems and obtaining appropriate solutions, the extension unit transmits solutions or innovations to farmers in their locations. The diagram below represents the organizational structure of ADPs' Technical Services division of some states' ADPs in the country (e.g.)

Ogun State Agricultural Development Project Abeokuta
Oyo State Agricultural Development Shaki
Osun State Agricultural Development Project Iwo
Ekiti State Agricultural Development Project Ikole Ekiti
Ondo State Agricultural Development Project Ikare Akoko
Bauchi State Agricultural Development Project Bauchi
Kwara State Agricultural Development Project Ilorin

Kogi State Agricultural Development Project Ayangba
Sokoto State Agricultural Development Project Bodinga
Kebbi State Agricultural Development Project Birnin Kebbi

SELF-ASSESSMENT EXERCISE 1

i. Give a clear definition of Agricultural Development Project.
ii. Mention the Cardinal Objectives of the development Project.
iii. Who are the focuses of the ADPs?

3.3 National Agricultural and Development Authority (NALDA)

Established by the Federal Government on the 7th May 1991 the National Agricultural Land Development Authority was to correct the identified deficiency in the country's agricultural development policies. The deficiency centres on the lack of sufficient attention to the quality and quantity of agricultural land and inefficient socio- agricultural land. Thus NALDA is to execute all national agricultural land development programmes towards attainment of food security in the country.

3.3.1 The Specific Objectives of NALDA

a. To promote and support optimum utilization of the nation's rural land resources.
b. Development of the country's agricultural land for enhanced agricultural production
c. Consolidate the present fragmented and scattered agricultural Land holding thereby reducing rural-urban income inequalities
d. Minimizing high labour cost associated with farming presently
e. Provision of gainful employment opportunities and stable income for the rural dwellers
f. Mobilizing public support towards the achievement of the goals of national food security.
g. Provision of incentives for the programme participants for the establishment of economic size village settlements capable of supporting basic facilities and agricultural activities.

3.3.2 Activities of NALDA

Activities of NALDA include the following:

1. Development of contiguous farmlands in the states of the federation.
2. Placement of farmer's participants on farm lands such that farmers do not need to travel more than 3-5 kilometers to get to his/her farm.
3. Conduct training/workshops for farm settlers on various themes such as management of agricultural land resources etc.
4. Subsidizes land development and management by the settlers.
5. Provision of integrated extension services to programme participants.

Thus, the programme participants are encouraged to increase their productivity. In addition, the processing and marketing of produce are supervised while the participant enjoy 15-20 years loan recovery period.

3.3.3 Development Programmes

Some specific sub-sectoral agricultural development programmes are:

1. Farm Input Production Programme: The objectives of this programme is intensification of input production, procurement and effective distribution to farmers
2. Infra structural Development Programme: The objective of intensifying production of essential raw materials for domestic industries and export.
3. Industrial Food Production Programme: It has the objective of intensifying production of essential raw materials for domestic industries and export.

SELF-ASSESSMENT EXERCISE 2

Enumerate the activities of NALDA.

3.4 The Role of Co-operatives in Agricultural Development Programme/Projects

The specific role of co-operatives in ADPs includes:

1. Co-operatives mobilize farmers into collective units in readiness for the agricultural development programmes/projects' activities geared towards enhancing farmer's productivity overall production and increased income.

2. Co-operatives build the capacity of participants to have effective working relationship in associations that are free and democratic

for the achievement of the community, individual security and desired development.

3. Co-operatives arc used as conduit between the rural small scale farmers and the agricultural development programmes/projects.

4. Co-operatives facilitate the transfer of useful agricultural information and modern technology to farmers. Using co-operatives is less costly and most convenient compared with individual fanners.

5. Distribution of agricultural inputs to small scale farmers is most effective through the use of co-operatives.

6. The group action to co-operative societies ensures rapid adoption of innovation by farmers.

7. Co-operatives participation in the small holders on lending scheme ensures easy and quick access to peasants to loans, effective loan management and recovery.

8. Co-operatives assist in organizing small scale farmers to cope with the expected increase in agricultural output consequent upon the projects' effects. They facilitate storage, processing and marketing of products.

9. Co-operatives facili1ates training of farmers participating in the programmes/projects are developed management capacities.

10. Co-operatives encourage thriftiness among members. From capital mobilized therefore, loans are disbursed to members. This enables farmers to surmount the .problems of lack of capital which often hampers their rate of adoption of innovations.

11. Co-operatives ensure sustainability of the activities of the agricultural development projects and facilitate attainments of the development objectives.

4.0 CONCLUSION

The agricultural development projects have contributed immensely to the food production in this country and it has really improved the standard of living of the peasant farmers who are the focus of the project

5.0 SUMMARY

The various agricultural development projects are designed purposely to boost food production in agriculture and purposely to improve the standard living conditions of these peasant farmers who are their targets. The projects have indirectly contributed to the socio-economic development of the country.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. Agricultural Development Projects are derived from agricultural development programmes. They are therefore the smallest units of economic activities undertaken to attain the overall policy objectives of the agricultural sector. They involve investing scarce resources and creation of wealth resources capable of yielding future streams of income within the agricultural sector.

ii. The Cardinal objectives of Agricultural Development Projects include:

- Promotion of integrated rural development by providing facilities for intensive extension services, modern/improved agricultural inputs/suppliers and rural infrastructures particularly feeder roads.
- To increase the productivity of the farmers and their income.
- To increase the overall standard of living of the farmers and the rural dwellers.

iii. The focus of the Agricultural Development Projects are the peasants farmers.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The activities of National Agricultural Land Development Authority (NALDA) include:

a. Development of contiguous farmlands in the states of the federal.
b. Placements of farmers participants on farm lands such that farmers do not need to travel more than 3 to 5 kilometers to get to his or her farms.
c. Conduct training/workshops for farm settlers on various themes such as management of agricultural land resources.
d. Subsidize land development and management of the settlers.
e. Provision of integrated extension services to programme participants.

6.0 TUTOR-MARKED ASSIGNMENT

1. What do you understand by Agricultural Development Project (ADP). Discuss the cardinal objectives and activities of a named agricultural development project.
2. Differentiate between Agricultural Development Policy (ADP) programme and project. How are these three ADPs linked together?

7.0 REFERENCES/FURTHER READINGS

Aweto, R. A. (1996). *Agricultural Co-operatives.*

National Agricultural Land Development Authority (NALDA) information leaflet.

The Fourth National Development Plan 1981 – 1985, Planning Office, Federal Ministry of Budget and Planning.

UNIT 3 INTEGRATED RURAL DEVELOPMENT

CONTENTS

1.0 INTRODUCTION

This unit ends the series of agricultural development policy, plan, programme and projects. It gives an outcome of all the various activities of our past discussions as to the development of the rural areas. From our past discussions, you will note that this is just the total activities of the policy, plan, programme and projects which give a comprehensive impact on the socio-economic life of the rural dwellers. You will remember that the fact that a single sector within a community is developed does not necessarily imply the development of the rural area concerned, this is because a community consists of several sectors such as agriculture, health, education, industry just to mention a few. It also involves a number of co-ordinated, interdependent multi-sectorial activities taking place within a defined area which covers all the sectors of the community.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the key point of rural development;
- understand the basic needs of the rural dwellers; and
- explain the effects on rural dwellers.

3.0 MAIN CONTENT

3.1 Integrated Rural Development

The fact that a single sector within a community is developed does not necessarily imply the development of the rural area concerned. This is because a community consists of several sectors such as agriculture, health, education etc. therefore, the development of the agricultural sectors does not imply the development of the rural area involved in the development of all the sectors within the community. It Involves a number coordinated, interdependent multi-sectoral activities taking place within a defined area which covers all the sectors of the community. You should please note that efforts of different agencies concerned with the development of rural areas are integrated, in such a way as to provide the basic need of the rural dwellers. Integrated rural development often adopts perspective planning approach in its programme because most of the programmes are of long gestation period and are implemented in phases. Kindly note that the main objectives of Integrated Rural Development (IRD) is to improve the general standard of living of the rural population.

3.1.1 Implementation

During the implementation of the programme, targets are set towards the achievement of the overall objectives. Through the IRD Programme, the rural dwellers are provided with good access roads (feeder roads), good water supply for people, livestock and crops, electricity, basic health care and appropriate educational facilities for the rural area to further stabilize the rural population. It aims to arrest the rural urban migration. In order to have a sustained agricultural growth the farmers should not only be assured of income higher than the prevailing minimum wage in the cities, but also of comfortable living condition in the rural areas.

SELF-ASSESSMENT EXERCISE 1

i. Give a clear definition of integrated rural development.
ii. What is the aim of the integrated rural development?

3.1.2 Role of Co-operatives

Given the integrated nature of development the roles of co-operatives cannot be over-emphasized. These roles arc similar to those mentioned under agricultural development projects. However the following additions are relevant to the integrated rural development programmes:

1. Co-operatives provide a better forum through which development agencies can channel inputs required for implementation of the integrated rural development programme to the rural dwellers. Family Planning material, storage and processing equipment etc. are distributed through co-operatives.

2. In situations where some of the rural dwellers are indifferent to the programme due to lack of mis-information, co-operatives may combine the role of instructing and stimulating members of the community to participate in the programme.

3. Agricultural co-operatives as rural institutions are part of the overall plan to raise the level of social and economic consciousness of the rural dwellers. Thus they are an integral part of integrated rural development scheme

3.2 Subject Matter Specialist

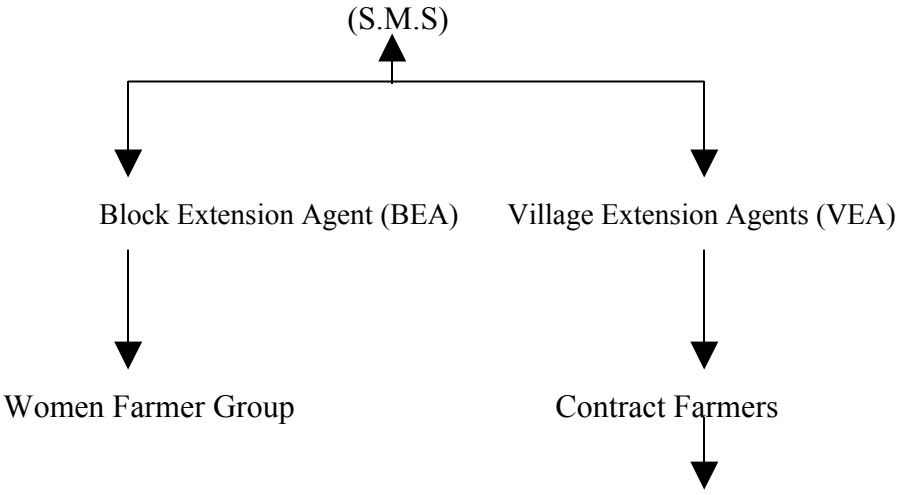

Fig. 8.1: ADP Extension Services Channel

The Subject Matter Specialist (SMS) trains the Village Extension Agents (VEA) who are charged with the responsibility of disseminating new technology and innovation to the farmers on their farms. They often make use of contact farmers. Contact Farmers are farmers who arc ready to accept, adopt innovations and disseminate same to other farmers. They must be residents of the particular village and in possession of a reasonable size of farm land holding bush as 2-3 acres.

The Block Extension Agents (BEA) is women extension agents who are mainly responsible for disseminating innovation to women group in all agricultural cells. A cell is a geographical location with 80 contact farmers and about two hundred and forty (240) farmers. Thus a cell may comprise of more than one village depending on the population of farmers in the village. Any location where there are up to 10 contract farmers' constitute a sub-cell, and an operational unit of VEA activities beginning with the Small Plot Adopting Techniques (SPAT). Small Plot

Adopting Techniques involve the use of a 10m area of land for growing improved seedling to be introduced to the farmers with all the accompanying farming practices such as fertilizer application, timely weeding etc. and pegged round, with the farmers' adjacent plot of the same size of comparison

SELF-ASSESSMENT EXERCISE 2

What are the roles of co-operatives in rural development?

3.3 Strategies of Rural Development

Rural Development Strategies usually take the form of programmes which implement projects in a specific rural area. Such programmes form the basis of most government and non-government efforts to assist rural areas and they include both agricultural and non-agricultural projects. It should be emphasized that the problems a farmer faces are complex and not all of them are physical or tangible. With this in mind, the kinds of strategies which rural development programme can adopt can be considered. The first point to make is that there is not on strategy which is relevant to the problems and strategy must be adapted accordingly. There are three broad rural development strategies to be considered.

3.3.1 Technological

Here, the emphasis is upon technological transformation or different aspects of the rural society e.g. improved cropping practice or better water supply, by the provision of the inputs and skill required to bring about the transformation.

3.3.2 Reformist

In this strategy, importance is also attached to technological change, but with a corresponding effort to provide the means by which the farmer can plan a bigger part in rural development, for example, through organizational development, or participation in rural development programme.

3.3.3 Structural

This strategy seeks to transform the economic, social and political relationships which exist in rural areas in such a way that those who were previously disadvantaged by such relationships find their position improved. Often this strategy is carried out by means of an agrarian reform programme.

3.4 Suggested Principles

The following principles are suggested to implement rural development programmes.

a. **Access**: Try to ensure that the programme and its benefits can reach those in need, and beware of the consequences if some farmers have access to the programme while others do not.

b. **Independence**: Ensure a programme which helps and supports the farmer but which does not make him or his livelihood dependent upon programme.

c. **Sustainability**: Ensure that the programme's plans and solutions are relevant to the local economics, social and administrative situation. Short-time solutions may yield quick results, but long-term programme that are suitable to the local government have greater success.

d. **Going Forward**: Technological aspects of rural development programmes should help the farmers to take the next step in his development and not demand that he take a huge technological leap. It is better to secure a modest advance which can be sustained than suggest a substantial advance which is beyond the ability of most farmers.

e. **Participation**: Always try to consult the local people, seek out their ideas and involve them as much as possible in the programme.

f. **Effectiveness**: A programme should be based on the effective use of local resources and not necessarily on their most efficient use. While efficiency is important its requirements are often unrealistic.

SELF-ASSESSMENT EXERCISE 3

Enumerate the suggested principles of rural development programmes.

4.0 CONCLUSION

This unit has emphasized that integrated rural development involves the development of all sectors within the community. It involves a number of coordinated, interdependent multi-sectorial activities taking place within a defined area which covers all the sectors of the community.

5.0 SUMMARY

The unit has identified the main objective as the improvement of the general standard of living of the rural population especially the farmers which directly arrest the rural urban migration.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i Integrated rural development is the total development of all the sectors within community. It involves a number of coordinated, interdependent multi-sectorial activities taking place within a defined area which covers all the sectors of the community.

ii. The aim of this is to improve the general standard of living of the rural population purposely to arrest the rural-urban community.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The roles of co-operatives in rural development include:

1. Provision of a better forum through which development agencies can channel inputs required for implementation of the integrated rural development programme to the dwellers.
2. Provision of information to the rural dwellers.
3. Combines the role of instructing and stimulating members of the community participate in the programme
4. Co-operatives are an integral part of integrated rural development scheme.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The suggested principles of rural development programmes include:

a. **Access**: Devise a programme which helps and supports the farmer's.

b. **Independence**: Device a programme which helps and supports the farmers.

c. **Sustainability**: Ensure that the programmes plans and solutions are relevant to local economic, social and administrative solution.

d. **Going Forward**: It should help the farmer to take the next step of development.

e. **Participation**: Always try to consult the local people, seek out their ideas and involve them as much as possible in the programme.

f. **Effectiveness**: The programme should be based on the effectiveness use of the resources while efficiency and effectiveness is very important and should be considered.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the term integrated rural development with reference to the aims and objectives.
2. Enumerate the roles of co-operative in rural development.

7.0 REFERENCES/FURTHER READINGS

Aweto, R.A. (1996). *Agricultural Co-operatives*.

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UNIT 4 AGRICULTURAL CREDIT

CONTENTS

1.0 INTRODUCTION

This Unit leads you to examine agricultural credit and usefulness to farmers especially in increasing food production because the small scale farmers constitute over 90% of Nigeria farming population. You will remember that capital is one of the most important factors of production. Credit constitutes either whole or a proportion of capital being employed in agricultural production. Agricultural credit has been a major problem of the farmers in production and at times it has under-developed these farmers to the extent that 90% of their output is being used or given to their creditors or the person or financial institution or origination that borrowed them credit for the farming operations. This unit will also examine some of these problems in details and even make useful suggestions for improvement of the farmers.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- understand the term agricultural credit;
- identify the various types of credit; and
- educate the farmers on the use of credit facilities.

3.0 MAIN CONTENT

3.1 Agricultural Credit

One of the most important resources of agricultural production is capital. However, capital is often scarce. Nevertheless, credit constitutes either whole or a proportion of the capital employed.
Credit is defined as the portion of investment of producers which they cannot meet from their own resources to attain a target of production of goods and services. The term credit refers to an arrangement which enables a borrower to obtain money under stipulated conditions and allowing the borrower the use of or possession of the goods or services without immediate payment. The amount of money given to the borrower at specified interest rate or interest free enables the borrower to perform specified financial obligation relating to his/her business.

There are two main sources of credit for farmers namely (1) formal or institutional and (2) informal or non-institutional sources.

3.2 Formal Credit Sources

These include financial institutions such as commercial banks. Generally, these banks are in a good position to provide both short-term and long-term loans to farmers for desired increase in agricultural productively. However, in the process of providing the credit there are some problems which may come to play.

3.2.1 Problems

Some of these problems are mentioned below:

a. Many commercial banks' avoid lending to small-scale farmers due to the high risky nature of agricultural production and the low productivity of small-scale farmers. They lend to concentrate their lending on relatively low risk areas like industrial and commercial agriculture.

b. The high administrative cost of processing large number of small loans to small scale farmers.

c. Disbursement of loans to small farmers is accompanied by a high cost of supervision and monitoring of the loan beneficiaries to ensure that loan is used for productive purpose and to guarantee prompt repayment.

d. The inability of the small-scale farmers to present collateral securities to financial institutions.

e. The cumbersome paperwork involved in applying for loan tends to discourage farmers from patronizing these credit sources.

f. The need for borrower to present a guarantor with high socio-economic status constitutes a hindrance to the prospective beneficiary.

g. Inadequate agricultural infrastructures like processing and storage facilities result in huge post-harvest losses, low income and inability of the loan beneficiaries to repay loan promptly.

On account of the problems listed above, a large proportion of the millions of small-scale agricultural producers in the country do not benefit from institutional credit sources facilities.

3.2.2 Government Provisions

Thus, special measures such as government interventions are often taken to facilitate small-scale farmer's access to credit. Such interventions are made through agricultural policies aimed at increasing agricultural production. These include:

i. Government guarantee loan to agriculture,
ii. Setting up of special agricultural bank such as Nigeria Agricultural Co-operative Bank, Nigeria People's Bank etc.
iii. Provision of free technical advice to borrowers
iv. Provision of subsidies etc.

However, because these financial institutions are government sponsored, disbursement of loans is usually at the discretion of the powers that be. The decision to grant loan is often not based on the needs of the borrowers, but on factors like ethnicity, nepotism, greed and religious affinity. These difficulties, in addition to the rigours resulting from bureaucratic red-tapism of processing loan application tend to discourage farmers. Thus, small-scale farmers do not readily have access to these formal institutional credits. Hence, they usually resort to informal sources.

SELF-ASSESSMENT EXERCISE 1

i. Explain the term agricultural credit.
ii. Enumerate the problems of formal credit sources.

3.3 Informal Credit Source

There are several types of informal savings and credit sources open to the small-scale farmers in the rural areas. These include relations, friends, produce buyers, money- lenders, indigenous co-operatives etc.

3.3.1 Problems

Problems associated with financial sources of credit are listed below:

a. They are usually unreliable particularly in case of friends and relations. Promises made are often not fulfilled due to scarcity of funds.

b. The cost of credit in terms of interest charged on the loan given is very high, particularly in the case of money-lenders who may charge as much as 90% p.a. interest rate. This is one of the significant factors responsible for the vicious circle of small-scale farmer's indebtedness.

c. Some lenders insist on farmers pledging their produce for credit.

d. A produce-buyer lender may insist that the farmer sells produce to him at prices lower than the prevailing market price which is unfavourable to the farmer. Besides, they may also insist that farmers buy their inputs of production from them and not from elsewhere.

e. These informal sources of credit are inadequate in meeting the specific credit needs of farmers. Most of the lenders are only prepared to give short-term loans. When a long-term open is, given, it is often given under conditions which tend to worsen the condition of the farmers' indebtedness. Lenders may insist on repayment of loan on terms unfavourable to the farmers. This leads to the borrower selling off their produce at awkward time.

3.3.2 Advantages

Inspite of these significant difficulties with formal sources of credit, their continued use is an indication of their usefulness to the people. This is particularly true In the case of the informal co-operatives such as Rotatory Savings and Credit Association (ROSCA), Esusu etc. Their main advantages are mentioned below:

i. These informal sources of credit are indigenous institutions found in many farming communities and are familiar to the small-scale farmers.

ii. Their proximity to the farmers makes access to their services easy for the community members.

iii. In contrast to formal credit sources these informal sources do not require collateral and elaborate paper-work. Each member is related to on his/her own right. The association relies on the repetition of the borrower as sufficient collateral security.

iv. Although there are reports of few cases of collectors absconding, financial fraud is not widespread. These informal financial sources possess well established social control mechanism which effectively prevents members defaulting.

v. Besides the promptness is giving the credit, the simplicity and convenience of obtaining loans make small-scale farmers prefer these non-formal sources to the institutional sources.

SELF-ASSESSMENT EXERCISE 2

i. Explain information credit sources.
ii. What are the advantages of informal credit sources?

4.0 CONCLUSION

The use of credit as a major factor of agricultural production could not be over emphasized especially in the various advantages of informal credit sources to agriculture in the rural areas, hence more avenues to available credit source should be created to enhance both food and cash crops production.

5.0 SUMMARY

There are two main credit sources to the farmers namely the formal and informal institutions. Credit is the bedrock of agricultural production especially the small-scale farmers which constitutes over 90% of farming population.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. Agricultural credit is the portion of producers (farmers) which they cannot meet on their own resources to attain a target of agricultural production. This term credit refers to an arrangement which enables the farmer to obtain money under stipulated conditions and allowing the farmer the use of the money without immediate payment.

ii. The problems of formal credit sources include:

- Lending mainly to only those on relatively low risk enterprises like industrial and commercial agriculture.
- The high administrative costs of processing large number of small scale loans to small scale farmers.
- High cost of supervision and monitoring of the loan beneficiaries.
- The inability of the small scale farmers to present collateral securities to financial institutions.
- The cumbersome paper work involved in applying for loans tends to discourage farmers from patronizing these credit sources.
- The need for borrowers to present a guarantor with high socio-economic states constitutes a hindrance to the prospective beneficiary.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

i. Informal credit are types of informal savings and credits open to small scale farmers in the rural areas through friends, relations, produce buyers, money lenders, indigenous co-operatives just to mention a few.

ii. The advantages include:

- They are close to farmers in the rural areas.
- Their proximity to farmers makes access to their services easy for the community members.
- No collateral and elaborate paper work needed.
- Financial fraud is not common.
- Promptness is getting the credit
- It is simple and convenience for farmers.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the term agricultural credit
2. What are the problems of formal institutions?
3. State the advantages of formal credit sources

7.0 REFERENCES/FURTHER READINGS

Aweto, R. A. (1996). *Agricultural Co-operatives*.

Ijere, O. Martins (1992). *Prospects of Nigerian Co-operatives*.

UNIT 5 AGRICULTURE CREDIT CO-OPERATIVES

CONTENTS

1.0 INTRODUCTION

You will recall that in the last unit we examined agricultural credit and this has led us to agricultural credit co-operatives. The focus of this unit will therefore be on cooperatives and their usefulness to farmers in terms of providing credit. Cooperatives as earlier explained are used as instrument for solving most of the problems in agricultural production which ranges from the use of out dated techniques of production to lack of access to markets. The society's educational programmes are used as means of extending and introducing improved technology to members. Agricultural cooperatives, being formal and people oriented organizations are in vantage position through which they can reach the farmers. While administration of loans to farmers through co-operatives is cheaper and repayment is highest with history of agricultural credit administration in Nigeria.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- identify the major advantage of providing agricultural credit through the cooperatives; and
- understand the importance of cooperatives in agricultural credit management.

3.0 MAIN CONTENT

3.1 Agricultural Cooperatives Societies

Cooperatives are formal institutions in the sense that they are registered under the state's cooperative laws and are supervised by the state. However, they are formed, owned and democratically controlled and managed by the members and patrons. Cooperatives have significant and positive impact on the development or rural economy. Generally, provision of credit (in cash or in kind) is an integral part of agricultural cooperatives. Credit is given to members for productive purposes at society's stipulated rate of interest which rarely exceeds an average of 10% p.a. Eligible members borrow as much as twice their total savings and shares with the society. The capital plus the interest is repaid in convenient installments over an agreed period. Where credit .is provided in kind, it is often given in form of required agricultural inputs of production. Experiences have shown that it is more difficult and costly for other institutional sources of' credit to have close contact with the fanners. Hence they tend to use groups such as cooperatives.

SELF-ASSESSMENT EXERCISE 1

Are cooperatives among formal institutions? Discuss in two sentences.

3.2 Agricultural Credit Co-operatives

These associations are made up of primary thrift and credit societies and secondary thrift and credit unions. The primary aims of the co-operatives thrift and credit societies are the provision of saving facilities and the granting of short-term loans to members. Credit limits are fixed for all members in relation to their savings. The rate of interest charged on loans varies from one society to another, but generally, the range is between 10-15 percent.

The main duties of the co-operative thrift and credit unions are to provide banking facilities for the affiliated societies. They borrow funds from the apex organization or other financial institution for on-lending to the primary societies. They also provide savings facilities for their members. One other important duty which the credit unions discharge is the supervisory role over the operations of the affiliated societies.

Apart from the primary agricultural credit co-operatives and the secondary credit unions there are apex financial institutions in some States in the federation. These are the Co- operative Bank Limited in Oyo. Ogun Osun, Ekiti and Ondo States and the Co-operative Bank of former Eastern Nigeria now comprising Imo, Abia, Enugu, Anambra, Cross River and Rivers States. These bodies are bankers both to the co-operative movement as well as, to the general public. Besides the two

existing co-operative banks, there are other co-operative financial organizations in some parts of the country. These are the Benue-Plateau and Nassarawa Financing Society. Unlike the full-fledged co-operative banks, these organizations limit their operations only to the co-operative sector. Other co-operative apex marketing organization such as the co-operative Federations that exist in Kano, Kwara, Kogi, Kaduna, Borno, Bauchi and Taraba and the Niger-Sokoto States Co-operatives also perform some banking functions to their affiliated co-operatives bodies.

Agricultural credit co-operatives constitute the second most predominant of the rural co- operatives in Nigeria.

SELF-ASSESSMENT EXERCISE 2

i. Explain the term Agricultural Credit Cooperatives.
ii. Distinguish between Primary and secondary Agricultural Credit Cooperatives.

3.3 The Advantages of using Cooperatives

The following are the advantages of providing agricultural credit through the cooperatives:

1. Agricultural cooperatives, being formal and people-oriented organizations are in vantage position through which they can reach the farmers.

2. Agricultural cooperatives obtain loans from commercial banks for on-lending to farmer members. This reduces the administrative cost of processing multiplicity of small loans to individual farmers.

3. Agricultural cooperative society can take up insurance policy with the Nigerian Insurance Company to reduce the risk envisaged by commercial banks and assures them of the safety of farmer's business and investment. Insurance policy is an acceptable collateral security *to* the banks.

4. The society is also in a position to obtain complete and submit members application forms collectively thus making access to credit relatively easy and convenient for illiterate farmers.

5. Agricultural cooperative society's credit has educational value. Credit alone is of little use to the farmer if it is not accompanied by complementary services which will help the farmer use the loan productively and avoid unnecessary debts. Thus, is the

cooperative societies help to provide required inputs of production and he1p disseminate information on improved agricultural practices amongst members?

6. Loan management skill training can also be given to the members at a relatively low cost through the cooperative society.

7. The administration of loans through cooperatives is cheaper and repayment It. rate highest with lowest rate of misuse of loan in the history of agricultural credit administration in Nigeria.

Non-government organizations (NGOs) also administer credit to farmers through the cooperatives.

The realization of these benefits depends however, on the strength and efficiency of the agricultural cooperative society operation. If the cooperative movement consists of societies formed on ad-hoc basis simply for the purpose of channeling government funds to farmers (e.g. former Better Life Co-operatives) these advantages will not be achieved. Therefore, an agricultural cooperative society should be used for channeling funds to individual small and medium size farmers provided they are organized and democratically controlled by members and functions efficiently to be able to handle the technical aspects of the loan.

SELF-ASSESSMENT EXERCISE 3

List four advantages of providing Agricultural Credit through Cooperatives.

4.0 CONCLUSION

This unit has outlined the usefulness of cooperative in agricultural credit management and its advantages to farmers through cooperatives since credit is an integral part of agricultural cooperatives.

5.0 SUMMARY

Agricultural Cooperatives being formal and people oriented organizations are in vantage position through which they can reach the farmers. The importance of cooperatives in agricultural credit management could not be over emphasized especially in loan administration.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

Cooperatives are formal institutions in the sense that they are registered under the state's cooperatives laws. They are monitored and supervised by the State Government.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

i. Agricultural credit cooperatives are associations made up of primary thrift and credit societies and second thrift and credit unions. The primary aims of the cooperatives thrift and credit societies are the provision of saving facilities and the granting of short-term loans to members. Credit limits are fixed for all members in relation to their savings.

ii. Primary agricultural credit cooperatives are formed by the association of farmers with at least 10 members while secondary agricultural credit cooperatives are the association of primary societies purposely to form a union.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The four advantages of providing agricultural credit through cooperatives are:

1. The vantage position of cooperatives through which farmers could be reached.

2. Reduction in the administrative cost of processing loan forms for the farmers.

3. Loan management training can also be given to the members at a relatively low cost through cooperative society.

4. Administration of loans to farmers through cooperatives is cheaper and repayment rate highest with lowest rate of misuse of loan in the history of agricultural credit administration in Nigeria.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the term agricultural credit.
2. What are the advantages of providing Agricultural Credit through the cooperatives?

7.0 REFERENCES/FURTHER READINGS

Aweto, R.A. (1996). *Agricultural Cooperatives*.

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MODULE 3

UNIT 1 PROBLEMS OF AGRICULTURE CREDIT IN NIGERIA

CONTENTS

1.0 INTRODUCTION

In the last two units we have examined the usefulness of agricultural credit in agricultural production. You will recollect that credit forms a major part of agricultural production. The agricultural credit programmes introduced by the Federal Government of Nigeria have achieved a lot of agricultural production especially in the food production which has been assessed by four main indicators namely

a. Rapid volume of agricultural credit
b. Increased volume of agricultural credit
c. Nigerian Industrial Development Bank (NIDB)
d. Nigerian Bank for Commerce and Industry (NBCI)

They have been saddled with the giving of loans to the farmers especially for food production and the effects were felt in the rural areas especially in raising the standard of living of the farmers.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- identify the major problems of agricultural credit in Nigeria; and
- understand the problems and proffer adequate solutions.

3.0 MAIN CONTENT

3.1 The Problems

In spite of the achievements of the various agricultural credit programmes discussed in Unit 5, it is clear, as we noted earlier, that more agricultural credit problems have evolved in the last two years. An objective assessment of the credit programmes is that, while the known achievements have been modest, the problems encountered have demonstrated to policy makers and those involved in policy implementation the direction in which the various agricultural credit policies should improve in future. For a better understanding of the adjustments which are necessary, the problems of the various credit programmes should be briefly examined. The most obvious ones are:

3.2 Inadequate Number of Beneficiaries

There is no doubt that some farmers have benefited from the Federal Government Agricultural Credit Programmes but yet a lot of farmers especially the small holders are .yet to benefit from the programme hence it has affected food production since the small holders constitute 98 percent of the total agricultural production in the country. Denied of access to credit and hence the small holders are also denied access to the use of essential inputs, the predominant small holders sub-sector can hardly make any visible impact on total agricultural production especially the food production. Definitely, whatever impact the current agricultural credit programmes have made, has been isolated and not comprehensive as implied in credit policy objective.

3.3 Interest Rate Problem

If the present agricultural credit programmes have managed to reach only a negligible proportion of farmers, it is debatable whether there is need for fixing interest rates on agricultural loans at much lower levels than on other types of loans. The modern farmers who have obtained the

bulk of the loans for livestock and fishery projects could have done without the subsidy element may probably be justified. Even if it is legitimate for government to want to continue to use this policy instrument, it may be desirable to rise so as to cover administrative and procurement costs. This may assist the public credit institutions in particular. Raising the lending rate can also be buttressed by the fact that most farmers continue to patronize private money lenders and this may suggest that effective supply of credit is the most important issue in agricultural credit programmes fur small farmers.

The government should then reduce the interest rate to a minimum of about 2.5% from the 10% just to cover the administrative charges alone and make it mandatory that all the small holders must benefit from the programme hence agricultural production especially food production will be achieved within a limited time.

3.4 Uneven Distribution of Agricultural Credit

The problem of uneven distribution of credit is present at both levels of sub-sectoral allocation and various borrowers. The latter problem has been discussed and has to do with the fact that most credit programmes have tended to discriminate against the small holders. The other aspect of credit distribution is the large imbalance in sub-sectoral on distribution of credit. By and large, the livestock sub-sector, and especially poultry, has been favoured both in the programmes of the public and private credit institutions. The effect of this on the spatial distribution of agricultural credit has been an undue concentration of credit users in many urban locations and the neglect of the main centres of agricultural production, particularly in the middle belt and south west of this country. Almost all the peasant crop production farmers have been neglected owing to no just cause in the credit programme. The government and all the policy makers should see to this and address this important aspect. If the small holders should benefit, there is prospect in the food production programme.

SELF-ASSESSMENT EXERCISE 1

List three of the problems of Agricultural Credit in Nigeria.

3.5 Inadequate Monitoring and Evaluation

Another undesirable aspect of the agricultural credit programme is the low level of monitoring and evaluation of implementation. As of today, most of the problems of the credit programmes have not been adequately documented and this has often resulted in a superficial discussion of such problems. Most projects financed by credit are

subjected to some serious analysis and evaluation which is a requirement for obtaining the credit. However, the ex-post evaluation has been very poor and very often, default cases just surface without an adequate background of how they came about. Apparently, the credit institution have not had the size of manpower needed for the evaluation and monitoring arc nevertheless commendable, but it does not seem that the institution have done enough justice to this problem.

3.6 Underdeveloped Production Base

The agricultural sector of the economy has witnessed some structural changes since 1979, but such changes have been isolated and insignificant in relation to the size and potential of the sector. The dual structure of production, consisting of a small modern sector and a large traditional sector, appears to have been accentuated by the developments in the economy which have generally been concentrated in non-agricultural activities. Development efforts have been concentrated in non-agricultural activities like commerce, construction and services to the detriment of the agricultural sector which continue to lose its manpower to these sectors. Unduly large projects were embarked upon without due regard to their long run financial requirement, while many subsidy programmes were initiated and turned out to benefit middlemen rather than the farmers. In view of these developments the base of the agricultural sector has remained largely underdeveloped. Under the circumstance, some of the agricultural credit programmes being currently appear to be out to context of the general level of agricultural development in the country and hence have made only little impact.

3.7 Weak Agricultural Policies

The continued underdeveloped status of Nigerian agriculture is, as it has just been suggested, due largely to the defective general economic policy framework of the country. But there have been some ineffective agricultural policies which have not lent sufficient support to the agricultural credit programmes. For instance, the development of virile agricultural cooperatives and effective extension services is vital for the success of these agricultural credit schemes. In fact the Agricultural Credit Guarantee Scheme (ACGS) and the Nigerian Agricultural Cooperative Bank (NACH) credit progrmnmes were expected to depend to a large extent on the involvement of fanners' cooperatives through which credit would reach individual farmers. From the Second National Development Plan period, government initiated hold policies to support the cooperative system through the improvement of training facilities for cooperative personnel and credit for executing cooperative project. The available evidence is that, actual government efforts have made only marginal impact. Total membership of cooperatives increased from

about 0.5 million to 1 million at the end of 1980. This is obviously a negligible proportion of the total farming population. Educational facilities for cooperative personnel were modestly expanded but could not adequately cope with the problem of inadequately qualified personnel to manage the existing cooperatives. The problem of inadequate finance for cooperative has also remained intractable. What may be observed is that at cooperative development policies have not been adequately backed up by effective programmes, while implementation of current, programmes has been very poor.

3.8 Poor Extension Services

Another serious gap which has affected the credit programmes is the weak position many extension services through the country. The extension system could have been very effective in monitoring the activities of borrowers and hence provide a good feedback to the credit institutions the extension service system has traditionally been under the control of the State Governments. But owing to lack of funds, the extension services in the states have virtually collapsed and are generally ill-equipped to perform effective intermediary roles between farmers and other agencies such as credit institutions.

SELF-ASSESSMENT EXERCISE 2

List other four problems of Agricultural Credit in Nigeria.

3.9 High Default Rate

Largely as a result of many loopholes in the agricultural credit system such as inadequate monitoring and evaluation and ineffective agricultural policies which have not adequately complemented the use of agricultural credit there has been an alarming increase in default rate. For example, at the end of 1984, under the ACGS, about 63 claims or default worth N0.4 million out of which 41valued at N0:4 million has been recommended for settlement and 34 were regarded to be in respect of deliberate defaults. By 1980 the NACR had a total of 142 loan defaulters owing N27 million. The data for recent years have not been made available, but it is roughly estimated that loan repayments arrears could be about 10 percent to total approval. The State Governments and their agencies have been the major defaulters of NACB loans and extensive diversion has been observed in NACB loans to State Government and their agencies. Many loan schemes of the State Agricultural Credit Corporations have almost collapsed because of huge loan repayment arrears. The state credit scheme has long been notorious in this regard. A high rate of loan default, such as we have observed in many agricultural credit programmes, does not augur well for such

programmes. It generates caution on the part of lenders and this attitude has for instance adversely affected the on-lending programme of the NACB. A high default rate also affects potential borrowers who may suffer lending conditions from the credit institutions. The credit institutions, especially the public agencies tend to adopt survival strategies in the management of funds because of limited sources of funds. The overall effect is that targets outlined in various credit programmes cannot be met.

3.10 Uncoordinated Credit Policies

Finally, the extent of coordination among the various credit programmes has been small and this adversely affects the total impact of the programmcs. The lack of coordination in these programmes stems from the inadequate cooperation in agricultural policy formulation and implemented by the Federal and State Government each of which had tended to pursue certain lines of action without due regard to what the other was doing. This has been the pattern since the Federal Government assumed some basic responsibilities in the realm of agricultural development probably due to their poor financial position. The states have attempted to benefit from the Federal credit programme of the NACB. But their own credit programmes, managed by their credit corporations have not been coordinated in any meaningful way with those of the NACB. With proper coordination of Federal and State credit policies, the NACB programme would probably have reached a larger number of farmers and many of the defaults by states arising from NACB loans might have been avoided. In the same vein the loan programme of the commercial and merchant banks might have reached many more farmers if that programme had been properly coordinated with those of the states. For the sheer cost of administration, there was no basis for the banks to cover so many farmers in their schemes. But if states could more effectively benefit from the bank schemes. There was only little coordination among the credit programmes at the Federal level. For instance, if a way could be found to permit an easy flow of credit from the banks to the NACB without coercive instruments, it might have produced a salutary effect on the agricultural credit system.

4.0 CONCLUSION

Agricultural credit programme could have achieved much in the development of agriculture in this country had it not been because of the problems encountered and if care is taken to address these problems, the issue of lack of credit among the farmers especially the small scale farmer would be a thing of the past.

5.0 SUMMARY

This Unit has examined the problem of agricultural credit programme and has be to identify that the problems range from inadequate number of beneficiaries to rate default rate and the understanding of these problems and put to correction: impact would be felt in agricultural production.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The three problems in Agricultural Credit in Nigeria include:

a. Inadequate number of beneficiaries
b. Interest rate problems
c. Uneven distribution of agricultural credit

ANSWER TO SELF-ASSESSMENT EXERCISE 2

Other problems include:

a. Inadequate monitoring and evaluation
b. Underdeveloped Production Base
c. Weak Agricultural Policies
d. Poor Extension Services
e. High Default Rate
f. Un-coordinated Credit Policies

6.0 TUTOR-MARKED ASSIGNMENT

Examine the problems of Agricultural Credit Programmes in Nigeria. In your own opinion give some practical ways of solving these problems

7.0 REFERENCES/FURTHER READINGS

Olajuwon, S. et as (1980). *Problems and Prospects in Integral Rural Development*.

Ijere, M.O. and Aja, Okorie (1996). *Reading in Agricultural Finance*.

UNIT 2 AGRICULTURAL MARKETING

CONTENTS

1.0 INTRODUCTION

This is the second Unit and we are focusing on marketing of agricultural products. From your experience in life, you will recall that marketing involves more than buying and selling hence this unit is going to examine the details of activities right from the farmer's gate to the consumer's yard.

You will remember from the rudimentary knowledge that marketing is the performance of all business activities involved in the flow of goods and services from the point of production to the ultimate consumer. With the above explanation it entails the exchange of ownership of goods and services for money or money worth. A man who grows an onion or vegetables along river Niger axis in Lokoja Kogi State and takes to the market at Lokoja for sale is involved in marketing. Hence, agricultural marketing is the performance of all business activities involved in the movement of agricultural commodities from the point of production to the consumer's yard.

2.0 OBJECTIVES

By the end of this Unit, you must be able to:

- identify the key point of agricultural marketing;
- understanding the salient features of marketing; and

- examine marketing contributions.

3.0 MAIN CONTENT

3.1 Definition

Agricultural marketing is the performance of all business activities involved in the movement of agricultural commodities from the point of production to the consumers. It is sometimes difficult to state precisely when marketing begins. This is because anyone embarking on agricultural production would have identified possible buyers, mapped put strategies for disposal of the output and projects gains accruable to him/her before actual production processes commence. However, real marketing is said to be with arrangement for transfer of ownership of the goods and exchange of the same for money or money worth.

3.2 The Need for Agricultural Marketing

The need for agricultural marketing arises with production of excess, over and above consumption. This relates to the concept of marketable surplus which is defined as the proportion of the total output that is available for sale after satisfying the producer consumption, seeds for next season are planting, gift and other needs. There is however, an exception to this conception, as certain agricultural commodities are produced for meeting specific population's needs. Thus, "Gbanja" kola is widely grown in south western Nigeria, transported and sold to the people of the northern parts of the country who relish the commodity. Marketing bridges the gap between production and consumption. It brings together impersonal forces of supply and demand irrespective of where the market is located. Therefore, one is involved in marketing whether one grow yam, sells the tubers or processes same to yam flour (elubo) and sells in the village or town markets in the southern parts of the country or received supplies of grains, onions, or goats from the north.

3.3 Market and Market Place

Market is the interaction of impersonal forces of supply and demand irrespective of the physical location of the sellers or buyers. It involves all possible buyers of the commodity. It differs from a market place, which refers to a specific physical location where the supplier (seller) and the buyer meet, for the exchange of the commodity for money or money worth.

Hence, a market may be a market place or not. The essential factor is the contact between seller and the buyer, which could be effected by any

means communication such a personal visit, letter, telegram, telephone, fax or electronic mail. In this regard, a market may be local, regional, national or international in scope.

SELF-ASSESSMENT EXERCISE 1

i. Define Agricultural Marketing.
ii. What is the need for Agricultural Marketing?
iii. Explain the term market and market place.

3.4 Features of Marketing

The salient features of marketing include prices, marketing functions and marketing institutions.

3.4.1 Prices

Prices are very important because they determine the farmer's income and its stability. Besides, they determine the profit of the trader. Agro-based industrialists and the final consumer's real income i.e. the quantity of goods and services they are able to buy at a particular level of income. Prices are also used by producers to allocate resources. The rise in the price of and demand for cocoa in the 1980s in the world market led to shift of factors of production such a labour, land etc. from other .products to the production of cocoa in the cocoa producing areas of Nigeria.

3.4.2 Marketing Functions

Amongst the marketing functions features listed above, marketing functions are the main specialized activities performed within the marketing system. The functions are grouped into three different categories as follows:

3.4.3 Exchange Function

This function involves processes that assign monetary value to and transfer of ownership the commodity. It affects the exchange of goods by the seller the money paid by the buyer. The function includes selling and buying.

Selling is the act of giving commodity to someone in exchange for money. However, in marketing system, selling goes beyond this simple act. It involves them search for all possible buyers of the goods or services, assigning value to the commodity, promotional activities (viz

advertising, occasional reduction of prices etc,) and the search for the best el of distribution of the products.

Buying includes activities such as the search for the sources of supply and the act of giving out money in exchange for the goods purchased. This function enables the seller and consumer to have a fair price and cost for good sold and bought respectively

3.4.4 Physical Functions

This function involves physical handling of the commodity. The function affects the goods in terms of their forms, movements from one place to another and the extension of the product's life span from one period to another. The specific functions are:

- Processing
- Transportation
- Preservation and
- Storage

1. Processing is the marketing function which ensures the availability of a particular agricultural product in the forms desired by the consumers, it provides the form utility to the final consumer of the product. Thus, cassava is processed into various forms such as gari, chips, Tapioca, cowpea into bean cake (moimoi, ekuru, akara) and soya beans into soya milk, paste etc.

2. Transportation is a physical function which ensures that goods are available as at when desired. It therefore creates time utility for the consumer. It involves the movement of produce form one place to another ensuring availability of produce at location of needs by the consumer.

3. Storage is a marketing function which ensures that goods are available as at when (desired. It therefore creates time utility for the consumer. In view of the time factor, involved in storage there is need to preserve the produce such that there is little or no, change in the desired quality of the good. Hence, preservation precedes storage.

However, the extent of the preservation is determined by the nature of the commodity to be stored. It is important to note that the performance of these functions varies from one commodity to another within the marketing system. Some commodities are rarely processed. For instance yam is sold in tuber forms while maize is sometimes sold in maize cobs to consumers, after harvesting. Cassava is processed into garri, cassava

flour or fufu (paste), transported outside the point of production to market places for sale, fresh tomatoes, and pepper are transported in baskets to market places for sale. The extent of marketing functions performed on a particular commodity therefore determines the marketing cost, marketing margin, the unit cost of good and the profit.

SELF-ASSESSMENT EXERCISE 2

i. List the salient features of marketing.
ii. What is exchange function?
iii. Enumerate the physical function.

3.4.5 Facilitating Function

The facilitating functions are those that make possible the smooth performance of the exchange and physical functions. These activities are not directly involved in either the exchange of title of the physical handling of products. However, without them the modern marketing system would not be possible. They might aptly be called the grease that makes the wheels of the marketing.

Facilitating is the provision of credit facilities for marketing the commodity. This need arises in view of the fact that fund is tied up in the commodities produced for marketing. There is time lag between production and marketing of the products.

Standardization is the process of credit establishing and maintaining a uniform measurement of a commodity in terms of quality. For standardization to be effective, it needs to be proceeded by grading which is predetermined as per agreed criteria within the marketing system such as type, size, shape, flavour, amount of foreign substances (rodent hair, insect ‘remnants, stones etc). This function deters adulteration of goods, and ensures good measures and quality.

Provision of marketing information involves gathering, interpreting and dissemination of all the data which tend to facilitate the bylines activities of selling and buying and such as supply and demand, prices, availability of credit facilities etc.

Risk bearing is the assumption of possible losses incurred due to the occurrence of several risks suffered while marketing. The losses include reduction in the market value of goods consequent upon loss of freshness or shrinkage of the good, loss in market value, fire outbreak, and theft, accidental fluctuation in prices occasioned by upsurge of supply, insect attack and unfavourable climatic conditions (cold and

heat) which makes the produce prone to fungal attack. The effect of these varies and includes:

i. Reduction of the desirability of the produce by the consumers and
ii. Loss of physical products. These changes observed in the goods reduce prices offered for the commodities and results in reduction of the farmer's or sellers, income.

Advertising involves activities that deal with publicizing of goods and services foe sale or increase sales. It therefore keeps the product constantly in the minds of the consumers thus creates effective demand.

The market intelligence function is the job of collecting, interpreting, and disseminating large variety of data necessary to the smooth operation of the marketing processes. Efficient marketing cannot operate in an information vacuum. An effective pricing mechanism is dependent on well-informed buyers and sellers. Successful decisions on much to pay for commodities or what kind of pricing policy to use in their sales requires that a large amount of market knowledge be assembled for study. Adequate storage programs, an efficient transportation services, and an adequate standardization all depend to a considerable extent on good information.

Much of the market research that is carried to evaluate the possible alternative marketing channels that may be used, the different ways of performing other functions, and the market potentialities for new products may be performed by those who specialize in its performance. On the other hand, everyone in the marketing structure who buys and sells products evaluates available market data and therefore performs this function to some degree.

SELF-ASSESSMENT EXERCISE 3

Enumerate the facilitating functions of marketing

4.0 CONCLUSION

This Unit has fully explained that marketing involves more than buying and selling and it is the-inter-personal forces of demand and supply irrespective of where the market is located. Marketing bridges the gap between productions and consumption.

5.0 SUMMARY

Agricultural marketing is the performance of all business activities involved in the movement of agricultural commodities from the point of

production to the consumers yard. The salient features of marketing include prices marketing functions and marketing institutions.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i Agricultural marketing is the performance of all business activities involved in the movement of agricultural commodities from the point production to consumers yard.

ii. The need for agricultural marketing arises with production of excess over and above consumption. This relates to the concept of marketable surplus defined as the proportion of the total output that is available for sale after satisfying the need of producer's consumption, seeds for next seasons planting, gift and other needs.

iii. Marketing is the interaction of the impersonal forces of supply and demand irrespective of the physical location of the sellers or buyer. Market place refers to a specific physical location where the supplier (seller) and the buyer meet of the exchange of the commodity for money with essential factor, is the contact between seller an: buyer which could even be affected by any means of communication.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

This salient feature of the marketing includes:

1. Price
2. Marketing Functions
3. Marketing Institutions

1. Exchange functions are those activities involves in the transfer of title to goods. They represent the point at which the study of price determination enters into the study of marketing. These functions are never performed in our economy without a Judgment of value usually expressed at least partially as a price, being place on the goods. Both the buying and the selling functions have not their primary objectives the negotiation of favourable terms of exchange.

2. The physical functions are those activities that involve handling, movement and physical change of the actual commodity itself. They are involved in solving the problems of when, what and where in marketing.

3. The facilities functions are those that make possible the smooth performance of the exchange and physical functions. These activities are not directly involved in either the exchange of title or the physical handling of products. However without them the modem marketing system would not be possible. They might aptly be called the grease that lubricants the wheels of marketing efficiency. The functions include:

a. Standardization
b. Financing
c. Risk Bearing
d. Market intelligence

6.0 TUTOR-MARKED ASSIGMENT

1. List the salient features of marketing.
2. Discuss the characteristic of agricultural marketing in Nigeria under the following headings.

a. Marketing place.
b. Scale of Operation.

7.0 REFERENCES/FURTHER READINGS

Kohls, R.L. and Uhl. N.J. (1972). *Marketing of Agricultural Products*.

Aweto, R.A. (1996). *Agricultural Cooperatives*.

UNIT 3 CHARACTERISTICS OF AGRICULTURAL MARKETING IN NIGERIA

CONTENTS

1.0 INTRODUCTION

In the last unit, you will remember that we dealt with the genesis and evolution of marketing. We did emphasize that marketing involves more than buying and selling. We also examined the features of marketing through marketing functions. This unit now focuses on the local marketing system coupled with the characteristics of marketing in Nigeria. You should recollect that the farmer's and the consumer's view points on an ideal marketing system differ. While the farmers expect maximum prices possible to be paid for produce sold especially during the harvest time, the consumers' expectation is the availability of produce at minimum price possible. Thus the marketing functions reconcile these two divergent ideals by creating consumers utilizes within the marketing system. This unit will explain clearly all these view for a better understanding.

2.0 OBJECTIVES

At the end of this unit, you should be able:

- identify the key points of ideal marketing system; and
- understand the characteristics of agricultural marketing.

3.0 MAIN CONTENT

3.1 Ideal Marketing System

Within the marketing system, the marketing functions discussed in the last unit are performed with varying degree of efficiencies. Everyone who handles agricultural products performs at least one of these functions either consciously or unconsciously, prior to the consumption of the products. A farmer who decides to sell the unharvested cassava he/she cultivated to women who process it to garri only performs the function of selling. The woman consumer who uproots, transports, process and sells the final product performs

i. Exchange functions of buying and selling
ii. Facilitating function of risk-bearing

The extent of the marketing function that goes into the produce and the number of hands the produce passes through before it gets to the ultimate consumers determines the price of the produce and the proportion of this value that gets to the producer. This is of relevance to the concept of ideal marketing system. Generally, an ideal marketing system is one which allows a reasonable proportion of what the ultimate consumer pays for the goods to reach the producer (farmer). Some farmers perform most of these of what the functions to enable them reduce the marketing chain thus obtaining a significant share of what the consumer offers for his/her produce.

3.1.1 The Farmer's View Point

The farmer's and the consumers view points on an ideal marketing system, differ. Farmers consider a marketing system an ideal one when:

i. Maximum prices possible are paid for produce sold
ii. Producers are purchased at harvest time at maximum prices possible
iii. Produces are paid for in cash or in advance if possible
iv. Produces are collected from the site to production and
v. All produces are acceptable to the buyer irrespective of quality such that he/she does not lose his/her produces

3.1.2 Consumer's View Point

However, the view points of the consumer about an ideal marketing system are:

i. Availability of produce at minimum price possible

ii. Availability of produce when needed at all times
iii. Produce to be purchased on generous credit terms
iv. Availability of produce at close range i.e., proximity to home or place of consumption; and
v. Produce to be only of high quality

Thus, the marketing functions reconcile these two divergent ideals by creating consumers' utilities within the marketing system.

SELF-ASSESSMENT EXERCISE 1

i. Explain the term ideal marketing system.
ii. Explain the farmers' and consumers' view points on ideal marketing system.

3.2Characteristics of Agricultural Marketing in Nigeria

The following constitutes the main features of agricultural marketing in Nigeria.

3.2.1 The Market Place

The market place as mentioned in the earlier section is a specific location where sellers and buyers meet regularly to perform the exchange functions of marketing. The market place occupies an important aspect of the marketing system.

Also, it provides a forum for meeting friends; acquaintances, to initiate and establish social, political and religious relationships, disseminate information and undertake adult educational programmes. Information on family planning, health and nutrition etc. is disseminated to the traders especially women participants by the appropriate extension personnel.

Except in some market (textile materials etc), agricultural commodities constitute over two thirds of items traded in, in most markets in Nigeria. However, some markets were specifically established for food. These are called farmers' markets. They hold specific market days, Ojo markets (Ibadan) holds every nine days.

An important feature of these market places is the general lack of adequate market infrastructures such as storage, warehouse facilities, counter or selves for display of commodities, lock up stalls etc. Other basic amenities which are usually lacking or inadequate include lavatories, parking areas and refuse disposal facilities. Hence, in many market places the produce are displayed in basins, bowls or trays on the

ground, such that the efficient flow of goods and services is hampered. Further more, the lack of or inadequate refuse disposal and lavatory facilities tend to endanger the health of the attendants.

SELF-ASSESSMENT EXERCISE 2

Differentiate between market and market place.

3.2.2 The Marketing Function

The marketing functions performed in marketing of agricultural products in Nigeria ranges from the exchange function to the facilitating functions, with varying degrees of efficiencies. *Marketing efficiency* relates to the movement of produce from the producers to the consumers at the lowest cost possible that is consistent with the services desired by the consumers. Marketing efficiency focuses on the cost of functions performed within the marketing system in relation to the consumer's satisfaction. Thus, reducing this cost means increasing marketing efficiency. However, increase in total cost of marketing does not necessarily imply inefficient marketing. There are two types of marketing efficiencies namely *Technical and Economic* efficiencies. Technical efficiency relates to procedure, physical facilities and scale of operation i.e., capacity utilization. It measures the effectiveness with which the physical functions of marketing are performed. These activities include processing, storing, transporting etc. thus, the use of the best available technology for processing, storing and transporting which tend to meet consumers' satisfaction regardless of cost leads to increase in technical efficiency, terms with the minimum available resources. Thus, economic efficiency is achieved when the marketing functions are performed using the most profitable techniques, and considering the prevailing market prices and margins, degree of competition and responsiveness of marketing system to consumers' desires. From the above the main objective of marketing efficiency is to provide commodities to final consumers in the desired form, at the required time and place, at the lowest feasible marketing costs in the interest of the produces i.e. Farmers.

SELF-ASSESSMENT EXERCISE 3

i. Explain the term Marketing Efficiency.
ii. Explain the term Economic Efficiency.

3.2.3 Marketing Operations

A greater proportion of traders in staple food marketing in Nigeria operate on small scale. They buy and sell their goods in small quantities.

This is a reflection of the small scale production level at which the farmers operate which leads to the small marketable surplus. Another factor responsible for traders selling in small lots is the low levels of consumers' income which has been further drastically reduced by the high level of inflation attending the continuous devaluation of the Naira since the inception of Structural Adjustment Programme in 1986.

The situation is becoming more critical with the further reduction of household purchasing power due to the skyrocketing prices of food items and stagnant workers' wages in recent times. For instance a unit measure of bean (1 congo) which sold for between N20 AND N30 in 1995 has risen to between N100 N120 by the following year. This represents a staggering increasing of between 300 and 400% depending on the variety in just one year. Many households are now forced to buy in small quantities in attempt to spread the available money on as many food items as could be accommodated.

Again there is little specialization by function amongst middlemen as traders themselves move from farm to farm in search of goods to buy in addition to performance of other functions of storage, processing transportation, financing and risk-bearing before selling. Selling and buying are characterized by price haggling due to non-usage of fixed prices r and price tags as obtained in supermarkets or departmental stores.

3.2.4 The Performance

The performance of the physical function of storage, processing and transportation is impeded due to lack of or inadequate marketing facilities. Consequently, post harvest losses are high and usually about 30 to 33% of total production m the country. For example, goods are stored in jute bags open basins or tins and placed on either earthen or cemented floor, which makes them prone to excessive spoilage by pests and rodents. Commodities such as fresh tomatoes, vegetables and fruits which are highly perishable are also stored in baskets, placed on the ground in the market places due to lack of and non use of cold storage facilities. In view of the nature of these products greater proportion of these is lost through spoilage. Likewise, cold storage for meat and fish are uncommon in the market places except in the case of wholesalers who operate cold rooms for selling fish to market women for retailing. The fresh fish trade is dominated by women in the market places. They often store these commodities in basins, stuffed with jute bags and cellophane bags to keep the fish from defrosting and spoilage.

However, the remaining stocks at the end of the day's sales are often preserved mainly by roasting. Food processing facilities are still

inadequate. Hence, food processing is done manually with ineffective traditional techniques. Marketing of livestock products particularly beef is dominated by men in most market places in Nigeria. The livestock products arc often displayed on tables with non-use of cold storage facilities. However, in recent times: few meat shops with adequate cold storage facilities exist in some of the big cities.

3.2.5 The Food Market Structure

The food market structure in Nigeria is made up of large number if middlemen and women especially at the retail level compared with other agricultural products such as cocoa, rubber, timber etc. This is due to the relative ease of entry and exit, little starting capital outlay, small scale of operation, lack of alternative remunerative employment and the fact that little or no specialization skill is required. New entrants only need to understudy older ones as apprentices for a short period.

The market costs, prices and margins are relatively high for food items compared with other crops. Generally, the factors responsible for these include small scale of operation by operators, losses and wastage, ineffective temporal and spatial arbitrage and collusive pricing by the wholesalers and numerous product specific trade associations, such as rice sellers' associations, yam sellers' associations etc. Specifically, marketing margins and price structures are determined by the nature of the product function that goes into the products (transportation. storage. processing etc) and the demand and supply conditions.

SELF-ASSESSMENT EXERCISE 4

List the physical functions performed in Agricultural marketing.

4.0 CONCLUSION

An ideal marketing system is one which allows a reasonable proportion of what the ultimate consumer pays of the goods to reach the producer (farmer) while marketing functions reconcile both the farmers and the consumers view point by creating consumers utilities within the marketing system.

5.0 SUMMARY

The key point of ideal marketing is from both the farmers and the consumers view points which are being reconciled by creating consumers utilities within the marketing system. The farmer's view point is that the maximum price possible is paid for produce sold while

the consumer maintains that availability of produce at minimum price possible.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. An ideal marketing system is one which allows a reasonable proportion of what the ultimate consumer pays for the goods to reach the producer (farmer) some fanners perform most of these functions to enable them reduce the marketing chain thus obtaining a significant share of what the consumer offers for his/her produce.

ii. The farmer's view points are:

- Maximum prices possible are paid for produce sold.
- Produce are purchased at harvest time at maximum prices possible.
- Produces are paid for in cash or in advance if possible.
- All produce are acceptable to the buyer irrespective of quality such that he/she does not lose his/her produce.

The consumer's views include:

i. Availability of produce at minimum price possible
ii. Availability of produce when needed at all times
iii. Produce to be purchased on generous credit terms,
iv. Availability of produce at close range
v Produce to be only of high quality

ANSWER TO SELF-ASSESSMENT EXERCISE 2

Market is the interaction of the impersonal forces of supply and demand irrespective of the physical location of the sellers and buyers. It involves all possible buyers of the commodity. Market place refers to a specific physical location where the supplier (seller) and the buyer meet, for the exchange of the commodity for money or money worth.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

Marketing efficiency relates to the movement 01- produce from the producers to the consumer at the lowest cost possible that is consistent with the services desired by the consumers. It focuses on the cost of functions performed within the marketing system in relation to the consumer's satisfaction. Thus reducing this cost means increasing marketing efficiency.

Economic efficiency is a subset of marketing efficiency and it is concerned with realization of maximum output in monetary terms with the minimum available resources. Thus, economic efficiency is achieved when the marketing functions are performed using the most profitable techniques and considering the prevailing market process and margins, degree of competition and responsiveness of marketing system to consumers desires.

ANSWER TO SELF-ASSESSMENT EXERCISE 4

The physical functions performed in marketing include:

a. Processing
b. Transportation
c. Preservation
d. Storage

6.0 TUTOR-MARKED ASSIGNMENT

1. Differentiate between ideal marketing and marketing efficiency.
2. The marketing functions reconcile both the farmers and consumers divergent ideals by creating consumers utilities within the marketing system. Discuss

7.0 REFERENCES/FURTHER READINGS

Kohls, R.L. and Uhl. N.J. (1972). *Marketing of Agricultural Products*.

Ijere, M.O. (1992). *Prospects of Nigerian Cooperatives*.

Aweto, R.A. (1996). *Agricultural Cooperatives*.

UNIT 4 MARKETING INSTITUTION

CONTENTS

1.0 INTRODUCTION

In the last two units, you have been reading about agricultural marketing in Nigeria, this unit will take another step further with you in explaining marketing institutions which is from the institutional approach. This is the study of various agencies and business structures that perform the marketing processes. This institutional approach to marketing problems focuses attention on the "who". Marketing institutions are the wide variety business organizations that have developed to operate the marketing machinery and it considers the nature and character of the various middlemen and related agencies and also the arrangement and organization of the marketing machinery. .In this unit, the human element receives primary emphasis hence middlemen are those individual or business concerns who specialize in performing the various marketing functions involved in the purchase and sale of goods as they are moved from producers to consumers.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- identity the key actors of marketing institutions;
- understand the of these middlemen; and
- explain their various effects

3.0 MAIN CONTENT

3.1 The Institutional Approach

Another method of analysis is to study the various agencies and business structures that perform the marketing processes. Where the function approach attempts to answer the 'what' in the question of "who does what" the institutional approach to marketing problems focuses attention on the "who." Marketing institutions arc the wide variety of business organizations that have developed to operate the marketing machinery. In this approach the human element receives primary emphasis.

3.2 Middlemen of Marketing

Middlemen are those individuals or business concerns who specialize in performing the various marketing functions involved in the purchase and sale of goods as they are moved form producers to consumers. Our concern here is with the place in the marketing processes which the middlemen occupy. There is no limitation as to the way in which they have organized for doing business. They may operate as individual partnerships, or cooperative or non-cooperative corporations.

SELF-ASSESSMENT EXERCISE 1

Explain the term middlemen in marketing.

3.3 Marketing Channels

This is sometimes referred to as marketing chain. It is defined as the sequential movement of the commodities form the producer (farmer) to the final consumer. It is the stages through which commodities pass form farmers to the consumers.

It represents the outlet for the distribution of the commodity. The marketing of agricultural products is characterized by a long and sometimes complicated chain of distribution with many intermediaries. Hence, there is no typical marketing channel for a particular produce. A

particular commodity can take any or a combination of these forms of channel.

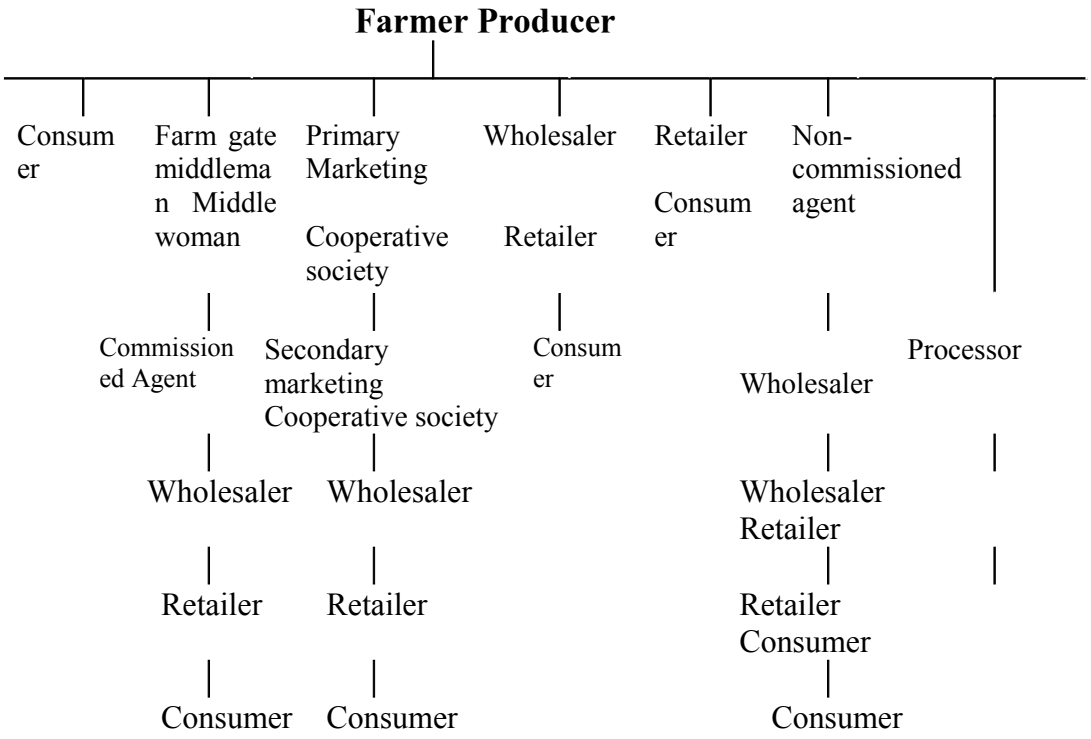

Figure 14:1: Possible Marketing Channels for Agricultural Food Crops in Nigeria

SELF-ASSESSMENT EXERCISE 2

What is marketing channels?

It is important to note that the longer the channel of marketing a particular produce, the greater the number of middlemen/women and marketing institutions, resulting in higher marketing cost and final retail prices. The percentage of retai1 prices which returns to the farmers is lower, hence a higher marketing margin.

3.4 Marketing Institutions

Marketing institutions are the various organizations that participate in the marketing of goods and services within the marketing system. They are also referred to as marketing agents and constitute the principal actors within the marketing institutions have been identified as peasants, large scale producers, farm gate middlemen/women, commissioned agents, non-commissioned agents, processors/manufacturers wholesalers and retailers, trade association including co-operatives.

These are distinguished by the size of operation, capital outlay required and function they perform.

3.4.1 Farm Gate Middlemen/women

This category of middlemen women buys the produce from site of production taking advantage of the spatial price differential. They undertake the transportation of the produce from the farm to market places for sale to wholesalers or retailers.

3.4.2 Commissioned Agents

These are middlemen or women who simply act as representatives of another marketing institution. They act as intermediaries between the farmer and buyer of the produce. Usually they do not take titles to the goods they sell. They however, have a good knowledge of the market situations such as information which they use to bring together the buyers and sellers of the commodity. In essence, they render marketing services. They perform the facilitating functions of marketing. At the end of the transaction they are paid a previously agreed commission or fee.

3.4.3 Non-Commissioned Agents

Non-Commissioned Agents are middlemen or middle women who take titles to the commodity they sell. They perform the marketing function of transportation, storage and sometime processing before selling to wholesaler, retailer or consumer.

3.4.4 Wholesalers

Wholesalers buy in large quantity and sell in bulk to others such as retailers industrial users of the product, processors, institutions and other middlemen or middlewomen. They do not sell significantly to ultimate consumers. In most market places, in Nigeria, wholesalers constitute a small proportion of the traders usually accounting for less than 10% of the entire traders' population. The wholesalers perform the function of collecting, grading, storing, delivery and financing, in marketing of the commodity.

SELF-ASSESSMENT EXERCISE 3

Briefly describe the following:

i. Farm gate middlemen.
ii. Wholesaler the commodity.

3.4.5 Retailers

Retailers are middlemen or middlewomen who buy commodities for resale to final consumers, often in small quantities. In this way they perform the function of breaking bulk, storing, sometimes giving credit and promoting sales. They are often referred to as the personal representatives of the producers to the ultimate consumers. They depend on haggling power to buy cheaply and sell at high prices. They make profit through the use of different measures. They purchase with large measures and sell with small measures. Some use false measures or change to smaller measures when innocent buyers are not watching. The introduction of uniform measure by the Oyo State Ministry of Commerce and Industry in late 1980s has significantly enhanced retailing in the state.

3.4.6 Processors/Industrialists

Farm products are the raw materials of these marketing institutions. They purchase the produce, transport. Store in warehouse and effect changes in the physical form of the commodity (process) and sell to ultimate consumers. Examples are (1) Women who process cassava into garri, cassava flour (ii) Cadbury Nigeria PLC that process cocoa into Bournvita. (iii) Fruit canners who process fruits into fruit juice etc.

3.4.7 Speculative Middlemen/Middlewomen

These undertake buying and selling of goods with the purpose of taking advantage of spatial and temporal price differentials. By so doing they perform the function of risk- bearing, storage and financing as money is tied down in the commodity store. Most agricultural products sell for relatively lower prices at the peak or the season and command higher prices at off seasons. Other marketing institutions are facilitating in their nature of operations such as Bodija market rice sellers' association. Kaduna butchers association etc. these associations assist in pricing and dissemination or marketing information to their members. They also provide credit facilities to members. The effects are that within a particular market place, a uniform unit price is place on a product depending on the type and the quality. Often, sanctions are placed on any defaulting member when discovered. They constitute cartel in the marketing system. Except for the facilitating and processors marketing institutions, all other marketing institutions are individualistic in operation. Other non-individual organized marketing institutions arc commodity boards and cooperative.

3.4.8 Facilitative Organizations

Faci1itative organizations aid the various middlemen in performing their tasks. Such organizations do not, as a general rule, directly participate in the marketing processes either as merchants, agent's processors, or speculators. One group of these organizations furnishes the physical facilities for the handling of products or for the bringing of buyers and sellers together. They establish the "rules of the game" which must be followed by the trading middlemen, such as hours of trading and terms of sale. They may also aid in grading, arranging and transmitting payment. They receive their incomes from fees and assessments from those who use their facilities. Another group of organization falling in this general category are the trade associations. The primary purpose of a large majority of these organizations is to gather, evaluate, and disseminate information of value to a particular group or trade. They may carry on research of mutual interest. In many cases they also may act as unofficial policemen in preventing practices the trade considers unfair or unethical. Though not active in the buying and selling of goods, these organizations often have far-reaching influence on the nature of marketing.

3.4.9 Speculative Middlemen

These are those who take title to products with the major purpose of profiting price movements. All merchant middlemen of course, speculative in the sense that they must face uncertain conditions. They undertake buying and selling of good with the purpose of taking advantage of spatial and temporal price differentials. By so doing they perform the function of risk bearing, storage and financing as money field down in the commodity stored. Most agricultural products sell for relatively lower prices at off seasons.

SELF-ASSESSMENT EXERCISE 4

Explain the following term:

a. Retailer
b. Speculative middleman

4.0 CONCLUSION

The activities of middlemen in marketing could not be over emphasized and are distinguished by the size of operation capital outlay required and the function they perform. the greater the number of middlemen in a marketing channel, the higher tic marketing cost and final retail prices and the percentage of this retail prices which returns to the farmer is

lower hence a higher marketing margin middlemen or middlewomen. They do not sell significantly to ultimate consumers. In most market places in Nigeria, wholesalers constitute a small proportion often traders usual1y accounting for less than 10% of the entire traders population.

SELF-ASSESSMENT EXERCISE 5

Retailers are middlemen or middlewomen who buy commodities for resale to final consumers often in small quantities. In this way they perform the function of breaking bulk, storing, sometimes giving credit and promoting sales. They are often referred to as personal representatives of the producers to the ultimate consumers. They depend on haggling power to buy cheaply and sell at high prices. They make profit through the use of different measures.

5.0 SUMMARY

The key actors of marketing institution are the middlemen who specialize in performing the various marketing functions involved in the purchase and sale of good as they a moved from producers to consumers. There is no limitation as to the way in which they have organized for doing business.

6.0 TUTOR-MARKED ASSIGNMENT

Explain the following:

1. Wholesaler
2. Retailer
3. Speculative middlemen
4. Farm gate middlemen

7.0 REFERENCES/FURTHER READINGS

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UNIT 5 COOPERATIVE MARKETING ORGANIZATIONS

CONTENTS

1.0 INTRODUCTION

This unit focuses on the contribution of Cooperatives to Agricultural marketing. You will recall that in units 1 and 2 of this course, cooperative's contribution to agriculture was well examined. The involvement of cooperatives in marketing of agricultural commodities in Nigeria dated back to the 1930's when formal cooperatives were introduced into the country. Their activities centered on export crops initially. The crops handled by cooperatives then were cocoa (in the Western Region) groundnut and cotton (North) and palm produce (West & East). Through these marketing activities they contributed to the National income of the country. From the available data, you will agree that cooperatives' share of the market-increases steadily from 13% (1995) to 22% (1961) and 23% (1965). As a result of cooperatives activities in agricultural marketing a lot of organizations came into being

which were saddled with marketing activities, details will be discussed fully in this unit.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- identify the various cooperative marketing organizations; and
- understand the contributions of cooperatives to agricultural marketing.

3.0 MAIN CONTENT

3.1 Cooperative and Marketing of Agricultural Commodities

From our discussion in the last unit, Cooperatives have made an impact in the marketing of agricultural commodities. The involvement of cooperatives in marketing of agricultural commodities in Nigeria dated back to the 1930's when formal cooperatives were introduced into this country. Most of their activities centered on export crops initially. The Marketing Board did not allow full participation of Cooperative in the marketing of these commodities.

Prominent among the cash crops exported by the Marketing Boards include Cocoa, Rubber, Groundnut, Cotton, Palm produce. Each of these commodities has a board of its own and this affected the full participation of Cooperatives. For example Nigeria was the leading producer of groundnut in the World 1960's and 1970's with up to 95% of the produce coming from Northern Nigeria, cooperative marketed only 2% of the produce through the marketing boards. Also cooperative share of the total quantity of cotton marketed was less than 7%.

3.2 The Association of Nigerian Co-operatives Exporting (ANCE) Limited

The Association of Nigerian Cooperative Exporters (ANCE) was established in 1945 when the existing four cooperative unions namely Ibadan, Ife, Ilesha and Ijebu produce marketing unions joined together to export their own produce.

3.2.1 Objectives

1. To act as a central agency for marketing, financing and stimulating production of members produce.
2. To establish as shipping, stevedoring clearing and forwarding agency.

3.2.2 Activities

All existing cooperative marketing unions used to market their produce through ANCE unit 1953 when Nigeria was divided into three regions. Thereafter, the Associations activities were limited to Western Nigeria. Cocoa is the major produce handled by the Association. Other produce traded in then, were ginger, chilies, cotton, sheanuts, rubber and palm kernel.

In 1964, the area of operation of ANCE was limited to the Western State on the creation of the Midwestern and Lagos States. With the splitting of the old Western State in Oyo, Undo and Ogun in 1976, the leaders of the cooperative movement in these states resolved that the activities of the association should be within the three states. Presently, it is a central cooperative marketing organization which is the apex organization of the marketing arm of the cooperative movement of Oyo, Osun, Ondo and Ogun States.

Prior to the scrapping of commodity boards, ANCE nurtured its affiliated unions to be financially strong enough to deal directly with the commodity boards as licensed buying agents. Weaker unions operated under the Association's license. ANCE also served as representation provided an opportunity for members to express their views, increase members bargaining power which is the only condition for effective performance of cooperatives in developing countries. ANCE also represents cooperative producers in the committee of licensed buying agents.

3.2.3 Operations

ANCE has diversified its operation into such ventures as livestock feeds; food crops (maize to feed the feed factory) and yam production and building. The scrapping of commodity Boards in 1986, constituted a great challenge for cooperatives in Nigeria. The challenge was aggressively accepted by ANCE and the Association is paying a significant role in the marketing of agricultural products particularly cocoa export. There however, the need to evaluate the performance of produce marketing cooperatives' and the Association's share of the export market

SELF-ASSESSMENT EXERCISE 1

i. List the contributions of Cooperatives in agricultural marketing.
ii. List the objectives of ANCE.

3.3 Cooperatives and Food Crop Marketing

The preceding section discloses that the involvement of cooperatives in marketing of food crops and livestock products has not been significant. However, efforts are being made to embrace marketing of staple foods by cooperatives. Past efforts include:

i. Marketing of citrus cooperative marketing society of lkorodu formed in 1935.
ii Yam marketing society which existed between 1945 and 1947.
iii Rice processing and marketing cooperative society established in 1960 in the East
iv. Fish marketing cooperative society (1959) established in the East.

However, these efforts failed due to the perishable nature of the products, inadequate storage facilities and lack of suitable market outlets. Other factors are disloyalty of members and inefficiency in the management of their business operation.

3.3.1 Other Cooperative Marketing Activities

Other examples of marketing activities in food crops by cooperatives include rice production and marketing by Uboma community cooperative union Imo State. Fish production and marketing cooperatives in Cross River State. Tomatoes production and marketing cooperative in Kaduna State. The Borno State Cooperative marketing union undertakes intra State marketing of grains (Rice, Maize, beans and guinea corn) by purchasing these products from group farming cooperative societies in the state for resale to the public. Edo State Cooperative federation deals with the retail and wholesaling of palm oil.

It is important to mention that the interstate staple food marketing attempts made by some states' Apex Cooperative Organizations failed because of complaint of high operational cost. But, the question is, if individual entrepreneurs are able to succeed in interstate food marketing, cooperative should even thrive better! Here is the challenge for cooperatives.

3.3.2 Education of Members

In recent time, cooperatives in Nigeria have been pursuing vigorously the education of their members, committee members and staff. Primary societies particularly in the South Western Nigeria sponsor their members and staff for management training aimed at developing managerial skills of committee members, staff and members. Cooperative need to harness all resources in order to effect improvement

in marketing of their members produce. Cooperative societies and unions should act as efficient marketing institutions for their members' produce and consumers. This will ensure that profit (surplus) accruing therefore goes to the members through "Bonus on patronage refund".

3.4 Nigerian Agricultural Cooperatives Marketing Organization (NACMO)

The Federal Department of Agricultural Cooperative (FDAC) promoted the establishment of NACMO a national apex marketing cooperative organization in 1987 under the cooperative and social development decree No. 28 of 1976. It was established as an instrument for the implementation of the Green Revolution Programme through the development of agricultural cooperatives in the country

3.4.1 Objectives

The objectives of the National agricultural Cooperative Marketing Organization include the following:

a. Promotion and coordination of agricultural cooperative inter and intra-slate trade in food products in Nigeria.
b. Promotion of the development of integrated multipurpose cooperatives for food production, storage, processing, marketing and export.
c. Ensure effective distribution of agricultural inputs particularly fertilizers and other agro-chemicals.
d. Promotion of agricultural cooperative marketing research

3.4.2 Activities

The main activities of the organization are:

i. The organization work closely with existing cooperative group farming society's multipurpose cooperatives, produce marketing cooperatives, women cooperatives etc, and agricultural development projects.
ii. NACMQ undertakes distribution of agricultural inputs such as fertilizer, agro- chemical and other inputs.
iii. NACMQ engages in interstate marketing of agricultural produce.
iv. NACMQ assists in insuring members' assets and produce.
v. NACMQ provides transport facilities to members for effective distribution of agro-inputs and evacuation of food products.
vi. NACMQ conducts research activities and provides marketing information to the members.

3.4.3 Organization of NACMO

The National Agricultural Cooperative Marketing Organization membership is limited to the State Apex Cooperative Federations. In line with the laws and principles of cooperation. NACMQ is democratically managed and controlled by the elected representatives who constitute the Board of Directors. The Board of Director formulates policies to guide the general operations of the organization. However, the daily management of the organization is undertaken by the National coordinator who is responsible to the Board of Directors.

SELF-ASSESSMENT EXERCISE 2

i. List the objectives of NACMQ.
ii. Mention three main activities of NACMQ.
iii. Mention two of the past cooperatives marketing activities.

3.5 Commodity Boards

Commodity boards, initially called marketing boards were established by the Nigeria Government to implement the price policy objectives in respect of the then tour principal rural export commodities namely cocoa, palm produce, cotton and groundnut.

3.5.1 Price Income Policy Objectives

The price income Policy Objectives were:

1. To stabilize prices of the commodities by fixing legal minimum buying prices for a whole season at a time and by seeking to minimize price alternation between one season and another. The price stabilization policy is usually based on fixed producers' prices supported by reserve funds. The boards had monopoly of the buying and selling of the commodities they handle.

2. To mention legally prescribed grades and standards of quality of export produce.

3. To maintain and control an efficient organization for the purchase of produce.

4. To allocate funds to the appropriate authorities by means of grants, loans, investments and endowments for the purposes of economic development and research on the commodities.

5. To supply produce to local processors for processing in their factories. The marketing boards failed to achieve the first three objectives. Rather than stabilizing prices, producers did not reflect current market prices of production cost. Thus, these prices were substantially below the world market prices.

Although, the fourth objective was achieved, the last was implemented in such a way that worked against the local processors. The marketing boards had limited warehouse facilities and were overstaffed with high overhead costs. There was also misapplication of the boards' surpluses for political and personal projects.

3.5.2 Activities

From the above it was obvious that the marketing boards concentrated on export crops. Thus, the marketing board were reorganized during the Third National Development Plan period into commodity boards and increased to seven in order to handle some food crops. However, the commodity boards were still not in control of perishable food crops such as fruits, vegetables, yams, etc. They concentrated on export crops such as cocoa, palm produce, groundnut, cotton and grains.

Generally, these commodity boards were ineffective and not efficient in their operations. Hence, they were unable to attain the objectives for which they were established and 'were scrapped at the onset of the Structural Adjustment Programme in 1986. Marketing of export crops is now being handled by private entrepreneurs and cooperatives.

SELF-ASSESSMENT EXERCISE 3

i. List three objectives of the commodity boards.
ii. What was the major activity of the boards?

4.0 CONCLUSION

Cooperatives have contributed immensely to agricultural marketing in Nigeria and they are still one of the leading marketing organizations of food crops. Most of the activities had major effects on the rural areas which symbolizes their contribution in the rural development.

5.0 SUMMARY

This unit has identified the various marketing organization such as Association of Nigerian Cooperative Exporters. Nigerian Agricultural Cooperative Marketing Organization and their activities which have contributed to the socio economic development of Nigeria.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. The contributions of cooperative in agricultural marketing include:

- Export of cash crops
- Formation of cooperative marketing organization. ,
- Promotion of agricultural cooperative marketing research.
- Ensure effective distribution of agricultural inputs particularly fertilizers and other agro-chemicals.

ii. The Objectives of Association of Nigerian Cooperative Exporters include:

- To act as a central agency for marketing financing and simulating production of members produce.
- To establish as shipping stevedoring, clearing and forwarding agency.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

i. The Objectives of NACMO include:

- Promotion and coordination of agricultural cooperative inter and intra-state trade in food products in Nigeria.
- Promotion and development of integrated multipurpose cooperatives for food production, storage, processing and marketing and export.
- Ensure effective distribution of Agricultural inputs particularly fertilizer and other agro-chemicals.
- Promotion of agricultural cooperative marketing research.

ii. Three main activities of NACMO include:

- To work closely with other existing cooperative organizations.
- To undertake distribution of agricultural inputs such as fertilizer, agrochemicals and other inputs.
- NACMO engages in interstate marketing of agricultural produce
- NACMO assists in insuring member's assets and produce.

iii. Two of the past cooperative marketing activities are:

- Export of cash crops
- Fish marketing

ANSWER TO SELF-ASSESSMENT EXERCISE 3

i. Three objectives of commodity boards include:

- To stabilize price of commodities by fixing legal minimum buying prices for a whole season at a time
- To maintain legally prescribed grades and standards of quality of export produce
- To maintain and control an efficient organization for the purchase of produce.

ii. The major activity of commodity board was on the export of crops.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the role of anyone of these agencies in marketing of agricultural products in Nigeria.

a. The association of Nigeria Cooperative Exporters (ANCE) Limited.
b. Nigerian Agricultural Cooperative Marketing Organization (NACMO).
c. Commodity Boards.

7.0 REFERENCE/ FURTHER READINGS

Aweto, R.A. (1996). *Agricultural Cooperatives*.

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MODULE 4

UNIT 1 PROBLEMS OF FOOD PROCESSING COOPERATIVES

CONTENTS

1.0 INTRODUCTION

For the past four units, you have been reading about marketing especially agricultural marketing of commodities. We examined that processing s one of the marketing functions. This unit now focuses on the problems of food processing cooperatives. From the time memorial you have known that food processing is the act of converting a

commodity from the raw state into a form more suitable and acceptable to the buyer or consumer. Processing is thus a means of creating utility of form to a product. It may lead to quality preservation and improvement. By prolonging the storage life of a product, processing thus reduces areas of wastages or losses. Food processing cooperatives are socio-economic organizations designed to achieve the above aims more expeditiously, economically and humanely.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the various problems of food processing cooperatives; and
- understand these problems and proffer adequate solutions.

3.0 MAIN CONTENT

3.1 The Problems

Cooperatives have been faced with a catalogue of problems since inception ranging from lack of education, mismanagement, capital to mention a few and these problems turn out to affect the food processing cooperatives to the extent that many of the first set of processing cooperatives died naturally.

3.2 Lack of Capital

The inadequacy of shares arid savings impels societies to borrow usually from member unions, governments and banks. The amount possible depends on the availability of collateral, but also on the extent of share capital savings and the law does not allow societies to borrow beyond five times their amount of shares. The interest rate is another major problem making things difficult for the processing cooperatives. Credit mobilization in Nigeria as many developing countries is predicated on many interrelated factors, chief of which are the economic situation of the country, the organizational structure of public and private institutions and the availability of investment opportunities. With all these, credit mobilization has not been easy for the food processing cooperatives.

3.3 Lack of Technical Competence

This is another major problem for the food processing cooperatives. The slow rate of growth of cooperative processing in foods is also predicated on the technical competence among Nigerians. Most early cooperative processing in food such as Aba Cooperative Rice Mill Company did not

survive purposely because of this problem hence lack of technical competence is a major factor for the survival of the food processing organization.

3.4 Managerial Problems

This has been a major problem in cooperatives all over the country. Most of the cooperative managers do lack experience and almost all of them learn on the job. This has affected all the various sets of cooperatives. Three things are really very noticeable in this managerial problem with the food processing namely.

a. Lack of experience in the production manager. Most managers employed are just set of fresh graduates that have little or no experience hence they depend mostly on the trial and error system in their various operations.

b. Lack of qualified supporting staff. As a result of managing the little fund the cooperative now employs incompetent support staff who invariably working with the production manager with little or no experience and within some months the processing cooperatives definitely will collapse.

c. Absence of in-service training for existing staff. Since there is not room to further or acquire more knowledge the supporting staff output will definitely fall below standard. This should be given urgent attention of the need to improve.

SELF-ASSESSMENT EXERCISE 1

Enumerate three major problems of food processing cooperatives.

3.5 Labour Problems

Labour as a factor of production is very paramount to the successful implementation of an industry especially ‘the processing industry. In the food processing cooperatives the labour force is drawn from the locality and not on the basis of training or experience. The cooperative industry has no scheme for training staff or for improving existing skills. Since processing demands skills of various kinds, cooperatives will be called upon to limit production or delay production until they -are trained. Except devices are introduced to check unnecessary mobility of labour, the components ones may resign for new employment with high incentives. Then there is the other problem that such industries tend to have an overdose of unskilled labour inherited from a segment of the ministry or a non prosperous sister society.

3.6 Infrastructure

Lack of infrastructure is one of the most difficult problems the rural areas in the country that are yet to overcome. Most of the so called urban centres also face this problem.

Lack of regular electricity is a perennial problem for poultry, feedmill and other processing enterprises in Nigeria. Food processing depends on an efficient market for its success. Cull birds of the poultry industry have to be sold off quickly or stored. Local products of vegetables, flour, garri, milk, cereals, fish, oil, meat and drinks have to compete with imported ones in suitably located supermarkets belonging to Leventis, Kingsway, Challerams and UTC. With the bogey of food aid or dumping, locally processed commodities face still greater competition. Unless the law prevents the competition at the retail level and reduces food aid, there is little hope for indigenous processors. A food processing cooperative will rely on its members, the immediate and distant communities, and the quality of its products to remain in business. It also requires a good transportation system -road, rail, air and water -to reach the consumer.

The unsuitability of these for perishable goods does not require any further elaboration. The disuse of the Nigerian railway for' transporting this category of goods is most unfortunate.

3.7 Storage Problems

The crux of the storage problem for foodstuffs produced in Nigeria is the relatively little processing preceding marketing. That is, most of the foodstuffs are sold in the raw state. Fish, meat, vegetables and fruit as well as eggs are purchased in this state. Refrigerated or frozen fish and meat are now being accepted locally as the fresh items are not readily available to meet the demand. Corned beef produced locally did not progress satisfactorily as the meat needed was in short supply. Similarly, production of processed fruit like squashes and juices of oranges, grape fruit, pineapples and lime as well as pineapple pieces and mango pieces have not been very successful commercially. Most of the plants operate below capacity several months of the year as fruits for processing are not available in sufficient quantities to the factory.

The paradoxical situation of unutilized plant capacity where fruits and vegetables rot away in some parts of the country is traceable .to the country’s system and production, transportation and marketing. Very few large and organized plantations of food crops are available in the country, hence the collection of fruits and vegetables from small-scale

producers has not been an economical proposition for the processing plant operators. In addition, many rural roads are not suitable for the big vehicles required for the collection of the commodities. Consequently, farmers have to limit the quantities brought to the main roads to amounts transportable in baskets carried on the head or on bicycles.

SELF-ASSESSMENT EXERCISE 2

What are the other major problems of food processing cooperatives (apart from the first three mentioned in exercise 16.1).

3.8 Suggested Strategies

The following have been suggested as strategies to overcome the above enumerated problems of food processing cooperatives.

3.8.1 Increasing the Number of Cooperatives

We have established the economy of food processing cooperatives over individual arrangements. The paucity of cooperatives has to be tackled by mass enlightenment publicity and regulation.

By the last, we mean any government attempts to project the cooperative form of organization short of force. It may include:

a. Channeling inputs through cooperatives;
b. Greater share in handling the sale of essential commodities;
c. Low duties for imported items and equipment used for manufacturing by cooperative;
d. Reducing or banning the importation of foods competing with those of cooperatives;
e. Subsidizing the construction of food processing facilities; and
f. Controlling the market for their products.

If the government is not seen to promote and possibly favour the use of cooperatives, it will be an uphill task for private groups and individuals engaging in the processing industry.

3.8.2 Processing to be integrated with Farming

It should be established what amount of processing is required over a period of time for a certain product. Then, the group farmer's cooperative community farms and others should be integrated to own or service a specific number of such factories. This will mean an attempt to integration either horizontally or vertically.

This will necessarily lead to the encouragement of multi-purpose cooperatives. A special study should indicate the required size of land, number of, say, pineapples; cassava, beans, fruits, livestock and poultry, etc. That can be produced over a given period of time.

It should stipulate also the types of orchards, demonstration farms, seed multiplication centres and what can be expected from private sources.

3.8.3 Role of Multi-Purpose Cooperatives

The increasing number of purpose cooperatives in the country is an indication of the attempt to reap the economies of scale and to obviate the low capital stock consequent on the poverty of most societies. This tendency should be encouraged and supported through management training for their personnel and market for their products.

3.8.4 Storage Facilities

Storage facilities for dry or cold food should form part of the package in any assistance to cooperatives. Warehouses should be built in strategic places depending on the types of products.

3.8.5 Technical and Managerial Competence

Processing is a specialized job. It requires skills and knowledge from specialized industries or factories. Before a society embarks on processing it must ensure that it has trained or employed such skilled manpower to take control of the technical and managerial aspects of the enterprise.

An interested government can come in here to provide such opportunities through scholarships to cooperative personnel locally and overseas and through the establishment of specialized institutes to impart the knowledge in Nigeria.

Managers can be made of cooperative secretaries and leaders. They can be given sandwich courses in such places as the Nigerian Institute of Management (NIM), the Nigerian Centre for Management Development, the Agricultural and Rural Management Training Institute, the proposed National Agricultural Cooperative Management Development Centre, or the Departments of Agricultural Economics in the following universities offering project planning courses–UNN, Ibadan, OAU and ABU.

3.8.6 Financial Assistance

Credit is required for the purchase of equipment, construction of factory payment of staff and marketing of products. Reliance on individual cooperatives, we have seen, will not be enough. We suggest therefore that:

a. Specific funds be set aside by various State Cooperative Financing Agencies for food processing;
b. The NACB should be persuaded to do the same;
c. Commercial Banks should be directed to lend to food processing cooperatives;
d. A moratorium of two years to be allowed each borrowing cooperative to consolidate its activities before repayment.

3.8.7 Marketing of Processed Foods

a. A network of sales agents and societies should be established for the processed foods from cooperatives. The existing cooperative societies, divisional councils; and unions can be involved in this;
b. In addition, the existing supermarkets, now devoted entirely to consumers, should be enlarged to include the sale of locally produced home foods;
c. Special clients should be sought out -schools, colleges, universities, hospitals, ministries, the police, prisons, the army, etc. for the disposal of cooperatively processed foods;
d. Transportation facilities-buses, refrigerated vans and pick-up trucks should form part of the packet in the setting up of such enterprises.
e. At the national level there should be railway construction to serve the needs of agriculture.

3.8.8 Home Economics, Extension and Cultural Awareness

The marketing of locally produced foods will require the cooperation of women, who can carry out extension activities among the people, to inform and educate them on the new products and to modify their attitude to their consumption. All this will require massive propaganda - advertisement and publicity in the news media, and above, all, in the women's organizations. The ministry should conduct weekly newsreels or radio broadcasts, and produce suitable "How-to-Do" leaflets on food processing and consumption.

3.8.9 Agro-Services Centres

Agro-service centres are necessary for the collection, storage and distribution of the processed foods. They should therefore be provided and managed cooperatively. This was the original intention of the federal government but ministerial conflicts and competition have halted the transfer, to the detriment of efficient delivery of services.

Lastly all the above suggested strategies should be well addressed and put in place.

SELF-ASSESSMENT EXERCISE 3

Enumerate the suggested strategies for the food processing cooperatives.

4.0 CONCLUSION

If all the problems facing the food processing cooperatives are well addressed wastages or losses will be drastically reduced in food production and definitely the aims and objectives of agricultural policy in this country will be achieved more expeditiously, economically and humanely.

5.0 SUMMARY

This unit has been able to identity and understands the problems of food processing cooperatives and has proffer adequate solutions to these problems leading to the achievement of the aims and objectives of food processing.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The three major problems first discussed include:

a. Lack of capital
b. Lack of technical competence
c. Managerial problems

ANSWER TO SELF-ASSESSMENT EXERCISE 2

Other problems include:

a. labour problems
b. Lack of infrastructure
c. Storage problems

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The suggested strategies include:

1. Increasing the number of cooperatives
2. Processing to be integrated with farming
3. Role of multipurpose cooperatives
4. Storage facilities
5. Technical and managerial competence
6. Financial assistance
7. Marketing of processes foods
8. Home economics, Extension and Cultural awareness
9. Provision of Agro-Service centres.

6.0 TUTOR-MARKED ASSIGNMENT

List and discuss the major problems of food processing cooperatives in Nigeria.

7.0 REFERENCES/FURTHER READINGS

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UNIT 2 STORAGE OF AGRICULTURE PRODUCTS

CONTENTS

1.0 INTRODUCTION

Our discussion on unit 12 centred on agricultural marketing and we did explain that storage is one of the marketing functions which must be performed at on stage within the marketing system. You need to appreciate or understand that any individual (farmer, wholesaler, retailer. consumer) involve in handling food undertakes preservation and storage of the produce. Poor storage is one of the major causes of food problems and low agricultural supply in the world. According to the Food and Agricultural Organization (FAO), post-harvest losses for grains amount to 200 million tons yearly, yet only about 20 million tons of grains are required to feed adequately a population of 500 million for a year.

This problem is most critical in developing countries especially Nigeria. You will agree with me that in Nigeria, about 10-33% of grains and

30-50% of root and tuber crops are lost during harvest and post-harvest activities annually. These figures indicate the importance of processing, preservation and storage in attaining the agricultural development policies of ensuring food security for the rapidly growing population. Ineffective storage tends to jeopardize the agricultural sector's development, retards the rate of development of the industrial sector and mass retrenchment of workers in such industries as it was the situation in the late 1994 1998 in Nigeria.

2.0 OBJECTIVES

At the end of this unit, you should be able:

- identify the major reasons for storage;
- understand the fundamental reasons for storage; and
- differentiate between storage and preservation.

3.0 MAIN CONTENT

3.1 Definition

Storage may be defined as the act of preserving and keeping agricultural produce or any commodity for future use without necessarily losing its quality. There should be little or no change or chemical or physical condition of the produce as to reduce its quality. Thus, the main objective of storage is to preserve the produce such that it will still be valuable and useful to the ultimate consumer. However, in few cases such as tea, tobacco, wine, cheese etc, storage constitutes part of the processing activities. The significant change in the physical condition of the produce actually enhances the quality of the commodity.

Preservation is often associated with and precedes storage. Preservation is the act of lengthening the life span of the product while in store. It ensures effective storage of the commodity helps to ensure food security and provides a source of additional Income for the producers.

3.2 Fundamental Reasons for Storing Produces

The importance of storing agricultural produce is enormous' and cannot be overemphasized. The reasons for performing the storage function include the point discussed under the subheading below.

3.2.1 To Avoid Wastage and Ensure Availability of Produce all the Year Round

Storage is one of the major marketing functions which create time utility for consumers. The situation when crops are harvested and consumed immediately is referred to as "Home Consumption". In such instance, produce such as vegetables, meat etc. are produced and consumed immediately thus little or no storage is required. However, with development and extended marketing situations, most agricultural products need a "buffer" between production and consumption. Thus, the need to even the supply of a commodity throughout the year makes storage imperative. Storage operations are necessary to bridge the time gap between periodic harvests, marketing and relatively stable consumption of food on a year round basis. Storage adds time value to agricultural products.

Moreover, crops are produced sporadically but processed on a continuous basis within the agro-allied industry. Hence, storage ensures regular supply of raw materials t the industry.

3.2.2 Storage Stabilizes Prices

Crops command low process at harvest. Therefore, the need to have higher price for the produce constitutes a driving force for storing .the produce. Effective storage ensures inter-seasonal and inter-yearly food price stability and stability of farmers' income. Farmers are encouraged to increase productivity when their income is stable.

3.2.3 Avoids Wastage of Produce

Storage prevents wastage of output especially highly perishable products such vegetables, fruits and livestock products. Storage preserves Products and ensures freshness and good quality. Effective storage of agricultural products encourages farmers to produce and more leading to higher income, living standard and development of the sector.

SELF-ASSESSMENT EXERCISE 1

Differentiate between storage and preservation.

3.2.4 Reservation of Seeds for Subsequent Planting Seasons

Storage ensures that part of the produce is preserved an input for production. It therefore enables agricultural sector receive continuous and timely supply of viable inputs of production.

3.2.5 Accumulation for Export

Crops or produce for export or to be evacuated to distant market, need be accumulated from individual farmers' or marketing agents' deliveries until there is enough to warrant bulk transportation (e.g. trailer load) to a further agent or make up a ship, aeroplane load for international transport.

3.2.6 National Food Security

Storage of agricultural products need be embarked upon, for future use as surety meat or security against future uncertainty such as natural disaster or for political stability.

3.2.7 Food Relief

Adequate storage of agricultural products enhances the capacity of nations to produce "Food Relief" to needy nations. United States of America usually stores a lot of grains which enables her to send food relief to hunger stricken and war-torn nations of the world. Nigeria was also involved in sending food relief to Somalia and Liberia during these nations' civil wars years back.

SELF-ASSESSMENT EXERCISE 2

Enumerate the fundamental reasons for storage of agricultural produce.

3.3Co-Operative and Storage of Agricultural Produce

Agricultural co-operatives may assume the position of producers, wholesalers, retailers or processors of produces within the marketing system depending on the storage objectives to the members. However, whatever position cooperatives assume, the management must economically appraise every storage decision before undertaking storage as much as possible and take management decision on whether to store, when to store and what quantity to store.

3.4 Advantages of Co-operatives

Generally, the advantages of a co-operative society storing produce on behalf of members are many and varied. Some of these include the following:

- The physical facilities such as building, packaging materials, equipment for moving produce in and out of store require substantial capital outlay for installation and maintenance. Since individual

small scale farmers often lack the capital base to meet this requirement, adequate capital may be mobilized through joint efforts of the cooperatives produce these facilities.

- Members of cooperative societies may wield their collective strength or organize training programmes on new storage techniques. Such storage skill development training programmes build up members' capacity to store their produce effectively.

- One of objectives of many cooperative is mobilization of capital to provide financial assistance to needy member. Thus, cooperatives are able to provide credit to members to enable them take care of their domestic needs (consumption credit) while produce are in store. Besides, advance payment is made for-members produce when crops are being stored.

- Cooperative society may also undertake storage preparatory activities such as grading, packaging, sorting etc, to maintain the quality of members' produce meet the market standards and ensure that their produce are in high demand.

- The decline in value of produce or losses of produce in store is often better absorbed collectively, than when individual small scale farmers perform the function alone.

- It is also easier and less expensive for society to obtain insurance cover on store produce as premium is paid collectively on members' produce.

SELF-ASSESSMENT EXERCISE 3

State four advantages of cooperative society storing produce on behalf of its members.

3.5 Government Contributions

In view of the importance of storage in agricultural development, the government formulated processing storage policy objectives during the fourth national development plan period 1981 1985 which is still in operations till now the government has contributed immensely to processing storage.

3.5.1 Agricultural Produce Processing Policy Objectives

The policy objectives are stated below:

1. Widening the demand base for agricultural produce, thus accelerating the rate of growth of the agricultural sector.
2. Preserving perishable agricultural products hence reducing the level of waste degree of seasonal price fluctuations.
3. Diversifying employment opportunities in the rural areas through the establishment of rural-based, small scale processing industries.

3.5.2 Strategies of Agricultural Products Processing

The strategies being pursued to attain the above objectives include:

1. Promotion of investment in agro-processing especially in the rural areas, through provision of credit and infra-structural facilities and other incentives to investors by the governments.
2. Promoting research into the appropriate agro-processing technology to be adapted to small-scale system of production in Nigeria
3. Encouraging the farmers to form agro-processing cooperatives for the purpose of collectively processing their produce.
4. Government enlightenment programmes to acquaint small investors with the economic opportunities that are relevant to simple cottage agro-processing activities in Nigeria.

3.5.3 Agricultural Product Storage Policy

The agricultural product, storage policy objectives are listed below:

1. To enhance inter-seasonal and inter-yearly food prices stability.
2. To ensure a higher food security for the nation through efficient food storage programme.

3.5.4 Strategies of Agricultural Products Storage

The strategies used in attaining the above objectives are mentioned below:

1. Exploration of all available means and technologies to encourage and assist farmers to implement on- farm storage of their products.

2. Encouraging the private and cooperative sectors to assemble and store 1 has surpluses of agricultural products.
3. State government store about 10% of total grain output in the state which is to be used later as "Buffer Stock" for price stabilization.

4. Encouraging immediate processing and storage of perishable produce while appropriate technology is developed for their storage in fresh forms.

SELF-ASSESSMENT EXERCISE 4

Enumerate the agricultural product storage policy.

4.0 CONCLUSION

Storage has been a major function of marketing that is very important in agricultural production and if adequate care is taken against the problems affecting storage. It is directly giving a solution to food problems and low agricultural supply all over the country.

5.0 SUMMARY

This unit has analyzed the fundamental reasons for storing agricultural products and also ascertains that preservation always precedes storage because preservation is the act of lengthening the life span of the products while in store. It also ensures effective storage of the commodity without losing its quality.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. Storage is the act of preserving and keeping agricultural produce or any commodity losing its quality. There should be little or no change in the chemical or physical conditions of the product as to reduce its quality. While preservation is often associated with and precedes storage.

ii. Preservation is the act of lengthening the life span of the products while in store. It ensures effective storage of the commodity.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

Fundamental reasons for storage include:

- Ensures availability of produce all the year round
- Storage stabilizes prices.

- Avoids wastage of produce.
- Reservation of seed for subsequent planting seasons.
- Accumulation for export.
- National food security
- Food relief

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The four advantages of cooperative society storing produce on behalf of its members are:

- Provision of adequate capital to meet produce facilities
- Storage skill development training programmes
- Storage preparatory activities such as grading, packaging, sorting are provided.
- Provision of collective insurance cover

ANSWER TO SELF-ASSESSMENT EXERCISE 4

The agricultural product storage policy objectives include:

a. To enhance inter-seasonal and inter-yearly food prices stability
b. To ensure a higher food security for the nation through efficient food storage programes

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the significance of storing agricultural products in achieving agricultural development.

7.0 REFERENCES/ FURTHER READINGS

Aweto, R.A. (1996). *Agricultural Cooperatives*.

Storage Management Manual, Materials for Management Training in Agricultural Cooperatives (MATCOM) ILO Office Geneva.

UNIT 3 MAJOR CAUSES OF LOSES OF AGRICULTURAL PRODUCE

CONTENTS

1.0 INTRODUCTION

In unit 7 we discussed on storage and preservation of agricultural produce. We also examined the fundamental reasons for storing produce. This unit focuses on the major causes of losses of produce. From your knowledge so far, you will remember that the cause of losses of production are numerous and varied depending on the nature of the produce and the method of storage employed. There are quantity losses in terms of weight and food content of products. There are also losses in quantity of produce as regards nutrients, moisture content, present of toxins, acidity level and foreign bodies resulting in lower commercial value and loss in nutritional value. Some crops keep for very long period once the condition of storage is satisfied. Grains keep for long period if minimum level of moisture content is maintained and effective storage management practices adopted. From your past experiences, most of the losses do occur either during harvesting and post harvest activities.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the major causes of losses of product;
- understand the various reasons for the losses; and
- proffer solutions for the losses.

3.0 MAIN CONTENT

3.1 The Problems

Most of these losses do occur during harvest and post harvest activities annually and this is the main reasons for storage and preservation.

3.2 High Level of Moisture Content in Produce

This is very important consideration when storing produce. The more the water content the more easily the produce gets spoiled especially with the rapid growth of mucor and other micro bacteria. The produce will loose both quality and quantity and a lot of different growth on it will make the efforts of those storing the produce become useless. Hence before storing and of the produce the moisture content must be reduced below 30%. In general the lower the moisture contents the better for the storage of the produce cocoa, grains, garri just to mention a few.

3.3 Insects Attack

Insects attack on produce is very devastating especially when no fumigants or any chemicals have been applied. Because of the gregarious nature of insects, they constitute a force of destruction to the produce in the stored. Under three days most of the usefulness of these produce would have been eating up.

At times insects made holes or boreholes into the produce which allows the produce to loose its quality. Insect's attacks are very devastating on produce kept in the store if no proper management practices are taken into consideration immediately. Chemicals are hereby applied to reduce losses of these insects and this is a major area were the farmer, wholesaler and retailer should provide an immediate solution or precaution.

3.4 Attacks by Rodents

Rodents are another type of animals that are very destructive to the farmers. As soon as the gain entrance to the store, the produce will be destroyed immediately and also brought other destructive agents. Rodents being prolific multiplied even more than geometrical equation. The rodents not only destroy but they even eat up most of the produce to the extent that the store becomes a place of keeping wastes products when all the produce would have been eaten up and wasted the left over.

SELF-ASSESSMENT EXERCISE 1

State any three major causes of losses of produce in your area.

3.5 Attacks by Micro-Organisms

Micro-organism are the tiny organisms which are invisible to the naked eyes such as bacteria mould or fungi. They are very destructive to the produce stored especially when e moisture content is very high. The bacteria will act on the produce to produce other toxins or chemical which allows the produce to deteriorate within few hours and this Institute menace for the farmers.

3.6 Attach by Nematodes

Nematodes are soil infection which penetrates the tubers or produce making the areas of penetration soft and watery thus making it easy for other pests such as fungi to enter and attach the tubers or produce. No effective chemical control has yet been confirmed but so far the most successful is Nemagon thought it is quite expensive. Also the use of fumigation in the store can also control nematodes.

3.7 Other Causative Agents

Other causative agents include heat effect which may damage the produce stored of fire outbreak which might result through carelessness of people around the store or even pilfering from the store attendants hence all these are major causes of losses of agricultural produce.

SELF-ASSESSMENT EXERCISE 2

Apart from the ones listed in Exercise 18.2, mention three other causes of loses of produce during storage.

3.8 Some Salient Storage Management Practices

Store agricultural produce should be free from loss in quality and quantity. The loss in quantity is observed in appearance of the stored commodity. Quality criteria depend on the amount of pesticides residues, present of insects, insect's feaces. Residues mould, rodent residues etc. while the quantity criteria depends on the percentage of the commodity shrinkage and physical disappearance of the produce through stealing. To ensure effective management of storage and avoid either tosses the following practices need be observed.

- Pre-storage sanitation is vital. Clean the warehouse or store Repair all cracks and crevices on walls and floors. Remove debris and burn.

- The wall and floor surface of the empty warehouse store/empty sacks bags should be sprayed with appropriate chemicals such as melathion or any other suitable chemicals before moving in new stock. This practice prevents cross infestation.

- Stack the bags of stored produce away from the walls and floor, on wooden crates or platforms to reduce moisture absorption by produce, absorption of moisture may render the produce mouldy and lead to losses on quality.

- Chemicals capable of killing rodent should be used to control these organisms, or anticoagulant baits such as warfrin may be used. However, care should be taken such that 1 as the chemical does not come in contact with the produce.

- Produce which does not tolerate high moisture content such as grains must be this adequately dried before being store. Damage and bruises should be avoided in produce for effective storage.

- Periodic inspection of stored commodity is highly essential to avoid spread of damage by spoilage organisms such as fungi insects, etc. inspection of the produce should include physical verification, reckoning of stored goods etc. to ensure proper accounting. This is very important especially if an organization such as cooperative society undertakes storage on behalf of affiliated members. In such instances, a proper system of accounting is inevitable since this partly constitute a pre-requisite for keeping the members satisfied and ensuring their loyalty.

- Temperature of produce should be checked periodically as increase in temperature indicates pest population increase, which must be controlled.

- Proper ventilation of the warehouse, stall or store is important for safe keeping of the produce. Hence, these structures should be contracted to ensure adequate ventilation. Besides, enough space should be allowed between rows of stacked produce for free passage of air.

- Evacuation of goods should be on the basis of First in First out (FIFO) principles. Thus, dates of produce receipt into the store should be clearly written on stacks and the delivery registers.

SELF-ASSESSMENT EXERCISE 3

List four salient storage management practices.

4.0 CONCLUSION

It has been revealed that since most of the losses do occur either during harvesting and post harvest activities a lot of enumerated precautions should be put in place to avoid these losses in future production. Such activities should include the control of insects attach, rodents and micro-organism.

5.0 SUMMARY

The unit has identified the major causes of losses and also proper the solutions against these losses in the future production. The farmer (producer) should then adhere strictly to these solutions and various controls as analyzed.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

Three major causes of losses of produce in my area include:

a. High level of mousier content in the produce
b. Insects attack
c. Attack by rodents

ANSWER TO SELF-ASSESSMENT EXERCISE 2

Three other major causes of loses in produce in my area include:

a. Attack by micro-organism,
b. Attack by Nematodes.
f. Other causative agents apart from the ones mentioned.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The four salient storage management practices include:

1. Pre-storage sanitation.
2. Spray with effective chemicals
3. Remove the moisture content to some level of all produce to be stored
4. Temperature of the produce / store should be checked regularly.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the major causes of food crops during storage.

7.0 REFERENCES/FURTHER READINGS

Aweto, R.A. (1996). *Agricultural Cooperatives*.

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UNIT 4 METHOD OF STORING AGRICULTURAL PRODUCE

CONTENTS

1.0 INTRODUCTION

The last Unit 17 and 18 have dealt with storage of agricultural produce and the major causes of losses of these products. This unit will focus on the various methods of storing these agricultural produce. You will agree with me that the methods used in storing produce by farmers, marketers and consumers vary while some are based in indigenous technical knowledge developed by farmers themselves, and improved upon over the years, others are based on advanced modem technologies. However certain factors need to be considered in the choice of the method for storing a particular produce. These factors range from the nature of the produce such as perishability up to the capital outlay required for the storage. The moisture content of the produce and the temperature of the storage environment should also be taken into consideration they both have series of effects on the produce through the activities of insects and other predators already mentioned in Unit 3.

2.0 OBJECTIVES

By the end of this Unit, you should be able to:

- identity the various methods al1dfactors affecting the storage of produce; and

- understand the various methods of storing produces.

3.0 MAIN CONTENT

3.1 Factors Affecting Storage

a. The nature of the produce such no perish ability.
b. Facilities available to the person performing the function such as capital space equipment etc.
c. The technological knowledge or skill of the agent performing function
d. The capital outlay required for storage
e. Moisture quarter of the produce
f. The quality of the produce
g. Temperature of the storage environment
h. Relative humidity of the storage environment.
i. Gas content of the storage environment.

3.2 Open Space Storage

Commodities are stored in open within the house by consumers and retailers leafy vegetable are kept out doors overnight and removed before the rising of the sun the following morning. At time, these leafy vegetables are sprinkled with cold water and wrapped with jute bags by market women. This is to delay wilting of the leaves.

3.3 Begging/Sealed Container/Storage/Warehouse Storage

Most marketing agents within the marketing system keep commodities they trade in, in jute bags, and place them in warehouse or simply constructed apartments called stores or stalls in the market places. Produce with low level of moisture content are stored in this form. Such commodity includes grains (rice, beans etc.) dried yam chips, fermented dried cassava etc.

SELF-ASSESSMENT EXERCISE 1

Enumerate the four of the factors to be taken into consideration for storing produce.

For effective storage, the warehouse must be properly constructed kept extremely clean and fumigated with chemicals such as phostoxin to kill the insects which might attack the produce. Sealed air tight containers such as jericans, drums etc. are also used for storing grains. The grains especially maize, are mixed with actellic dust before putting them in the

containers for storage. Usually half kilogram of actellic dust is used for treating one tonne of maize grain.

Fumigants such as phostxin are applied where air-tight containers or polythene bags are used. The fumigants are available in tablet forms and one tablet of photoxin is sufficient for treatment of 100kg of grams. Unlike actellic dust, the photozin tablet is not applied directly to the produce. Rather, it is placed in sealed envelop and placed inside the bag of grains and sealed up Phostoxin kills all the insects and the grains keep for a very long period. This method is appropriate and convenient for keeping fairly small quantities of grains especially by consumers and retailers. It is also cheap and within the reach small-scale farmers. Grains treated with phostoxin should not be consumed until after months of application. It should also be aerated for a minimum period of three days after removing the produce from the container.

3.4 Barns Storage

Barns are indigenous farm structures constructed for storing agricultural produce especially root and tuber crops such as yams. Yam tubers are often stored in heaps or raised platforms or shelves made of bamboo poles or sawn wood, in the barns. The barns shield the produce from the adverse weather conditions. The tubers should be of good quality free from bruises and disease in order to keep well under this condition. Hence, the practice of tying yams with rope to poles on the barns which causes bruises and promotes yams rot should be avoided.

3.5 Storage in the Ground/Soil

This method is used for root-and tuber crops which do not keep well for long after harvesting such as cassava does not keep for more than a few days after harvesting. It is processed into garri, or cassava chips immediately. Hence, storage of cassava is rare. However, cassava may be stored m moist sawdust m containers or baskets for some few days before selling the produce to farm gate middlemen or middlewomen who do not keep well once they are dug up from the ground. Hence, it is left in the ground until they are needed.

The major problem with this method in the danger of attack of potatoes by termites, cocoyams by white ants and sprouting of the produce when rain falls especially yam. However, to achieve effectiveness in storage of the root and tuber crops, particularly yam, sprouting and rot should be avoided. Besides, the following steps need be taken to reduce rate of quality and quantity losses of the produce.

1. Exercise great care in harvesting and handling of the produce to prevent damage or bruises. Damage or bruised tubers or roots, rot fast during storage.

2. Damage or bruised produce need not be stored. They should be disposed of by marketing immediately or processed into forms which can be effectively stored.

3. Barns in which produce are stored should be well constructed to ensure good ventilation and shield produced from rains and direct sunlight.

4. Buds should be removed from sprouting tubers as soon as they appear however, sprouting may be inhibited for up to six months under controlled storage condition of l0oc 16oc temperature and 65 75% relatively humidity. Yam stored in this manner retains their freshness and palatability.

Fungicides such as Benlate are used to control rotting in store yams by dipping the produce in a solution of the chemical.

3.6 Cribs

Cribs are ingenious technology for storing grains e.g. maize cobs in Nigeria, particularly in the southern part of the country. Improved cribs have been designed for effective storage of grains. This ensures that the grains are adequately dried, kept dried and tree from insects and rodent attack. The cribs are constructed on a level ground free of tress and bushed to ensure good ventilation. The crib should be rectangular in shape with a maximum width and height of 150cm. the length could be of any dimension depending on the desire of the user. Cribs with length l50cm, leg of the crib are provided with rate guards to prevent rodent attack. Maize cobs stored in cribs are treated with pirimiphos methyl (actelic dust) to control insect. About ¾ full of cigarette three will treat one jute bag of maize cobs. This keeps the maize free from insect for about month. However, treated grains should not be consumed until 2 months after application. The insecticide is no longer harmful to human beings after two months. In Nigeria, seeds used for planting are also stored as suspended cobs under eaves. Plastic sheeting's or gourd shards are used as effective rate guards.

3.7 Silos

Silos are storage structures used specifically for storing dried grains in bulk. It is used by large scale producers, and large processors and companies. There are various types of silos ranging from simple silos to

highly mechanized types. They are made of any materials such as concrete, metals, rubber or aluminum. Silos are usually cylindrical in shape, build outside as a separate structures. The highly mechanized silos are airtight and have nitrogen gas which is conductive for living organism. This is the most effective means of storing grains, providing about 11 % protection for about two years or more.

3.8 Cold Storage

Cold storage involves the use of refrigerator and deep freezing in storing the produce. It is used for perishable agricultural produce such as livestock products (meal, milk, cheese, etc,), fruits and vegetables and processed foods. This principle of cold storage is to create an environment condition which is unfavourable for micro-organisms that cause food spoilage, by reducing the temperature below that of room temperature. This is because, low temperature retards growths of spoilage organisms. It also prevents excessive loss of water from the produce. Cold storage preserves the quality of the produce as they are transported over long distances and enhances efficiency of marketing of the produce.

3.9 Refrigerator

The principle employed in this method is to reduce the temperature of the storage environment to about +6oc to +8oc. Under this condition multiplication rate micro- organism is drastically reduced. Thus, food kept in refrigerators stores for a long period. However, periodic inspection of the produce is necessary to verify produce which requires further preservation to ensure quality of the produce.

3.10 Deep Freezer

The principle of deep-freezing is to further reduce the temperature of the storage environment to a level (e.g. 18oc to 20oc) which kills the spoilage organisms or makes them attain state of dormacy. Food which tolerates very low temperature stores for much longer period in freezers than in refrigerators. Usually, produce store for months and even years unless the expiration date on the produce (especially processed products) indicates otherwise.

SELF-ASSESSMENT EXERCISE 2

Differentiate between cribs and silos in the storage of Agricultural produce.

4.0 CONCLUSION

The methods employed in storing agricultural produce vary, while some are based on indigenous technical knowledge developed by farmers themselves and improved upon over the years, other are based on advanced modem technologies. In all these methods, they are still being affected by some factors such as the nature of the produce in terms of perishability and moisture content of the produce etc.

5.0 SUMMARY

This unit has identified the various factors affecting the storage to produce hereby dictating the methods of storing these produce ranging form the open space storage, silos, cribs, barns etc.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

Four of the factor to be taken into consideration.

a. The nature of the produce such as perishability
b. The technological knowledge or skill of the agent performing the storage functions.
c. The moisture content of the produce.

Four methods of storing agricultural produce include:

a. Open space storage
b. Bagging/sealed Container/Warehouse
c. Barns Storage
d. Cribs

ANSWER TO SELF-ASSESSMENT EXERCISE 2

Cribs are indigenous technology for storing grains e.g. maize cobs in Nigeria particularly in the Southern part of the country. Improved cribs have been designed for effective storage of grains. They are constructed on a level ground free of trees and hushes to ensure good ventilation.

Silos are storage structures used specifically for storing dried grains in bulk. It is used by large scale producers and large processors and companies. Silos are usually cylindrical in shapes, built outside as separate structures. It is the most effective means of storing grains providing about 100% protection for about two years or more.

6.0 TUTOR-MARKED ASSIGNMENT

1. Enumerate the various factors being considered before storing agricultural produce.
2. Mention at least five methods of storing agricultural produce.
3. Discuss any two of these methods mentioned above.

7.0 REFERENCES/FURTHER READINGS

Aweto, R.A. (1996). *Agricultural Cooperatives.*

Storage management Manual, Material for management Training in Agricultural Cooperative (MATCOM) ILO Office Geneva.

UNIT 5 COSTS AND BENEFITS OF STORAGE

CONTENTS

1.0 INTRODUCTION

For the past four units, we have been discussing and analyzing storage as a function of marketing. This unit will move a step further in explanation since storage cannot be eliminated in view of its importance within the marketing system. The performance of storage functions attracts some costs which the owner bears. It is always difficult to isolate the cost of storage function from the cost of financing and risk-bearing functions, especially when goods and stored. This is because the owner of the produce forgoes possible money income referred to as opportunity cost or borrows money against the stock. By holding the storage stock, the person who stores also bears other various cost inform of risks and losses. You will be fully involved now in various calculations in determining the total cost of storage.

2.0 OBJECTIVES

At the end of this unit you should be able to:

- identity the various costs involved in storage; and
- understand the reasons for all these cost.

3.0 MAIN CONTENT

3.1 Definition

This is the amount of money expanded on all the various items/facilities during the period of storing the produce. In determining the total cost of storage, seven categories of cost items must then be considered

3.2 The Cost of Physical Facilities

This is the cost incurred in providing and maintaining the physical facilities for storage. This category includes, cost of constructing storage building or rent paid on warehouse or stores rented, cost of land on which the building is constructed.

- Cost of equipment strictly used for storage operations.
- Cost of racks and any other storage appliances.
- Cost of packaging materials used only for storage.
- Cost of repairs and depreciation of equipment.

These various cost items are calculated based on the nature of the particular facility. The cost of appliances with long usage period such as silo is estimated by depreciation while the actual rents paid are used for warehouse and stores.

3.3 The Interest on the Financial Investment in the Produce Stored

The interest on the financial investment in the produce stored. Whether the money invested to produce while the store is actually borrowed or not, this cost needs be assessed at the rate of interest that would have been paid if money was borrowed during the storage period. Alternatively, it could be assessed based on the interest that would have been earned if the crops were sold earlier and the income deposited in the bank. This concept is called opportunity cost. Opportunity cost is defined as the satisfaction one must have derived from the next alternative which one has given up.

3.4 The Cost of Quality Deterioration and Loss of Value in Produce

This cost includes losses resulting from unavoidable fungus, rodent attack etc. and decline in the value of the produce such as loss of freshness, deterioration in quality or shrinkage in volume or both. The actual cost of crops loss during the period is estimated in calculating this cost.

3.5 Cost of Insurance

This cost includes cost of insuring physical facilities and produce against risks such as fire outbreak, theft and other natural disasters. The actual premium paid for insuring the facilities and produce during the period of storage is used for estimating total cost of storage. However, if the owner of the produce fails to take insurance policy the cost of these risks may be estimated by multiplying the amount of possible loss of produce during the storage period by the odds of the occurrence of the risks.

SELF-ASSESSMENT EXERCISE 1

Enumerate four of the cost that may affect the total cost of storage.

3.6 The Risks of Unexpected Decline in Price

If there is unexpected decline in price of a particular produce held in store, the produce is often sold at less cost than its value at the time when it was placed in store. However, an upward movement of the produce price is favourable for undertaking speculative storage by middlemen or middle women. This cost is usually calculated by estimating the percentage losses expected and multiplying this value by the expected price.

3.7 Cost of Loss Resulting from Poor Consumers Acceptance

Cost of loss resulting from poor consumer acceptance of the stored produce as against the fresh produce.

3.8 The Cost of Labour

This is the wages of people directly employed in storage. It also includes a proportion of salaries of supervision and management staff. These cost items which constitute the total cost of storage should be considered and compared with the benefit to be derived from the stored produce. The owner should only store the produce if the benefit expected significantly exceeds the cost of average.

SELF-ASSESSMENT EXERCISE 2

Explain what is meant by cost of labour.

Worked Example

A farmer harvested 50 bags of cowpea. Each bag weight 100k. at the peak of the crop season, each bag sells for N3,000. It is observed that the produce price is likely to increase by 50% during the off season period (about six months latter). The estimated costs of storing the produce are:

1. Rent of Store N500 per month
2. Labour N600 per month
3. Cost of storage equipment (fixed cost items) is N20,000 for 5 years.
4. Cost of chemical N2,500

If the estimated loss in storage is about 0.5% and the interest rate is 15%, calculate (i) the total cost of storing the produce (ii) the benefit of storing the produce. Assume that all other market costs are the same for both options.

Solution

Step 1

Identify the options in the exercise. The options are to sell produce immediately (ii) to store the produce for six months before selling.

Step 2

Estimated the revenue of selling the produce immediately

Revenue from Immediate Sales

Quantity of Cowpeas	50 bags	
Unit Cost of Produce	N3,000	
Sales	50 x 3,000	N150,000

Step 3

Estimate the cost/benefit of storing the produce for six months

Revenue from Sales of Stored Produce

Quantity of produce after six months	49.75 bags
(0.5% of 50bags = 0.25 bags)	
50 0.25 = 49.75 bags	
Unit price of produce after	N4,500
Six months	

Sales N49.75 x 4,500 = N223,875

Cost of Storage

1.	Rent of store @ N500 per month x 6 months		N 3,000
2.	Labour @ N600 per month x 6 months	=	N 3,600
3.	Equipment (N2,000 x 1/5 x ½ yrs)	=	N 2,000
4.	Chemicals	=	N 2,500
5.	Cost of money tied down in stored produce		N11,250

(15% of N150,000 x ½ years)

Total = N22,350

Benefit from storage

Revenue from sales after six months	N223,875
Revenue from immediate sales	N150,000
	N73,875
Total cost of storing the produce for six months -	N22,350
	N51,525

From all indication the farmer is better off if he/she stores the cowpeas for six months before selling

SELF-ASSESSMENT EXERCISE 3

From the worked example in 3.8, is it better for the farmer to store the produce? If yes/no. why?

4.0 CONCLUSION

The cost and benefit of storage is much especially with the erratic market prices prevailing hence fanner should be advised to store most of their produce especially for the off season of these commodities.

5.0 SUMMARY

The benefits of storage overshadow the total cost involved and this has added more profits to the farmers output despite all the risks and losses involved.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

Four of the costs that may affect the total cost of storage include*:*

a. The cost of the physical facilities.
b. The interest on the financial investment in the produce stored
c. The cost of quality deterioration and loss of value in produce.
d. Cost of insurance.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The cost of labour is the wages of people directly employed in storage. It also includes a proportion of salaries of supervision and management staff.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

Yes. The benefit of storing the produce is the N51, 525.00 which the farmer has made on the 50 bags of cowpea stored.

6.0 TUTOR-MARKED ASSIGNMENT

1. Enumerate the costs that may affect the total of storage
2. Clearly explain why the Nguru multipurpose cooperative union would want to store 2,000 bags of soyabeans between July and August if the price is expected to increase from N800 to N1500 per bag after ten months.

Use the following information for your calculation:

Labour Cost is N4,200 monthly:

- Rent paid for use of warehouse is N2500 per month
- Insurance premium per year is N5000
- Cost of chemical N3000
- Losses estimates while produce are in store is nil
- Interest paid on deposit is 15%

7.0 REFERENCES/FURTHER READINGS

Aweto, R.A. (1996). *Agricultural Cooperatives*.

Ljere, Martins and Okoric, Aja (1998) *Readings in Agricultural Finance*.

MODULE 5

UNIT 1 PASTURE AND FORAGE

CONTENTS

1.0 INTRODUCTION

This unit focuses on pasture and forage crops under crop production. The importance of this crops in livestock feed could not be

overemphasized especially in the feeding of farm animals namely cattle, goats and sheep. Pasture and forage form the main nutrition of these animals. You will remember that most of the livestock especially cattle, goats, and sheep feed on grasses and legumes crops which are either harvested by have or the animals are allowed to graze directly. Efforts will also be made to explain details the various advantages of forage crops in agricultural practices.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the main pastures grasses and legumes species of Nigeria; and
- understand the importance of pastures and forage crops.

3.0 MAIN CONTENT

Pastures may be defined as an area of land covered with forage crops usually grass and legumes and used for grazing. Pasture includes the various types of grassland which may vary from the moors to the permanent pasture.

Forage may also be defined as grasses or legumes mainly grown for feed production. These can be harvested by hand and fed to livestock or they are grazed directly. Forages constitute the greater portion of feeds consumed by livestock. They include pastures, soiling crops, hay, silage and straw. These are treated in more details later.

3.1 Types of Pastures

There are two main types of pastures the Natural and Artificial (man made).

3.1.1 The Natural Pasture

The Natural Pasture is also referred to as natural grass land or rangeland. In this pasture, in this pasture; grasses and legumes grow naturally on their own and are fed upon by farm animals i.e. grasses are not planted by farmers. Examples of natural grassland are the savanna areas of Nigeria.

Characteristics of Natural Pasture

i. Natural pasture or grassland contains poor quality grasses and Legumes.
ii. It contains soil types that are low in fertility.
iii. It contains wide varieties of grasses and legumes, some of which may not be eaten by livestock.
iv. It has good regenerative ability.
v. Productivity of natural pasture is very low and resistant to drought.
vi. Forage crops in natural pasture can withstand trampling by farm animals.
vii. Natural pasture may contain some grasses which cannot be easily eradicated
viii. New growth is stimulated by burning.

3.1.2 Artificial Pasture

This is also referred to as established or sown pasture. In this pasture grasses and legumes are deliberately planted and managed by man to be fed on by livestock.

Characteristics of Artificial Pasture

i. It contains high quality grasses and legumes.
ii. It contains no weeds except some shade tress.
iii. Selected grasses and legumes are grown in adequate proportion.
iv. It has high regenerative ability after being fed on by animals.
v. It can withstand trampling by farm animals
iv. It is properly managed for high productivity of the forage crops e.g. fertilization, irrigation and rotational grazing.

SELF-ASSESSMENT EXERCISE 1

Mention the two types of pasture with at least three characteristics.

3.2 Identification

The following are common grasses and legumes of livestock with their botanical names.

3.2.1 Grasses

Common Name	Botanical Name
1. Elephant Grass	Pennisetum purpureum
2. Guinea Grass	Panieum maximum
3. Giant Star Grass	Cynodon Plectostachyum
4. Carpet Grass	Axonous compressus
5. Spear Grass	Imerrata cylindrical
6. Bahama Grass	Cynodon dactylon
7. Northern Gamba	Andropogon gayanus
8. Southern Gamba	Andropogon tectorum

3.2.2 Legumes

Common Name	Botanical Name
1. Centro	Centrosema pubeseens
2. Stylo	Stylosanthes gracilis
3. kudzu or puero	Pucraria phaseolodies
4. Calopo	Calopoganium mucunodies
5. Muccuna	Muccuna utilis
6. Sun hemp	Crotalaria juncea

3.3 Characteristics of Some Pasture

3.3.1 Guinea Grass (Panicum Maximum)

It is a dominant pasture grass in the rainforest zone. It is a bunchy or erect of tufted grass. It has a very rigorous growth of about 2m tall. It is perennial and has short underground root-stock ration. It is propagated by seeds or stolen. It is palatable to livestock and also good for making of hay.

3.3.2 Elephant Grass (Pennisetum Purpureum)

It is a widely distributed pasture grass throughout the rain forest zone. It is erect and about 3-5m tall. It is a perennial grass with cane-like stems and dull green or purplish leaf blade. It is a highly leafy, palatable and aggressive grass. If is a high yielding grass, propagated by stolon and it is good for making silage.

3.3.3 Giant Star Grass (Cynodon Plectuostachyum)

It is a spreading, drought-resistant, perennial grass with a long and rapidly-growing stem, this grass can grow more than one metre high. It is most easily propagated by cuttings and once established, it spreads very quickly, thereby making it difficult to control. It makes a nutritious

pasture grass and responds well to fertilizers, especially the phosphate fertilizers.

3.3.4 Carpets Grass (Axonopus Compressus)

It is a perennial and creeping types pf grass, its stems are creeping, short, compressed and two edged. The stems have the tendency to root at the nodes. The grass does best on soil where the moisture is near to the surface but not on swamps. It is very aggressive and not nutritive. Hence, it is not so much recommended for pasture.

3.3.5 Centro (Centrosema Pubescens)

Centro is a vigorous and an aggressive-growing legume. It is a creeping and twining plant with trifoliate leaves that are attached to the stem by a pulvinus. Stem and leaves are hairless. It is leafy, perennial. Shade-tolerant and drought-resistant legume, it is self-seeding as the pods split open by explosive mechanism during dry weather and the seeds germinate during the following rainy season. It is palatable and highly nutritious to ruminants. It is high modulated and does well in combination with guinea grass.

3.3.6 Tropical Kudzu (Pueraria Phascolodies)

It is a vigorous, climbing and perennial legume, its stems and leaves are densely hairy and spread over the soil to form a good cover crop Leaves are trifoliate, it is sensitive to soil moisture, stress and cannot survive drought condition. It is propagated by seeds, and its roots are modulated. It is usually avoided by cattle on range, and it be used as hay and silage.

3.3.7 Style (Stylosantes Gracilis)

It reaches 60 89cm in height. When kept short through regular cutting or grazing. It develops into a leafy plant, which is highly modulated leaves are trifoliate and creep among the ground. They are drought-resistant, propagated by seeds and perform better in dry areas. It takes livestock a little while to get used to the taste.

SELF-ASSESSMENT EXERCISE 2

Name four grasses and legumes that serve as food for farm animals.

3.4 Distribution of Pastures

Factors affecting the distribution of pasture can be grouped into three main classes namely.

3.4.1 Climatic Factors

The type of climate in an area influences the types of vegetation in that particular area. For example, Sudan type or climate favours the growth of grasses and legumes while Equatorial climate does not. Elements of climate which can directly influence the distribution of past are length, sunlight, etc.

3.4.2 Soil or Edaptics Factors

This refers to the level of fertility of the soil. Fertile soil tends to support pasture growth while poor soil does not. Soil factors which may influence the distribution of pastures are soil pH, soil texture, soil structure as well as the slope of the land (topography).

3.4.3 Biotic Factors

Biotic factors like diseases, pests, parasites, predators generally influence the distribution of pasture. The activities of man such as bush burning, over-grazing generally has adverse effects on the distribution of pasture.

SELF-ASSESSMENT EXERCISE 3

Mention the various factors affecting the distribution of pasture.

3.5 Uses of Forage Crops

Forage crops have the following uses:

i. **Livestock Feed**: Forage crops are usually used for feeding livestock like cattle, sheep and goat. Hay, straw and silage are prepared from forage crops.
ii. **As Cover Crop**: Most forage crops, especially leguminous plants, serve as cover crops which add nutrients to soil and control weed growth.
iii. **Conservation of soil Moisture**: Most forage crops, especially leguminous plants help to conserve soil moisture by preventing evaporation.
iv. **Prevention of Erosion**: Some forage crops, especially leguminous plants, help to prevent water and wind erosion.

v. **As green Manure**: Forage crops, especially when they are young, could be ploughed into the soil as green manure.
vi. **For Roofing Farmsteads**: Some forage crops like guinea grass and elephant grass are usually used for roofing, farmsteads as a result of their strong stems and plenty leaves.
vii. **As Bedding Materials**: Most of forage crops serve as bedding materials for animals.

3.6 Establishment of Pastures

i. **Adaptation of Species**: Legumes and grasses should be adapted to the local environment.
ii. **Palatability**: Legumes and grasses to be established must be palatable and nutritious for animals
iii. **Compatibility**: the grass-legume mixture in the pasture must be compatible to each other.
iv. **Time of maturity**: Grasses and legumes to be established should be able mature within the shortest possible time.
v. **Life Cycle of the Species**: Annuals with annual plants or perennial with perennials plants should be mixed together when establishing pasture. This is to ensure continuous availability of pastures.

3.7 Common Management Practices in Pasture

Some common management practices in pasture to ensure continuous supply of grasses and legume to livestock include the following:

1. **Burning**: burning should be done once in a year, especially when the forage crops are over-matured and fibrous. This is to encourage regrowth other grasses and legumes
2. **Fencing**: this is the partitioning of the pasture into sections called paddocks to facilitate rotational grazing
3. **Application of fertilizer**: application of fertilizers in the pasture ensures rapid and succulent growth of pasture because of increase in the fertility of the soil.
4. **Weed controlled**: weds should be removed regularly from the pasture to prevent competition with forage plants for nutrients an space.
5. **Pest and diseases control**: these should be prevented for ensure rapid growth of pasture crops.
6. **Irrigation**: pastures farm should be irrigated especially during the dry season to ensure the availability of fresh and succulent grasses all the year round.
7. **Adequate stocking**: the correct number of animals should be placed on a pasture to graze. Overgrazing should be prevented.

SELF-ASSESSMENT EXERCISE 4

List the management practices of pasture.

4.0 CONCLUSION

Pasture and forage have constituted the major feed of farm animals especially cattle, goats and sheep in the last years in Nigeria and this has justified the importance of these grasses and legumes in agricultural practices.

5.0 SUMMARY

This Unit has given a better identification and understanding of these grasses and legumes especially in the feeding of farm animals particularly cattle, sheep and goats.

6.0 TUTOR-MARKED ASSIGNMENT

1. List six common grass and legumes species of Nigerian pastures giving their common botanical names.
2. Discuss three factors affecting the distribution of pasture in Nigeria.

7.0 REFERENCES/FURTHER READINGS

Anyanwu, A.C and Other (1998). *Agricultural Science for Schools and Colleges*.

Agbo, F.U. (1999). *Element of Agricultural for Cooperative Colleges polytechnic and universities*.

UNIT 2 COMMON WEEDS FOUNDS IN FARMS

CONTENTS

1.0 INTRODUCTION

In the last unit (unit 21), our discussion centred on pasture and forage. This unit our now focuses on weeds which is one of the problems being encountered in agricultural practices on-the field. The harm done by weeds is due mainly to their competition with crops while more than 30% of the labour expensed by the farmers during the crops from growing season is on weeds. Loses in crop yield due to weeds may be greater than those dues to plant pests and disease. If a farmer fails to control weed growth, the chances of successful crop production are seriously reduced. However, some weeds are still useful to the farmers as cover crops, serve as forage grasses for feeding farm animals and also help to control soil erosion.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- identify the common weeds;
- state the economic importance of weeds; and
- list the main varieties of weeds.

3.0 MAIN CONTENT

3.1 Definition

A weed is a plant growing where it is not desired in such a way that it constitutes a nuisance either to man, livestock or to the crops.

3.2 Classification of Weeds

This is based on the length of life of the weed.

3.2.1 Annual Weeds

These weeds have their life cycle completed in one year.

3.2.2 Biennial Weeds

These weed have life cycle of more than one year but not more than two years.

3.3 Characteristics of Weeds

Weeds often poses characteristic which increase their growth habit and mode of dispersal. Factor which aid the growth habits of weeds include:

3.3.1 Production of Large Quantity of Seeds

Most annual weeds usually produce a large quantity of seeds which germinate and grow rapidly.

3.3.2 Some Weeds Reproduced by Seed

Most weeds are deep-rooted and reproduce themselves by seeds. This most of sexual reproduction enhances their spread and growth.

3.3.3 Some Weeds Reproduce by Vegetable Propagation

Most perennial weeds, e.g, grasses are usually propagated by means of rhizomes or solons which spread rapidly.

3.3.4 Growth of Large Leaves within a Short Time

Rapidly growing weeds may reproduce many relatively large leaves within a short time. These may shade the seedlings or crops plants, if they are not controlled early.

3.3.5 Weed Growth is Favoured During Raining Season

Most weeds germinate and grow rapidly during the rainy season as water is available in sufficient quantity to enhance their growth and spread.

3.3.6 Most Weeds are Wind-Pollinated

Most weeds are pollinated by wind and this enhance the spread without hindrance e,g, tridax.

3.3.7 Production of Large Quantities Pollen Grains

Most weeds have small inconspicuous and odourless flowers which produce large quantity of pollen grains.

SELF-ASSESSMENT EXERCISE 1

i. Explain the term weed**.**
ii. Classify weed into groups.

3.4 Methods of Weed Dispersal

Weeds dispersal is aided by various agents. These agents are man, wind, water and animals. Man can spread weeds consciously or unconsciously. He carries weeds across seas, Oceans Mountains, deserts and continents. He may take plant seeds to new areas where they become weeds. Man is associated with carrying weeds across the natural barriers through which water and wind cannot succeed in carrying weeds. He can carry weed seed on his clothes or loads during escape and become weeds. They produce large number of fruits and seeds, many of which fail to establish themselves due to the fact that they do not find favouable soil conditions.

Mode of Dispersal of Weeds include:

1. **Dispersal of Seeds by Winds**: the fruits and seed of many weed species are specially adapted to dispersal by wind. Weed species which spread their seeds through the agency of wind often have feathery, winged or powdery seeds e.g. tridax procumbent, goat weed, guinea grass, elephant grass, and many other species of the grass family.

2. **Dispersal of Seeds by Animal**: Animal like rabbits, rats, squirrels, antelopes, man etc. are involved in the dispersal of weed seeds. Animals dispersal weeds, usually have sticky, hooked, edible or colourful fruits or seeds. The sticky and hooked types of fruits and seeds adhere to the coats of grazing animals and are carried from one place to another. Some animals particularly birds, swallow the seed of edible fruits. These pass unharmed through their digestive tracts. Examples of animal dispersed weeds are pig weed (boerhavia diffusa), commelina spp etc.
3. **Dispersal of seeds by Water**: Water-dispersed, weeds are common in riverine areas, fruits or seeds of such weeds have waterproof cuticles air spaces within the seed fruit mesocarp and light weight.

4. **Dispersal of seeds by Explosive Mechanism**: Few plants and all leguminous weeds are dispersed by explosive mechanism e.g. puraria, mucuna, calopoginium etc.

SELF-ASSESSMENT EXERCISE 2

List the various method of weeds dispersal.

3.5 Economic Importance of Weeds

The harm done by weeds is due mainly to their competition with crops. However, some weeds ate still useful to the farmers. Details are explained below:

3.5.1 Disadvantages of Weeds

a. Weeds cause losses in crop yield. This is due to the competition of crops with weeds for water, light, nutrients, carbon dioxide and other crop needs.
b. Weeds lead to increased cost of farm operations, thereby leading to inefficiency of farm operations.
c. They also lead to an increased cost of harvesting for it requires labour to separate weeds seeds and other weed particles from the harvest.

d. Weeds may reduce the quality of crop products by imparting bas odour and bad taste to the food products.
e. They also affect the quality of animal products such as milk by imparting bad odour and taste to it. Some also reduce the quality of hide and wool.
f. Certain weeds are poisonous and hence kill animals that teed on them.
g. Weeds form alternate hosts for posts and diseases of crop plants.
h. Weeds compete with crop plants for nutrients.
i. Weeds reduce land value because land with a very bad weed costs less.
j. Weeds particularly the poisonous ones are dangerous to man. Many people have lost their lives by eating the leaves, stems, roots or tubers of poisonous weeds.

3.5.2 Advantages of Weeds

a. Some weeds are used for food.
b. Weeds help in checking erosion.
c. If weeds are ploughed in they produce nutrients to the soil i.e. the nutrients they remove from the soil thus preventing their being leached are returned to the soil.
d. Weeds can be cut and used as mulches
e. Some weeds provide food for livestock.
f. Certain weeds serve as medicine

SELF-ASSESSMENT EXERCISE 3

List four of both advantages and disadvantages of weeds.

3.6 Methods of Weed Control

Weed control involves sufficient keeping down of the weed vegetation to permit economical agricultural production. Several methods have been adopted for weed control. These methods include:

3.6.1 Mechanical Methods

1. **Hand Pulling**: this method is efficient in row crops and in gardens. It is best used for annual and biennial weed control. But not very much for perennial for these have left in the soil roots which may regenerate. This method demands much labour and it not efficient in case of weeds that have underground stems. The pulling should be done when the seeds have not matured.

2. **Hoeing**: This is used in gardens, pastures, etc. it can be used as a secondary method of cultivation. During hoeing, care must be taken not to destroy the roots of the crops.

3. **Tillage:** This is one of the most practical methods used. By tilling the ground, we do not only control the weeds but we also prepare the land for cropping.

4. **Mowing**: This is usually practiced where weeds are too large is too effective cultivation to be carried out. It is a good method of preventing weed formation and for weeds that have root, stocks constant cutting may exhaust the food reserve and make control easy.

5. **Flooding**: The weeds are set on fire. This method kills weeds be denaturalization of the protein and protoplasmic material of the plant Steam can also used to achieve this end, Heat is occasionally used in killing buried weed seeds and the subterranean organs of perennial weeds.

6. **Smothering**: This may be done by the use of non-living materials such as mulch, straw, hay, manure, paper, plastic film or rice hulls. This covers the vegetation of weeds and they are choked. Also fast growing crops can be used to cover the weeds.

3.6.2 Cropping and Competition Methods

In the crop rotation method, a system is evolved that will include smother crops during the period the weeds may prevail a lot. In the competitive system, crops that can suppress the growth of particular weeds are grown such weeds are most abundant. The principal competitive crops involved in wed control are millet, sudan grass, sweat clover, sunflower, rape, sorghum, cowpeas etc.

3.6.3 Biological Control Method

This method involved the use of parasites to control weeds. It involved killing weeds with their natural enemies. Before this can succeed you have to isolate an insect that can feed on the weed and this insect must be able to survive and reproduce in the environment where the weed grows. The insect must exhibit maximum specificity in its feeding habit which means it must not feed on the food crops.

Common Name	Botanical Name
Guinea Grass	Panicum maximum
Bahama Grass	Cynodon dactylon
Carpet Grass	Axonopus compressus
Sensitive Plant	Mimosa pundiea
Spear Grass	Imperiata cylindrical
Wire Grass	Aspilia Africana
Centro	Centrosema pubescens
Blue feather	Commelina mudiflora
Stubborn Grass	Eleicine indica
Stubborn Weed	Sida actua
Goat Weed	Ageratum Coniziods
Elephant Grass	Penisetum purprecum
Giant Star Grass	Cynodon plactostachyum
Pig Weed	Boerhavia diffusa
Bust Green	Armarathus spinosus
Water leaf	Talinum traingulare
Sedge Plant	Cyperus rotandus
Tridax	Tirdax procumbens
Calope	Calopogonium mucunnoides
Northern Gamba	Andropogon gayanus
Sun Hemp	Crotalaria juncea
Mucunea	Mucuna utilis
Stylo	Stylosanthes gracilis
Southern Gamba	Andropogon tectorum
Kudzu or Puero	Pueraria phaseoloides

SELF-ASSESSMENT EXERCISE 4

Enumerate the various methods of weed control.

4.0 CONCLUSION

Weed has constituted a nuisance either to man, livestock or to crop. They cause losses in crop yield and also increase cost of farm operations leading to inefficiency of farm operations. However, some weeds are still useful to the farmers in some way as food to farm animals and also as cover crops and even to control erosion.

5.0 SUMMARY

This Unit has identified the various common weeds found in the farm and some of the economic importance include serving as food for some farm animals and also serve as over crops despite the fact that loses in crops are mainly due to weeds and pest being haboured by them.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. A weed is a plant growing where it is not desired in such a way that it constitutes nuisance either to man, livestock or to the crops.

ii. The classification of weed is based on the length of life, which include:

- Annual weed. These weeds have their life cycle completed in one year.
- Biennial weeds these weeds have life cycle of more than one year but not more that two years.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The various methods of weed dispersal include:

i. Dispersal by wind
ii. Dispersal by animal
iii. Dispersal of weed seeds by explosive mechanism

ANSWER TO SELF-ASSESSMENT EXERCISE 3

A. The advantages of weeds include:

i. Some weeds serve as food
ii. Certain weeds serve as medicine
iii. Weeds help in checking erosion
iv. Weeds can be and used as mulches

B. Disadvantages include:

i. Weeds compete with crops for both space and nutrients and sunlight.
ii. Weeds habour crop pests and diseases.
iii. Losses in income of farmers
iv. Weed causes losses in quality of crops.

ANSWER TO SELF-ASSESSMENT EXERCISE 4

The various methods of weed control include:

i. Mechanical method
ii. Crop rotation
iii. Biological methods
iv. Chemical methods
v. Crop competition method

6.0 TUTOR-MARKED ASSIGNMENT

1. Define the term weed.
2. Explain the effects of weeds on crop plants.
3. Briefly discuss the dispersal of seeds or fruits of weeds.

7.0 REFERENCES/FURTHER READINGS

Anyanwu, A.C. *et al* (1998). *A Text Book of Agricultural Science for Schools Polytechnic and Universities*.

Agbo, F.U. (1999). *Element of Agricultural for Cooperative Colleges Polytechnic and Universities*.

UNIT 3 CASH CROPS (COCOA)

CONTENTS

1.0 INTRODUCTION

Before the discovery of petroleum commercial quantity in Nigeria, the country relied heavily on some cash crops for its foreign exchange. The crops also serve as sources of raw materials for production of goods. These cash crops as the name indicate are source of cash to the nation and to individuals who cultivated them. Thus in the next three units, you will be studying the cultivation and utilization of some selected cash crops especially cocoa oil palm tree, rubber and kola nuts. These cash crops are planted and could stay on the same piece of land for many years e.g. between 5-50 years yielding every year at the fruiting season of each crops. As a result of their long stay at the permanent site these cash/tree crops. Require initial fertile soil, adequate and well distributed

rainfall and suitable culture practice. The focus of this Unit is on cocoa which was the pride of Nigeria before independence.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

Also during this course, there will be practical exercises to give a better understanding and the picture of agricultural practices which will enable your clear observations of various facts and practices of the farming system.

- identity the main cash crops of Nigeria;
- state the characteristics of the named cash crops (cocoa);
- explain why cocoa is referred to as cash crop;
- described the methods of cultivation and propagation of cocoa; and
- outline the methods of harvesting and processing of cocoa.

3.0 MAIN CONTENT

3.1 Coco (Theohroma cocoa Family – Streculiaceae)

Cocoa is one of the crops that brought Nigeria to the limelight of the world market .The crop is grown all over the southern part of Nigeria but more in the former Western region (Oyo, Ondo, Ekiti, Ogun, Lagos, Osun and part of mid- West (Edo and Delta State). There is also substantial production of cocoa in the present Akwa Ibom and Cross River States.

Cocoa and chocolate are prepared from the seed of the cocoa tree. Cocoa ranks with coffee and tea in the world market. Cocoa beans contain fat, and protein and are of very high food value. The cocoa beverage is highly valued due to its stimulating effects as a result of the presence of theobromine. The theobromine is extracted and used for the .preparation of drugs. Cocoa shell is used as animal feed, sometimes as fertilizer and often as fuel Cocoa is used for the manufacture of biscuit and drinks.

3.2 Origin and Distribution

Cocoa is a native of tropical America. This includes areas such Brazil, Ecuador, Columbia, Venezula, Mexico, Costa Rica. It is also grown widely in West Indies, West Africa, Congo, and Ceylon. It is important to note that before Nigeria Independence in 1960, Nigeria and Ghana produced about two thirds of total world cocoa need.

SELF-ASSESSMENT EXERCISE 1

Mention the states of Nigeria where cocoa is grown.

3.3 Climatic and Soil Requirements

Cocoa is strictly a tropical crop, restricted in cultivation to lowland areas, where rainfalls is at least 73cm. There should be at least 9cm of rain every month.

Cocoa requires a minimum temperature of about 27^0 C. Temperature fluctuations can be checked by shading.

Cocoa requires warm and humid conditions. Good growing conditions are associated with high humidity whereas low humidity has adverse effects on yield especially when more water is lost than taken up by the plant.

Winds of high velocity cause serious damage in yield. Cocoa requires soil that is retentive of moisture during the dry season and soil that is well aerated. The soil should be easy to penetrate but need not necessarily be very deep but must be deep enough to allow root penetration. It should be rich in nutrients and have good structure and texture. The best soils are clay and loam; for they retain more moisture during the season. Shallow soils with impervious layer are not good for cocoa plantain for the impervious layer does not allow root penetration, which may reach depth of about 7m.

3.4 Cultivation

3.4.1 The Nursery

Choose an area free water logging, and near to the field or a good road. Provided enough shade using bamboo and palm fronds or using timber scantling and make sure that about 50% light penetration is allowed. The shade is removed gradually to harden the plant. Areas exposed to severe Harmanttan should not be used for cocoa nursery. Where a percent nursery is needed, shade is provided by timbers which have treated to prevent action of ants. Roots could also be used.

Cocoa seeds are usually grown in containers. This makes it easy to handle and survival is also more. Sometimes baskets can be used, but now polythene bags and other plastics containers should be filled with good top rich in humus and manure and fertilizer may be applied. The soil should be renewed as often as possible.

SELF-ASSESSMENT EXERCISE 2

Briefly describe the climate and soil requirements for cocoa.

3.4.2 Sowing

Sowing the seeds with the scar placed downwards. Cover lightly with soil and compact tightly. Depth of planting should be about 2.5cm and you can plant late in the day or early in the morning. Sowing can be at any month of the year provided you water during the dry season. Germination takes place in 2 weeks.

In some parts of the world, cocoa seeds are sown directly into the field and later the plant population is thinned down to required number of stands.

3.4.3 Planting of Cocoa in the Field

Land Preparation: Clear the land and provide some shade before the cocoa establishes its own shade. Provide shade for at least first two years after planting. You can do partial felling of trees leaving some to provide the required initial shade. Burn the rubbish only when necessary as burning may damage the soil. In the felling of trees, cares must be taken not to leave big trees that may constitute danger to the cocoa. In such a case you cut the trees for part of it to regenerate branches that can provide shade.

3.5 Maintenance of Plantation

This is very important in order to obtain a satisfactory yield. It varies with environment, fertility of the soil, age and vigor of cocoa plant and the method of establishment. Under management we have weeding, shade maintenance, pest and diseases control, mulching, pruning, regeneration, replacement of dead plants and harvesting.

3.5.1 Weeding

After establishing the plantain, with time, plants begin to compete with weeds and if this is not checked, the crops performance becomes poor. Weeds are problems during the first years of plating when the canopy of the cocoa plant has been fully developed. The frequency of weeding depends on the overhead shade. However, clean weeding is recommended three times a year supplement with slashing for about six times a years. Clean weeding and slashing help to reduce the incidence of black pod and also caterpillar attack on young cocoa shoots. On very large plantations weed killers may be effectively used.

3.5.2 Mulching

It is essential to mulch before the first dry season after planting out into the field. The mulching is done before the end of the rain and the mulching may be extended to the second year but after the second years, it becomes unnecessary. Each plant should be given a 15cm deep layer of mulch which may be grass, vegetable matter or sometimes polythene materials or straw. Avoid the direct contact of mulch with the plant to keep off termite attack. Satisfactory mulch reduces moisture losses, weeds and also leads to active growth and quick information of a closed canopy.

3.5.3 Shade

This is essential during the early part of establishment when the canopy has not been fully formed. The shade plants should not be active competitors with the cocoa plant for moisture, light and nutrients not are not alternative host to a disease or pest that attacks the cocoa plant. The shade trees should be easy to establish and easy to remove. The trees shade should also be economical. The plantain has been recommended but the banana has not so much been recommended for it competes highly for moisture during the dry season. When the cocoa canopy has been established, the shade is removed progressively with time.

3.5.4 Pruning

This is the practice of removing unwanted trees to maintain good plantation and ideal canopy. An ideal canopy has no branching for the first 2m -4m and is usually umbrella shaped. Before pruning, a thorough inspection of the unwanted branches is made and then they are cut off as close to the stem as possible. Indiscriminate pruning must be avoided for it leads to heavy losses in yield. Pruning should stop at a height of 2m 4m and after three years you practice mild pruning. Use very sharp knives or saw for pruning. All pruned surfaces greater than 2.5cm should be coated with ordinary paint or tar. Pruning ensures free movement in the plantation and also facilitates other farm operations such as spraying and harvesting.

3.5.5 Regeneration

This is the practice of getting new plants from old ones. During heavy storms, trees not well established are blown over and usually from the based of such plants, new branches begin to develop. When this is the case, you allow only three of the new buds to grow and then with time

you eliminate two leaving only the most vigorous and active bud. Allow this to branch producing new chupons which develop to provide the required canopy. Then earth up the stem to allow the new plant develop roots. When it has developed roots and fully established, you cut off the old bent tree from which the young tree has developed, then maintain the tree as any other young cocoa plant but you must create a gap between it and the older tree around it to avoid smoothening. Regeneration can be used to replace an old plantation where the trees are no higher yielding.

3.5.6 Harvesting

Pods are ready for harvesting when the green pods turn yellow and then red pods turn orange. Do not allow the pods to overripe. Use knives or hooks with handle for harvesting. The cushion on which pods grow should not be damages to ensure continuous yield and avoid disease attack. The pods should never be twisted off the stem and the short stalk suspending the pod should not be damage. Healthy pods should be harvested separately and discard all infected pods for they produce black beans.

SELF-ASSESSMENT EXERCISE 3

List five practices of maintenance of cocoa.

3.6 Processing of Cocoa

After harvesting, you break the pods avoiding any damage to the seeds and then pulp along with the beans are collected and carried to the fermentary. The interval between fermentation and the breaking of the pod should be more than three days. It is advisable to remove the placenta before fermentation

SELF-ASSESSMENT EXERCISE 4

Draw the map of Nigeria and locate the growing producing areas or states.

3.6.1 Fermentation

This is essential for flavour development in chocolate production. During this process a uniform temperature of between 47^0C – 51^0C is maintained to ensure uniformity in the fermentation. Any fluctuation in temperature results to the formation of slaty beans.

For the fermentation, here in the Nigeria, we use sweat boxes which are made of wood and they can be of various sizes. The depth box should not exceed 1m. Each box should contain between 460kg -4,600kg of beans. The boxes should have a sliding form and the holes should be about 1cm in diameter. These boxes are arranged one on top of the other on concrete steps. The fresh material is put in the top box and then allowed to remain there for 48hours before it is removed to the middle box for 2-3days and fermentation is completed. The whole process lasts for about 6- 7days.

You can also ferment the material by the tray process. Each tray measures 0.6mx x 0.6x 1m and can hold about 60kg of wet beans and the bottom of the tray is slatted. The tray usually covered with palm leaves and here fermentation takes about 4 days. This method is recommended for its simplicity.

Locally, the farmers may leave the broken pods to ferment in a basket covered with banana leaves. This method does not however ensure high quality beans because there can be little or no control of temperature.

3.6.2 Drying of Beans

Drying of beans is by sun after spreading on tray or mats and drying period depends on intensity of the sun. However rapid drying is not advisable. A period of about 14 days is good enough. Drying can be done artificially in areas where the sun is not regular.

3.7 Control of Diseases and Pests

Good management goes a long way to reducing the incidence of pests and diseases.

One major disease of cocoa is the swollen shoot disease, virus disease that is not easy to control but can be prevented. You can prevent this disease by the removal and destruction of all infected plants. You will not only remove and destroy the infected plant but also remove a few of the trees nearest to the infected plant. If for example five trees are affected, you cut 5m from the last affected plant and this includes another two trees, if 5-50 plants you cut other trees within 10m of the last affected plant and if more you cut 15m

In the case of' black pod, you have to adopt a spraying cycle of 21 days starting from the beginning of rainy season to the beginning of the dry season. The recommended fungicides are Perenox and Bordeaux mixture.

Capsid attack is checked by spraying young plants with Gammalin 20 in the middle of the rainy season at monthly intervals.

SELF-ASSESSMENT EXERCISE 5

List the cultural practices of cocoa cultivation.

4.0 CONCLUSION

Cocoa is one of the major cash crops of Nigeria which thrives on good human conditions with relatives shading. However vegetative propagation by budding is also practiced with better yield but harvesting is still much done manually.

5.0 SUMMARY

Cocoa which is a major cash crop of Nigeria is also a source of revenue to some individual farmers and as a foreign exchange to Nigeria. Cocoa ranks first among the cash crops in Nigeria that yield revenue and it amounted to 60% of foreign exchange before Nigeria's Independence in 1960. Propagation is carried out by germinating the seed while harvesting is still very much done manually. The issue of mechanization is yet remote.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The state of Nigeria where cocoa is being grown includes – Oyo, Osun, Ogun, Ondo, Ekiti, Lagos, Edo, Delta, Akwa-lbom and Cross River State.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

Cocoa requires an annual rainfall of at least 73cm, a minimum temperature of about 27^0C. Temperature fluctuations can be checked by shading. It requires a humid condition, well aerated soil capable of retaining moisture during the dry season. Cocoa thrives bests on clay and loamy soils.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The cultural practices of cocoa include:

i. Nursery
ii. Sowing
iii. Land Preparation
iv. Maintenance of Plantain

v. Weeding
vi. Mulching
vii. Pruning
viii. Regeneration
ix. Harvesting
x. Processing
xi. Fermentation
xii. Dry of Beans

6.0 TUTOR-MARKED ASSIGNMENT

Discussion briefly the production of cocoa under the following headings.

a Method of Propagation
b. Climatic and Soil Requirements
c Nursery Requirement
d. Maturity Period
e. Method of Harvesting
f. Two major diseases and their control.

7.0 REFERENCES/FURTHER READINGS

Anyanwu, A.C. *et al* (1998). *A Text Book of Agricultural for Colleges and Universities*.

Agbo, Festus (1999). *Elements of Agriculture for Cooperative Colleges, Polytechnics and Universities*.

UNIT 4 CASH CROPS (OIL PALM)

CONTENTS

1.0 INTRODUCTION

This unit is the continuation of our discussion of cash crops. In this unit, we are going to focus our discussion on the oil palm which is one of the most important economic crops in the tropics. Like cocoa, oil palm is another important cash crop that contributes immensely to the economy of Nigeria. It also plays significant role in the lives of the rural farmers

due to the multifarious use to which parts of the oil palm tree can be put. For instance palm oil can be used as food for making pomades, and other industrial uses; palm kernel has also several industrial uses (e.g. soap, pomade, candle, etc the funds and the bamboo are got from the funds and the tree itself can be sawn into timber and used for construction of local houses

Present the government is engaged in programmes intended to bring about commercial production of improved species of oil palm.

2.0 OBJECTIVES

By the end of this unity, you should be able to:

- explain why oil palm is referred to as cash crop;
- state the characteristics of oil palm;
- describe the methods of cultivation and propagation;
- outline the methods of harvesting and processing of oil palm; and
- list the disease and symptoms of the diseases that attack oil palm.

3.0 MAIN CONTENT

3.1 The Oil Palm (Elaesis Guineensis Family-Palmae)

The oil palm is one of the most important economic crops in the tropics. It is the most important sources of oil and produces more oil per acre than any of the oil producing crops. It has two types of oil, palm oil itself which is extracted from the outer fleshy part of the fruit and palm kernel oil obtained from the kernels. These oils have quite distinct properties and are used to different purposes. Palm oil is mainly used for the manufacture of soap, but also in the production of margarine, lubricating oils and candles, and in the tin plate and sheet steel industries. Palm kernel oil is used for soap and margarine manufacture, and the cake left after extracting the oil is good for livestock feed. Besides the importance of oil palm as a commercial oil crop, it serves many other purposes locally providing food, drink, building materials and brooms. The bunch refuse is used for mulching and for manuring.

3.2 Origin and Distribution

The oil palm tree is said to be indigenous to tropical Africa and grows mostly along the coastal plains of West Africa. The oil palm belt occurs between latitudes 15^0N and 12°S where the rich loose alluvial soi1 of the area has made its growth abundant and luxuriant.

3.3 Varieties/Cultivars

Three main varieties are known. These include:

3.3.1 Dura

This variety has a thin mesocarp, thick endocarp (shell) with a large kernel. It is generally homozygous and represented by DD.

3.3.2 Pisifera

This variety has a thick mesocarp (i,e.) it contains very little oil content), absence of endocarp (no shell) with small kernel. It is genetically homozygous recessive for shell. It is represented by dd.

3.3.3 Tenera

This variety has thick mesocarp, thin endocarp with moderate sized kernel. It is a cross between dura and pisifcra. It is capable of producing both the oil and the kernel. It is genetically heterozygous and it is represented by Dd.

SELF-ASSESSMENT EXERCISE 1

Name the three varieties of oil palm.

3.4 Climatic and Soil Requirements

The soil occurs between latitude 15^0C – 23^0C. The rainfall requirement is 100cm 150cm average and an optimum of 200cm – 200cm but the rainfall must be evenly distributed. Oil palm does well is loose loam of alluvial friable types and the optimum pH is 5.5. 6.5. Average daily sunshine should be up to 6 hours per day.

3.5 Cultivation

3.5.1 Germination of Oil Palm Seed

a. Dry heat treatment method: The seeds are soaked for 7 days a daily change of water remove the pericarp. At the end of the soaking period, dry the seeds for not more than 24 hours in the shade spread out in a single year. Avoid as far as possible excessive drying.

On the eighth day, place seeds in 500 gauge polythene bags secured with a rubber band and put about 750 seeds in each bag of about 60cm x 60cm and support in wooden boxes of about 30cm x 20cm x 10cm. then place the bags with seeds in the germination room and efforts should be made to maintain a temperature of 39^0C. The seed should be examined occasionally to check that no polythene bag seal has come unwedded or a rubber band broken.

After 80 days the seeds are removed, then soaked again in water for 7 days with a daily change of water. At the end, the seeds are slightly and carefully dried in the shade until the shine produced by the adhering water disappears, but the seed is still almost black. This may take about 2 hours.

The seeds are then returned to the polythene bag and kept in a cool place with a twice weekly examination and watering with a fine spray to maintain the almost black appearance. After about three weeks there will be a flush of germination. Soaking should start in early August for a wet season nursery and in mid-January for a dry season nursery.

b. water Heated Government Method: Also a former method of germinating the oil palm seed is oven type or water-heated germination system which involves the use of charcoal.

3.5.2 Growing in the Pre-Nursery

The newly germinated seeds are too delicate to be planted directly into the nursery and period of very careful husbandry is necessary to produce strong and healthy seedlings suitable for planting into the nursery. This is the pre-nursery stage and it lasts for 4- 5 months. The successful establishment of the nursery and the eventual success in the field depend on the handling of the seedlings in the pre-nursery. It is here they are given a vigorous start. Wooden or concrete trays are used. They are raised off the ground by a suitable wall or platform to make maintenance easy.

The most recently used method is planting in polythene bags or other plastic containers like what obtains in the cocoa nursery. The sterilized soil is used for filling the containers, the seedlings are planted and care is taken of them. This method ensures fewer disturbances of the young tender roots during transplanting into the nursery.

It is important that the germinated seeds are planted the right way up, other wise the seedlings will be deformed and twisted. A planting depth of 2.5cm in a neat square pattern and spaced at not less than 7.5cm apart

are recommended. Crowding the seedling will lead to the attack of Anthracnose after planting out in the nursery.

After planting, the trays, beds or bags should be lightly mulched and if very severe dry weather is anticipated, the pre-nursery should be shaded. Under dry conditions the beds should be watered once or twice daily with a watering-can that has a fine rose.

If the seedling start to develop yellow colour, there will be need to apply a weak solution of fertilizers. A solution of 40g of ammonium phosphate dissolved in 19litres of water should be applied to 4 trays of I.2m x 1.2m every week or alternatively, 40g of sulphate of ammonia may be equally applied in the same way. Water trays lightly after fertilizer application to remove traces of fertilizer from leaves.

For transplanting into the nursery, the seedling should be lifted carefully with a ball of earth. If nursery is far from the pre-nursery, the naked roots should be protected by dipping them into clay slurry or tying them with flesh leaves.

SELF-ASSESSMENT EXERCISE 2

Why do you consider pre-nursery necessary in the cultivation of oil palm?

3.5.3 The Oil Palm Nursery

The oil palm needs a flat fertile land. The normal nursery should be prepared in March and planted in April. Planting later than April will be late and plants suffer from a severe attack of blast.

The land for the nursery should be well cleared and deeply ploughed up to 20cm to 25cm. Then compost or any other form of organic manure is added at a rate of up to 125tonnes per hectare. The area is then marked out at a spacing of 1 m x 1 m leaving sufficient rows for watering.

Plants are seedlings immediately after lifting from the pre-nursery. Hold the seedling at the correct level and place oil evenly around the roots and make it firm. Spray the nursery immediately after planting and at weekly intervals of six weeks to check Anthracnose. If freckly disease is suspected spray fortnightly after six weeks.

Mulch the nursery a month after planting preferably with whole bunches. Hand pick pest like snails, crickets, grasshoppers and caterpillars. Water the nursery during the dry season.

The recommended fertilizer mixture is one part of sulphate of ammonia one part of super phosphate, one part sulphate or muriate of potash: two parts of magnesium sulphate or one part of anhydrous sulphate is used. The fertilizer is applied in a ring of about 5cm to 7.5cm away from the seedling.
For a dry season nursery, greater care handling is required, and the time of planting is important. Seedlings planting in August and September may suffer severely from blast attack in November, whereas those planted in mid-October suffer relatively little blast attack. Also shade is essential from the time of planting until January ending, the amount of shade being reduced progressively after December. Mulching should be heavy and routine spraying with Captan to check Anthracnose and Freckle should be done.

Fertilizers should be applied at the rate of 20g of a 1:1:1:2 NPK Mg, mixture per seedling per month, starting a month after planting and continuing for five months. Watering should be at least twice daily if the dry season nursery is to be successful.

3.5.4 The Transplanting of Oil Palm-Seedling

Transplanting from nursery into the field can start as early as March when the first rain start. Late planting is not advisable since the dry season might set in before the palms get established.

It is best to plant on land that has been under heavy bush or forest. Clear and cut down the bushes and burn them. If the palm is to be intercropped with annual crops such as maize and okro, total clearing is essential otherwise total clearing is unnecessary: Mark the field and then cut down the big trees. The rows should run North to South but if there is to be intercropping, it should run East to West. The planting positions are clearly marked with pegs and such positions cleared. The spacing is usually 10m x 17m triangle. No spacing should be less than 8cm. After marking, clear all stumps on the palm row and dig holes 60cm x 60cmx 90cm. Then fill the holes with top soi1 and allow them to settle for about 2-3 weeks.

SELF-ASSESSMENT EXERCISE 3

Which month of the year do we start transplanting? And why?

3.5.5 Fertilizer Application

Apply 227g of sulphate of ammonia per palm 6 weeks after planting. Then around October, apply 227g per palm of same fertilizer: Then around first year, after planting and the second year apply 45g per palm

yearly. The ferti1izer should be broadcast on a circle 1m 2m in diameter around the palms.

Potassium fertilizers should be applied throughout the life of the palm in the field. Potassium sulphate or muriate of potash should be applied at the following rate: 227g per palm 6weeks after planting, 454g per palm first year after planting, 681g per palm second year or planting during the early rain. In all subsequent year, apply 681 per palm each year.

Magnesium sulphate should be applied 227g, 454g and 681g, per palm in three years following planting, followed by 681 g per palm for subsequent years.

3.6 Maintenance of the Plantation

It is very important to keep down vegetation growth in the field. The vegetation should be cutlasses about 4 times a year especially during the early stages of the palm. It encourages early bearing of fruits, reduces nutrient deficiency and competition between palms and weeds, prolongs the life of the palms and simplifies the care of the palm.

It is also recommended to ring weed around each palm when the palm is grown. All ferns, weeds etc. around the palm should be removed. The frequency of cutlassing or ring weeding reduces as the palm grows older.

Pruning of old leaves or any infected leaves should be a routine practice. Such leaves should be removed and burnt. The local practice of trimming is not advisable. Any removal of green leaves will reduce the future yields of the palm. At least once a year, usually during the dry season, all dead leaves should be cut off and all ferns and creepers removed from the crown of the palm.

It may also be necessary to cut paths linking palms to facilitate harvesting and palm maintenance.

3.6.1 Harvesting

For well cared plants, ripening beings at the end of the third year of planting but these are not usually harvested. Actual harvest starts about the fourth year. A palm bunch is ready for harvesting when it has a few loose fruits. It is essential that each palm is inspected at least once a fortnight for ripe bunches as overripe fruits produce poor quality of harvest of harvesting varies with season.

Harvesting is usually done with matchets, axes and various types of knives. NIFOR recommends the use of chisel and hook, a sickle-shaped knife fixed to a pole. In all cases, it is essential that only the fresh leaves which hinder the removal of the bunch should be cut off. You can grow palms with the use of climbing ropes, ladders or tractor drawn hydraulic lifts.

Harvested bunches and fruits arc collected and carried away for processing. Transportation should not be delayed to avoid any waste of time in the processing, since delay reduces palm oil quality by increasing the free fatty acid contents.

SELF-ASSESSMENT EXERCISE 4

Why is it necessary to carry out the main tenancy of the plantation regularly?

3.6.2 Yield

This varies from 4,600kg 13,800kg per hectare. Much lower yields are obtained in palm grooves. Average yield varies from 1, 150kg 2,300kg per hectare for palm grooves.

3.7 Processing

Various methods have been used in the extraction of the palm oil locally. In one case the fruits are slightly fermented and then pounded. The nuts and fibres are thrown into water and the oil is extracted. In another case the fresh fruit is pounded and then fried to extract the oil. A third method entails boiling and then pounding in a mortar and the extracting the oil by hand or by putting in water.

However, the quality of the oil produced is determined by the free fatty acid (F.F.A.) content present. Good quality oil should have its F.F.A. content reduced to about 4% -5%. This is hardly achieved through the local methods.

The fruits or bunches should be boiled before pounding and the extraction of oil. This is referred to as sterilization. It softens the fruits for pounding, kills germs and at the same time, inhibits the action of the enzymes which are present in ripe fruit and which raise the F.F.A. content of the oil. The local practice of allowing fruits and bunches to ferment should not be done.

After sterilization, the fruits are then pounded and milled to extract the oil. The extraction can be by hand removal, hand screw press, hydraulic

hand press, and centrifugal force in pioneer oil mils or power driven hydraulic presses. Any of these methods can be used for the oil extraction. However the hydraulic hand press and power driven hydraulic press are the most efficient while hand extraction is the poorest method.

3.8 Grades of Palm Oil

Palm oil graded into three major categories based on the quality of free fatty acids (FFA) present in the oil.

The three major grades are

i. Soft oil it has low free fatty acid (FFA)
ii. Hard oil it has high free tatty acid (FFA)
iii. Special oil it has very low free fatty acid (FFA)

3.9 Pest of Oil Palm

i. **Rodents**: Rodents, like rats, squirrel, bush rats, dig up and eat the seeds in the pre- nursery stage.
ii. **Control**: Use wire mesh to surround tile nursery beds.

3.9 Diseases of Oil Palm

3.9.1 Blast Diseases

It is caused by a fungus which is spread within the soil. Symptoms include yellow coloured leaves with some brown patches on the leaves of seedling in nursery. It may lead to death of seedlings.

Control: (i) Regular watering and mulching of the nursery beds.
(ii) Spray at regular intervals with captain.

3.9.2 Anthracnose

It is caused by a fungus. Symptoms of the disease include black and brown patches on the surfaces of leaves in pre-nursery.

Control

i. Ensure adequate spacing within the pre-nursery
ii. Spaying with captan or perenox

3.9.3 Freckle Disease

It is caused by a fungus which can be spread by wind or air. It may develop in pi nursery and later spread to nursery and the field, when it is not property control.

Affected plants develop brown spots on the leaves.

Control

i. Remove infected plant
ii. Spray with captan.

3.9.4 Galadina Diseases

It is caused by a bacterium which is spread within the soil. Symptoms include rapid wilting and death of the entire plants.

Control

i. Avoid infested oil
ii. Practice crop rotation, especially in pre-nursery and nursery stages.

4.0 CONCLUSION

Oil palm is one of the most important cash crops in Nigeria which had contributed much to the economy and the individual farmers because of its multifarious use to which parts of the oil palm tree can be put.

5.0 SUMMARY

This Unit has identified oil palm as one of the cash crops due to its contribution to national economy and has also stated the main characteristics highlighting that propagation is only by seed while harvesting is done on a continuous basis as each fruit ripens.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The three varieties of oil palm include:

i. Dura Thick shelled with a thin mesocarp hut large kernel.
ii. Tenera- Thin shelled with thick mesocarp and small kernel
iii. Pisifera None shelled with no outer shell but has fleshy and swollen perrianth which bears the oil.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The newly germinated seeds are too delicate to be planted directly into the nursery and a period of very careful husbandry is necessary to produce strong and healthy seedlings suitable for planting into nursery.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

Transplanting starts in March when the first rain stared. This is because of the coming raining season to provide logistic support for its establishment on the field.

ANSWER TO SELF-ASSESSMENT EXERCISE 4

It encourages early fruiting i.e. bearing of fruits reduces nutrient deficiency and competition between plants and weeds prolongs the life of the palms and simplifies the care of the palms.

6.0 TUTOR-MARKED ASSIGNMENT

Describe briefly the production of palm oil under the following headings:

i. Methods of propagation
ii. Climatic and soil Requirement
iii. Nursery Requirement
iv. Method of Harvesting
v. Two major diseases

7.0 REFERENCES/FURTHER READINGS

Anyanwu, A.C. *et al* (1998). *A text Book of Agricultural for Colleges and Universities*.

Agbo, Festus (1999). *Elements of Agriculture for Cooperative Colleges, Polytechnics and Universities*.

UNIT 5 PLANT DISEASES AND PESTS

CONTENTS

1.0 INTRODUCTION

You will recall our discussion on the agricultural practices of some crops in the last few units and we mentioned the various diseases and pests affecting these crops. This unit will discuss in details the various pests and diseases affecting crops production especially the growth and yields aspects which reduces the income of the farmers drastically. We shall also prefer adequate solution for the control of these diseases and pests of the crops which will form part of our contributions to the agricultural production especially in boosting both foods and cash crops. Most of the losses are due to pests and diseases either during the growing period or harvest/storage periods.

2.0 OBJECTIVES

By the end of this unit, you cannot be able to:

- identify the various plants disease and pests;
- state the various causes of these disease and pests;
- list some of the disease and their symptoms; and
- outline the various methods available for control.

3.0 MAIN CONTENT

3.1 Definition

Disease in plants is a physiological activity caused by a continuous irritation of a primary casual factor (pathogen) or malnutrition exhibited through abnormal cellular activity and expressed in characteristic pathological conditions known as symptoms and harmful to the plant or to any of its parts and products or reduces its economic value. This means that in a plant disease we must have:

a. the casual organism (pathogen) or factors
b. pathogenic activity or deficiency
c. response of the plant to the activity of the pathogen or signs of efficiency
d. manifestation of the disease, i.e. the symptoms of the disease.

3.2 Classification of Plant Diseases

Several authorities have classified plant diseases on different basis. Plant diseases have been classified on the basis of etiology that is based on the casual factor or pathogen. Under this you have diseases caused by fungi, bacteria, virus, nematodes and non-living factors.

3.2.1 Fungi

These are those groups of organisms that have no chlorollphyll. They are either parasites or saprophytes and be pathogens.

Fungi can be classified into:

a. Phycomyeetes
b. Ascomyeetes
c. Basidiomycetes
d. Fungi Imperfect

These various classes cause various diseases.

a. Phycomyeetes: Within this class, we have phytophthora of the family phythiaceae which causes blight of potato and tomato.
   Also the family peronosporaceae causes a general disease called downy mildew.
b. Ascomycetes: Within these cases, the order Taphrinales causes abnormal high development of plant organs. They cause leaf curl and witches broom.
c. Basidiomcetes: These causes rust of maize these parasites i.e. they can only grow on maize. Some also cause root rot.
d. fungi Imperfect: The order Melanionales cause a group of plant diseases called anthracnose in plants. The disease is characterized by necrotic spots.

SELF-ASSESSMENT EXERCISE 1

i. Explain the term plant disease.
ii. List the various causes of plant diseases.

3.2.2 Viruses

These are recognized by the nature of the disease which they cause. .The symptoms of virus diseases are much varied. We have such signs as local lesions as in the case of tobacco mosaic virus, and vein clearing as

in the case of swollen shoot disease o1'cocoa: Other common symptoms of virus diseases are:

a. Mosaic mottling where the leaves of the plant show an alternation of light and dark patches.
b. Chlorosis where there is uniform yellowing of all plants of the leaf.
c. Stunting stem is shorter than usual and the whole plant appears dwarfed.
d. Hyperplasia there is abnormally high development of certain tissues of plant. e.g. the swelling of the shoot of cocoa.

3.2.3 Bacteria

Bacteria as pathogens cause the following main groups of diseases:

a. Leaf spots. In this case necrotic spots appear on the leaf.
b. Bacteria blight. When this occurs, a large area of the surface of the organ e.g. leaf becomes necrotic and appears as if the organ has been burnt with fire sometimes ago. e.g. bacterial blight of guinea-corn.
c. Bacteria gall. This gives rise to the development of certain hyperplastic area on the organs of the plant. The reason for this is that the bacteria produce certain enzymes which cause the cells of the organ to divide and consequently large numbers of cells are produced and the area attacked becomes hyterplastic.
d. Soft rot. Mainly a temperate disease, but can be found in the tropics under wet conditions. In this case, the bacteria invade the cells and omit toxic substances which cause plasmolysis of the cells and the cells maybe killed and grow rotten.

3.2.4 Nematodes

Nematodes by themselves do not cause much outstanding damage but they progressively weaken the plant and the loss in yield in gradual for many years. Because of this slow process, nematodes are not easy to control. The nematodes generally infect the root system of the plant and they weaken the tissue of the plant and expose it to infection by other disease-causing organism. Control can be achieved by breeding resistant varieties and by the use of nematic ides e.g. Nemagon.

One of the most important nematodes so far identified in Nigeria is the root rot nematodes which have been found in the leguminous crops, fibre crops (kenaf and jute), sugar-cane and cassava.

Other classifications have been based on pathology, symptoms and interruption of physiological process. However classification based on symptoms and interrupted process have been the most accepted.

SELF-ASSESSMENT EXERCISE 2

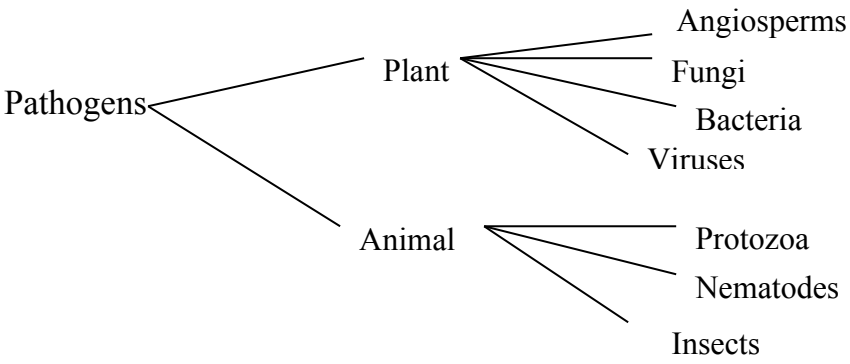
Mention three plant disease causes by viruses and bacteria.

3.3 Etiology of Plant Diseases

This is the study of the primary cause of plant disease. The casual factors can be divided into:

a. pathogens: These are those living agents which pass through a regular cycle of development, are capable of reproduction and induce diseases in plants. The pathogens can be divided into.

ETIOLOGY OF PLANT DISEASES



b. Inanimate objects: these are the non-living thing generally chemicals, physical or non-living factors many of which are essential for the normal growth of a plant but which produce disease when they are deficient or in excess.

SELF-ASSESSMENT EXERCISE 3

Explain the term etiology of plant diseases.

3.4 Effects of Plant Diseases

1. Diseases generally reduced the yield or productive of crops
2. The quality of crops can be reduced
3. They cause the malformation of some parts of the plant or of the whole plants
4. They lead to death of the whole plant.
5. Reduce farmer's income
6. They increase the cost of production

7. They can lead to retarded growth in plants
8. They make fruits and vegetable unattractive and unmarkable
9. Diseases which attack the level of plants, such as powdery mildew, rust, necrotic spots and blight, will reduce photosynthetic activities
10. They account for about 20% of the world's total loss in agriculture

3.5 Symptoms of Plant Disease

1. Rolling of Leaves
2. Chlorosis
3. Foliage of leaves
4. Shedding of leaves, flowers and fruits
5. Decay of plant part
6. Stunted of growth
7. Lodging in the Stem
8. Death of plant
9. Delays in metabolic activities
10. Exudation of Gum in the Stem

3.6 Principles of Plant Disease Control

3.6.1 Exclusion

This means preventing the entrance or establishment of pathogens in uninfected gardens, farms, plantations or countries. This can be achieved by the use of certified planting materials. This is normally a country wide responsibility. It is the government's responsibility mainly through the establishment of quarantine services work.

3.6.2 Eradication

This means the elimination of the pathogen from a place where its presence has already been established. This can be done by the removal of diseased specimens from the farm if infection is on a small scale, as is done in the case of black pod of cocoa. Also alternative weed hosts should be reduced. Planting materials can disinfect before planting. An example of this is the common seed dressing seeds suspected diseased before planting. Cowpea and cassava are planted from the attack of Cerocospora and Fusarium, by this method. The planting material can be dusting or sprayed e.g. powdery mildew can be controlled by dusting with sulphur.

3.6.3 Protection

This means the interposition of some protective barrier between the susceptible part of the host and the pathogen. The plant is covered with the chemical before the arrival of the pathogen. It is particularly used where the pathogen is spread by spores.

3.6.4 Immunization

This means conferring a sort of immunity on the plant. In this case the plant and the pathogen will be growing together but it does not harm the plant. This is achieved by the breeding of resistant varieties.

3.7 General Methods of Controlling Plant Diseases

3.7.1 Ecological Control

This is brought about of a radical change in the environment of the crop of pathogen so that it follows the survival of the crop and encourages the destruction of the pathogen. Examples are bush burning which kills soil borne pathogens and flooding on a limited scale thus suffocating the pathogens. However, this method is uneconomical and not so effective.

3.7.2 Cultural Control

This involves a modification of the cultivation system to enable the crop to escape disease attack. Examples of this practice are:

a. Crops rotation of susceptible with non-susceptible plants to the disease to starve out the pathogen
b. Alteration of the planting dates, if the pathogens are much when the planting is done.

3.7.3 Biological Control

This is the use of a pathogen's natural enemy to control it. This method is ineffective with fungi but is most applicable with nematodes.

3.7.4 Chemical Control

Chemicals are produced which serve either as eradicates or protective. So far this is the best method of disease control known. It gives quickest results and in most cases is very economical. However the danger in this method is that chemicals can be destructive to desirable organisms or even to man and animals.

3.7.5 Breeding Resistant Varieties

This is a fairly successful method but the period does not last too long before the pathogens devise a counter resistance and then attack the plants.

SELF - ASSESSMENT EXERCISE 4

List the various methods of controlling plant diseases.

3.8 Plant Pests and Parasites

3.8.1 Stem Borers or Cereal Crops

There are three major species that attack the cereal crops-maize, millet, guinea-corn, etc. These species are Basseolu fusca, Sessamia calamistitis and Coniesta ignefusalis, Busseolu and Coniesta are abundant in: the north while Sesamia is abundant in the south. These lay their legs between the sheath and the stern. Any individual female lays 3,000- 4,000 eggs and these takes about a week to hatch and from there, larvae disappear into the plant. Sesamia and Coniesta bore straight into the stem, but Busseolu attacks from the leaves in the upper leaf roll and then bore down through the stem. This makes control difficult in the case of Sesamia and but in Busseolu control can take place as the larvae crawl to the top.

In millet and guinea-corn a great number of tillers are produced as a response to the stem borer attack.

These insects have a diapause period (period of inactivity) and this ends at the end of pupation and this is usually at the beginning of the rains. The diapause period is mainly found in the millet and guinea corn, whereas the case of maize is slightly different for there is little diapause. Also infestation of early maize is less and heaviest attack is on the maize. In the maize, the adult of sesamia feeds on guinea grass and elephant grass because the condition does not favour dispause and there are not many borers. If late planting infestation is more because at the end of the first planting he stems borers that have been feeding on grass new infest and feed on the second maize crops. In these second maize crops, you can do little to control the pests for shifting the planting period exposes the crops to drought and earlier planting increases borer attack. About 20% of yield is lost to the stem borer in the second maize crop.

3.8.2 Roots Feeding Insects

These may occur in the larvae or adult stage. They have subterranean habit and they may feed on the roots or on the crown of the plant (i.e. the junction between stem and root). One of the major orders is the order Coleopteran to which belongs to the yam beetle (See notes on pests of yam).

3.8.3 Fruit Seed Feeders

These include the fruit piercing moths; fruits flies and the beetles that feed on fruits and seeds in the farm before harvest. An example of this group is the Dipatopsis spp. (Red Boll Worm). This is confined to Africa and attacks all species of cotton in Africa, but it is absent from Africa north of Sahara and from the equatorial region of Central Africa. Eggs are laid around the cotton boll and larvae bore into the boll and when they enter the boll they plug the entrance hole with frass and the circle the hole. The mature larva leaves the cotton plant and bores into the soil where it makes a chamber about 15cm down which it lines with silk and which it pupates. The end of the diapause comes with the onset of the rains some 4-6months later. The breaking of the diapause is not defined so that the moths appear over a considerable period. Eggs are once more laid and the cycle repeated.

3.8.4 Sucking Insects and Virus Transmission

These include the mealy-bugs, scale insects, aphids, leaf hoppers and white flies. These transmit many diseases and these include swollen shoot of cocoa cassava mosaic virus, streak disease of maize, tristeza disease of citrus and cowpea yellow mosaic.

Disease transmission may be mechanically done through the mouth parts or by acting as a vector by which the virus agents are ingested and many multiply within the insect. There are two major types of transmission.

a. infection of a healthy plant by the insect immediately after feeding on an infected plant and this is referred to as a non-persistent mode of transmission. The ability to transmit in this depends on the length of time the virus will remain viable in the insect's gut.

b. in this type of transmission, there is an incubation period clasping between the insect feeding and ability to the insect to transmit. In

this case the ability of the insect and may even be passed into succeeding generations. This type of virus cannot be transmitted mechanically and is referred to as the persistent virus. The ineffective power is developed during the incubation period in the insect. Generally persistent viruses are hosted specific and most of them require insect vectors as an essential link in the transmission of the diseases.

3.8.5 Aphids (Aphidae)

These are usually found in colonies which may include hundreds of individuals. In the tropics, reproduction appears to be entirely pathogenesis (development of the organism from a sex cell but without fertilization). A wingled female will fly to a young growth of a suitable host where she will settle down to feed and produce offspring pathogenerically and viviparously (i.e. bringing forth young alive). Twenty to a hundred offspring may be produced depending on the species of aphid and the environmental conditions. These will settle down to feed close to the parents and will become mature wingless pathogenetic females in 10-15 days.

3.9 General Principles of Pest Control

The general principle is based on the reduction of the pest population to low level so that the cost of control is too insignificant. The following control measures can be adopted.

3.9.1 Total Eradication

This has been done for few limited species either because they are new introductions or they are too localized. This has been used in the control of the Colorado beetle. However the costs involved in eradication is prohibitive and hence the method is rarely used. This method uses chemicals and eradicators.

3.9.2 Preventive Control Measures

This prevents the crops from the pest attack by applying the insecticide before the insect attacks.

3.9.3 Curative Control Measures

This involves treatment after the pest has attacked the plant and is intended to destroy or kill the pests already present on the crop.

3.9.4 Immunization

This involves breeding resistant varieties which can live in harmony with the pest.

3.10 Methods of Pest Control

These can be divided into:

- physicallmechnical control: Destruction, collection, trapping etc
- Culturallagronomic control: Variations in cultural operations, closed season practices, crop rotation, irrigation etc.
- Natural and biological control: Parasites, diseases and predators
- Chemical control: Use of chemicals
- Control of legislation: Quarantine4 service.
- Modern trends: Hormones, radiation, sterilization, chemosterilization etc.

3.10.1 Physical/Mechanic Control

This applied to the physical destruction of the pests as in the pests as in the collection of beetles either by hand collection or by using traps. Such traps as light traps and water traps have been used for aphids. However this method is successful within a limited area and when the infestation is low. Other methods include burning of stumps, destroying of larvae and pupae and tree banding in which case the tree is movements through the stem.
Flooding may destroy soil pests if they are susceptible to wet conditions.

Generally the physical methods of control can only be used effectively within a limited area and at low infestation.

3.10.2 Cultural Control

This involves a variation or modification of the cultural practices in such a way as to make the environment less favourable to the development of the insect. Such cultural practices include:

a. **Closed-season Practice**: When a crop is being grown, e.g. cotton, and it is normally infested towards the end of the cropping season, you can effectively close the season by ensuring that the crop is not growing anywhere and by destroying all possible hibernating tissues or alternative hosts of: the pest. This means that you ensure that there is no development of the pest or growing of the particular crop during the intervening period between one crop and the other. In Nigeria, the closed-season can be applied to cotton and sorghum Also in Southern Nigeria, it can be applied to maize stem borer.

b. **Crop Rotation**: This means alternating a susceptible crop with a non-susceptible crop so as to starve the pest to death.

c. **Use of Catch Crops**: This involves the growing of a short duration crop that is resistant or toxic which is often used for the control of nematodes.

d. **Time of Planting**: This means planting so as to evade the peak of the population of insects. The crop may be planted earlier or later but the major aim is to avoid the peak to the population of the insect.

e. **Irrigation**: Irrigation water can be used to control soil insects if they are susceptible to wet conditions.

f. **Use of Trap Crops**: Crops that are heavily infested by the insect can be planted and then when the insects attack, they are destroyed.

g. **Tillage Practices**: Soil pests can be exposed to heat destruction or the action of predators e.g. birds and rodents through proper tillage.

h. **Use of Resistant or Tolerant Varieties**: Certain varieties of particular crops are resistant to pest attack and these should be used. The hairy varieties of cotton are known to be resistant to Jassid attack.

3.10.3 Natural and Biological Control

This involves the use of the natural enemies of the pests to destroy them. This makes use parasites, diseases and predators. These can be obtained by introduction from other countries. The predator can be a bird, a mammal, other insects or any animal. This method is very expensive and can be practiced only in limited areas like estates, gardens, and plantations.

3.10.4 Control by Legislation

This is the prevention of the introduction of a pest into country and it is a government concern. It is normally done by a plant quarantine service unit. This is the only way of avoiding pest introduction and it can be successful if rigidly observed.

3.10.5 Chemical Control

In this method insecticidal toxic chemicals, are used either to reduce the population of the insects or to protect the crop from attack or to kill off the pests. These include chemicals known as insecticides, fumigants and acaricides.

The insecticides and fumigants can be applied in the form of solids, dusts, liquids, suspensions or emulsions. The insecticides include inorganic components, organophophorus components and chlorinated compounds. The insecticides can be classified into stomach poisons, contact insecticides, systematic insecticides and fumigants.

This method is very effective and popular, but certain precautions must be taken in handling the insecticides. Most of the insecticides are equally toxic to man. They have residual effects on plants and in the soil. Therefore, the chemical can also be destructive to useful and desirable organisms. The method is expensive and requires average intelligence for it to be adopted.

3.10.6 Modern Trends

With the advancement in the scientific inventions and discoveries particularly in the field of radioisotopes, modern methods of insect control have been adopted. Now the use of the sterile male technique has been very popular. Also chemicals known to have sterilizing effects have been used. This method is called chemo-sterilization and for this aziridines and antimetabolites are used. These chemo-sterilizers have been successful on fruits, flies, mosquitoes, etc. Chemo-sterilization is more economical than radiation, but the use of chemo-sterilants is hazardous and they are not so much recommended for they have disastrous effects on man and other beneficial animals. Also used are hormones. These are inactivate insects and may cause continuous moulting till the insect dies.

SELF-ASSESSMENT EXERCISE 5

Enumerate the various methods of controlling crops pests.

4.0 CONCLUSION

The effects of plant diseases and pests have been much to the extent that yields have been reduced up to 40% while various efforts and methods of control should be intensified.

5.0 SUMMARY

This unit has identified the various causes of plant diseases and pests with the various methods of control including the symptoms and effects of these diseases and pests on crops.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. Disease in plants is a physiological activity caused by a continuous irruption of a primary casual factor (pathogen) or malnutrition exhibited through abnormal cellular activity and expressed in characteristic pathological conditions known as symptoms and harmful to the plant or to any of its parts and products or reduces its economic value.

ii. The various causes of plant diseases include:
- Viruses
- Fungi
- Bacteria
- Nematodes
- Others.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The three plant diseases caused by Viruses:

a. Mosaic mottling
b. Chlorosis
c. Necrosis

By Bacteria

a. Leaf spots
b. Bacterial Blight
c. Bacterial galls

ANSWER TO SELF-ASSESSMENT EXERCISE 3

Etiology of plant diseases is the study of primary cause of plant disease. The casual factors can be either (a) Pathogen or (b) Inanimate objects

ANSWER TO SELF-ASSESSMENT EXERCISE 4

The various methods of controlling plants diseases include:

i. Ecological Control
ii. Cultural Control
iii. Biological Control
iv. Breeding Resistant Varieties

ANSWER TO SELF-ASSESSMENT EXERCISE 5

The various methods of controlling crop pests include:

a. Physical/Mechanical control
b. Cultural Control
c. Natural and Biological Control
d. Control by Legislation
e. Chemical Control

6.0 TUTOR-MARKED ASSIGNMENT

Briefly describe the side effects of preventive and control measures of diseases and pests of crops under the following headings:

1. Chemical control
2. Biological control
3. Cultural control

7.0 REFERENCES/FURTHER READINGS

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MODULE 6

UNIT 1 FERTILIZER/MANURE

CONTENTS

1.0 INTRODUCTION

The use of fertilizer has become so rampant and important in farming nowadays because of the decline in soil fertility which has been caused by erosion. Leaching and constant too many users of the land. It has not been easy to control the use of the farm land because of .the large population hence regular application of manure and fertilizer has been the major way of maintaining the fertility of the soil since it has been difficult to practice the following and crop rotation system because of the large population. With the recent development in agricultural practices especially in the farm mechanisation, the use of fertilizer has really increased. The demand for fertilizer has increased tremendously more especially in boosting food production. This unit therefore focuses on manure and fertilizer for maintenance of soil fertility in boosting agricultural production.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the various types of fertilizer;
- explain the uses of fertilizer; and
- describe the various methods of application.

3.0 MAIN CONTENT

3.1 Fertilizers

Fertilizers are the chemical materials supplied to soil to improve its fertility and productive capacity. They are usually applied to soils which lack some important nutrients. Usually they are solids but some can be dissolved and applied as liquids. These fertilizers are salts containing the needed nutrients in available forms. They are available in powders, granules, crystals or pellets.

3.1.1 Types of Fertilizers

3.1.2 Complete Fertilizers

These contain the major elements: Nitrogen, Phosphorus and Potassium (NPK). The salt containing the NPK sometimes contains trace elements as impurities. Proportions of N,P,K vary in different fertilizers, the variation is in accordance with the specific need of the soil to which they are marketed as NPK 15:15:15; NPK 20:20:20; NPK 10:10:10; NPK 5:10:5; these figures standing for percentage of N, P, and K respectively.

3.1.3 Nitrogenous Fertilizers

These are fertilizers containing nitrogen essentially. They are usually applied to the soil to increase the nitrogen content of the soil e.g. urea containing 25-45% N. sulphate of ammonia containing 12% N, anhydrous ammonia containing 82% N, sodium nitrate containing 16% N. Nitrogen fertilizers are very good for leafy vegetables.

3.1.4 Phosphatic Fertilizers

These are fertilizers containing more of phosphorous than any other element. Rock phosphate is the main source of phosphorous. Rock phosphate is treated with chemical to form fertilizers. Super phosphate with $P_2 O_5$ content of 29-30% is the commonest phosphatic fertilizers. Others are tride super phosphate containing about 54% $P_2 O_5$ basic slag containing 15-25%, $P_2 O_5$, Bone meal containing 25-30% $P_2 O_5$ ($P_2 O_5$ is oxide of phosphorous).

3.2 Method of Applying Fertilizer

3.2.1 Broadcasting

Broadcasting involves the spreading of the fertilizer all over the ground. It is done by hand or machine. Some of the chemical fertilizers are toxic to the plant, hence should not fail on the plant but should be carefully applied to the soil. The distribution of fertilizer must be uniform on the soil. After spreading, it should then be covered up with soil. This method is good for vegetable garden and rice farms.

3.2.2 Row Placement

This involves making a hole few centimeters from each plant after which the fertilizer is put about the hole. This method is good for most field crops.

3.2.3 Ring Method

This involves the spreading of the fertilizer evenly in a ring made round the base of the plant at specific diameter. It is commonly practiced in tress crop plantations.

SELF-ASSESSMENT EXERCISE 1

i. Explain the term fertilizer
ii. List the various types of fertilizer

3.3 Advantages of using Chemical Fertilizers

1. The major advantage is that essential elements concentrated in them are liberated within relatively short period.
2. It brings about increase in soil nutrients with consequence increase in farm income

3.4 Disadvantages of using Chemical Fertilizers

1. Some parts of the chemicals are easily leached away because they are mobile. Such chemical fertilizers cannot work in soil for a very long time
2. Chemical fertilizer cannot improve the texture and structure of the soil as does humus.

SELF-ASSESSMENT EXERCISE 2

Enumerate the various methods of fertilizer application.

3.5 Manures

Manures are materials which are added to the soil in order to replace the nutrients that are deficient in the soils. In other words, it is anything added to the soil to maintain or improve soil fertility.

3.6 Types of Manure

1. Farmyard Manure
2. Compost Manure
3. Green Manure

3.6.1 Farmyard Manure

Farmyard manure refers to the dung from livestock such as cattle, pig, poultry, sheep, and goat. It is a mixture of dungs, faces, urine, and the grass used for litter or bedding.

3.6.1.1 Advantages of Farmyard Manure

1. It is a source of major plant nutrient i.e. nitrogen phosphorous and potassium
2. Farmyard manure helps to improve soil texture and structure
3. It improves the water retaining capacity of the soil because it readily absorbs and retains water.
4. It provides the favourable medium for the growth and actives of beneficial microorganism e.g. Bacteria
5. It is cheap because it can be produced in the farm and around the home residues, grass, weed, house-hold waste, poultry dropping and ash in heaps or pit and allowing the mixture to rot or decompose.

3.6.1.2 Advantages of Compost Manure

1. It is a source of soil nutrient especially as it increases nitrogen content of the soil
2. It improves the texture and structure of the soil
3. It improves the water holding capacity of the soil
4. It encourages the activities of soil micro-organisms
5. Compost manure helps to balance the acid/base condition of the soil. A rapid change in soil temperature is reduced with the application of compost manure.

SELF-ASSESSMENT EXERCISE 3

What do you understand by the term manure mention the various types of manure.

3.6.2 Green Manure

These are crops that grown with the purpose of adding them to the soil while they are still green. These crops are buried in the soil just before they start flowering. If the crops are too old, the rate of decomposition is slow. Nitrogen content is also decreased. Green manure is usually fast growing plant. They include legumes and grasses like mucuna and cowpea.

3.6.2.1 Advantages of Green Manure

1. It adds nutrients to the soil. Legumes fix nitrogen from the air into the soil.
2. Green manure increases the organic matter content of the soil.
3. It improves the texture of the soil.

4. It checks soil erosion and leaching of soil nutrients.
5. Green manure crops may help to control weed by smothering them.

3.7 The Importance of Soil Micro-Organisms in the Maintenance of Soil Fertility

1. They aid in partial disintegration of plant materials into their component parts to form plant nutrients.
2. They help in transporting sub-soil to surface of the soil thereby aid mixing of the top and sub-soils.
3. They aid development of humus
4. They improve water percolation and aeration e.g. burrowing soil animals.
5. They produce materials that bind soil particles into aggregate e.g. Earthworm and algae.

3.8 Factors Affecting Fertilizer Application

In deciding the method of application and time of application of any fertilizer, certain factors have to be considered.

3.8.1 Kind of Fertilizer to be Applied

Some fertilizers dissolve more rapidly than others. Some nutrient elements move father a field than others. The fertilizer should be applied so that it can be of maximum use to the plants. Those that dissolve slowly are to be applied early enough so that the crops can make use of them at the time they start dissolving. Nitrogen fertilizer especially the nitrate form should be placed a little away from the roots. It is usually good for top dressing. On the other hand, phosphate fertilizers are best applied in the zone of root development. It is therefore; better to apply in the bands or in rows. In case of micro-nutrients that are not easily absorbed from the soil by roots or when nutrients are required in small quantities, spraying may be ideal.

3.8.2 The Arrangement of Crops in the Field

Where the crops are planted in rows, now application is easy whereas if the crops are clustered together as in rice fields, broadcasting in most suitable.

3.8.3 The Root System of the Crops

If the crops have a well developed root system it can easily capture nutrients no matter how they are applied but a crop with a poorly developed root system will require the fertilizer to be placed close enough to the roots.

3.8.4 Quantity of Fertilizer to be applied

With limited quantity of fertilizer it is often advisable to place it in bands or in rows within the reach of the roots. On the other hand, if plant of fertilizer is available broadcasting may be a cheaper method.

3.8.5 Degree of Soil Fertilizer

Where the soil is already fertile application of fertilizer is only to maintain the fertility. Broadcasting method is advisable. But a poor soil requires very large quantities of fertilizer to be broadcast before the crops show any response. Band or row application should be the most reasonable method in that case.

3.8.6 Time of Application

The time of application will depend on the type of soil, type of climate, the nutrient application and the plant involved. In heavy rainfall areas, it is necessary to apply nutrients when they will be absorbed by the crops to avoid waste. The time will be different where heavy leaching is not feared.

For fertilizers that have limited movements in the soul like phosphorous fertilizer, the total quantity may be applied at the time of planting without fear of leaching: On the other hand, nitrogen, especially when in the form of nitrate is easily lost by leaching and should not be applied long before it is required by the plants and whenever it is applied, it should be covered up with soil. For many crops in humid area it is advantageous to split the time of application into two or three. Plants with low food reserve need to have the fertilizer applied along with the seed but placed 5-10cm from the seed.

3.9 Lime and Liming

Lime is described as any compound of calcium or calcium in combination with magnesium which are applied to the soil to reduce the acidity of the soil. Plants have varying degrees of tolerance to acidity.

It is therefore, necessary to reduce acidity especially in humid climates to enable some crops to grow and develop. Similarly most micro-

organisms cannot live in highly acidic soils. In order to have them in the soil to do their duty, therefore, acidic soil has to be neutralized.

3.9.1 Functions of Lime

The functions of lime can be summarized as follows:

- It neutralizes acid soils,
- Calcium is an essential element for the growth and development of all crops especially legumes.
- It aids the development of roots and translocation of carbohydrates.
- It is important for cell wall construction and maintains a balance between acids and bases in the plant.
- It improves the availability of phosphorous in acid soils by changing it into calcium phosphate which is a little more readily available.
- Lime encourages the decomposition of organic matter, nitrification, and oxidation of sulphur and the growth of nitrogen fixing bacteria.
- It prevents the occurrence of some plant diseases that usually occur in acid soils
- It increases the effectiveness of fertilizer

SELF-ASSESSMENT EXERCISE 4

i. What do you understand by the term liming?
ii. List the functions of lime

4.0 CONCLUSION

Fertilizer has become so important as a result of its uses in agricultural production hence farmers demand for it has raised the cost of purchasing a bag has gone up while the time of application depends on so many factors as type of the soil, climate, the nutrient applied and the plant involved.

5.0 SUMMARY

This unit has given a detailed explanation on the various types of fertilizer coupled with its uses and contribution to agricultural produce and the methods of application which includes broadcasting, and row application top dressing.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. Fertilizer is chemical materials supplied to the soil purposely to improve its fertility and productive capacity. They are usually applied to soils which lack some important nutrients.

ii.. The various types of fertilizers include:

- Complete Fertilizer as NPK
- Nitrogenous Fertilizer
- Phosphatic Fertilizer

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The various methods of fertilizer include:

i. Broadcasting which involves the spreading of the fertilizer all over the ground. It is done by hand or machine.

ii. Row placement. This involves placing the nutrient within the immediate reach of the root hairs of the crops. This method is very suitable but can only be used on small gardens because of the high labour requirement. Mechanization of this method is not yet achieved because of lack of adequate machinery to handle it.

iii. Top Dressing is the method used when the crops are already growing. Fertilizer applied in this way tends to lose much of its nutrients through leaching and volatilization. But it serves a more useful purpose as much as a mulch material especially manure by conserving water and controlling erosion.

ANSWER TO SELF-ASSESSMENT EXERCISE 3

i. Manure is materials (plant and animal) which are added to the soil in order to replace the nutrients that are deficient in the soils. In other words, it is anything added to the soil to maintain or improve soil fertility.

ii. The various types of manure include:

- Compost manure
- Farmyard manure
- Green manure

ANSWER TO SELF-ASSESSMENT EXERCISE 4

Liming is a practice which involves the addition of some chemicals to the soil to reduce soil acidity. Forms in which time is added to the soil include lime (oxide of lime), slaked lime (hydroxide of lime) calcium carbonate or dolomite (carbonate of lime). The functions of lime include:

a. It neutralizes soil acidity.
b. Calcium is an essential element for growth and development of all crops especially legumes.
c. It aids the development of roots and translocation of carbohydrates.
d. It makes nutrients more readily available to plants.
e. It has a physical effect as it encourages granulation in heavy soils.
f. It improves soil structure.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the term fertilizer and enumerate the various types
2. Briefly explain the methods of application.
3. What are the effects of fertilizer application on soil?

7.0 REFERENCES/FURTHER READINGS

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UNIT 2 LIVESTOCK FARMING (POULTRY)

CONTENTS

1.0 INTRODUCTION

This unit with livestock farming especially the farm animals commonly produced in the farms in Nigeria like cattle poultry, sheep, goat, and pig to mention a few. Livestock production in Nigeria is carried out mainly in the traditional method and under this system animals are rarely housed or given adequate health care. Mortality rate under this traditional production practices is as high as 30% due to poor management hence this unit is to provide you with relevant information about raising and caring for poultry which refers to the birds which are domesticated from our past experiences and observations. The poultry production in Nigeria is carried out by peasant farmers who use mainly traditional techniques while in modem poultry production emphasis is placed on egg and meat production hence the poultry farmer may wish to specialize in commercial egg production, production of parent materials hatching of fertile eggs or broiler production.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the various types and breeds fowls;
- classify the various fowls according to their origin;
- explain the economic importance of poultry birds; and
- understand the basic needs of poultry farming.

3.0 MAIN CONTENT

3.1 Poultry

Poultry is domesticated species of birds reared for production of eggs, meat, feathers, etc. even though term poultry is mostly used for chicken; it also includes other avian species like turkey, duck, guinea-fowl and geese. One more species of birds, namely quail, has been recently domesticated and it is famous for its very tasty, delicious and high proteinous meat. These domesticated poultry birds are efficient converters of coarse grains, grain-by-products, agro-industrial by-products, some waste from biological industries, etc. into superior animal protein having high biological value is often called as “allied-agriculture" industry.

3.1.1 Types and Breeds Fowls

Among the improved breeds three types of fowl are produced. These are the egg producers, the meat producers, and the dual purpose ones. The Mediterranean breeds are noted for their high egg productive ability. An example is the Leghorn. The Cornish dark and Jersey back giant are good examples of meat producers. Coming in between the specialized egg and meat producers are the dual purpose breeds which can produce fairly large number of eggs and at the same time giving reasonable high quantity of meat.

Coming after these are the tropical all purpose fowls. These are not kept especially for either egg production or meat production. They gives eggs and meat but on very small scale.

3.2 Chicken Breeds

Zoological Classification

Class	-	Aves
Order	-	Galliformes
Family	-	Phasianidae
Genus	-	Gallus
Species	-	Galus demesticus of Gallus

3.2.1 Types of Chicken

Chickens are grouped into four types on the basis of their utility

Types	**Popular Breeds**	**Popular Character**
Egg type	Leghorn, Minorca Ancona	Light weight, very active
Meat type	Cornish, Sussex, and Orpington Australorp	Heavy weight, flashy body, slightly dull
Dual Purpose	Rhod Island Red, Plymouth Rock, Newhampshire, Wyandotte	Moderate weight Quite alert
Miscellaneous Game	Aseel, Redjungle fowl	Powerful built up

3.2.2 Classes of Chicken

Chickens are classified into various classes depending on their origin in different geographical region of the world. The different classes of chicken with few examples of breeds are as under

1. Mediterranean class Leghorn, Ancona; Minorea

2. English class Cornish, Sussex, Australorp and Orpington. The Red caps Dorkings
3. American class Rhode Island Red. Plymouthrock, New Hampshire, Wyandotte
4. Asiatic class Aseel, Brahma, Karaknath, Clittagong, Cochin

SELF-ASSESSMENT EXERCISE 1

i. Explain the term poultry.
ii. Mention the four types of chicken on the basis of their utility.

3.3 Adaptability

The species of poultry are adaptable or can survive in different environments. They are therefore, widely distributed in the world. The following factors therefore, favour its being extensively distributed in the world.

a. It can fit into small farm areas
b. Can thrive in poor land
c. It has a high food conversation rate
d. It has a fast rate of multiplication
e. It form highly excellent food and is easily processed.

With great increase in population, the demand for food especially protein food becomes acute. To meet the demand for animal protein the development of animal industry especially the fast developing and the rapidly multiplying ones as the poultry becomes very necessary.

SELF-ASSESSMENT EXERCISE 2

Why is the species of poultry very successful?

3.4 Economic Importance of Poultry

3.4.1 Sources of Proteinous Food

Poultry produce, eggs and meat, are cheaper source of high quality proteinous food and are very much useful to fight malnutrition. Egg is the only wholesome food of animals origin which can not adulterated by any human means till it reaches the ultimate consumer in its original form.

3.4.2 Employment Generation (Direct)

Poultry industry utilizes most of semi-skilled and unskilled personnel and labour for management of poultry farms are relevant activities with little technical assistance by exerts. Hence it can provide remunerative jobs to number of poor individuals to bring up the living standards. About one individual is required to manage 2000 birds without atomization. While 4000 birds can be handled by one person with semi-auto-operations for feeding, watering, collection of eggs and removal of droppings.

3.4.3 Employment Generation (Indirect)

The intensive rearing, modernization, organization and application of improved technology in poultry industry have led to the development of associated or allied industries to supply various inputs to poultry industry. Some of such industries are building and construction, scientific equipment manufacturing, feed manufacturing vaccine and health production manufacturing, processing, packing, marketing.

3.4.4 As Fertilizer

Its dropping is excellent fertilizer for enriching poor soil. Some farmers do use it in the production of arable crops like maize, yam, tomato, pepper and vegetables. Poultry mamma is about 10 times richer in fertilizer constitutes when compare with dung. It contains 3.2.2 percent N.P.K.

3.4.5 Sources of Earning

Poultry farming can be a major source of earning for livelihood of one family with medium size farming of about 3000-5000 birds. Agriculture farmers or labourers can take it as side/supportive business to earn additional income to improve their living standards. Such units can be managed by family members in leisure time. Service personnel can adopt it as part time farming with small size nits of 500-1000 birds, which can be managed by house wives or schooling children in leisure time. Not, only the students of agriculture or veterinary colleges can also earn considerable amounts by participating in "Earn while you learn" schemes on poultry rearing. Thus poultry keeping can be a very good source of earning for all categories of persons.

3.4.6 Addition to National Income

It adds to the country’s gross domestic product of the economy.

3.4.7 Use of Poultry and Products in Other Industries

Nearly all the poultry parts as it is or in the form of poultry products are useful for some or the other uses in many industrial processes. Egg shell is used for making mineral mixture. Yolk is used in preparation of shampoo, paint, soaps, while egg white is used in manufacture of paints, varnishes, adhesives and lot of pharmaceutical preparations. Hormones are prepared from endocrines of poultry. Fertile eggs are useful vaccine production while discarded eggs from hatchery are used as manure or in making animal for feed. Poultry feathers are used to make shuttlecocks and millinery materials like ladies hats, lace, ribbons etc.

3.4.8 Lesser Inputs with Cheaper Cost

Ample labour at reasonable cost is available in our country. The agriculture products and agro-industrial by products can be efficiently used to manufacture poultry feed at cheaper cost. Though not in all states, but electricity at subsided rates is supplied to poultry industry in most of the states of our country. Medicines, vaccines and diseases diagnostic aids are also available at reasonable rates. The hybrid chicks of high genetic potential of improved breeds and varieties are being produced and marketed by many private and government hatcheries. All these are relevant basic facilities have given a shape industry of poultry farming with lesser inputs and cheaper costs.

SELF-ASSESSMENT EXERCISE 3

Enumerate the economic importance of poultry.

3.5 Basic Needs of Poultry Farming

The efficiency and success of poultry rearing depends on some of the following factors, which form basic requirements for adopting poultry farming as a profitable venture.

3.5.1 Technical Knowledge and Experience

For successful poultry keeping, one should obtain some basic technical knowledge about poultry rearing by undergoing some sorts of short-term training from well-known poultry training institute. Not only this if possible, one should get practical experience through working in established poultry farm with or without accepting any remuneration to enrich the knowledge of poultry rearing with practical approach.

3.5.2 Capacity to Invest and Work Hard

In fact, poultry keeping is not an easy going enterprise. Therefore, one should be ready to work hard round the clock, throughout the year with

persistency for highly profitable poultry production. Similarly, a future poultry keeper must be able to invest in farming, so that he will take utmost care of safeguard his money with efficient management.

3.5.3 Availability of High Potential Hybrid Chicks

Day-old chicks of high yielding stains of renowned breeds with good disease resistance, within distance of maximum 200kms should be available to reduce transit stress on them. Nowadays this problem doesn't exist as good wide network of Government and private hatcheries, supplying quality chicks of high genetic potential strains, is available in all parts of country.

3.5.4 Veterinary Aid with Vaccines and Medicines

The services of qualified veterinarians specialized in poultry fields is an essential factors for efficient poultry farming on medium and large scale. For emergency and routine health care advice of nearby veterinary doctor can be utilized. Similarly, poultry disease, .diagnostic centre at reasonable distance (50- 75kms) should be available to seek its help to control severe outbreaks. The vaccines from reputed manufacturers and medicines at reasonable rates must be available within reach.

3.5.5 Balanced Feed

Availability of balanced feed at cheaper cost is a prime need of poultry farming, which affects its profitability to greater extent. The quality of feeds is important for better productive performance of birds, while prices of feeds play a role in reducing production cost.

3.5.6 Equipment and Capital

The availability of equipments like feeders, waterers, brooders, cages, egg, trays etc reasonable prices, carries lot of importance for starting a new poultry venture. Similarly, to adopt poultry farming on medium or large scale as commercial enterprise, availability capital is also most important due to higher initial investment.

3.5.7 Marketing Facilities

Before starting of new poultry venture, one should assess the marketing potential of the area for eggs, poultry meat or ready to lay pullets and then decide the size of farm.

3.5.8 Size of the Business

This will depend on labour, feed cost and demand. The market price for the product is an important aspect to consider in terms of product to go for. Having decided to establish a flock, choose the breed that can survive the environment, a breed that can produce well based on records of the breed, and a breed that appeals to you. Interest is very important. It would be cheaper and better to choose a breed that is available and has adapted itself to the environment under which it is to be produced.

SELF-ASSESSMENT EXERCISE 4

List the basic needs of poultry farming.

3.6 Management Practices in Poultry

Your choice of management system will depend on your purpose of raising the birds. System of management could be any of the following: (try to mention them).

The extensive or the so called 'free-range system'
The semi-intensive system and the intensive system

3.6.1 The Extensive System

Here the birds (chickens) are allowed to move freely about and feed themselves under natural condition.

The system is the cheapest way of raising poultry. It does not cost much to feed and care for the poultry. The control of the birds is however the least as compared to other systems. The birds could move to any place even places of danger, sleep and lay eggs anywhere. The resultant effect is low productivity and low yield profit.

i. A simple structure that can house the chicken at night; this will give protection from danger.
ii. Provide additional food to the chicken. This extra food means the chicken can grow faster and mat lay more eggs.

3.6.2 Semi-Intensive (Restricted Range)

Here you will acquire a small piece of land and fence it using galvanized wire netting and erect a small house for the birds at once. The fenced area is called the run and the birds are allowed to move around in the runs during the day and feed on natural green feeds and a night they are kept in the house.

As the birds have only a small piece of land to walk over, they will find only very little food. You will therefore need to give additional food and water in order to ensure high productivity.

3.6.3 Intensive System

Here you will need a large poultry house to keep the chicken indoor at the time. This means that all the food and water must be provided .It is the most expensive method and therefore you must be sure of strong capital before starting this system.

There are 2 basic types of intensive system that are commonly used to poultry industries

These are:

(i) Battery cage system (ii) Deep little system

3.6.3.1 Battery Cage System

The system is generally the best, if the poultry is mainly for eggs production. The battery cage is made of wire and there are several cages in it, one cage on top of the other. In each cage two or more buds or layers could be kept. The cage is just large enough to allow little movement. The floor of the cage slopes down slowly and this allows for easy collection of the eggs which just roll out as they are laid. This reduces the chance of the layers damaging the eggs. Attached to each cage are troughs for feeding and water. Since the cage is made of galvanized wire, wasters from the birds can only drop the cage and therefore allows for proper sanitation.

3.6.3.2 The Deep Litter System

If the purpose of raising the poultry is to keep the birds (chicken) for meat, this system is often best used. Although layers could as well be kept in this form.

Here the birds are kept in well ventilated house with the floor covered with litters made of absorbent materials such as sawdust, woodshaving, crushed maize cobs or groundnut shells. Inside the deep litter house, feeding and water troughs are provided. The filters can easily be replaced.

The advantages of intensive systems are that the birds can be given all the food they required in correct rations and at the appropriate time. This will enable the chicken to grow quickly and the layers to lay more eggs.

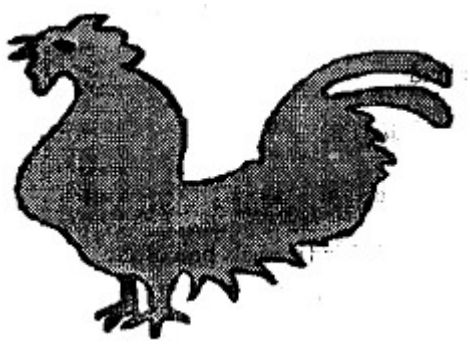
The temperature of the house can kept at comfortable as possible. These also enhance productivity.

Some problems with this system are:

1. It is most expensive system of poultry production. If everything goes well, the productivity is high and their will be enough profit. If however things go wrong, much money invested will be lost

2. In case of any epidemic disease; and one chicken is infected, the diseases is easily passed to other. Ill-health reduces the productivity of the birds. If immediate control is not given the whole poultry could die.

3.7 External Features of the Fowl (Cock)



SELF-ASSESSMENT EXERCISE 5

What is the advantage of using battery cage system for layers?

4.0 CONCLUSION

The economic importance of poultry has contributed immensely to the self sufficiency in production of food in adequate quality to meet the nutritional requirements of all classes of the populace this preventing malnutrition. The farmer must also ensure proper management of the birds for adequate productivity.

5.0 SUMMARY

The various types and breeds of fowls include egg type (leghorn and Minorca) meat type (Cornish and Sussex). Dual purpose (Rhode Island

Red and Plymouth) to mention a few which have contributed has contributed, economically to the production in food inadequate quality and provision of employment for Nigerians for while.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. Poultry refers to the birds which are domesticated. It includes such as chickens (fowls) ducks, geese, turkeys, and pigeons among others.

ii. The four types of chicken on the basis of their utility are:

- Egg type Leghorn, Monorca and Ansonia.
- Meat type Cornish. Sussex, Austratoop.
- Dual purpose Rhode Island Red. Plymouth Wyandotte
- Miscellaneous Game. Asee, Redjingle Fowl.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The specie of poultry is adaptable and has survived in the different environment because

1. It can fit into small farm areas
2. It can thrive in poor land
3. It has a high food conversion rate
4. It has a fast rate of multiplication
5. It forms highly excellent food and is easily processed

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The economic importance of poultry includes:

i. Sources of proteinous food
ii. Employment generation (direct)
iii. Employment generation (indirect)
iv. It serves as fertilizer
v. Source of earning
vi. Addition to national income
vii. Use of poultry parts and product in other industries
viii. Lesser inputs with cheaper cost.

ANSWER TO SELF-ASSESSMENT EXERCISE 4

The basic needs of poultry farming include:

i. Technical knowledge and experience
ii. Capacity to invest and work hard
iii. Availability of high potential hybrid chicks
iv. Veterinary aid with vaccines and medicines
v. Balanced feed
vi. Equipment and capital
viii. Marketing facilities

ANSWER TO SELF-ASSESSMENT EXERCISE 5

The eggs can easily be collected and stage from damaged.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the three main poultry management system
2. Name three advantages of the battery cage system

Practical

Visit a poultry farmer at his farm and find out the system of management in operating, then write a report

7.0 REFERENCES/FURTHER READINGS

Anyanwu, A.C. *et al* (1999). *A Text Book of Agricultural for Schools and Colleges*

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UNIT 3 FERTILIZER/MANURE

CONTENTS

1.0 INTRODUCTION

In the last unit, we dealt with introduction to poultry farming. This unit will move a step further into explain the care and management of poultry because it carries a lot of importance in production process of poultry. If this sensitive point is neglected, the profitability of enterprises may considerably go down or sometimes if it is totally neglected, the business may fetch or even losses also. With inadequate care and faulty management at any stage, whatever may be the high genetic potential of birds, but it will lead to poor performance only. Many a times the difference in the productive performance of the poultry farms nearby having the same breed with the same age is noted due to this vulnerable care and management factor only. Here the role of a man who is very important to achieve maximum output from birds with update care and skilled management. Efficient management of livestock is second to nothing in working towards profit. In a nutshell, the degree of success of livestock (poultry) enterprise depends on the degree of the efficiency of the management practiced. Management includes housing, feedings, breeding care of the young, record keeping identification and control, prevention and treatment of diseases.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- explain general principles of poultry management;
- identify the factors that favour poultry production; and
- demonstrate an appreciation of poultry production by going into small-scale poultry production.

3.0 MAIN CONTENT

3.1 General Management

Efficient Management of poultry dictates the degree of profit all things being equal. It is like a machine, gives you what you want, depending on how you have furnished it with what it needs. The degree of success of poultry enterprise depends on the degree of the efficiency of the management practiced.

3.2 Housing

Generally, livestock need comfort and protection against rain, the sun and excessive cold among other agents of whether. Fowls need neither excess heat nor cold. Housing provides these essentials for them.

The location of the house should be such as to provide good drainage and not easy to be destroyed by the storm or floods. It should accessible to the road for transportation of materials, where possible, it should have East West orientation: It should not cost very much. A good fowl or chicken house should be the following qualities:

a. Adequate floor space for the type of birds.
b. A healthy temperature
c. Good ventilation and enough light

The system used will influence the type of house and also the space to be provided per bird. Usually houses are used for restricted system, deep little system and battery system. Portable houses are used for the free range and fold system.

3.2.1 Types of Poultry Houses

The poultry house may vary from the simple one room building multiple a storey houses. The one room building is the colony house and is used for housing small units of the birds. The colony houses are the types used in ranges. They are portable houses. They are normally of the shed type. Often it is built of wood and the floor slatted. This method facilitates the cleaning. The roof can be of corrugated asbestos, aluminum sheet or thatch. In the tropics, thatched houses are cool and healthy.

3.2.2 Multiple Units

Multiple unit houses are permanent houses consisting of several rooms referred to as pens. Each pen can house several birds depending on the space. In the multiple houses, the roof is usually of the gable type and may be thatched, aluminum or corrugated asbestos. The wall is usually of element or mud kneaded earth to sheets of metal wood.

Multiple storey houses are just permanent housing but consisting of two or more storey. Where land is very scarce. They are much more to be ventilated.

3.2.3 Multiple Storey

Multiple storeys can further be classified as the bases of the purpose to which they are put. Brooder houses, rearing houses and laying houses do exist. Brooder houses are for brooding chicks. Rearing houses are used for rearing chickens from the time they need no more heat supplies, till they reach laying stage if they are pullets or sold out if they are broiler. Laying houses are provided for hens when they reach laying age.

3.3 Feeding

Food is very necessary for all living things. The growth and the well-being of organisms are to a large extent dependent on the amount and type of food they receive and the manner or rate at which they received it. For poultry, these three factors will influence their performance. Poultry is kept for meat, and for eggs in most cases. Their performance in supplying these wants will depend on a large extent on these three factors. Other factors like disease and environmental conditions will play a part no doubt.

The importance of the different feeding stuffs and their make-up has been discussed earlier under nutrition. The main concern in this section is how these feedings stuffs are fed to the different classes of poultry to get what we want. This is the aim of the science of feeding.

In feeding, all those essential requirements of the body are provided. Water, carbohydrates, minerals, fat, vitamins and proteins are provided. They are provided in such a way that the food is palatable, easily digestible and giving the required nutrients in the right proportion for the class of poultry with an aim of getting the requirement product

3.4 Water

In poultry, water comes through the feed and the metabolic action of the body and through free water provided. Water constitutes about 55%-78% of the life weight of chickens. The first two sources of water have a very small percentage of water requirements of birds. Free water has to be available to them at all times.

SELF-ASSESSMENT EXERCISE 1

Mention a three of qualities of a good house of fowl or chicken.

3.5 Breeding

In poultry breeding is carried out to provide fowl that can live longer, use the food well and produce more eggs and more meat. The breeder aims at improving one or more characters in the flock of birds. More egg

production may be aimed at. In poultry more egg production and better meat have been bred for by many breeders.

Breeding System

In order to achieve this, one or more of the following breeding systems may apply:

a. Cross-breeding
b. In-breeding
c. Up-breeding.

3.5.1 Cross-Breeding

In cross-breeding, unrelated male and female birds are crossed.
This involves:

1. The crossing of the different breeds
2. Crossing the first generation of the cross of breeds with another different breed's variety.
3. Crossing the generation of crosses between two breeds or varieties.

3.5.2 In-Breeding

In in-breeding, related individuals are mated. The degree of breeding varies with the degree of relation existing between the two individuals mated. 1n-breeding enables breeds to get cherished characters or qualities well developed in an individual bird. It is used to get these qualities strengthened for about four generations to produce what is called lines. When two different lines are crossed a high quality is got and the undesirable characters are removed-to a large extent.

To consolidate a desirable trait two family lines of the same variety may be crossed. This is called strain-crossing. An in-breed male of one strain may be cross with non-in-breed female of another strain. This is termed top-crossing.

From these various combination it is possible for one of the cross-bred generations to posses the character of their parents, such as a large number of eggs with large size and good texture. These are the methods

to produce breeds of good producer of large number of eggs and better meat.

3.5.3 Up-Grading (Grading)

This is a form of crossing when the desire is to change the characters of an individual. A low grade stock female is mated to the male of the breed with the desired character up to the fifth generation. There is an accumulation of genes of the male and the stock is improved. The Cornish male which is noted for meat production can be used to up-grade the local breed to increase meat yield.

3.6 Methods of Mating

Here the aim is to ensure that there is good fertility of the eggs. Fertility will affect the number of chicks produced.

The following methods may be adopted:

a. Flock mating
b. Pen mating
c. Stud mating
d. Artificial insemination.

3.6.1 Flock Mating

In flock mating, the flocks of hens are allowed to run with a number of males. This is common in the commercial firms, where range is available. Usually to ensure enough fertility 15-10 hens should be allowed for a male bird of light breeds and 10-15 for heavy breeds.

3.6.2 Pen Mating

In pen mating, a number of hens are run with the male in a pen. One male is allowed 12 15 of females for light breeds or 10 12 females for heavy breeds. Better fertility is obtained in the flock mating than in pen matting for there is competition between the males. In pen mating there may be in choice so that some hens may not be mated at all. This will result in the production of unfertile eggs.

3.6.3 Stud Mating

In this method a male is kept in a separate coop or pen and is used in mating the females individually. This is very useful when a very valuable male is got for breeding. It involves more labour and the female should be mated at least once a week to ensure fertility.

3.6.4 Artificial Insemination

This method is not common in poultry production. It is however possible in experimental work. One centimeter cube of semen is introduced into the female oviduct once a week in the hen kept in a cage.

SELF-ASSESSMENT EXERCISE 2

i. List the breeding system you known
ii. List the methods of mating

3.7 Care and Management of Chicks

The Brooding Phase

This is the first 8 weeks of the bird from the day of hatching (day-old to 9 weeks). During this period the chicks require special care. They require eating and a special house called brooder is a house with minimum window. If an ordinary house is used with minimum window. If an ordinary house is used for brooding, and a special house called brooder house. The brooder house with minimum window. If an ordinary house is used for brooding, use plastic sheets to cut off breeze by covering the windows. The chicks are confined to about 1/4 of the final space. Put the source of heat in a place and install a canopy around this source of heat. The canopy should be large enough to accommodate all the chicks conveniently without them lying on top of one another. Provide feeder and waterers outside the canopy.

When chicks arrive do not open the containers in which they arrived until you are inside the brooder. Make sure also that by now the source of heat has started giving steady heat of not less than 35^0C. As the chicks are removed from the container count them to enable you determine the mortality rate. Hatchers always make provision for anticipated death on some chicks due to transportation shock by adding one or more chicks to each batch of about 25 chicks.

Keep close watching the chicks and the brooder. If they go about in the surrounding, it is an indication that they have enough heat but if they huddle together around the source of heat it implies that the heating system is not providing sufficient heat. If the heat is too much, the chicks indicate by moving away from the source of heat. The heating system is very important at this stage because the chicks have not developed enough feathers to regulate their body temperature. During

the brooding phase, the chicks are fed on ad libitum. Brooding lasts for four weeks.

The mortality rate during the brooding phase could be very high. Always alert the veterinary officials of the arrival of the chicks. During brooding, the following management practices are observed.

a. Give intraocular vaccine (i.o.v.) at 6 days old to prevent coccidiosis.
b. Add coccidiostat in the chick mash and water to prevent coccidiosis.
c. Give a booster does of intra muscular vaccine at the age of 6 8 weeks.
d. Spread liberally insecticide solutions in the gutter around the brooder to check the attack of soldier ants. Place a disinfectant through at the entrance of the brooder for foot bath for these entering the brooder
e. Feed the chicks ad lib; add vitamin supplement to check transportation sock
f. Reduce the temperature of the brooder gradually by 3 – 5^0C as the chicks grow feathers especially in the first 6 weeks prior to their growing phase.

3.8 The Growing Phase

The brooder is also used to house the chicks during this phase. By the time the chicks are seven weeks old the brooder change their feeding gradually by introducing growers mash in the initial ratio of ¼ growers mash to 3.4 chick mash. Since the growers need some exercises, it is necessary to provide ample space in the growers' pen.

Feeding at this stage is still ad lib with a liberal addition of anti-biotic to check disease spread. As they attain sexual maturity at the age of 18b 20 weeks, stop ad lib feeding since excess feed in-take at this age would lead to excess deposition of fats which ultimately affects adversely the rate of egg laying.

By the 19^{th} week, when the chicks are due for transfer to the layers pen gradually introduce layers mash in the ratio of ¼ layers mash to ¾ growers mash until after week 22 when their first set of eggs will have started dropping.

3.9 Laying Phase

Make sure that only healthy and standard birds are transferred to the layers pen. By week 24 26, 50% of all the birds will have started laying

if management is up to date. If the battery system is used, the birds are transferred into standard cages in the layers pen by the 19th weeks. If the deep little system is adopted provide nest boxes at different strategic points in the pen. It is expected that the layers will have attained their peak production (90%) at weeks 25 28. During the laying phase, give adequate feed to the birds (about 1000gm/bird).

In most modern farms the laying pattern of birds can be categorized into three:
Period of erratic laying during which rate of egg laying is not steady because the birds have not attained their egg laying rhythm.

Main period during which the birds lay steadily for about 30 days and rest for about one or two days a month.

And, end of laying which sets in after 12 months of continuous laying.

It should be noted that shortage of feed or water, low quality feed and vices like egg eating can affect drastically the rate of egg laying and the profitability of the entire enterprise. Cull substandard, sick or viceful regularly and carry out total culling of all the rest after 12 months continuous laying.

The production pattern of layers follows the scheme below and farmers and field workers are advised to take proper note of it.

3.9.1 Production Pattern of Layers

March 2001	-	Introduction of Day old chicks
	-	Weeks 1 8 (Brooder Phase)
	-	Weeks 8 20 (Grower Phase)
August 2001	-	Layers are at point of lay transfer to layers pen
March (2002)	-	Introduce new day old chicks
August (2002)	-	Cull the old layers stock

SELF-ASSESSMENT EXERCISE 3

Mention the three management/care phases.

3.10 Broiler Production

Broilers are more fragile than layers and generally do not stand shock arising from transfer one to another as in the case of layers. Because of this, broilers are provided with a house big enough to rear them from the brooding stage until they attain market weight. Since they also need

sufficient exercise, their stocking density should be about 30cm2 per bird. As in the case of the layers, all brooder requirements should be present before taking delivery of the first batch of day old chicks.

Because of their rapid rate of growth, broilers require feed high in protein content. Start the chicks from day old with feed called broiler starter with 20 24% crude protein content until they attain market weight. For best performance, allow the birds to fed for 23 hours a day by providing light all through the night with only allowance of 30 -60 minutes of: darkness.

For good performance, adequate health care programme is needed. For instance, the birds should be given intra-ocular vaccine against Newcastle disease at day old.

The dosage is repeated 6 weeks later. To check the outbreak of coccidiosis adds coccidiostat in their water through out the period of their lives. Vitamin and mineral supplements are also given to enrich their feeds.

The type of housing adopted depends on the resources available. Deep litter system is always used for broilers. When resources are not available, the farmer(s) could use only one pen for production of one batch of broilers. The first 10 out of the 12 weeds will be used for rearing the birds while marketing takes place in the 11th week.

The 12th week is used for scrubbing the pen before introducing the next batch of broilers. A total of 4 batches (runs) will be produced in one year i.e. (52/12) weeks 4 runs.

3.11 Health Care and Sanitation

For proper growth and production of the birds, high level of health and sanitation must be maintained from the day chick till maturity of the birds. Administration of drugs, vaccination and sanitation must be carried out. The vaccination programme of the poultry includes:

Age of Bird	Vaccination	Disease
1 – 7 days	Intraocular (NDV 1/10) Through the eye	Against Newcastle disease
18 – 20 days	Gumboro Vaccine IBDV Through drinking water	Against gumboro disease
3 – 4 weeks	(NDV lasota through Drinking water)	Against Newcastle disease
3 – 4 weeks	Fowl pox Vaccine (FPV) Stab in wing web	Fowl pox disease

6 weeks	Komorov Vaccine (NDVK) Through Intra-muscular injection	Newcastle disease
8 weeks	Komoron Vaccin (NDVK) Through Intra-muscular injection	Newcastle disease

Apart from this vaccination, other drugs are given to the birds through water to either prevent or cure certain diseases.

3.11.1 Cleanliness of Poultry Farm is also necessary. To Ensure Proper sanitation:

i. Sick or dead birds must be removed from the building.
ii. Visitors should not be allowed into the poultry houses.
iii. The buildings should be disinfected regularly.
iv. Water bath containing chemicals should be provided where visitor and workers must dip their legs before entering into the poultry house.
v. Drinkers should be washed thoroughly
vi. Wet litters and mouldy feeds should be detected quickly and removed
vii. External parasites like lice, should be controlled by dipping birds in solutions containing chemicals to kill the parasites
viii. Internal parasites should also be controlled by regular deworming with certain chemicals to kill the parasites.

SELF-ASSESSMENT EXERCISE 4

Explain broiler production.

3.12 Stress Management in Poultry

In real sense, poultry birds are always under some or the other kind of stress or it can be said that stress has become a part of regular life of poultry. Therefore, it is one of them major factor affecting performance of poultry. Most of the times adverse are not immediately visible but during prolonged course they may cause considerable losses in production. Hence wisdom lies in detecting the stress timely combating them to minimize losses.

Stress: The adverse change, in natural physiological state of body of birds due to any reason which leads to deleterious effects on health, growth, production, quality of production and mental statue of birds, is known as stress.

Kinds of Stress:

Broadly stresses in poultry can be divided into two groups:

1. Avoidable stress
2. Unavoidable stress

3.12.1 Avoidable Stress

Even though adverse effects of such stress are not severely notes, indirectly in long-term period they result in considerable losses by lowering down productive performance. Therefore, it is better to avoid such stress factors for benefit of farming. Some of such stress factors and remedies are as under:

1. **Inadequate Management Facilities**: Many of times for false economy in capital investment, birds are not provided standard floor, water and feeder space as per their breed, type and category. This adversely affects growth, production and health of birds. Overcrowding sometimes may lead to cannibalism also.

2. **Housing Excess Chicks in Brooder**: Sometimes more chicks than capacity of brooder are reared under brooder by providing less candle wattage to save electricity. This leads to slow feathering, stunted growth and increased mortality. Therefore, only 200 250 chicks under one brooder with 2-2.5 candle watt heat per chick, allotting 58 – 65cm floor space should be reared for efficient brooding.

3. **Avoiding Use of Chick Guard**: This lead to staying away of chicks from heat source due to stress of cold (chilling) during initial rearing period of 6 to 7 days.

4. **Sudden Change of Feed**: Switching over of type of feed or brand of feed suddenly creates stress in birds leading to decreased performance. Hence such change should be gradual with proportionate mixing of old and new feed for 3 to 4 years

5. **Importer and Late Debeaking**: Not cutting the beak at proper distance from the nostril and not in time also leads to stress in chicken. This may lead to social order stress, cannibalism and feed wastage.

6. **Irregularities in Lighting and Feeding Schedule**: Frequently, changes in timings of feeding and artificial lighting schedule

result in severe stress in poultry lighting schedule result in severe stress in poultry leading to deleterious effects on productive performance.

7. **Inadequate Ventilation:** In case of brooder chicks and adults in winter ventilation is obstructed by closing open sides of sheds by curtains. The closing and opening of curtains must be operated correctly to supply adequate ventilation to remove impurities of air in the form of obnoxious gases like CO_2, CO, NH_3, and water vapors.

3.12.2 Unavoidable Stress

Some of the important operations in poultry even though lead to stress; they are to be carried out for benefit of birds as part of management. Few such stress factors and their remedies are as under:

1. **Shifting of Birds**: Transport of day old chicken from brooder house to grower house or grower house layer house, produce stress in them. This stress can be combated by administering vitamin A, B complex vitamins and electrolytes for 3 to 5 days.

2. **Handling and Vaccination**: Handling of individual bird at the time of vaccination and body reactions produce immunity after vaccination leads to considerable stress in poultry. This stress can be nullified by administering vitamin A, D, E, C, and electrolytes for 3 to 5 days.

3. **Deworming**: This is to be carried out periodically to eradicate worms. The stress created by it can be eliminated by offering liquid vitamin A for 3 to 5 days through water.

4. **Debeaking**: It is usually carried out in layer and breeders and leads to severe stress due to handling and bleeding. The effects of stress can be minimized by administering vitamin K and electrolytes for 3 days starting it before on day of debeaking.

5. **Heat and Cold Stress**: Excessive heat and cold in respective seasons leads to reverse stress in poultry resulting in drastic impaired productive performance. Management of bird in summer and winter has been dealt separately in the "Practical manual Avian Production and Management" to combat this stress.

SELF-ASSESSMENT EXERCISE 5

i. What is stress
ii. Name the two types of stress in poultry management

3.13 Disease of Fowls

The diseases of poultry like the diseases of other animals may be caused by:

a. Pathogenic organisms like bacteria and viruses, protozoa, worms and some members of the arthropods.
b. Nutritional deficiency.
c. From wound or cannibalism.

Apart from the nutritional diseases (which can manifest themselves under different forms and which can occur at any time depending on the nutritional standard available) the following diseases are usually associated with the fowls locally:

a. Newcastle disease.
b. Chronic respiratory disease.
c. Fowl typhoid.
d. Fowl pox
e. Coccidiosis

3.13.1 New Castle Disease

This is a virus disease of poultry. As a virus disease, it spreads within the flock very quickly. It spreads through direct contact by means of respiratory, eye and mouth discharges and faces. The secretions passing out through the above means contaminate feeds and water. It can also be spread by poultry house equipment, feed delivery materials like reused feed bags. The disease attacks fowls of all ages. It has an average incubation period of 5 days. The signs of the disease are shown by the difficulty of breathing, gasping and weakness of the fowl. These are followed by the paralysis of one or both wings and legs of the chicks. The neck may also distort. The chick may also have occasional circling.

In adult fowls, there is sudden drop in egg production. There is mucus in the trachea of the dead fowl and the air sacs are cloudy. There is no use treating the affected unit. Adequate measures should be taken to control it. Vaccination is a very nice way of doing this. A chick is vaccinated at

two weeks and this is repeated at 6 to 8 weeks of age. The vaccination offers satisfactory immunity.

Another control measure would be to keep off visitors, especially those from infected areas. Food dips of disinfectants should be provided. Poultry farmers should make sure that equipment transferred from one farm or one unit to another is well cleaned. New bags should be used for feeds for sale.
The mortality of this disease can be from 0% - 100% depending on management.

3.13.2 Chronic Respiratory Disease (CRD)

The disease is believed to be caused by a bacterium like organism not yet classified as virus of bacterium. This organism inhabits the respiratory tract. It is spread through contact in the flock. It spreads slowly. It is transmitted through the body discharge. The signs of the disease are nasal discharge and rattling sound during breathing especially at night. There is loss of weight and decline in egg production. It attacks fowls of all ages, its mortality is up to 50%. It can be controlled by strict sanitation. The use of antibiotics helps to bring down the mortality rate.

3.13.3 Fowl Typhoid

Fowl typhoid is a bacterial disease of mature and often young domestic birds. Its spread is brought about by contact with dropping of infected birds. Contaminated litter, feed, water and soil also aid the spread of this disease.

The signs of the disease include the dull pale nature of the bird accompanied with yellowish diarrhoae. The disease is controlled by avoiding those things that aid in the spread of the disease as previously mentioned. Sanitation has to be scrupulous. Usually chickens are vaccinated against typhoid at sixth to eighth weeks of age. In case of any outbreak of the disease, a veterinary officer should be consulted for the necessary treatment.

3.13.4 Coccidiosis

Coccidiosis of fowl is a protozoa disease brought about by the attack of the intestines and the cacca of chicks by the different stages of coccidian. Fowls from 6 8 weeks are the most susceptible to the attack of the disease. The disease is spread through faeces of the infected birds. Litter, feed, water and soil contaminated with dropping of the infected chicks are means of spreading the disease. Fowls at the ages of 6 to 8

weeks pick the disease earlier than birds of other ages, fowls younger or older than this age are less susceptible to the disease.

The signs of the attack of the disease include blooding faeces, progressive emaciation, paleness, ruffled feathers and often death.

The control of the disease lies in keeping the flow away from the droppings of the infected birds. This would involve having good litter management so that the litter is not contaminated. The feed and water troughs should be raised so that they are not contaminated with droppings. Under the range system, the fowls should be moved from time to time so that susceptible fowls are not kept on contaminated soil.

The fowl can be made to acquire immunity by gradually introducing the young fowl to coccidian. This can be done by adding small amount of coccidian in feed and by starting chicks on fitter that has little coccidian. It has to be remembered here that chicks are not susceptible so that they become immunized by the time they reach the susceptible age of 6 8 weeks. The disease can also be prevented by adding some coccidiostats in feeds. These chemicals prevent the attack of the disease. The outbreak of the disease is treated using high levels of the coccidiostats as recommended by the veterinary officers. Sanitation is very important both in the prevention and treatment of the disease.

SELF-ASSESSMENT EXERCISE 6

List the various common poultry diseases.

4.0 CONCLUSION

Care and management of poultry dictates the success of the system and if all the management requirements are put in place, the profit is bound to increase which compensates the farmer's efforts directly because efficient management reduces loss especially from diseases attack.

5.0 SUMMARY

Livestock generally needs comfort and protection against all odds and efficiency in management dictates the degree of profitability while the various care and management includes housing, feeding, and breeding care of the young, record keeping control, prevention and treatment of diseases.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

i. A good fowl or chicken house should have the following qualities:

- Adequate floor space for the type of birds
- A healthy temperature
- Good ventilation and enough light

ANSWER TO SELF-ASSESSMENT EXERCISE 2

i. The breeding system in poultry includes:

- Cross-breeding
- In-breeding
- Up-grading

ii. The methods of mating in poultry include:

- Flock mating
- Pen mating
- Stud mating
- Artificial mating (insemination)

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The three management/care phases

i. The brooding phase
ii. The growing phase
iii. The laying phase

ANSWER TO SELF-ASSESSMENT EXERCISE 4

Broilers are birds grown for the purpose of poultry meat only. They are more fragile than layers and generally do not stand shock arising from transfer from one pen to another as in the case of layers. Because of this, broilers are provided with a house big enough to rear them from the brooding stage until they at1ain market weight. For good performance, adequate health care programme is needed. For instance, the birds should be given intra ocular vaccine against Newcastle disease at day old and the dosage is repeated two weeks later. Vitamin and minerals supplements are also given to enrich their feeds.

ANSWER TO SELF-ASSESSMENT EXERCISE 5

i. Stress is the adverse change, in natural physiological state of body of birds due to any reason which leads to deleterious effects on health, growth, production, quality of production and mental status of birds.

ii. The two types of stress in poultry include:

- Avoidable stress
- Unavoidable stress.

ANSWER TO SELF-ASSESSMENT EXERCISE 6

The various common poultry disease includes:

i. Newcastle typhoid
ii. Chronic respiratory disease
iii. Fowl typhoid disease
iv. Foul pox
v. Coccidiosis.

6.0 TUTOR-MARKED ASSIGNMENT

1. a. Explain the term stress
b. Discuss both avoidable and unavoidable stress in poultry.
2. Mention three diseases of poultry and discuss one fully out of these diseases.
3. Visit any poultry centre in your area so as to relate what you have read to what is practiced. Then write a comprehensive report. .

7.0 REFERENCES/FURTHER READINGS

Anyanwu, A.C. *et al* (1998). *A Text Book of Agricultural for Schools and Colleges*.

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UNIT 4 LIVESTOCK FARMING (CATTLE PRODUCTION)

CONTENTS

1.0 INTRODUCTION

The last two units have focused on livestock farming especially the production and care and management of poultry. This unit will still continue the livestock management on cattle and it will involve the integrated application of the principles of animal breeding, feeding, housing, organization and disease control in the ruminant animals especially the cattle which posses four stomach compartments (complex stomach) and hence they can ruminate or chew the cud. Cattle has made a remarkable contribution to man's well being and generally they have help to raise the economy of this nation as well as of other countries. The products of cattle, both meat and milk are widely consumed by people while some cattle, the ox help to pull ploughs as work or draught animal and they also provide hides and skin.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- mention the various types/breeds of cattle;
- explain the management practices of cattle;
- explain the economic importance of cattle; and
- identify the factors that four cattle production.

3.0 MAIN CONTENT

3.1 The Cattle

Cattle belong to the family bovidae which are ruminants with hollow horns. As ruminants they are characterized by the possession of four stomach apartments (rument, omasum, abomasums and reticulum) as well as the ability to chew their cod. They have hollow horns and hoofs with an even number of toes. Cattle are reared for their meat, milk, hide and skin, manure and as draught animals for work on the farm.

3.2 Characteristic of Cattle

Generally, the characteristics of cattle include:

- They are large bodies animals with large under with four glands.
- They have four pairs of hoofs on each limb while most male and female cattle have horns.
- They are ruminants that graze on herbs and pasture with well developed ear lobes.
- The female (cow) produces a calf in one parturition and at least once in a year.
- They have a gestation period of about 283 days or 9½ months.
- Beef cattle are stocky and stubborn while the dairy cattle are bony, spongy and docile.
- Cattle usually have a puberty age which ranges between nine to 12 months.
- Cattle stop lactation at nine to 12 month after parturition and calf is bred to bull at about three to four months after parturition.

3.3 Terminologies used in Cattle Management

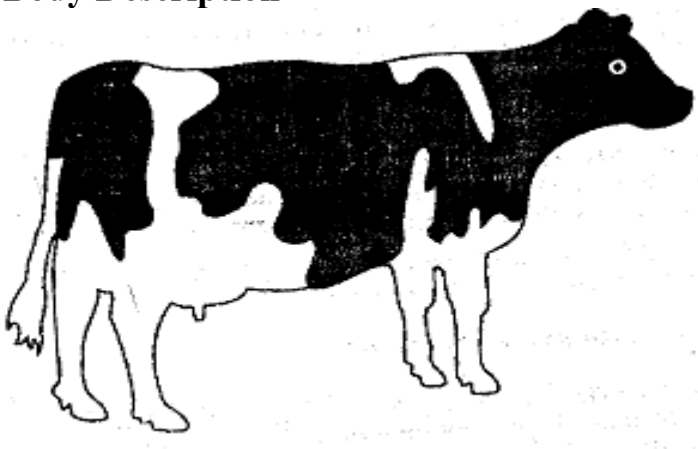
Bull	-	An adult male cattle
Cow	-	An adult female cattle
Calf	-	A young or baby cattle
Heif	-	A growing female up to her first calving
Bull Calf	-	A young male cattle
Heifer Calf	-	A young female cattle
Steer	-	A castrated male cattle
Ox	-	A castrated female cattle
Vealer	-	A castrated female cattle
Serving	-	Act of mating in cattle
Calving	-	Act of giving birth (parturition)
Beef	-	Meat of cattle
Dairy cattle	-	Cattle kept for milk production
Beef cattle	-	Cattle reared for meat production
Herd	-	A group of cattle
Polled	-	Cattle without horns

Horned	-	Cattle with horns
Humped	-	Cattle with hump
Humpless	-	Cattle without hump

SELF-ASSESSMENT EXERCISE 1

Mention two characteristics that will enable you differentiate dairy cattle from beef cattle.

3.4 Body Description



3.5 Parts of Cow

1	Horn	11	Hind Quarters	21	Naval flap
2	Poll	12.	Pin bone	22.	Belly
3.	Forehand	13.	Thigh	23.	Chest
4.	Face	14.	Flank	24.	Shoulder Point
5.	Muzzle	15.	Barrel	25.	Dewlap
6.	Neck	16.	Udder	26.	Brisket
7.	Hump	17.	Teat	27.	Elbow
8.	Back	18.	Hock	28.	Knee
9.	Loin	19.	Tail	29.	Skank
10.	Rump	20.	Switch	30.	Pastern

The various species of cattle belong to the group of domesticated animal with large body sizes. They are characterized by great length, width, height and weight of the body. These characters differ in the group depending on bred species, type and sex.

3.6 Breeds of Cattle

i.	Azawal	ii.	Sokoto Gudali
iii.	Wadara (Shuwa)	iv.	White Fugani
v.	Red Bororo	vi.	Muturu

vii.	N'dama	viii.	Keteku (Borgu)
ix.	Kuri	x.	Brown Swiss
xi.	Holstein	xii.	Jersey

The breeds of cattle can also be categorized into four groups. These groups are:

3.6.1 Beef Cattle

Beef cattle are the cattle which have the ability to produce meat. Examples are: (i) N'dama (ii) Red Bororo (iii) Sokoto Gudali (iv) Keteku (Norgu) (v) Kuri (vi) Brown Swiss (vii) Rhaji

3.6.2 Diary Cattle

Diaries are the cattle which are reared mainly milk. Examples are (i) White Fugani (ii) Kerse (iii) Red Poll (iv) Kerry (v) Guersey (vi) Dexter (vii) Holstein/Fiesian (viii) Ayshere (ix) South devon (x) Diary short horn

3.6.3 Dual Purpose Cattle

Diary cattle are the cattle which are reared mainly to produce milk. Examples are: (i) Whilte fulnai (ii) Jersey (iii) Red poll (iv) Kerry (v) Guernsey (vi) Dexter (vii) Holstein/Friesian (viii) Asyshere (ix) South devon (x) Diary short horn.

The dual purpose cattle produce both meat and milk in appreciable quantities. Their features are developed to produce these products. The Gudalis are good examples.

3.6.4 The Drought Cattle are used for Work

They serve by carrying things, e.g. they can pull the cart to which they are attached. They are also used for ploughing the soil. The animals in this group are large and have well-developed muscles.

3.6.5 Description of Some Common Breeds Found in West Africa

The breeds of cattle found in West Africa include:

3.6.5.1 The White Fulani

These are bred in Northern Nigeria. The white Fulani, also called 'Baunaji' is grey in colour with black points. The males have a muscular neck, a large hump and a rather coarse neck, their bodies re compact and fleshy with a well-developed rump. The head is small and the horns are of medium size. The white Fulani is the most suitable milk producer among the zebus.

3.6.5.2 The Red Bororo

This longhorn breed is found in the North-Eastern part of Nigeria. The Red Bororo has a narrow body, long legs and weighs about 408.2kg at maturity. Their horns are long and the back slops towards the rump. It is a poor milk producer and matures late.

3.6.5.3 The Sokoto Gudali

These are found around the Sokoto province as the name suggests. They are less resistant to trynosmiasis than the White Fulani, hence they are found in the drier parts. They have a well developed hump, a fleshy and compact body and large dewlap. Though they are suited for beef cattle as a result of their conformation, they are also good as dairy cattle especially when they are fed under good farm conditions. The breed is popular in many parts of northern Nigeria as they are comparatively docile and are easily trained for farm work.

3.6.5.4 The N'Dama

This is one of the humpless cattle found in Guinea, Sierra Leone and Senegal. They have been introduced into Ghana and Nigeria their confirmation is very much like that of specialized beef breeds but their average weight is only 299.4kg. The bulls have been found to weigh up to 50kg under improved management. Their body is compact with short legs and a broad straight back they have little or not dewlap and small sheath. They are typically brown in colour. These cattle are early maturing and are poor milkers but are exceptionally fertile. They tend to be nervous, stubborn, and easily provoked into action. One of their greatest assets in West Africa is their resistance to trypanosomiasis. This is why they are successfully reared along the tsetse fly coastal areas of West Africa and are even used to upgrade other breeds.

3.6.5.5 The Muturu

This is a dwart, shorthorn type found in villages in the typical rain forest areas of West Africa from Zambia to Zaire. The colour ranges from dark

brown to pure black, sometimes with white markings. It has a good body conformation with a large fleshy body and fine bones. It is hump less with a relatively small head. It is highly resistant to trypanosomiasis. It manures in 3-4 years and reaches a body weight of about 202.5kg. It is low in milk yield. In most cases they are kept for prestige purpose and not for work or food. This is why they are not found in large numbers. They are often seen grazing in the bush, tethered to sticks which are driven into the ground. The muturu is often given as dowry or used in ceremonies like burinal of distinguish tribesmen and chiefs.

3.6.5.6 The Friesian

This is dairy (i.e. milk producing) type which originated from the Netherlands. It has succeeded in West Africa because it is resistant to trypanosomiasis. It is discussed briefly here benches these cattle are being used to crossbreed with the native breeds in order to improve their milk producing capacity. Because they have not been able to tolerate the stress of high temperatures here, it has becomes more economical to import the semen and cross-breed by artificial insemination. The Friesian is a large-sized breed which at maturity weights between 540-675kg for cows (adult female) and 675-900kg for the bull (adult male).

SELF-ASSESSMENT EXERCISE 2

List the breeds of cattle according to the uses.

3.7 Cattle Production

Factors favourable for cattle production include:

- Cattle, particularly the beef cattle, utilize roughage such as the maize, millet, groundnut residues of the farm.
- The cattle can rely on the natural grass growth thought the year
- Cattle can be reared comfortably in land areas that are unsuitable for crop production.
- Cattle rearing do not involve many workers. One man can control about two hundred herds of cattle.
- A large production of dung by cattle provides a good means of maintaining soil fertility.
- They do not need much expenditure of money for housing and equipment.
- Products of cattle, both meat and milk, are widely consumed by people.

In Nigeria, certain factors particularly favour the raising of cattle:

- There is an abundance of farm residue which the cattle can utilize.
- There are great areas of land for grazing. There is no restriction in areas that can be used for grazing except in farms where the crops are still growing.
- Sources of water abound in the South where there are a lot of streams and rivers and where the period of dry season is very short.
- The Federal Government and all the States of the Federation encourage cattle production. The various governments of the country have set up research programmes, in their experimental farms, in order to improve the methods of cattle rearing as well as the stock of cattle in the country. They also provide facilities to help cattle herdsmen.
- It is the traditional practice of many tribes of Nigeria to keep cattle.
- Products of cattle are widely consumed in the country.

SELF-ASSESSMENT EXERCISE 3

Mention four factors that favour the cattle production in Nigeria.

3.8 Establishing a Herd

3.8.1 Choice of Product

The cattle may be kept for milk, meat or both or for draught. In determining the choice of product, several factors are taken into account. The market for the product

- The cost and availability of feed
- Personal choice of the breed of cattle
- Environment under which the herd is to be kept.

3.8.2 Selection of the Breed of Cattle

The breed of cattle chosen is one that shows a high production of the chosen product

- Can survive the environment
- Is personally preferred by the farmer
- Is resistant to diseases
- Has high fertility

3.8.3 Management of the Herd

It is important to think of the management of the herd. Without a high standard of management, the above two factors would not allow for the settlement of a herd. We have to consider factors such as:

- Housing of the cattle.
- Feeding of the cattle.
- Measures of control of insects and diseases.

3.9 Economic Importance of Cattle

- Cattle provide meat and milk for man
- Some cattle help to pull ploughs as work or draught animals
- They provide hides and skin
- They provide blood meal and bone meal for farm animals as feed
- Fertilizers can be obtained from blood, bones and offals of cattle
- Cattle dung (faeces) is a very good sources of manure
- Cattle provide employment and income to the people
- Cattle are also a source of revenue to some countries
- Cattle are also use for religious purposes as well as festivals in some places
- Cattle are used for research work or educational purposes.

3.10 Systems of Rearing Cattle

There are three systems of rearing cattle. These are extensive, semi-intensive and intensive system.

3.10.1 Extensive System

Extensive system of rearing ruminants e.g. cattle, sheep and goat is the same. It involves the following: Cattle are allowed to move freely from one place to another in search of pastures for grazing or browsing. The cattle fend for themselves and graze on a wide range of pastures. There is no special housing unit provided. In most cases, animals are not provided with medication. It is a very cheap system of rearing livestock. No supplementary feed is usually provided. Animals are exposed to weather hazards such as excessive heat, heavy rainfall and strong windstorm. Diseases out-break cannot be easily controlled. Animals can be solon or killed by wild animals. There is also indiscriminate mating and the cow delivers their young ones in the field. Cattle and other ruminants generally destroy cultivated crops; thereby causing community disputes.

3.10.2 Semi-Intensive System

Under this system, housing is provided for the cattle and they are also allowed to move out and graze on pasture. The animals spend more time outside their pens. Houses are built with suitable materials that can permit free circulation of air. The houses are not completely walled, and rails are preferred to solid walls which should be about 2m high.

The grasses or pasture must be managed properly to provide the necessary food for the cattle. The system needs less capital investment but large labour requirements, disease and parasite incidence are slightly high.

3.10.3 Intensive System

In this system, the cattle are confined within a building with limited access to grazing. Grasses (by zero grazing), water medications are supplied daily to the cattle.

The system saves labour, and provides conditions for management standards and easy control of parasites. There is protection from extreme weather conditions, predators and thieves. This system favours rapid growth though, it requires high capital investment in terms of including and feeding.

3.11 Feeding

Feeding in cattle depends on the types of cattle considered, the stage of development and their productive capacity. Cattle belong to the group of animals called the ruminants. They can therefore be feed on roughage. However, grass forms the greater portion of their food. In cattle feeding, it is important to endure that the essential nutrients, which are carbohydrates, fats, proteins, minerals and vitamins are supplied.

For beef cattle, adequate supply of water and feed throughout the year is essential. Planted pasture should be maintained and should be grazed rotationally. Silage and hay can be used during the dry season. Supplementary feeds should also be given during the dry season.

In dairy cattle, nutrition plays a very important role. Extensive grazing during the wet season can go a long way to meet the requirement for milk production. Concentrates are also given at this time for increased milk production. During the dry season, the concentrates have to be increased to cater for both maintenance and for production. Mineral mixture and rock salt are also given. Calves need colostrums, adequate water, concentrates, good quality forage and minerals.

SELF-ASSESSMENT EXERCISE 4

i. Mention four economic importances of cattle.
ii. List the factors considered for the establishment of a herd.

3.12 Management of Cattle

The management of cattle from breeding to market size can be grouped into three phases (a) from breeding to calving (b) from birth of calf to weaning and (c) from weaning to finishing (market size).

3.12.1 Breeding to Calving or Birth

Breeders (bulls and heifer or cow) are housed in the breeder houses make of railed wall, concentrate floors and galvanized roofing sheets. Bulls and heifers should be at least 24 months old before they are bred. Prior to mating, the heifer or cow should be properly fed on concentrate as well as on roughages such as grasses. The bull is brought to mate or serve the cow when it is on heat.

The gestation period for cattle is about 283 days. During the gestation period, the cow is allowed to feed in the ranch in order to take some exercises. About eight weeks to participation (calving), the cow is put on a special (rich) dies to set all he organs in good order for milk production after birth. This special system is called **steaming up**.

Constipation should be avoided by giving the animal plenty of roughages and bran in the diet. The cow is separated from the rest of the herd and is being taken to calving pen a week to calving. Adequate sanitation, comfortable beddings and clean water must be provided. At calving, the cow should not be disturbed. The cow normally stands while calving without any difficult.

3.12.2 Birth of Calf to Weaning

As soon as the calf is born, the mucus membrane should be wiped off from the nostril to facilitate normal breathing of the calf. The cord from the naval should be allowed to break on its own. The cow should also be allowed to lick up the mucus membrane on the calf body as the cow derives satisfaction from it, it also stimulates the cow circulatory system and milk let-down. A tincture of iodine solution should be applied to the naval stump to prevent infection. The calf should be helped to take milk from the teat of the cow. This milk called **colostrums** should be taken

for the first three days because colostrums provide (antibodies) immunity to the calf. It is also rich in proteins, minerals and vitamins.

If the farmer's aim is to produce beef cattle, the calf is allowed to follow the dam and suckle it without restriction. The calf is left with the dam until the weaning time (six months) during period, the calf is vaccinated against diseases like foot and mouth disease, rinder-pest, and anthrax etc. the calf is also dewormed at regular intervals.

Another calf management is **castration** of the bull calf that is not going to be used for breeding. This helps to control indiscriminate mating. The calf is finally weaned and is separated from its mother when it is about six months of age.

3.12.3 Weaning to Finishing or Market Size

The calf just separated from the dam can now feed on concentrated feed as well as roughages (grasses) on its own. The calf is also housed separately from the older cattle but indifferent building of the same design. However, semi-intensive system is the best method of rearing the calf market size.

One other operation that can be performed on the calf is **dehorning or disbudding**. Disbudding is the removal of the born. Its advantages include: easy management of the cattle when they grow up it reduces the risk of damage which horns can cause to the hides' of animal; makes it safer to handle animal when inoculating or deworn1ing. This can be done either by using a hot iron to burn out the horn bud, by applying caustic soda to the horn bud or use of saw to cut it off it is allowed to fully grow and later dealt with iodine solution.

Another operation on the calf is branding or tattooing. Branding is done for the identification of the calf. This can be done by using hot iron to mark numbers on the animal skin, especially on the cheek or on the forelegs below the shank. Tattooing is a practice whereby, the numeral, and letters are formed from metal pins which are then pressed onto the ears of the animals. Both branding and tattooing are different methods that can be used for the identification of the cattle. **Ear notching** (small cuttings) on the ear can also be used for identification.

In order to achieve early market weight or size, the calf can be fattened up by placing it on a special diet of high concentrates and low roughages with restricted movement within the building and by maintaining a high level of sanitation and health care through regular vaccination, deworning and dipping to control disease and parasites.

3.13 Cattle Breeding Information

For cattle farmers, the following pieces of information will serve as a useful guide for planning cattle breeding schemes.

3.13.1 Breeding Information

Age of Poultry	8 – 12 months
Estrus Cycle	21 days
Heat Duration	16 – 20 hours
Gestation Period	283 days
Act of Parturition	Calving
Number of Teats	4
Number of Udder parts	4
Age of Weaning	Diary 3 – 7 days
	Beef 24 – 32 weeks

3.13.2 Age of Breeding

Heifer Varies with growth and development (15 – 20 months) bulls 12 months if physically mature. Bulls should remain reliable breeders for 10 years but under range 6 – 7 years.

SELF-ASSESSMENT EXERCISE 4

i. Mention the three phases in the management of cattle
ii. What is gestation period?

3.14 Diseases of Cattle

Cattle diseases may be due to:

- Pathogenic organisms such as bacteria, viruses, protozoa, worms and some members of the athropoda.
- Nutritional deficiency
- Wound or cannibalism
- The bovine diseases under the first category including the following:

    - Rinderpest
    - Bovine dematophilosis or streptohricosis
    - Bovine pleuro pneumonia
    - Bricellosis

- Tryanosomiasis
- Gastro-intestinal helmnthiases
- Cystieercosis and foot and mouth disease

3.14.1 Rinderpest

This is a virus disease of cattle, sheep and goat. It is highly fatal and very contagious. It is like to be most deadly disease of cattle.

The loss of cattle from an attack of this disease is tremendous. It can wipe out a herd which can amount to a loss of stock in an area. The diseases also limit the exportation of meat or livestock to other following control measures are very costly.

An international joint campaign has helped considerably to control the outbreak of these diseases. One of these campaigns was mounted in 1969 in West Africa. The participating countries agreed on the following control measures:

Vaccination of the annual calf drop at least once a year in successive years.

- Stick quarantine pf all infected herds.
- Slaughtering of all animal within a radius of 16 kilometers of the infected area. This is not very easy to carry out. 1t is doubted whether all the participating countries carry out this procedure considering the cost of paying compensation for the slaughtered animals.

The presence of susceptible wild animals is another factor that should be taken into account in the country measures that are being implemented. Complete eradication of the diseases has yet to be achieved.

3.14.2 Bovine Dematophilosis or Streptothricosis

This skin disease is caused by a bacterium, Dermatophilus congolcnsis. The bacterium penetrates the epidermis. Scabs are formed and these spread and become. It causes emaciation in cattle and may lead to death.

It is one of the most serious bacterial diseases of cattle and is a serious problem throughout the country. All classes of cattle are affected and many suffer from this disease each year. It is estimated that over 600,000 cattle are affected annually. This disease causes a great loss to

the livestock industry in terms of the amount of hide and meat cost. The hides affected are down-graded. Many animals, when heavily affected. Their weight, milk yield and working ability (for draught animals) are affected. The disease also affects exotic cattle which are very susceptible to the disease. The N'dama cattle is known to be resistant to the disease but this resistance is not passed to its cross-bred offspring.

Control of this serious disease is necessary. At the moment, culling of the affected animals appears to be the method adopted to prevent the spread of the disease in the herd.

3.14.3 Foot and Mouth Disease

It is cause by a virus. The first symptoms are watery blisters in the mouth and between the claws of the booves. It is highly contagious. The disease has no cure.

3.14.4 Contagious Bovine Pleuro-pneumonia (C.B.P.P.)

This is another highly contagious bacterial disease of cattle. It is common in Nigeria and some other West African countries. Poor husbandry practices favour the spread of this disease.

The disease is of very great economic importance. It causes a lot of wasting and death. The vaccine for control does not confer life-long immunity. The cost of vaccination is high.

Control of the disease can be achieved by stopping up husbandry practices. Strict adherence to the vaccination programme will also help.

3.14.5 Brucellosis

This is a serious bacterial disease of cattle. It is prevalent throughout the world. It causes abortion in cows and this may lead to sterility. This is a problem wherever breeding operations are conducted.

3.14.6 Trypanomiasis

This is a very important disease which has posed a great problem for livestock production in West Africa. Its effect is deadly in cattle it has limited the raising of cattle to some regions which are free from the vectors of this disease. Except for the N'dama, Muturu and Keteku, other species of cattle do not thrive well in the forest and certain Savannah areas of Nigeria, and other West African Countries.. The exotic breeds are very susceptible to this disease. This has posed a problem in importing exotic breeds to up- grade the local breeds in the forest zones.

This disease is a protozoan disease. The protozoa called trypanosomes swim in the blood of the animal and cause destruction and death.

T. vivax and T. congolense affect the cattle more that the other species. The diseases is prevented and controlled by taking up measures to eradicate the tsetse-flies, destroying wild animals that harbour the protozoa, protecting the animal against the insects bites and fortifying the animals against the attack of the protozoa by certain medication. However, the control measure and treatment of the disease are costly.

The disease is important economically because:

- It prevents the raising of cattle in areas where good quality forage abound and where a good supply of water is cheaply available all the year round.
- It makes it difficult to import exotic breeds to up-grade the local breeds.
- It brings about a huge loss to herdsmen. The mortality rate of cattle is high.
- It lowers the performance of the affected cattle apart from causing death.
- It causes low meat and milk production in the affected countries and this affects the economy since such countries will have to import these products.

3.14.7 Gastro-intestinal Helminthises

These are the various diseases caused by the parasitic worms: The disease cause retarded growth and loss of weight. They also weaken the animals and make them more vulnerable to attacks of other diseases.

3.14.8 Bovine Cysticercosis

This is another Worm disease. In this case the stage of the worm that causes disease does not inhabit the gastro-intestinal tract but the muscle of the cattle. The larval stage of *Taenia saginata* stays in the muscle of the cattle. This does not affect the animal drastically but the quality of the meat is affected. The meat containing cysticerci infects humans and is the therefore not fit human consumption.

The control of this disease lies in the interruption of the tapeworm's life cycle to prevent human infection or the infection of the intermediate host, i.e. the cattle. Careful meat inspection is essential. Rejection of the affected meat or appropriate treatment to kill the parasite should be carried out personal hygiene is essential in this control.

SELF-ASSESSMENT EXERCISE 5

i. List the various diseases of cattle.
ii. Mention the causative agent of any three of them.

4.0 CONCLUSION

Cattle as ruminants are able to graze on herbs and pasture which helps to reduce feeding cost while it also contribute to the economy of the countries especially the beef and diary ones. The beef cattle are stock and stubborn while the diary cattle are bony, spongy and docile. Most of the diseases could be taken care off through proper care and management.

5.0 SUMMARY

The management and care of cattle involves the integrated application of principles of animal breeding feeding, housing and due to the complex stomach rumination has been possible. The cattle is grouped into four types (beef, milk, dual and draught) based on utilization while they have also helped to raise the economy of the nation as well for other countries.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The dairy cattle have well developed mammary gland and boney body while beef cattle have poorly developed mammary gland, but have short and stocky body.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The Beef Cattle

i. N'dama
ii. Red bororo
iii. Sokoto gudahi
iv. Keteku (Borgu)
v. Kuri
vi. Brown Swiss
vii. Rahaji

- The Dairy Cattle

i. White Fulani
ii. Jersey
iii. Red Poll
iv. Kerry
v. Guernsey
vi. Dexter
vii. Friesian
viii. Ayshere

ix. South devon x. Dairy Short Horn

- The Dual Purpose

i. Azawal ii. Biu
iii. Muturu iv. Wadara (Shuwa)

- The Draught Cattle

i. Ceudalis ii. N'dama

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The four factors that favour the production of cattle include:

- The cattle can rely on the natural grass growth throughout the year.
- Cattle rearing do not involve many workers. One man can control about three hundred herds of cattle.
- Cattle can be reared comfortably in land rears that are unsuitable for crop production.
- A large production of rung by cattle provides a good means of maintaining soils fertility.

ANSWER TO SELF-ASSESSMENT EXERCISE 4

The four economic importance include:

i. Cattle provide meat and milk for man
ii. They provide hides and skin
iii. Cattle provide employment and income to the people
iv. Cattle dung is a very good source of manure

The factors considered for the establishment of a herd include:

- Choice of product
- Selection of the breed of cattle
- Management of the herd.

ANSWER TO SELF-ASSESSMENT EXERCISE 5

The three phases in the management of cattle include:

- Rinderpest
- Bovine dermatiphilosis
- Bovine pluero-pneumonia

- Brucellosis
- Try panosomiasis
- Gestro intestinal helminthiases

1. Render pest is a virus disease
2. Bovine dermatophilosis is causes by bacteria
3. Trypanosomiasis is called by protozoa

6.0 TUTOR-MARKED ASSIGNMENT

1. Name five breeds of cattle in Nigeria
2. Discuss the management of cattle under the following:

    a. Breeding to calving
    b. Calvain to weaning
    c. Weaning to finishing or market size
    b. What is gestation period?

Practical

Visit a cattle ranch to see the details of all our discussion and then write a report.

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UNIT 5 LIVESTOCK FARMING (SHEEP AND GOAT PRODUCTION)

CONTENTS

1.0 INTRODUCTION

This unit gives a continuation of livestock farming which we have been dealt with for the past three units. You will recollect that we have dealing with poultry and cattle production in these past three units. This unit will concentrates on Goats, and sheep production. You will recollect from the past observations and experiences that goats are noted for their ability to thrive in areas where other groups of livestock find difficult to live in. The reasons for wide adaptations are attributed to the fact that goats are very good foragers and browse on a variety of vegetation while they have the appetite for so many edible materials. They (goats) do not discriminate much over food materials. Above all goats can withstand the adverse environmental conditions especially in the humid region in almost every home and all West under the extensive system management.

2.0 OBJECTIVES

After you must have carefully studies this unit, you should be able to:

- mention the various types of goats and sheep;
- explain general principles of sheep and goat production and management; and
- identify the factors that favour the production of goats and sheep.

3.0 MAIN CONTENT

3.1 Sheep and Goats

Sheep and goats belong to the group of animal known as ovidac and capra respectively. They are ruminant like cattle and are commonly found in towns and villages all over West Africa. Sheep are found in large numbers in the drier north than in the Southern parts of the region while goats, which are hardier, are more evenly distributed. Sheep can be easily included in a settled mixed farming system while goats are of value in removing browse shrubs which infest farm lands in grassland areas. Goat is reared for its meat milk and hide and skin e.g. Morocco leather from Sokoto Red. Goat milk is the riches of all the milk produced by animals including man.

3.2 Characteristics of Goats

- Goats are tough and hardy animals that can survive unfavourable environmental conditions.
- They are small bodied animal which can produce kids twice a year.
- Goats are very inquisitive animals which are mainly reared for skin meat milk and fibre.
- Both male and female have horns while male goats are often bearded.
- They are mostly reared on the extensive system of management while the gestation period of between 145 -154 days
- .Goats ran browse on many forage plants hence the cost of producing bother goats and sheep is very cheap and mostly reared on the extensive system.

3.3 Terminologies used in Goat

Buck (Billy)	-	Adult make goat
Doc (Nanny)	-	Adult female goat
Kid	-	A young or baby goat
Wether	-	A carstrated make goat
Kidding	-	Act of giving birth (Parturition) goat
Chevon	-	Meat of goat
Serving	-	System of mating
Sucking	-	Female with its offspring

SELF-ASSESSMENT EXERCISE 1

List three characteristics of Goat.

3.4 Breeds of Goat

These include the breeds in the tropics and temperate zones of the world

i.	Sokoto Red	ii.	Bornu Red
iii.	West African long legged goat	iv.	West African dwarf goat
v.	Bantu	vi.	Anglo-Nubian
vii.	Alphine	viii.	Boer
ix.	Kano Brown	x.	Bauchi Type
xi.	Togenburg	xii	Nuban
xiii.	Boer	xiv.	Anglo
xv.	Nandi	xvi.	East Africa Small goat

3.4.1 The Breeds Found in the Tropics include

- **The West African Dwarf Goats**: These are the short-legged meat-type goats. They have an average weight of about 27.2kg, they thrive in the humid region.

- **The Hejazi of Arabic and the Moxoto of Pernambuco**: These are varieties similar to the West African Dwarf goat both in shape and weight.

- **The Cutch**: This is a meat types breed with long legs and having an average weight of 36.3 4kg. it is found in Bombay
- **The Sapel**: This is a long-legged meat breed with an average weight of 18.0kg. It is found in West Africa.

- **The Jumnapari and the surti**: These are the chief milk producers in the tropics. Both of them have their home in India. The Jumnapari has loears and has an average weight of 54.4kg 29.4kg. The Surti is short-legged.

SELF-ASSESSMENT EXERCISE 2

Mention eight types of goat's breeds.

3.4.2 The Temperate Breeds of Goats include

- **The Anglo-Nibian**: This is a big breed of goats, Its ears are pendulous, The males have an average weight of 82kg 100kg and the females 63.5kg 77.1kg. This breed's milk yield is high. It is believe to have originated from the cross between the Nubian and English goats.

- **The British Sasnen**: This is a white breed of heavy milk producers. This was originally improved from the Sannen a Swiss breed. The goats of this breed are narrow-bodied at the hind quarter. They have an average weight of 81 kg 100kg for the male and 63.5kg 72. 1kg for the females.

- **The Toggen-burg**: This is a milk producer of long lactation breeds of goats. They are not produced in the tropics. The Angora breed has been considerably improved in South Africa and North America.

3.5 External Parts of a Goat

External Features of the Goat

1.	Mouth	2.	Muzzle	3.	Nostril	4.	forehead
5.	Ear	6.	Eye	7.	Neck	8.	Breast
9.	Shoulder	10.	Top of shoulder	11.	Back	12.	Ribs
13.	Belly	14.	Fore leg	15.	Dew claw	16.	Hoof
17.	Udder	18.	Teat	19.	Rump	20.	Thigh
21.	Hock	22.	Hind leg	23.	Tail	24.	Hip
25.	Lion	26.	Fore flank	27.	Rear flank	28.	Horn

3.6 Establishing the Stock

In establishing a stock you have to consider the purpose of raising the stock. The market demand for the product, the cost and availability of the breeds and the feeds, the size the stock and the environmental conditions of the place the stock is to be raised.

Secondly, you have to select the stock having decided on establishing a herd. You should go for a popular breed whose progeny will be in demand and therefore yield profit for the owner. You should look into the performances of the breeds to know which breeds have performed well. The pedigree records should be thoroughly looked at. It one is going for milk producers, one should look for yield and duration of lactation and also the percentage of butter fat of the milk. The prolificity of the animal should be considered.

You should also consider the number of kids produced. Those goats producing twins should be preferred. Breeds with fast rates of growths

should be preferred too, for the offspring of such breeds will have high food conversion rate.

The number of kids is an important factor in Nigeria for the economic yield of goats depends on the number of kids the goads are able to raise. Milk production is not great and is only used by the goats in nursing their kids.

Another important factor you should consider is the age of the stock to establish. Usually there are three stages of goats, namely, the kid the goatling and the adult.

The Kid is the Young Goat: This stage may cost less than the other stages but one has to spend a lot to rear it. Starting with it has one advantage in that the owner gains some experience of management and becomes used to the animal. I t however needs great care.

The goatling is the goat that is over a year old but is under two years of age. This stage is almost fully developed and it does not need as much care as the kid. It is also easy to see clearly its good and bad qualities. It is however expensive.

The Adult: This is the mature goat may perhaps have given some offspring. The qualities of the animal are brought to light and one can easily make a choice. The records of previous yield can help one make decisions easily.

You have also to consider the general appearance of the animals. The animal should be balanced and have feminine qualities if a female and masculine qualities if a male. They should be true to their breeds. The conformation should be good. They should possess the qualities associated with their breeds. The conformation should back, deep body, broad be strong and stand squarely on the feet. The health of the animal should be considered.

It is a fact that no animal is perfect, there must be faults. It is up to you to dry to detect the serious faults, which will disqualify the animals for breeding, or for establishing a stock.

SELF-ASSESSMENT EXERCISE 3

In establishing a stock of Goats, what are the factors you will take into considerations?

3.7 System of Keeping Goats

Goats enjoy free movement and resist confinement. They do best if let free to browse in vast areas of pasture. Their destructive habit makes it dangerous to let them move freely in areas where crops are planted or where there are no extensive uncultivated fields for them to herd. Goats are, therefore, usually kept under three main systems, namely:

- Tethering
- Semi-stall feeding
- Herding or fencing

3.7.1 Tethering

In this method of keeping goats, the goat is tethered to a stake by means of a string or chain. The goat moves depending on the radius of the chain.

In some cases, the goat is tethered in the field and in which case it is exposed to intense sun, rain, wind and other enemies. This is a very bad method of keeping goats. The goat may however be tethered in a small hut of 1.5m square with roof and fodder sent to it there. Tethering is not a good method of getting the best out of the goat.

3.7.2 Semi-Stall Feeding

This is the system of providing an enclosure for the goats. Within the enclosure is a small goat-house where feed racks are provided. The goat-house also provides shelter from intense heat of the sun, rain and excessive wind. Soilage and leaves and refuse of the yard are placed for the goat in the hut. The enclosure maybe fenced with walls, sticks and wire mesh. The fence should be I m in height. Few strands of barbed wire may be placed above it to prevent some very active ones jumping the fence.

The enclosure provides enough area for fresh air and exercise for the goats. To avoid accidents very aggressive horned goats should not be kept with polled or hornless goats.

In the goat-house 1.4m2 should be provided for a doc. 1.8m2 2.3m2 for a doe area with a kid and 55.7dm^2 74.3dm2 for a goat that is feeding out.

3.7.3 Herding

This is the system of providing the goats with enough field to browse and choose from a variety of vegetation and weed. This is an ideal condition for their keeping. They get enough green feed and exercise and fresh air. During the dry periods branches of trees may he brought to

them to supplement what they get from herding. Eight to ten heads of goats are recommended for one acre. A few goats may be kept with herded sheep to lead sheep and bring about extensive ranging.
In areas where there is the possibility of destruction to crops the fields or pasture should be fenced with wire mesh or where possible with an electric fence.

3.8 Feeding and Food of Goats

The art and practice of feeding animals take into consideration the age, and the type of animals fed. In feeding goat also the ages as well as the purpose of production is considered in working out the quantity and quality to food to provide.

Usually, goats from the fourth week to the sixth month are fed feed or ration which has large protein content in it and milk incorporated in the feed programme. Goats from the sixth month to the ninth month are given more concentrates as given the rest of the herd. From the ninth month and thereafter the goats are given about 0.4kg of concentrates daily in addition to about lkg of silage. It is really difficult to ascertain feed. It is provided with, soilage, and in some cases silage. It also goes out for browsing and grazing. The concentrate feeds may be given three times daily according to one's choice. They may be at 10a.m., 1 pm. And 5 pm. Milk feed is also fed in the case of kids. If there is a field for browsing it is recommended that the goats be left for browsing from 10 am. 1 pm.

Water is made available to the g6ats, although they do not take much water. 2 4½ litres of water per head per day are sufficient during hot weather. Minerals should also be given to them and this can be mixed with the concentrate feed or be left in through boxes for them to lick that are given ad lib.

The silage, roots and concentrates can be fed to the goats in their goat-house in bunks, which may be flat bottomed. Some two side bunks of width 55cm and of depth 7.5cm 10cm are found useful. The bunks are raised 20.3cm 25.4cm above the water. A linear space of 30.5cm per head of goad is allowed at feeding bunk if there are no bars provided or 20.1 cm if bars separate the goats as they feed.

Feeds should be provided in accordance with production. Pregnant and milking goats need more feed than dry goats. Feeding is very important to milk producers. The animal gives you what you want the milk, if you give it what it wants the food.

It is known that goats enjoy the following concentrated food stuffs beans, groundnut cake, maize (corn) soy bean meal, oat and small qualities of coconut cake and cotton cake. These concentrate foodstuffs are mixed in the right proportion to provide for the animals the right percentage of protein and starch needed for the stage of the animals and for the particular production or purpose. Groundnut cake mixed with maize and oats are found to be good.

Good roughage is very important for goats and efforts should be made to provide it in the right quantity and quality.

3.9 Breeding in Goats

The female and male goats reach sexual maturity as early as 6 months. They are however, not bred or mated before they are 9 month old. The female may be left until it is a year and half. This is a good practice in well-managed stock breeding. This gives the doe enough time to develop. The male goat is fully used only when 2 years old. At this stage it may be kept for 100 does.

The does should be mated about 12 hours following head period. In the tropics, heat period spread all the year round. It is however more frequent in one period of the year than others. The heat period lasts from 1 -2 days, it reoccurs after 18 221 days except where there is pregnancy. Heat period in the doe is signified by the swelling of the vulva, its reddish nature and the discharging of colourless materials from the vulva. The goat is restless and cries frequently.

Flock mating and stud mating are the two main mating systems adopted in goat breeding. Very often the stud mating is used. In the ease of a large herd, the flock mating becomes more preferable.

It is necessary that the period is noticed and the doe served. Crossbreeding is often practiced in the tropics by both the local farmers and at the government farms. The aim in government farms has been to improve the poor yielding West African dwarfs with some high yielding exotic breeds. The Anglonubian breed for example was improved was is imported into Nigeria and the East Central State in particular before the civil war to upgrade the local breed.

3.9.1 Gestation Period

The average gestation period in goat is 150 days but some individuals can give birth to their kid after 154 days of pregnancy. The period may extend up to 153 days. Goats usually kid three times in 2 years. The

number of kid per parturition is 1 for some goats. 2 for some and occasional cases of 3 kids are got.

3.9.2 Care of Gestation

Goats in kid need more attention that those not in kid. They should be well fed for the growth of their kids and to prepare themselves for lactation. They should be allowed to have exercise to avoid muscular weakness which may result in difficulty in kidding.

3.9.3 Care at Kidding

The kid arrives anytime from the one hundred and forty-fifth days of gestation. Plans should be afoot to aid the goat kid without much difficulty. The goat should not be tethered. With parturition approaching the goat has increased appetite and this may be a sign for the goat keeper to get ready. All essential materials needed to assist the goat in case of difficulty in delivery should be gathered.

3.10 Management of Goats

The management of goat from breeding to market weight or size is grouped into three phases. These are:

i. From breeding to kidding.
ii. From kidding (birth of kid) to weaning and
iii. From weaning to finishing (market size).

3.10.1 Breeding to Kidding or Birth

Buck and doe meant for breeding are kept in a building, which is well ventilated, railed and walled. The floors should be made with concrete and the roof with corrugated iron sheets.

Buck and doe should be at least 12 month of age before they are used for breeding. Seven to ten days of mating, the doe should be given a high plane of nutrition in order to increase the number of eggs ovulated and consequently, an increase in the number of kids to be given birth to. This process of increasing the feed intake of goat is called **flushing.**

Before flushing, it is advisable to deworm the goat to get rid of endoparasites. The buck is brought to mate the die (hand mating) during the heat period.

The gestation period of the doe is about 145-150 days, during the gestation period, the doe should be allowed to graze in the pasture and supplementary feeds in form of concentrates should be fed to the doe. Clean drinkable water should also be provided for the doe.

Few days to parturition, adequate sanitation, comfortable bedding and clean water should be provided; signs of approaching parturition include mucus discharge from vulva, undue noise making, frequent urination and restlessness. At kidding, the doe should not be disturbed unless incase difficult kidding during which the attendant can render some help to save the doe and the kid.

3.10.2 Birth of Kid to Weaning

When the kid is born, mucus membrane is wiped from their nose to enhance normal breathing and prevent suffocation. The naval cord which can break off on its own is dipped in iodine solution to prevent infection and to promote fast healing. The doe is allowed to lick up the mucus from the body of the kid because it derives satisfaction from it and it also promotes milk let-down. The placenta, which should come out few hours after birth should be disposed of and the pen cleaned. The udder should be washed in disinfected.

The kid, where possible, should be helped to suckle colostrums produced by the dam for the firs three days of birth. Colostrums provide immunity against disease infection to the kid. It is also rich in protein, vitamins and minerals. The feed intake of the doe should be increase to promote easy production of milk to feed the kid. At about two weeks of age, **creep feed**, which is rich in protein, carbohydrate, minerals and vitamins should be given to the kid. This promotes rapid growth of the kid and early weaning.

Kids not required for breeding are castrated to prevent, indiscriminate mating. Identification marks, either by branding, tattooing or ear notching, should also be given to the kids when they are about four weeks old. The kids should also be vaccinated against foot and mouth disease, rinderpest and anthrax diseases. During weaning, the kids should be introduced to roughages in order to promote the fresh raging of the rumen. Throughout this period, high level sanitation has to be maintained to prevent diseases and parasitic infection.

3.10.3 Weaning to Finishing or Market Size

The kids are weaned and separated from the doe at about eight weeks of age. They are kept in the growing house where they earn do out to browse and graze on grasses and legumes.

The semi-intensive system is the best method of rearing goat in Nigeria, In addition to the roughages they feed on by rotational grazing; supplementary yam and banana peelings and other household wastes can be given to the goat to feed on. Salt licks, which are rich in minerals and vitamins as well as cool and clean water, should be provided regularly.

In order to prevent parasitic infestation, good sanitary conditions has to be maintained through regular dipping of the animals in chemical solution, to eradicate ectoparasites, and regular deworming with lead arsenate or phenothiazine using drenching gun to administer the dewormer which kills endoparasites, brucellosis foot and mouth and anthrax diseases should be repeated.

With good housing feeding and healthcare, the goat will mature within four to six months.

SELF-ASSESSMENT EXERCISE 4

Mention the three phases of the management of goat from breeding to market size.

3.11 Goat Diseases

The diseases of goats differ in relation to the location of the goats. The goats in the rain forest areas for example have certain diseases, which they suffer from and which differ from the diseases associated with the goats of the savanna region or the temperate regions.

In Nigeria, a few of the most common diseases of goats are:

- Enteritis pneumonia (scouring)
- Tryponomiasis
- Helminthiasis
- Scabbies

3.11.1 Enteritis Pneumonia

This is a complex and contagious disease of goats. It is an attack of pneumonia complicated by intestine upset resulting in diarrhea.

This disease spreads easily through discharges and droppings. It can be spread by contaminated water, feed and equipment or carried by an attendant through inadequate sanitation.

Symptoms

The animal is dull and there is occasional cough. Watery nasal discharge is observed. There may be some discharges from the eyes. There is loss of appetite and the goat has a very watery diarrhea. The animal discharge solids the rail and the thighs.

The mortality rate is very high. Depending on management it may reach 100%.

This complex disease is caused by bacteria, which affect the lungs and the intestines. Viruses are very likely to participate.

Treatment and Control

The sanitary aspect of the management has to be intensified. The affected goats should be separated quickly and contamination of the water, feed and equipment used should be avoided. 1'he affected goats should be kept in a clean dry place. On the detection of the outbreak, a veterinary officer should be consulted without delay for the necessary medication.

3.11.2 Trypanosomiasis

This is very acute disease of many livestock including goats. It is a protozoan disease. The protozoa called trypanosome swim in the blood in the body and cause a lot of havoc and death to the animals.

The trypanosome associated with this disease in goat is Trypanosomia vivox. The protozoa which cause the disease are transmitted by tsetse-flies Glossina species which act as the intermediate host.

The incidence of the disease is manifested by emaciation, relapsing, fever, anaemia, ocdema, loss of weight eye upsets, accompanied by lachrymation.

The disease is not as acute in goat as in pigs where it kills within 6 days, goats appear to have immunity over species of tryanosoma.

The disease is prevented and controlled by taking up measure to eradicate the tsetse-flies, destroying wild animals that form reservoirs for the protozoa, protecting the animals against the insect bites and by fortifying the animals against the attack of the protozoa by certain medication prior to the entry of the protozoa into the body.

The treatment for the disease varies according to the species of animals and drugs are available for this treatment.

3.11.3 Helminthiasis

This is the common name given to so many diseases caused by parasitic worms. These worms include platyhelminthes the flatworms and the Nemathelminthes the roundworm. The flatworms are exemplified by the flukes and the tapeworms while examples of roundworms are the Ascaries and Hookworms. Ancylostomatiae). These parasites inhabit different organs or the body and during their stay and by their movement cause a lot of harm to the tissues and organs of the body. Their dependence on the animals in which they live render the animal week and susceptible to so many other disease.

The disease is spread by providing a favourable for the parasite to develop and get access to other animals. This is mainly through the contamination of feed, water and the environment with the faeces of the infected animals.

The symptoms of the presence of these parasites are diversified as these worms are very varied. Each species has its symptoms. The symptoms will also be related to the tissues or organs attacked. For example the liver-fluke causes hemorrhage. The havoc, which these worms can cause include anaemia, loss of weight, loss of vigour, intestinal disorder including diarrhea, reduction of products and making the animals more susceptible to the attack of other disease.

The worms do not cause a lot of death but the degree of harm depends on the number of the worms contained in the body and also on the nutritional level of the animal. If the animal feeds well the effect of the worms may be manifested very such on the animal.

The disease can be treated by the correct application of worm expellers. The animals are dewormed from time to time. The direction of the manufacturers should be followed.

It can be prevented by maintaining a high standard of sanitation and preventing the infective stages of the worms getting into the animal. This can be achieved by moving the animal to fresh pastures after deworming. The caeces should be well handle. The young susceptible animals should not graze where older animals had grazed.

The secondary hosts of the worms should be destroyed and prevented from coming where the animals graze or inhabit.

SELF-ASSESSMENT EXERCISE 5

Enumerate the common diseases of goats.

3.12 Characteristics of Sheep

The following are the characteristics are notable of sheep:

- They have medium size with long legs and long stick tails, which hangs down.
- The earlobes are long and dropping and are kept mostly for meat, wool fleece and milk purposes.
- They are grazers and can only scavenge on relish of roads side
- Leather from sheep hides in used to make shoes, gloves and jackets
- Their wool and fleece are shorn off in a sheering room
- They seem to be very stupid in appearance and behaviour
- They thrive well under the extensive system of management.
- They are also ruminants while the male have horns but the females are polled.
- Twining is very common (delivery of twins) while the gestation period is between 151 154 days or 5½ months.

3.13 Terminologies in Sheep Management

- Ram - Adult male
- Ewe - Adult female
- Bambing - System of delivery
- Lamb - Young sheep
- Mutton - Meat of sheep
- Tupping - System of mating
- Sucking - Female with its offspring
- Flock - A group of sheep

3.14 Breeds of Sheep

a. Dorset
b. Border Leicester
c. Lohi
d. Nellore
e. Balami
f. Ouda/uda
g. Yankassa
h. West African dwarf

3.15 Management of Sheep

The management and care is the same with that of goat.

3.16 Sheep Breeding

The ram should not be used for mating until about 12 months of age. Under good management, a ram can top up to 20 to 30 ewes, although under conditions where sheep are allowed to breed all the year round, as is the practice in West Africa, one ram should not be allowed to top more than 10 to 20 ewes, or about two rams should be allowed to run with 50 ewes.

The ewe first goes into oestrus 9 heat) at about 12 to 18 months of age; Oestrus occurs at an interval of every 17 to 19 days and lasts for 24 to 48 hours. Suckling ewes should return to oestrus after lambing within 60 days following parturition. Actually, observations in Nigeria and Ghana indicate that the interval between lambing and next oestrus varies between 18 and 128 days for forest types, 33 and 55 days for the Sahel or Sudan type, and between 40 and 100 days for the Nungua black head. The period of gestation (pregnancy) usually varies between 140 and 160 days an average of 5 months. In effect, ewes can lamb twice in a 12 month period, when the fry season is short as it is in the West forest zones. In the longer dry season areas of northern Nigeria and Southern Ghana for example, lambing takes place once in one year.

For good reproductive performance, older rams should be allowed to make with young rams with older ewes. Rams should be kept with their ewes for about 50 to 60 days, or for three oestrus cycles. This is to ensure that the ewes are pregnant. A typical timetable for breeding programme follows.

Prior to mating, say in July, all ewes not required for mating should be called or removed from the herd. The farmers should select only mature, healthy animals. Breeding rams should be vigorous, with good hind legs and prominent testicles. Ewes meant for breeding should also show good udder development and have strong legs. In August, breeding stock should be flushed this means putting the animals on lush pasture or providing about 0.23kg to O.34kg high protein concentrate a day depending on the weight of the animals, for two to three weeks before mating. This will ensure a higher percentage of twining and a good lamb crop. Animals are then ready to be mated during September, October and November. It is good husbandry practice to raddle-mark breeding rams, by painting their briskets at this time with any colouring material which cannot easily away, so that they will leave the colour mark on the back of ewes already serviced or mated.

Between November and January, ewes should be separated from the rams and the pregnant ewes sent to pasture. Lambing should start in February and continue till March. The nostrils of young animals should be cleaned and any mucus removed, the navel cord clipped and tincture of iodine applied to prevent infection. Records of the date of birth,

weight of lambs and registration number showing the number of the two parents should be kept.
Lambs should be allowed to run with their mothers until weaning from April to May that is from two to three months following parturition. Prior to this, it is desirable to castrate male lambs not wanted for breeding when they are four to six weeks old. Weaning, or the separation of young animals from their mothers, should depend on the weight, health, and milking ability of the ewe. After weaning, the ewes are dried off, that is, milk production is stopped and the ewes are allowed to rest until July, when the breeding season starts and the cycles is repeated.

SELF-ASSESSMENT EXERCISE 6

i. Give four characteristics of sheep
ii. List four breeds of sheep

4.0 CONCLUSION

Sheep are however easier to restrict and control than goats. The latter are much more active and require freedom of movement to maintain good health. Both are more successful because they can withstand the adverse environmental conditions especially in the humid regions of the tropics and thrive well under the extensive management

5.0 SUMMARY

The various types of sheep and goad are very good foragers and browse on a variety of vegetation while they have appetite for so many edible materials. The production is more favourable under the extensive system of management and among the factors that contribute to the success is the fact that they can survive unfavourable environmental conditions.

ANSWER TO SELF-ASSESSMENT EXERCISE 1

The three characteristics of the goats include:

- Goat are tough and hardy animals that can survive unfavourable environmental conditions.
- They small bodied animals which can provide kids twice a year
- Goat can browse on many forage plants hence the cost of producing goats is very cheap.

ANSWER TO SELF-ASSESSMENT EXERCISE 2

The eight types of goats include:

i.	Sokoto Red	ii.	Borno Red
iii.	Bantu	iv.	Alphine
v.	West African long legged goat	vi.	Suri
vii.	West African Dwarf goat	viii.	Nubian

ANSWER TO SELF-ASSESSMENT EXERCISE 3

The factors that will be taken into consideration include:

- The purpose of raiding the stock
- Selection of a proper breed
- Number of kids to be produced
- The age of stock to be established
- Type of the breeds

The three main systems of keeping goats

- Tethering
- Semi-stall feeding
- Herding or fencing

ANSWER TO SELF-ASSESSMENT EXERCISE 4

The three phases of management of goats include:

- Breeding to kidding or birth
- Birth of kid to weaning
- Weaning to finishing market size

The common diseases of goats include:

- Enteritis pneumonia
- Trypanosomiasis
- Helminthiasis

ANSWER TO SELF-ASSESSMENT EXERCISE 5

i. They have medium size with long legs and long thick tail which hangs down.

ii. Twining is very common (delivery of twins) while the gestation period is between 151 154 days or 5½ months.
iii. The earlobes are long and dropping and are kept for meat, wool, fleece and milk purposes.
iv. They are grazers and can only seavenge on relish of roads side.

6.0 TUTOR-MARKED ASSIGNMENT

1. Name five breeds of goats in Nigeria
2. Discuss the systems of management of goat.
3. Briefly discuss the rearing of goats from kidding to market size.

Practical

a. Note the various characteristics and heading/management of goats.
b. Discussed and visit a home or farm where goat/sheep are being raised.
c. Let your report include the developmental stages.

7.0 REFERENCES/FURTHER READINGS

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