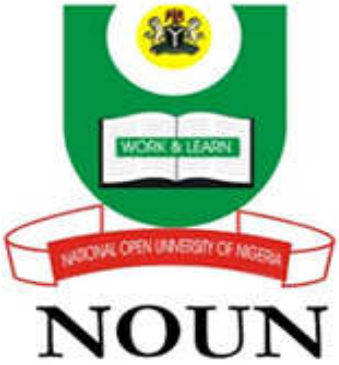

NATIONAL OPEN UNIVERSITY OF NIGERIA
AGRICULTURE AND POVERTY ALLEVIATION
DES 422
FACULTY OF SOCIAL SCIENCES
DEPARTMENT DEVELOPMENT STUDIES
COURSE GUIDE

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Course Guide

Introduction

Welcome to DES: 422. Agriculture and Poverty Alleviation is a 3-credit and one- semester undergraduate course for developments studies students. The course is sixteen units spread across fourteen lectures week. This course guide provides you with an insight into the study of Agriculture and Poverty Alleviation, and all that it will take you to complete and walk through your way in understating issues in the study of Agriculture and Poverty Alleviation. Some general guidelines are suggested for the amount of time required of you on each unit in order to achieve the course aims and objectives successfully. Answers to your tutor marked assignments (TMAs) are therein already.

Course Competencies

This course is expected to expose students to the overall importance of Agriculture and how it can be used to foster development. Hence it is expected that the knowledge acquired can help the student to known the various policies on agriculture and would be in a position to apply it in response to development issues.

Course Objectives

To achieve the aims of this course, there are overall objectives which the course is out to achieve, though, there are set out objectives for each unit. The unit objectives are included at the beginning of a unit; you should read them before you start working through the unit. You may want to refer to them during your study of the unit to check on your progress. You should always look at the unit objectives after completing a unit. This is to assist the students in accomplishing the

tasks entailed in this course. In this way, you can be sure you have done what was required of you by the unit. The objectives serves as study guides, such that student could know if he is able to grab the knowledge of each unit through the sets of objectives in each one. At the end of the course period, the students are expected to be able to:

- Have a clear understanding of the concept, definition and scope of Agriculture.
- Know the various forms of poverty
- Define Poverty and poverty alleviation
- Definition and meaning of Poverty reduction and alleviation
- Define and have a clear meaning of Agricultural development.
- Examine the concepts of Agricultural development.
- Examine the challenges of agricultural development.
- Know the themes in Agricultural development
- Understand the importance of conservation agriculture
- Have an understanding of the concept of Sustainable agricultural development
- Have a clear conceptual definition of policy
- Describe the Agricultural practice and policies
- Know the importance of agricultural policies in agricultural production
- Identify the Problems of agricultural policies in Nigeria
- Be able to define Agricultural Productivity
- Agricultural Productivity and Poverty in Developing Countries
- Understand the challenges of agricultural productivity in Africa
- Have a clear knowledge of agricultural Productivity and the incidence of Poverty in developing Countries.
- Conceptualize Agricultural investment
- Agricultural Investment and Productivity.
- Challenges of agricultural investment and productivity in Nigeria

- Identify the State Policy and Agricultural Growth Process and Development in Poverty Reduction
- Identifiable agricultural policies in Nigeria
- Sustainable Agriculture and Rural Urban Poverty Transition
- Meaning and concept of sustainable Agriculture
- Meaning and concept of Agricultural marketing and produce

Working Through this Course

To successfully complete this course, you are required to read the study units, referenced books and other materials on the course. Each unit contains self-assessment exercises called Student Assessment Exercises (SAE). At some points in the course, you will be required to submit assignments for assessment purposes. At the end of the course there is a final examination. This course should take about 15weeks to complete and some components of the course are outlined under the course material subsection.

Study Units

There are 16 units in this course which should be studied carefully and
diligently

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Presentation Schedule

The presentation schedule included in your course materials gives you the important dates for this year for the completion of tutor-marking assignments and attending tutorials. Remember, you are required to submit all your assignments by due date. You should guide against falling behind in your work.

Assessment

There are two types of the assessment of the course. First are the tutor-marked assignments; second, there is a written examination. In attempting the assignments, you are expected to apply information, knowledge and techniques gathered during the course. The assignments must be submitted to your tutor for formal Assessment in accordance with the deadlines stated in the Presentation Schedule

and the Assignments File. The work you submit to your tutor for assessment will count for 30 % of your total course mark. At the end of the course, you will need to sit for a final written examination of three hours' duration. This examination will also count for 70% of your total course mark.

How to get the Most from the Course

In distance learning the study units replace the university lecturer. This is one of the great advantages of distance learning; you can read and work through specially designed study materials at your own pace and at a time and place that suit you best. Think of it as reading the lecture instead of listening to a lecturer. In the same way that a lecturer might set you some reading to do, the study units tell you when to read your books or other material, and when to embark on discussion with your colleagues. Just as a lecturer might give you an in-class exercise, your study units provides exercises for you to do at appropriate points. Each of the study units follows a common format.

The first item is an introduction to the subject matter of the unit and how a particular unit is integrated with the other units and the course as a whole. Next is a set of learning objectives. These objectives let you know what you should be able to do by the time you have completed the unit. You should use these objectives to guide your study. When you have finished the unit you must go back and check whether you have achieved the objectives. If you make a habit of doing this you will significantly improve your chances of passing the course and getting the best grade.

The main body of the unit guides you through the required reading from other sources. This will usually be either from your set books or

from a readings section. Some units require you to undertake practical overview of historical
events. You will be directed when you need to embark on discussion and guided through the tasks you must do.

The purpose of the practical overview of some certain historical economic issues are in twofold. First, it will enhance your understanding of the material in the unit. Second, it will give you practical experience and skills to evaluate economic arguments, and understand the roles of history in guiding current economic policies and debates outside your studies. In any event, most of the critical thinking skills you will develop during studying are applicable in normal working practice, so it is important that you encounter them during your studies.

Self-assessments are interspersed throughout the units, and answers are given at the ends of the units. Working through these tests will help you to achieve the objectives of the unit and prepare you for the assignments and the examination. You should do each self-assessment exercises as you come to it in the study unit. Also, ensure to master some major historical dates and events during the course of studying the material.
The following is a practical strategy for working through the course. If you run into any trouble, consult your tutor. Remember that your tutor's job is to help you. When you need help, don't hesitate to call and ask your tutor to provide it.

1. Read this Course Guide thoroughly.
2. Organize a study schedule. Refer to the `Course overview' for more details. Note the time you are expected to spend on each unit and how the assignments relate to the units. Important

information, e.g. details of your tutorials, and the date of the first day of the semester is available from study centre. You need to gather together all this information in one place, such as your dairy or a wall calendar. Whatever method you choose to use, you should decide on and write in your own dates for working breach unit.

3. Once you have created your own study schedule, do everything you can to stick to it. The major reason that students fail is that they get behind with their course work. If you get into difficulties with your schedule, please let your tutor know before it is too late for help.
4. Turn to Unit 1 and read the introduction and the objectives for the unit.
5. Assemble the study materials. Information about what you need for a unit is given in the `Overview' at the beginning of each unit. You will also need both the study unit you are working on and one of your set books on your desk at the same time.
6. Work through the unit. The content of the unit itself has been arranged to provide a sequence for you to follow. As you work through the unit you will be instructed to read sections from your set books or other articles. Use the unit to guide your reading.
7. Up-to-date course information will be continuously delivered to you at the study centre.
8. Work before the relevant due date (about 4 weeks before due dates), get the Assignment File for the next required assignment. Keep in mind that you will learn a lot by doing the assignments carefully. They have been designed to help you meet the objectives of the course and, therefore, will help you

pass the exam. Submit all assignments no later than the due date.

9. Review the objectives for each study unit to confirm that you have achieved them. If you feel unsure about any of the objectives, review the study material or consult your tutor.
10. When you are confident that you have achieved a unit's objectives, you can then start on the next unit. Proceed unit by unit through the course and try to pace your study so that you keep yourself on schedule.
11. When you have submitted an assignment to your tutor for marking do not wait for it return `before starting on the next units. Keep to your schedule. When the assignment is returned, pay particular attention to your tutor's comments, both on the tutor-marked assignment form and also written on the assignment. Consult your tutor as soon as possible if you have any questions or problems.
12. After completing the last unit, review the course and prepare yourself for the final examination. Check that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in this Course Guide).

Online Facilitation

Course Information

Course Code: DES422
Course Title: Agriculture and Poverty Alleviation
Credit Unit: 3

Course Status:
Course Blub:
Semester: Second
Course Duration:
Required Hours for Study

Course Team

Course Developer: NOUN
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Ice Breaker

Module 1: DEFINITION AND SCOPE OF AGRICULTURE

Module Introduction

This Module has 4 units which contain an introduction of the units, the intended learning outcome, the main contents, a self-assessment, the conclusion, summary as well as the cited references.

Unit 1: Definition and meaning of Agriculture
Unit 2: Definition and meaning of Agricultural development
Unit 3: Themes in Agricultural development
Unit 4: Agricultural practice and policies

Unit 1: Definition and meaning of Agriculture

Contents

1.0 Introduction

The first unit of the study guide provides an understanding of the definition and concept of Agriculture. Agriculture has been defined by various authors and could have different meaning to the various scholars in development; we have been able to look at some

definitions of Agriculture from the various positions and views. It is also an introduction into the meaning of Agriculture, Concept of Agriculture, Scope of Agriculture as well as the various Forms of Agriculture. The unit also covers the definition and meaning of agricultural development, the challenges of agricultural development, themes in agricultural development, agricultural practice and policies as well as the importance of agricultural policies in agricultural production.

2.0 Intended Learning Outcomes (ILOs)

It is expected that at the completion of this unit, the students should be able to;

1. Define Agriculture
2. Conceptualize of Agriculture, as well as identify and review the scope of Agriculture and the various Forms of Agriculture
3. A clear meaning of agricultural development.
4. The challenges of agricultural development will be stated
5. Agricultural practice and policies as well as the importance of agricultural policies in agricultural production is identified

3.0 Main Content

3.1 Definitions of Agriculture

When we talk of agriculture what easily comes to mind is the art of farming. However, agriculture comes with its various definitions. “The term agriculture is derived from two latin words “Ager” and “Cultura”.

Ager means land and cultura means cultivation i.e. tilling the soil and preparing it for planting of crops" (Webfinder, 2022).

National Geographic Science (2022) defined agriculture as the art and science of cultivating the soil, growing crops and raising livestock. It includes the preparation of plant and animal products for people to use and their distribution to markets. It denotes the way in which crops plants and domestic animals sustain the global human population by providing food and other products (Harris and Fuller, 2014). It can also be defined as the practice or work of farming. Agriculture could also be defined as the art or science of cultivating the ground and raising and harvesting crops.

3.2 Concept of Agriculture

Conceptually agriculture can be explained to mean the practice of cultivating the soil for growing and raising of animals. The essence is to provide food and raw materials for man. It entails the preparation of plant and animal product for societal use. This will also include the marketing of these agricultural products. Basically the essence is to produce food and other raw material for human needs. Scientifically the need is to produce useful plant and animals for the society. Merriam Webster (2022) defined agriculture as "the science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products". "Agriculture is the art and science of cultivating the soil, growing crops and raising livestock. It includes the preparation of plant and animal products for people to use and their distribution to markets" (National Geographic Society, 2022). "Agriculture provides most of the world's food and fabrics. Cotton, wool, and leather are all agricultural products. Agriculture also provides wood for construction and paper products".

Science daily (2022) defined agriculture as “the process of producing food, feed, fiber and many other desired products by the cultivation of certain plants and the raising of domesticated animals (livestock)”. “Agriculture is the most comprehensive word used to denote the many ways in which plants and animals are cultivated and raised to sustain the global human”(Abass, 2011). At the subsistence level, agriculture is the production of food primarily for consumption by the farmer and mostly found in less developed countries. In subsistence agriculture, small-scale farming is primarily grown for consumption by the farmer and their family (TDC, 2019). It is the “deliberate modification of the earth’s surface for the cultivation of plants and rearing of animals and livestock is termed as agriculture” (Eagrovision, 2022).

3.3 Scope of Agriculture

Agriculture is a broad term encompassing all aspects of crop production, horticulture, livestock farming, forestry etc. the science and art of cultivating the soil, producing crops and raising livestock that are directly or indirectly benefiting to humans. The term agriculture also includes the financing, processing, marketing and distribution of agricultural products, farm production supply and service industries, health, nutrition and food consumption the use and conservation of land and water resources, development and maintenance of recreational resources, and related economic, sociological, political, environmental and cultural characteristics of the food and fiber system which are the extremely basis of civilization (Sarwar, 2014).

Its area covers crop husbandry (agronomy, horticulture, pomology, oleri culture, floriculture, soil science, crop science, crop protection,

forestry, plant pathology, plant breeding). Other areas include animal husbandry (animal science).

3.4 Various Forms and types of Agriculture

The various forms of agriculture includes; growing of crops, rearing of livestocks, rearing of fish (fishery), rearing of snails (heliculture), apiculture (bee keeping), horticulture etc. Growing of crops is the process of using plant or animal products that can be grown and harvested extensively for profit or subsistence purpose. Live stocks rearing is the process and "management and breeding of domestic, livestock or farm animals for the purpose of obtaining their meat and products (milk, eggs, leather, etc.)" (Abinbola, 2022).
The major types of agriculture includes; the subsistence agriculture and the commercial agriculture.

Subsistence agriculture: is the cultivation and production of food basically for consumption by the farmer. It is and mostly found in less developed countries. In subsistence agriculture, small-scale farming is primarily grown for consumption by the farmer and their family.

Commercial agriculture: it is the cultivation of and production of agriculture with the intention to produce food for commercial and for sale in the global market place.

4.0 Self-Assessment Exercise(s)

1. Provide a concise definition of Agriculture.
2. List and discuss the scopes of agriculture.
3. Discuss the various forms of agriculture.
4. List and discuss the types of agriculture.

5.0 Conclusion

In this module and unit we have been able to have an understanding of the definition and concept of agriculture, the scope of agriculture, various forms of agriculture as well as the types of agriculture.

6.0 Summary

In this unit of the study guide you have been taught and learnt;

1. The definition of agriculture as have been conceptualized by various authors
2. The scope of agriculture
3. The various forms of agriculture and
4. The types of agriculture.

7.0 References/Further Reading

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Unit 2: Definition and meaning of Agricultural development

Contents

1.0 Introduction

The unit 2 of module one (1) is designed to bring to your knowledge the definitions and concept of agricultural development and studies. Agricultural developments are the outcome of agricultural policies from state and international actor's and scholars. Agricultural development also comes with it challenges. Therefore the challenges of agricultural development will be discussed in this unit.

2.0 Intended Learning Outcomes (ILOs)

It is expected that at the completion of this unit, the students should be able to;

1. Define Agricultural development
2. Conceptualize of Agricultural development, as well as identify and examine the challenges of Agricultural development.

3.0 Main Content

3.1 Definitions of Agricultural development

"Agricultural development is defined as the process that creates the conditions for the fulfilment of agricultural potential. Those conditions include the accumulation of knowledge and availability of technology

as well as the allocation of inputs and output" (De Laiglesia, 2006). "It describes the process of creating the circumstances for agricultural potential to be realised. The accumulation of knowledge and the availability of technology, as well as the allocation of inputs and outputs, are among these conditions" (BYJUS, 2022).

3.2 Concepts of Agricultural development

"Agricultural development promotes the proper conditions for farming so that planting, harvesting and processing of crops can be done effectively, which ultimately can reduce poverty and save lives" (Geri, 2022). "It enhances the growth rate of development in agricultural sector by boosting crop production and productivity that would assist in strengthening the farmers economically and enhancing their status and life-style" (Jackeline, 2008). "Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity, and feed a projected 9.7 billion people by 2050"(World Bank Group, 2022). Agricultural development plays a significant part in rural development.

Within its project form, agricultural development as explained by Law insider (2022), it means "a marketing, agribusiness development, seed capital, or research and development project designed to discover, develop, transfer, market, use, or commercialize existing or new agricultural products or processes in order to strengthen and enhance agricultural economic development in the state". While as a plan, Law insider (2022), explained it as "identifying crop types anticipated to be planted, anticipated for the expansion of agricultural or horticultural activities into areas of the farm management unit currently not cultivated and/or irrigated, and/or the amount of impervious surface planned on the farm management unit during the effective period of the water usage certification".

3.3 Challenges of agricultural development

Farmers need to deal with many problems, including how to: Cope with climate change, soil erosion and biodiversity loss. Satisfy consumers' changing tastes and expectations. Meet rising demand for more food of higher quality" (Syngenta, 2022). The main objectives of agricultural development are "the improvement of material and social welfare of the people" (Udemezue and Osegbue, 2018), however agricultural development comes with its challenges. These challenges include;

1. **Transportation:** Transportation is also a key component to agricultural development. Even if a farmer does grow enough agricultural items to sell, if there is no way to transport these products to the market, the farmer cannot sell the crops and make money (Geri, 2022).

2. **Land and land tenure system**: this is another challenge faced by farmers, espe- cially in developing and underdeveloped countries. Many small-scale farmers work on land that they do not own, decreasing their production level and increasing their poverty. "Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. (For convenience, "land" is used here to include other natural resources such as water and trees.) Land tenure is an institution, i.e., rules invented by societies to regulate behaviour. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints" (FAO, 2020).

3. **Poor storage system:** storage of farm products is important for farmers as it will ensure that they have either seeds of products for replanting and also preserved for export and exchange. This can lead to several problems, including reduced quality, reduced price, bacteria and mold growth, food spoilage through natural decay, and even food waste, which will costs billions of dollars annually worldwide. “Freshly harvested agricultural produce is a living thing that breathes and undergoes changes during post-harvest handling. This will lead to damages which will restricts the use of a product, and create loss which makes the usage of products impossible.

4. **Credit facilities**: credit facilities are important to farmer’s improvement and purchase of farm inputs and machines. The inability of farmers to access credits as loans for agribusiness can affect input and likewise impact on out-put. Most of the time the terms and condition placed by credit facilitators for farmers are high and cumbersome that it becomes impossible for farmers to access.

5. **Farm inputs and basic amenities:** Inputs are things put into the production process such as land, labour, implements, seed, mechanization (tractors) fertilizer, pesticides. Lack of basic social amenities such as pipe borne water, good roads and electricity in the local areas are problems that can hinder Agricultural development. In addition, health facilities are often absent or inadequate and where available is very costly. Inputs and basic amenities like “harrows, tractors, platers, etc., are grossly inadequate. Local amenities like hoe and cutlass can lead to low agricultural production or output. In the other hand farm tools and implements are expensive to purchase and

maintain, this could be a problem to farmers and agricultural productivity.

6. **Agricultural extension:** “extension programmes have been the main conduit for disseminating information on farm technologies, support rural adult learning and assist farmers in developing their farm technical and managerial skills”(Danso-Abbeam, Ehiakpor and Aidoo 2018). “Extension programmes will help increase Danso-Abbeam, Ehiakpor and Aidoo 2018). Farm productivity, farm revenue, reduce poverty and minimize food insecurity” its exclusion will lead to low farm productivity, decreased farm revenue, reduce poverty and minimize food insecurity.

7. **Government policies:** policies are plans or definite course or method of action to guide and determine present and future decisions. Most policies on agriculture are not prioritized to meet with the demands of farmers. Even when some policies on agriculture are made, critical stakeholders (farmers, agribusiness) are not consulted in policy decisions on agriculture. This impact on needs assessments and priority.

8. **Environmental problems**: “Environmental impacts are changes in the natural or built environment, resulting directly from an activity, which can have adverse effects on the air, land, water, fish, and wildlife or the inhabitants of the ecosystem”(Thomas, 2017). One problem that has impacted adversely on agricultural development is environmental problems. For instance environmental problems like climate change, increased ground-level ozone, changes in water availability, carbon dioxide fertilisation, soil degradation,

deforestation and land use change can significantly impact on agricultural development.

9. **Migration (rural-urban):** most rural population are engaged in agricultural production. However, the migration of rural farmers and population from the rural areas to the urban areas will create the gap in the necessarily population for agricultural development.

10. **Marketing system:** the products from agriculture need to be sold or marketed. However, the right price and marketing systems could significantly impact on the input derived from agricultural products. When the wrong marketing system is introduced for the produce of agriculture, the significant loss to the farmer and subsequently agricultural production.

11. **Diseases and pest control**: one major challenges of agricultural development is the problems of diseases and pest control. Pest and diseases have significant effect on agricultural productivity since it will reduce the quality of product and the input it will add to production.

Other challenges facing agricultural development as mentioned by Dawd, Montague and Barbara (2019) includes; growth of the farming population, loss of soil fertility, climate change, water scarcity, post-harvest losses, and limited market access.

4.0 Self-Assessment Exercise(s)

1. Provide your understanding of agricultural development
2. List and discuss the challenges of agricultural development

5.0 Conclusion

Unit 2 of module 1 discussed the definitions of agricultural development. It identified and discussed the concepts of agricultural development as well as the challenges of agricultural development in Nigeria. These challenges were discussed to elicit their relevance in the study of agricultural development.

6.0 Summary

The main point raised in this unit is that;

1. Agricultural development can be conceptualized within its project form, agricultural marketing and agribusiness development.
2. The main objectives of agricultural development are “the improvement of material and social welfare of the people. However, there are many challenges of agricultural development.

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Unit 3: Themes in Agricultural development and Sustainable agricultural development

Contents

1.0 Introduction

Unit 3 of module 1 is designed to acquaint student of major themes in agricultural development, the importance of organic farming, a review and an analysis of Sustainable agricultural development. The unit is also the discussion on the importance of conservation agriculture.

2.0 Intended Learning Outcomes (ILOs)

At the end of this unit; you should be able to understand and discuss

1. The major themes in agricultural development.
2. The importance of organic farming in sustainable agriculture.
3. The concept of sustainable agricultural development.

5. The importance of conservation agriculture.

3.0 Main Content

3.1 Major themes in agricultural development

Integrated farming: Integrated farming is a multifaceted approach to the introduction skill in different types of agricultural practices such as raising pigs and poultry, crop and vegetable farming, growing grass and aquatic plants and farming of fish (FAO/UNDP, 1978). Integrated Farming could also be referred to a “System (IFS) of an interdependent, interrelated often interlocking production systems based on few crops, animals and related subsidiary enterprises in such a way that maximize the utilization of nutrients of each system and minimize the negative effect of these enterprises on environment” (Shubham, 2022).

Conservation agriculture: Conservation agriculture has been identified as one of the technological options to meet the global challenges of increasing food production and conserving environment thereby improves food and nutritional security and alleviates poverty (Joshi, 2011). Adopting conservation agriculture practices entails a sustainable farming method is based on three principles: crop diversification, minimal soil movement and permanent soil cover (Donovan, 2020). “Conservation agriculture conserves natural resources, biodiversity and labor. It increases available soil water, reduces heat and drought stress, and builds up soil health in the longer term” (Donovan, 2020). Conservation agriculture is based on the interrelated principles of minimal mechanical soil disturbance, permanent soil cover with living or dead plant material, and crop diversification through rotation or intercropping. It helps farmers to maintain and boost yields and increase profits, while reversing land

degradation, protecting the environment and responding to growing challenges of climate change. “Conservation agriculture (CA) is characterized by minimal soil disturbance, diversified crop rotations, and surface crop residue retention to reduce soil and environmental degradation while sustaining crop production.

Conservation agriculture involves changing many conventional farming practices as well as the mindset of farmers to overcome the conventional use of tillage operations” (Mohammad and Kadambot, 2015). Peter (2007) defined as minimal soil disturbance (no-till) and permanent soil cover (mulch) combined with rotations, as a more sustainable cultivation system for the future. Is a way of farming that conserves, improves, and ensures efficient use of natural resources. It aims to help farmers achieve profits with sustained production levels while conserving the environment (Sustainable Agriculture Information Initiative, 2010). Conservation agriculture (CA) encompasses a set of complementary agricultural practices which enhances minimal soil disturbance (through reduced or no-tillage) in order to preserve soil structure, soil fauna and organic matter, permanent soil cover (cover crops, residues and mulches) to protect the soil and contribute to the suppression of weeds and diversified crop rotations and crop combinations, which promote soil micro-organisms and disrupt plant pests, weeds and diseases (European communities, 2009).

Conservation agriculture aims to boost agricultural production by optimising the use of farm resources and helping to reduce widespread land degradation through the integrated management of available soil, water and biological resources combined with external inputs. Mechanical tillage is replaced by biological mixing of the soil, whereby soil micro-organisms, roots and other soil fauna take over

the tillage function and soil nutrient balancing. Soil fertility (nutrients and water) is managed through soil cover management, crop rotations and weed management.

3.1.1 Importance of organic farming

Some of the importance and reasons for adopting of organic farming include;

1. The population of the planet is skyrocketing and providing food for the world is becoming extremely difficult. The need of the hour is sustainable cultivation and production of food for all (Miller, 2022).
2. The Green Revolution and its chemical-based technology are losing its appeal as dividends are falling and returns are unsustainable. Pollution and climate change are other negative externalities caused by the use of fossil fuel based chemicals (Miller, 2022).
3. “Protect the environment, minimize soil degradation and erosion, decrease pollution, optimize biological productivity and promote a sound state of health. Maintain long-term soil fertility by optimizing conditions for biological activity within the soil. Maintain biological diversity within the system. Recycle materials and resources to the greatest extent possible within the enterprise. Provide attentive care that promotes the health and meets the behavioural needs of livestock. Prepare organic products, emphasizing careful processing, and handling methods in order to maintain the organic integrity and vital qualities of the products at all stages of production” (The Ontario Ministry of Agriculture, Martin, 2009).
4. Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms. Nitrogen self-sufficiency

through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures (TNAU, 2016).

Biodynamic farming: Biodynamic farming is a form of alternative agriculture that takes an ecological and ethical approach to farming, food, and gardening. Biodynamic agriculture offers a way to maintain and restore ecological balance and organic harmony to your farm ground or garden, making efficient use of your farm's natural energy. Biodynamic farming and gardening is a way for land cultivators to develop a symbiotic relationship with their soil. Biodynamic practices take the life force and natural elements of the land into consideration when cultivating crops, establishing a more biologically harmonious environment and more efficient farm management (Finley, 2021). Biodynamics is a holistic, ecological, and ethical approach to farming, gardening, food, and nutrition (Biodynamic Association, 2022).
Biodynamic requires that a farm system itself produce its own fertility – meaning compost and nutrients as much as possible through the integration of livestock and the rotation of crops (Esha, 2017). This method of production was a sort of "holistic" approach based on treating the farm as a single organism and focused on a balanced management of agricultural products (plants and livestock) organic farming is attributed to Rudolf Steiner in 1924 (Brianna, 2022).

Agroforestry: Agroforestry is a management system that combines agriculture and trees to address conservation needs and build more profitable and weather-resilient farms, ranches and communities. Agroforestry practices provide opportunities to integrate productivity and profitability with environmental stewardship resulting in healthy and sustainable agricultural systems that can be passed on to future generations (USDA National Agroforestry Center, 2014).

“Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence” (FAO, 2015).

Permaculture: Permaculture is an approach to land management and settlement design that adopts arrangements observed in flourishing natural ecosystem. Merriam Webster (2020) defined permaculture as an agricultural system or method that seeks to integrate human activity with natural surroundings so as to create highly efficient self-sustaining ecosystems. “Permaculture is an innovative framework for creating sustainable ways of living, it is a practical method of developing ecologically harmonious, efficient and productive systems that can be used by anyone, anywhere” (Permaculture magazine, 2015).

The Twelve Principles of Permaculture include; “observe and interact, catch and store energy, obtain a yield, apply Self-Regulation and Feedback, use and value renewables, produce no waste, design from patterns to details and Integrate don't Segregate” (Waddington, 2022). The three basic permaculture ethics are: Care for the Earth, care for people, and take only your fair share (and return any surplus) (Finley, 2020).

“Permaculture gardens serve many functions. Rather than limit the garden to only one use, permaculture gardens employ a variety of uses. A permaculture garden provides food and medicinal crops, wildlife habitats, crafting materials, an attractive appearance, and a private, relaxing atmosphere throughout every season” (Tilley. 2021).

3.2 Sustainable agricultural development

“Agricultural sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs” (Brodt, Six, Feenstra, Ingels and Campbell, 2011). Therefore, long-term stewardship of both natural and human resources is of equal importance to short-term economic gain. Stewardship of human resources includes consideration of social responsibilities such as working and living conditions of laborers, the needs of rural communities, and consumer health and safety both in the present and the future. “An economically and socially sustainable agriculture system is one that enables farms of all sizes to be profitable and contribute to their local economies. Such a system supports the next generation of farmers, deals fairly with its workers, promotes racial equity and justice, creates access to healthy food for all, and prioritizes people and communities over corporate interests (Union of concerned scientist, 2017)”.

Agro ecosystems cannot be sustainable in the long run without the knowledge, technical competence, and skilled labor needed to manage them effectively (Brodt, Six, Feenstra, Ingels and Campbell, 2011). An example of sustainable agriculture Union of concerned scientist (2017) includes planting a variety of crops can have many benefits, including healthier soil and improved pest control. Crop diversity practices include intercropping (growing a mix of crops in the same area) and complex multiyear crop rotations. The goal of sustainable is to “meet society's food and textile needs in the present without compromising the ability of future generations to meet their own needs” agriculture (UC Sustainable Agriculture Research and Education Program, 2021).

3.2.1 Importance of conservation agriculture

Conservation agriculture enhances water intake that allows for more stable yields in the midst of weather extremes exacerbated by climate change. While conservation agriculture provides many benefits for farmers and the environment, farmers can face constraints to adopt these practices. Wetlands or soils with poor drainage can make adoption challenging. When crop residues are limited, farmers tend to use them for fodder first, so there might not be enough residues for the soil cover. To initiate conservation agriculture, appropriate seeders are necessary, and these may not be available or affordable to all farmers. Conservation agriculture is also knowledge intensive and not all farmers may have access to the knowledge and training required on how to practice conservation agriculture. Finally, conservation agriculture increases yields over time but farmers may not see yield benefits immediately (Donovan, 2020).

Other importance of conservation agriculture includes improving on the organic carbon stock, biological activity, above- and below-ground biodiversity and soil structure. Higher biological activity, the formation of well connected, mostly vertical soil macrobiopores that increase water infiltration and resistance to severe packing. Reduction in Soil degradation – in particular soil erosion and run-off, which will lead to soil and nutrient losses, in combination with more rapid pesticide breakdown and greater adsorption (due to the higher organic matter content and biological activity). Result in improved water quality. Carbon dioxide (CO2) emissions are lowered as a result of the reduced use of machinery and increased accumulation of organic carbon. CA practices could sequester. Reduction in labour and energy inputs related to land preparation and weeding. Conservation agriculture will also lead to reduction in fertiliser

requirements and soil restoration interventions (Sustainable Agriculture Information Initiative, 2010).

Organic farming: Organic farming (OF) is a farming system that uses environmentally friendly methods of weed, pest, and disease control. The principles and practices of Organic Farming have been expressed in the standards of International Federation of Organic Agriculture Movements (IFOAM) as the principle of health, ecology, fairness, and care (Šrůtek and Urban, 2008). International Federation of Organic Agriculture Movements (IFOAM) defined organic farming as “Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved…”The principal methods of organic farming include crop rotation, green manures and compost, biological pest control, and mechanical cultivation. It is an agricultural system that uses ecologically based pest controls and biological fertilizers derived largely from animal and plant wastes and nitrogen-fixing cover crops (Adamchak, 2021). “Organic farming uses fewer pesticides, reduces soil erosion, decreases nitrate leaching into groundwater and surface water, and recycles animal wastes back into the farm” (Adamchak, 2021).

Organic farming is a technique, which involves the cultivation of plants and rearing of animals in natural ways. This process involves the use of biological materials, avoiding synthetic substances to maintain soil fertility and ecological balance thereby minimizing pollution and wastage (Miller, 2022). Organic farming is a farming

method that involves growing and nurturing crops without the use of synthetic based fertilizers and pesticides. Also, no genetically modified organisms are permitted (Miller, 2022). The Ontario Ministry of Agriculture, Martin (2009) defined organic agriculture as a method of crop and livestock production that involves much more than choosing not to use pesticides, fertilizers, genetically modified organisms, antibiotics and growth hormones. It is a holistic system designed to optimize the productivity and fitness of diverse communities within the agro-ecosystem, including soil organisms, plants, livestock and people. The principal goal of organic production is to develop enterprises that are sustainable and harmonious with the environment. It is a m method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an eco-friendly pollution free environment (TNAU, 2016).

4.0 Self-Assessment Exercise(s)

1. List and discuss the major themes in agricultural development.
2. Provide a concise analysis of the importance of organic farming.
3. Discuss the following areas in the study of agricultural development; a. Biodynamic farming b. Agroforestry c. Permaculture
4. What is the meaning of sustainable agricultural development?
5. Discuss the importance of conservation agriculture.

5.0 Conclusion

In this unit we have been able to;

1. Discuss the major themes in agricultural development.
2. Review and do an analysis of the importance of organic farming
3. Discuss the areas in the study of agricultural development
4. An explanation of meaning of sustainable agricultural development as well as
5. Reviewed and discussed the importance of conservation agriculture.

6.0 Summary

The main area of focus in this unit is;

1. Conservation agriculture has been identified as one of the technological options to meet the global challenges of increasing food production and conserving environment.
2. Biodynamic farming, agroforestry, organic farming are some the options in agricultural sustainability and conservation agriculture.
3. Agricultural sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs.

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Unit 4: Agricultural practice and policies

Contents

1.0 Introduction

The unit is a review of Agricultural practice and policies; it also explains the concept of policy as well as identifying and reviewing the various agricultural policies in Nigeria, taking also a review on importance of agricultural policies in agricultural production. The identifiable problem of agricultural policies in Nigeria is also discussed.

2.0 Intended Learning Outcomes (ILOs)

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

1. Have an understanding of the Agricultural practice and policies; and also explain the concept of policy.
2. Discuss and review the various agricultural policies in Nigeria.
3. The importance of agricultural policies in agricultural production is identified.
4. The problems of agricultural policies in Nigeria are identified.

3.0 Main Content

3.1 Definitions of policy

Policy is a law, regulation, procedure, administrative action, incentive, or voluntary practice of governments and other institutions. Policy decisions are frequently reflected in resource allocations (Centre for Disease Control and Prevention, 2015). A policy is a high-level statement of enterprise beliefs, goals, and objectives and the general means for their attainment for a specified subject area (Wies, 1996).

Any given policy represents the end result of a decision as to how best to achieve a specific objective (Sherri, 2015). The duration of a policy may be characterized by a short, medium, or long term application (Wies, 1996).

Policies include guidelines, rules, and procedures established to support efforts to achieve stated objectives. Policy is defined as the value or perspective that underlies action (Jiliow, 2017).

3.2 Agricultural policies in Nigeria

The Agricultural Policy for Nigeria is a sectoral national policy in force for the period of 1985-2000. The main objective of the document is to further develop and improve the performance of the country's agricultural sector (FAO, 1985). Agricultural development is an integral part of national development. It is that aspect of development that is related to agrarian reforms (Daneji, 2011). Part of what the agricultural policy of Nigeria provided for includes;

1. Inclusive and efficient agricultural and food systems.
2. Provision for a water supply for food crop production to be increased through the construction of irrigation structures, dams and boreholes in strategic food crop production zones.
3. Selective subsidies which will be granted on farm inputs, farm equipment and facilities and farm services to reduce the cost of agricultural production and on agricultural product prices to enhance farmers' revenue (FAO, 1985).
4. Improvement and protection of arable lands useful for farming and protection of all resources on and under the ground.
5. Preservation of the farming environment to ensure sustainable production in agriculture.

6. Establishment of all necessary institutions to cater for needs of farmers and promote farming.
7. Attainment of complete self-sufficiency in all basic food products placing emphasis on those foods that takes up a good chunk of Nigerians foreign exchange, like rice.
8. Increase in quantity of agricultural-related raw materials produced to make them adequate for the industrial sector and remove the need for importation of such raw materials.
9. Increase in the quantity of exportable products being produced in an attempt to increase amount of foreign exchange Nigerian earns on such products towards diversifying the economy with increase in export base.
10. Modernization of all aspects of agriculture, like distribution, storage, processing and production. Implementation of proper management and viable technologies to ensure agriculture can meet with the needs and expectations of the other sectors towards further grooming of the economy.
11. Provision of more rural employment opportunities through agricultural development towards increasing farmers' incomes and bettering the lot of rural dwellers. This equally provides employment opportunity towards reducing unemployment rate (Nigerian finder, 2022).

Some of the other agricultural policies since the inception of independence include;

1. National commodity boards.
2. Agricultural Research Policy.
3. Agricultural Extension and Technology Transfer Policy.
4. Agricultural Mechanization Policy.
5. Water Resources and Irrigation.

6. Operation Feed the Nation.
7. River Basin Development Authorities.
8. National Directorate of Employment (NDE).
9. Arid Zone Afforestation.
10. Land Use Policy.
11. Directorate for Food, Roads and Rural Infrastructure (DFFRI).
12. Rural Bank Scheme.
13. Agricultural Credit Guarantee Scheme (Muktar, nd).
14. National Accelerated Food Production Programme (NAFPP) 1972-1973.
15. Operation Feed the Nation (OFN) 1976-1980.
16. Green Revolution Programme (GRP) 1981-1983.
17. Go Back to Land Programme 1983-1985

3.3 Importance of agricultural policies in agricultural production

Agricultural policies usually have major impact on profitability of the agricultural system and the welfare of farmers as they affect the flow of funds to the sector in terms of budgetary allocation, credit, subsides, taxes and therefore, must be in harmony and mutually reinforcing with the agricultural policies (Uche, 2011). Agricultural policies are important in providing guidelines and directions to be followed in improving domestic agriculture production, and thus reduce poverty. It also helps farmers to use improved inputs. Policies also help commercialization of small holder agriculture and increased value addition (Abdirahman, 2021).

“Agricultural policies take into consideration the value chain which starts with the preparation of production of a primary commodity and ends with the consumption of the final product and it includes all the economic activities undertaken between these phases such as: primary production, for instance, all processes of soil cultivation, crop establishment, fertilization, crop protection, harvesting and secondary like manufacturing or processing of goods which provides value addition to agricultural products, creating facilities for primary processing, delivery, and also activities performed during tertiary such as service sector wholesaling, retailing and banking” (Abdirahman, 2021).

Agricultural policy is important for the development of favourable and sustainable guidelines for the promotion of efficient agricultural practices that will guarantee food security, provide employment for the citizens, raw material for all agro – based industries as well as to earn foreign exchange (Akinbamowo, 2011). Agricultural policy also protects family farm incomes, supports the rural economy, ensures the production of high-quality safe food for consumers and protects rural landscapes and the environment (EU Division Department of Agriculture, Food and the Marine, 2019).

3.4 Problems of agricultural policies in Nigeria

Akarowhe (2018) listed the following problem of agricultural policies in Nigeria to include; Lack of adequate funding, Embezzlement, misappropriation of fund, Lack of sufficient agricultural extension service, Unclear/undefined objectives, Role conflict among various agric policies/programmes. While Okafor (2017) mentioned the lack of full non-participation of groups of stakeholders, increased poverty, and inaccessibility of essential social features with dwindling

economic success and failure of agriculture policies as some of the problems of agricultural policies in Nigeria.

Other problems include; the absence of Involvement of all stakeholders, weak agriculture development policies: agricultural policies should be specific and spelt out for the masses. The short duration of agriculture development policies, the inconsistency of regional agriculture development policies with the national policies, inadequate monitoring and evaluation of programmes (Okafor, 2017). Okuneye and Ayinde (2011) mentioned some of the agricultural development polices to include;

1. Lack of acceleration of increases in yields of commodities, farm resource productivity and sector growth in a sustainable manner.
2. Lack of a paradigm shift that has the composition of market oriented, investor-friendly and competitive agricultural systems.
3. Non participation of the organized private sector in a commercial basis which guarantees continual flow of investment resources, technologies, and entrepreneurial and technical capacities into agriculture.
4. Lack of economic policies that will attract the youths into agriculture with a view to empowering them and equip them to replace the aging farmers.
5. Disjointed linkage between the farmers and the industry's leading to low profitable production of highly needed raw materials in a continual basis beneficial to the buyers and the industries; and
6. Policy inconsistency and policy abortion or summersault.

“Lack of continuity and eagerness to be identified with a named policy intervention of successive government in our country has been the bane of the much desired rural and agricultural development and transformation to guarantee self-sufficiency in food and fibre” The inconsistency of regional agriculture development policies with the national policies: new agriculture policies and programmes, Policies should be monitored and evaluated purposely to determine achievements of rural/agriculture development programmes vis-à-vis the set policy objectives (IR Global, 2020).

4.0 Self-Assessment Exercise(s)

1. What is policy?
2. Discuss the major agricultural policies in Nigeria
3. Discuss the importance of agricultural policies in agricultural production.
4. Discuss the major problems of agricultural policies in Nigeria.

5.0 Conclusion

This unit has been able to explain what a policy is. It has also explained in clear term the major agricultural policies in Nigeria and also the importance of agricultural policies in agricultural production. The major problem of agricultural policies in Nigeria is reviewed.

6.0 Summary

The main point to note in this unit is that;

1. The failures of the agricultural policies in Nigeria is the making of both the stakeholders and level of inclusiveness.

2. Certain cultural factors constrain female in migration process.

3. Agricultural policies are important for agricultural development and productivity in Nigeria.

4. The failures of agricultural policies will constrain food product and development in Nigeria.

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Module 2: DEFINITION OF POVERTY AND MEANING OF POVERTY ALLEVIATION

Module Introduction

This Module has 4 units which contain an introduction of the units, the intended learning outcome, the main contents, a self-assessment, the conclusion, summary as well as the cited references.

Unit 1: Definition and scope of Poverty
Unit 2: Definition and meaning of Poverty reduction and alleviation
Unit 3: Agricultural Productivity and Poverty in Developing Countries
Unit 4: Agricultural Investment and Productivity

Unit 1: Definition and scope of Poverty

Contents

1.0 Introduction

Unit one (1) in Module 2 discusses the definition and concept of poverty; given the different conceptual definition form various authors. It also discusses the Indices of poverty.

2.0 Intended Learning Outcomes (ILOs)

At the end of this unit you will be able to;

1. Define poverty
2. Have an understanding of the indices of poverty.

3.0 Main Content

3.1 Definitions of poverty

Poverty refers to lacking enough resources to provide the necessities of life—food, clean water, shelter and clothing (WorldVision, 2022). Poverty is about not having enough money to meet basic needs including food, clothing and shelter (Economic and Social Inclusion, nd). However, poverty is more, and it encompases various indicators that looks at human index and development. Poverty can be defined as a state where one lacks access to basic needs such as food, clothing and shelter. It is also used to describe a person whose living conditions prevent them from being able to acquire education, seek medical help, secure a stable job, and participate in recreational activities due to a lack of money (Worldvision, 2022).

3.2 Concepts of Poverty

Quite a number of factors contribute to the concept of poverty, including political, economic, social, and cultural forces (Carney, 1992). There are two concepts of poverty in economics. They are absolute poverty and relative poverty.

1. Absolute Poverty: this is a situation where a person's income or consumption expenditure is so low that he cannot live at minimum subsistence level, he is said to be absolutely poor.
2. Relative poverty concept indicates inequalities of income. It is a concept used to imply that the people of low income groups are relatively poor as compared to the people whose incomes are high (Chand, 2021).

Poverty concepts have evolved in these three concepts which is based on ideas of subsistence, basic needs and relative deprivation (Ehrenpreis, 2006). The fullest definition of poverty recognizes that to be poverty-stricken is to be overwhelmed by need, unable to meet basic needs. Make a donation today to help meet the basic needs of

children living in extreme poverty (Compassion International, 2022). Within the monetary term, poverty can be said to be the state of one who lacks a usual or socially acceptable amount of money or material possessions.

3.3. Indices of poverty

“A poverty index measures the level of poverty in a society. In measuring the level of poverty, a poverty line or poverty threshold, usually stated in terms of income, is defined to divide the society into two separate groups. An individual is poor if that individual lives below the poverty line” (Buhong, 2019). The Multidimensional Poverty Index (MPI) published by the UNDP’s Human Development Report under the United Nations Development Programme, measures poverty across three dimensions—health, education and standard of living, which is further broken down into 10 indicators, namely; Nutrition, child mortality, years of schooling, school attendance, cooking fuel, sanitation, drinking water, electricity, housing and assets (WorldVision, 2022; SDSN, 2012).

Poverty is also looked through social indicators like: Illiteracy level, lack of general resistance due to malnutrition, lack of access to health care, lack of opportunities, lack of access to safe drinking water and lack of access to safe sanitation facilities. Poverty can also be measured using the following indicators; Earnings, unemployment and workers' compensation, social security, supplemental security income, public assistance, veterans' payments, pension or retirement income and interest (Institute for Research and Poverty, 2022).

4.0 Self-Assessment Exercise(s)

1. Define poverty
2. Discuss the concepts of poverty.
3. Discuss the indices of poverty.

5.0 Conclusion

In this unit you have been able to define poverty, the concept of poverty as well as the indices of poverty in Nigeria.

6.0 Summary

The focus in this unit is;

1. The Definition of poverty and as well as discussion on the concept of poverty is based on position of various authors.

2. Poverty index is measured using the level of poverty in a society. In measuring the level of poverty, a poverty line or poverty threshold, usually stated in terms of income.

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Unit 2: Definition and meaning of Poverty reduction and alleviation

Contents

1.0 Introduction

Unit 2 of module two explains the definition and the concepts of poverty alleviation, it also an explanation of agricultural development and poverty reduction linkages. The types of and pattern of agricultural development is discussed here.

2.0 Intended Learning Outcomes (ILOs)

At the end of this unit you should be able to;

1. Discuss the concepts of poverty alleviation
2. Reviewed linkages between agricultural development and poverty reduction
3. Types of and pattern of agricultural development is discussed.

3.0 Main Content

3.1 Definitions of Poverty Alleviation

Poverty could be seen in the prism of lack of income and productive resources sufficient to ensure sustainable livelihood, hunger and malnutrition, ill health, limited access to education and other basic services, increased morbidity and disease – related mortality, homelessness and inadequate housing, unsafe environments, and social discrimination and exclusion (Ogwuma, 1999 in Oviasuyi, 2020). Poverty alleviation is a set of measures, both economic and humanitarian, that are intended to permanently lift people out of poverty (Byjus, 2022).

3.2 Concepts of poverty alleviation

Poverty entails more than the lack of income and productive resources to ensure sustainable livelihoods. Its manifestations include hunger and malnutrition, limited access to education and other basic services, social discrimination and exclusion as well as

the lack of participation in decision-making (United Nations, 2020). Poverty alleviation is accompanied by a number of positive social impacts. These include improved access to food (that results in higher nutritional and health levels), improved access to education (due to higher income levels and ability to pay for fees and supplies), and improved employment opportunities (Carole and John, 2019).

Poverty alleviation aims to improve the quality of life for those people currently living in poverty. Poverty alleviation strategies may be categorised into four types including community organisations based micro-financing, capability and social security, market-based, and good governance (Pramod, 2020). There are numerous causes of for which there is concern for poverty alleviation. They include; inequality and marginalization, conflict, hunger, malnutrition, and stunting, poor healthcare systems, little or no access to clean water, sanitation, and hygiene, climate change, lack of education, poor public works and infrastructure (Concerned Worldwide, 2020). Poverty alleviation aims to improve the quality of life for those people currently living in poverty (Jordan. 2013).

3.3. Agricultural development and poverty reduction

Poverty is a significant and persistent problem in developing countries. Over 1.1 billion people live in households that earn a dollar a day or less per person. Almost half of the population of South Asia and Sub-Saharan Africa lives in absolute poverty; only East Asia has managed to substantially reduce the proportion of its population that is absolutely poor (Lynn and Lawrence, 2020). “The importance of agriculture for the reduction of poverty derives from three main facts; first in the developing countries poverty is disproportionately high and still relay on the agriculture development for income generation,

secondly most poor people households rely typically on agriculture for jobs or farming and thirdly the poor people have limited assets and also having no skills like other than manual labour to sell. Generally poor people are facing many obstacles and troubles in connecting with non-agricultural economy for jobs" (Abdul, Luan, Rafia and Muhhamad, 2016).

Agricultural growth stimulates economic growth in nonagricultural sectors, which, in turn, results in increased employment and reduced poverty. This further stimulates demand for agricultural goods, acting as a growth multiplier in the agricultural sector (Lynn and Haddad, 1994). Agricultural development can also stimulate economic development outside of the agricultural sector, and lead to higher job and growth creation. Increased productivity of agriculture raises farm incomes, increases food supply, reduces food prices, and provides greater employment opportunities in both rural and urban areas (There various ways by which agricultural development can be a tool for poverty alleviation.

The various ways include the creation of jobs on the land, linkages from farming to the rest of the rural economy, and a decline in the real cost of food for the whole economy (Xarvia, Lin, Colin and Steve, 2001). Increased productivity of agriculture raises farm incomes, increases food supply, reduces food prices, and provides greater employment opportunities in both rural and urban areas.

Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity, and feed a projected 9.7 billion people by 2050. Growth in the agriculture sector is two to four times more effective in raising incomes among the poorest compared to other sectors (World Bank, 2022). Agricultural progress is a potent

force in reducing poverty in developing countries. An OECD study finds that rapid and sustainable progress to reduce extreme poverty is next to impossible except where agricultural productivity increases and incomes increase for poor farmers (OECD, 2022).

A sustainable agricultural sector is responsible for provision of food for a country's increasing population; raw material for industries; employment Opportunities; and generation of foreign exchange for economic development (Bello, 2021).The agriculture sector is the backbone of an economy which provides the basic ingredients to mankind and now raw material for industrialisation. Raising supply of food by agricultural sector has, therefore, great importance for economic growth of our country (Brainly, nd). The agricultural productivity, an indicator of real agricultural growth, has played an important role in poverty reduction in rural areas as indicated by its higher elasticity for poverty reduction (Kumar, Kumar and Shamar, 2011).

"Agricultural income growth is more effective in reducing poverty than growth in other sectors because given that the incidence of poverty tends to be higher in agricultural and rural populations than elsewhere, and also most of the poor live in rural areas and a large share of them depend on farming and agricultural output for survival" (Cervantes-Godoy and Dewbre, 2010).

Singh (2020) highlighted the role of agriculture in economic development especially as it will stimulate the alleviation of poverty to include; industrial expansion, providing employment, resources for Capital Formation, supply of Foreign Exchange, shift of Manpower, supply of Food and Raw Materials, reduce Inequality, create Effective Demand and source of Foreign Exchange for the Country.

Christiaensen, Demery, and Kuhl (2006) study supports the overall premise that “enhancing agricultural productivity is the critical entry-point in designing effective poverty reduction strategies, including in Sub-Saharan Africa. These include the use of the right agricultural technology and investments.

“One of the fundamental postulates of economic development in developing and emerging economies is the alleviation of poverty through agricultural led growth. Long-run agriculture growth programme in line with overall economic development with strict implementation mechanism will enhance the tempo of agricultural growth towards poverty alleviation which will ultimately increase the speed of economic development (Hayat, Ali, Mateen and Bilal, 2019).

3.4 Types and patterns of agricultural development

There are patterns and types of agricultural development Marilou (2015), included;

1. Irrigation projects.
2. The promotion of scientifically developed cash crops through the provision of improved seeds, equipment and fertilizer (the so-called Green Revolution approach to making agriculture productive).
3. Providing credit for agricultural investments to stimulate agricultural production.

Aditya (2020) noted that from the point of agricultural development, and also citing Mellor’s agriculture three stages, note that the stages of agriculture development and pattern include; Traditional Agriculture, technologically dynamics agriculture-low capital technology and technologically dynamic agriculture high capital technology. The traditional agriculture is a technologically stagnant stage in which production is increased largely through slowly

increased application of traditional forms of land, labour and capital. The character of agriculture at this stage is declining income and productivity.

The technologically dynamics agriculture-low capital technology stage is characterized “a complex of technological changes which substantially increases the efficiency of agricultural processes and raises the rate of increase of agricultural production” and the technologically dynamic agriculture high capital technology, when agriculture has much of its relative importance in the generation of the National Income.

4.0 Self-Assessment Exercise(s)

1. Provide a concise meaning of poverty reduction and alleviation.
2. Discuss the link between Agricultural development and poverty reduction.
3. Discuss the types and patterns of agricultural development.

5.0 Conclusion

We have been able to discuss the meaning of Poverty reduction and alleviation, a review of Agricultural development and poverty reduction as well as the types and patterns of agricultural development.

6.0 Summary

The summary of this unit is that;

1. Poverty could be seen in the prism of lack of income and productive resources sufficient to ensure sustainable livelihood,

hunger and malnutrition, ill health, limited access to education and other basic services, increased morbidity and disease.

2. Poverty alleviation aims to improve the quality of life for those people currently living in poverty.

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Unit 3: Unit 3 Agricultural Productivity and Poverty in Developing Countries

Contents

1.0 Introduction

Unit 3 is of module 2 of the study guide is an analysis of Agricultural Productivity and Poverty in Developing Countries. The definitions of Agricultural productivity were reviewed. Other Key areas of analysis include the challenges of agricultural productivity in Africa. Incidences of poverty in developing countries, Agricultural Productivity and the Incidence of Poverty in developing Countries as well as the linkages between Agricultural productivity and poverty reduction

2.0 Intended Learning Outcomes (ILOs)

At the end of the study you will be able to have an idea of;

1. The linkages between Agricultural productivity and poverty reduction.
2. The challenges of agricultural productivity in Africa.

3.0 Main Content

3.1 Definitions of Agricultural productivity

Productivity is defined as the ratio of output to input. For example, labour productivity can be measured as the ratio of total output to hours worked. Yield is a measure of land productivity (Department of Agriculture, Water and the Environment Australia, 2020). Agricultural productivity is measured as the ratio of agricultural outputs to inputs. While individual products are usually measured by weight, which is known as crop yield, varying products make measuring overall

agricultural output difficult. It can be defined as a measure of efficiency in an agricultural production system which employs land, labour, capital and other related resources. The general factors determining agricultural productivity are as follows: Pressure of Population on Agriculture, Rural Environment, and role of Non-farm Services, size of Holdings and pattern of land tenure (Sinha, nd).

The department of Agriculture, Water and the Environment Australia (2020) noted that agricultural productivity is measured as the ratio of total output to total input. Output is measured as an aggregate index of crops, livestock, wool, dairy and other farm income; input is measured as an aggregate index of land, capital, labour, materials and services. Agricultural production can be improved through; implementation of land reforms, interplant, plant more densely, plant many crops, raised beds, smart water management, heat Tolerant Varieties (Tractor junction, 2022).

3.2 Challenges of agricultural productivity in Africa

“Sub-Saharan Africa is one of the world’s poorest regions. Its population and land area are approximately three times that of the USA. The region’s economies are heavily dependent on agriculture, which accounts for two-thirds of the labour force, 35% of GNP and 40% of foreign exchange earnings. Productivity performance in the agricultural sector is thus critical to improvement in overall economic well-being in Sub-Saharan Africa (Lilyan et al., 2004 in Urgessa, 2013). A lot of factors are responsible and serves as the challenges for low agricultural productivity in Africa. These challenges include; availability of improved or hybrid seed, lack of seed multiplication

capacity, low profitability and efficiency of fertilizer, lack of irrigation development, lack of transport infrastructure, inaccessibility of market and prevalence of land degradation, unfertile soil, overgrazing, deforestation and desertification are among the constraints to agricultural productivity (Urgessa, 2013).

Other challenges are identified as inappropriate land policies which reduce the provision of farmers with security but discourage gains in productivity and sustainable management of the natural capital constraints agricultural productivity in Africa (Jean-Claude, 2011). Development economists point to the fact that the low agricultural productivity in poor countries stems from the persistence of small non-mechanized farms (Md Mahbubur & Oksana & Raghav, 2018). Restricted usage of the advanced technologies has also constrained agricultural productivity in Africa. Population pressure, uneconomic holdings, uncertain Monsoons and inadequate irrigation facilities, subsistence nature of farming, decline in soil fertility, lack of support services, poor organisation of resources and lack of entrepreneurship

3.3 Incidences of poverty in developing countries

“1.3 billion people in 107 developing countries, which account for 22% of the world's population, live in multidimensional poverty. About 84.3% of multidimensionally poor live in sub-Saharan Africa and South Asia. 644 million children are experiencing multidimensional poverty” (World Vision, 2018). About 9.2% of the world, or 689 million people, live in extreme poverty on less than $1.90 a day, according to the World Bank (World Vision, 2018).

Factors like urbanization, population growth, a decrease in agricultural land and poor policy making are responsible for the increasing food insecurity in Asia. Lack of proper education also

causes poverty. Poverty entails more than the lack of income and productive resources to ensure sustainable livelihoods. Its manifestations include hunger and malnutrition (United Nations, 2021).

3.3.1 Agricultural Productivity and the Incidence of Poverty in developing Countries

“The broad consensus amongst donors and developing country governments that agricultural growth will directly benefit the rural poor and also improve the position of the urban poor by reducing food prices. “For the poorer developing countries, growth is dependent on increases in agricultural productivity, which provides sufficient food for a growing non-agricultural population” (Colin, Xavier, Lin, McKenzie-Hill and Steve, 2001).

“Improved technology produces agricultural productivity growth that drives a rural growth process that can be inherently pro-poor. It can; benefit poor farmers directly by increasing their production; benefit small farmers and landless labourers through greater employment; lead to lower food prices for all consumers; increase migration opportunities for the poor; benefit the rural and urban poor through growth in the rural and urban non-farm economy; lead to access to crops that are high in nutrients; empower the poor by increasing their access to decision-making processes, increasing their capacity for collective action, and reducing their vulnerability to shocks via asset accumulation” (Colin, Xavier, Lin, McKenzie-Hill and Steve, 2001).

In most sub-Saharan African countries, agriculture and the broader agri-food system remain the primary source of employment and incomes for most of the population. Hence, agricultural productivity growth (i.e., increases over time in the ratio of agricultural output to inputs) remains one of the key challenges to be addressed by African

governments, but it is by no means the only challenge, especially for fragile and resource-rich countries (Jayne, Louise, Keith, Fuglie, and Adesoji, 2021).

3.4 Agricultural productivity and poverty reduction

Evidence points to the issue that agriculture can contribute to poverty reduction beyond a direct effect on farmer's incomes (CEDEP, 2022); Agricultural development can stimulate economic development outside of the agricultural sector, and lead to higher job and growth creation. Increased productivity of agriculture raises farm incomes, increases food supply, reduces food prices, and provides greater employment opportunities in both rural and urban areas. Cervantes-Godoy and Dewbre (2010) revealed that while economic growth generally was an important contributor to poverty reduction, the sector mix of growth mattered substantially, with growth in agricultural incomes being especially important.

The key driver for increasing agricultural productivity and rising incomes is the adoption of innovative technologies and practices by farmers. This will enable farmers to raise yields, manage inputs more efficiently, adopt new crops and production systems, improve the quality of their products, conserve natural resources, and adapt to climate challenges (World, Bank, 2019). The numerous ways Africa can raise farm productivity and boost growth and reduce poverty in Africa. Develop high-yield crops, boost irrigation, increase the use of fertilizers, and improve market access, regulations, and governance, information technology and adopt genetically modified (GM) crops (Jones, 2015).

4.0 Self-Assessment Exercise(s)

1. Define Agricultural productivity.
2. What are the challenges of Agricultural productivity in Africa?
3. Discuss the linkages of Agricultural productivity and poverty in developing countries.

5.0 Conclusion

In this unit we have been able to conceptualize Agricultural productivity; reviews of the challenges of agricultural productivity in Africa as well as incidences of poverty in developing countries were discussed. Agricultural Productivity and the Incidence of Poverty in developing Countries were linked. We also reviewed the correlation of Agricultural productivity and poverty reduction in Africa.

6.0 Summary

In this unit we can summarize that;

1. Productivity performance in the agricultural sector is thus critical to improvement in overall economic well-being in Africa.
2. Restricted usage of the advanced technologies has also constrained agricultural productivity in Africa.
3. The key driver for increasing agricultural productivity and rising incomes is the adoption of innovative technologies and practices by farmers.

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Unit 4: Agricultural Investment and Productivity

Contents

1.0 Introduction

Unit 4 is of module 2 of the study guide is an analysis of Agricultural investment and Poverty in Developing Countries. The definitions of Agricultural productivity were reviewed. Other Key areas of analysis include the Challenges of agricultural investment and productivity in Nigeria as well as Agricultural Productivity in developing Countries.

2.0 Intended Learning Outcomes (ILOs)

After studying this unit, it is expected that;

1. Students can define Agricultural Investment.
2. The challenges of agricultural investment and productivity will be identified.

3.0 Main Content

3.1 Conceptualizing Agricultural investment

Agricultural sector contributes 25% of Nigeria's Gross Domestic Product (GDP) and accounts for 48% of the labour force. The sector's growth rate over the last 5 years averaged 4%. Crop production dominates the sector, accounting for 22.6% of GDP alongside livestock (1.7%), fisheries (0.5%) and forestry (0.3%) (Nigerian Investment Promotion Commission, 2022). "Investing in agriculture means putting your money behind food and crop production, processing, and distribution". As the world needs to feed a growing population and with less land, interest in agriculture production as an investment has grown right along with the world population (Linton, 2022).

Agriculture is a low-risk investment that keeps pace with inflation and increases in value over the long-term. They describe investment in agriculture as a tangible asset that provides benefit to the community, adding that it can diversify the investor's portfolio (Ojoye, 2019). “The expenditures on agriculture including short-term costs as well as long-term investments. Investment in agriculture includes government expenditures directed to agricultural infrastructure, research and development, and education and training” (Ishita, Sukalpa and Ishita, 2020).

3.2 Agricultural productivity in Developing countries

Knowledge dissemination through Agricultural Extension services and structure is very poor in developing countries, and other main reason is the mismanagement of utilization of available resources, and time of utilization of input is very important in productivity (Adnan, 2018). The agricultural productivity gap in developing countries According to national accounts data for developing countries, value added per worker is on average four times higher in the non-agriculture sector than in agriculture (Douglas, David and Michael, 2011).

According to data from national income and product accounts, this “agricultural productivity gap” (APG) is around a factor of four in developing countries, on average. These large agricultural productivity gaps have several important implications for developing countries. First, with minimal assumptions on production technologies, they imply that labor is misallocated across sectors (Douglas, David and Michael, 2011).

3.3 Challenges of agricultural investment and productivity in Nigeria

Problem with development system and policies, Use of low Inputs and technology that contributes for low productivity, low level of Agricultural Intensification, Slow pace of technology adoption and productivity, the available technologies inappropriate to local conditions and the low levels of capital available, Advanced technologies are not complemented with capital investment to increase labor productivity. Poor efforts for appropriateness of technology choices, low investment in agricultural research and development, less research and development support from high-income countries also accounts for the challenges of agricultural investment and productivity (Beemnet, 2018).

Other particular problems that hamper the competitiveness of producers especially the agricultural sector in LDCs include; the gradual removal of trade barriers, rising demand for higher quality products and higher standards, the continuous erosion of trade preferences and the costly compliance with the new trade rules (FAO, nd).

4.0 Self-Assessment Exercise(s)

1. What is Agricultural investment?
2. List and discuss the challenges of Agricultural investment and productivity in Nigeria.

5.0 Conclusion

In this unit we have made a narrative of what Agricultural investment is. It is stipulated that low investment in agricultural research and development, less research and development support from high-income countries also accounts for the challenges of agricultural investment and productivity.

6.0 Summary

We can summarize in this unit that;

1. Low investment in agricultural research and development, less research and development support from high-income countries also accounts for the challenges of agricultural investment and productivity.

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Module 3: State Policy and Agricultural Growth Process and Development in Poverty Reduction

Module Introduction

This Module has 4 units which contain an introduction of the units, the intended learning outcome, the main contents, a self-assessment, the conclusion, summary as well as the cited references.

Unit 1: Agricultural Policies and Formations
Unit 2: Stages in Agricultural Growth Process in Nigeria
Unit 3: Meaning and concept of Agricultural marketing and produce
Unit 4: Theories of agricultural development

Unit 1: Agricultural Policies and Formations

Contents

1.0 Introduction

Agricultural policies are paramount to the development of agriculture in Nigeria. Their success or however their failures will go a long way in deciding the development of agriculture in Nigeria. Therefore, in the unit 1 of module 3, the study guide, we will review the agricultural policies in Nigeria, examine the impacts of the agricultural policies in Nigeria, especially as it affect the development of agriculture as well as examine the challenges and problems of agricultural policies in Nigeria.

2.0 Intended Learning Outcomes (ILOs)

It is expected that at the end of this unit that students will be able to;

1. Identify and discuss the agricultural policies in Nigeria.
2. Identify the challenges of agricultural development in Nigeria.

3.0 Main Content

3.1 Agricultural policies in Nigeria

The Agricultural Policy for Nigeria is a sectoral national policy in force for the period of 1985-2000. The main objective of the document is to further develop and improve the performance of the country's agricultural sector (FAO, 1985). “The Policy envisages a series of measures to enable more inclusive and efficient agricultural and food systems. Among others, it provides for a water supply for food crop production to be increased through the construction of irrigation structures, dams and boreholes in strategic food crop production zones. Further, it notes that subsidies will be selectively granted on farm inputs, farm equipment and facilities and farm services to reduce the cost of agricultural production and if necessary, on agricultural product prices to enhance farmers’ revenue. Moreover, the document also pertains to growth of specific areas of agriculture, for example in the subsector of livestock and fish production. Finally, the document also ensures an effective and efficient utilization and conversion of agricultural by-products.

The following are some of the agricultural policies in Nigeria;

Farm Settlement Scheme (FSS): This was initiated by some regional governments in Nigeria and was a critical element of Western Nigeria Policy of Agricultural and Natural Resources of 1959. The main objective of this scheme was to settle young school leavers in a specified area of land, making farming their career thereby preventing them from moving to the urban areas in search of white collar jobs (RGlobal, 2020).

National Accelerated Food Production Programme (NAFPP): National Accelerated Food Production Programme (NAFPP) was an

agricultural extension pr ogramme initiated in 1972 by the Federal Department of Agriculture during General Yakubu Gowon's regime. The programme focused on bringing about a significant increase in the production of maize, cassava, rice and wheat in the northern states through subsistent production within a short period of time (RGlobal, 2020).

The Go-Back-to-Land Programme of 1983-1985: was a restoration of the elements of NAFPP after the military coup in 1985 (RGlobal, 2020).

Operation Feed the Nation (OFN): This programme evolved on 21st May 1976 under the military regime of General Olusegun Obasanjo ad remains one of the most widely-publicized agricultural programmes. The programme was launched in order to bring about increased food production in the entire nation through the active involvement and participation of everybody in every discipline thereby making every person to be capable of partly or wholly feeding him or herself (RGlobal, 2020).

Green Revolution (GRP): The programme was inaugurated by Shehu Shagari in April 1980 to increase production of food and raw materials in order to ensure food security and self-sufficiency in basic staples. Secondly, it aspired to boost production of livestock and fish in order to meet home and export needs and to expand and diversify the nation's foreign exchange earnings through production and processing of export crops (RGlobal, 2020).

Agricultural Development Projects (ADP): ADP formerly known as Integrated Agricultural Development Projects (IADP) was earlier established in 1974 in the North East (Funtua), North West (Gusau)

and North Central (Gombe) states as pilot schemes. The idea of Agricultural Development Programmes is an offshoot of the concept of integrated agricultural and rural development. It started in 1972 in Northern Nigerian towns of Gombe and Gusau with two pilot projects assisted by the World Bank (RGlobal, 2020).

River Basin-Development Authorities (RBDAs) (1976): The existing abundant water resources in the country and its potential for increasing agricultural production prompted the establishment of River Basin Development Authority (RBDA). The scheme became necessary because of persistent short rainy seasons in many parts of the country which has continued to restrict cultivation to single cropping pattern the year round. However, the establishment of various large-scale irrigation facilities the country witnessed unprecedented multiple cropping patterns (RGlobal, 2020).

National Agricultural Land Development Authority (NALDA): This was established in 1992 much more later than the Decree (Land Use Decree, 1978) and Act (Land Use Act 1979). The authority aims at giving strategic public support for land development, assisting and promoting better uses of Nigeria's rural land and their resources, boosting profitable employment opportunities for rural dwellers, raising the level/standard of living of rural people, targeting and assisting in achieving food security through self-reliance and sufficiency (RGlobal, 2020).

Directorate of Food, Road and Rural Infrastructure (DFRRI): The Directorate was initiated in Nigeria in January 1986 under General Ibrahim Babangida's administration. It was a kind of home grown social dimensions of adjustment (SDA) that was embarked upon in most sub Saharan African countries by the World Bank, African

Development Bank and the United Nations Development Programme (UNDP). The programme was designed to improve the quality of life (improvement in nutrition, housing, health, employment, road, water, industrialization etc) and standard/level of living of the rural dwellers through the use of many resources that exist in the rural areas and mass participation of the rural people (RGlobal, 2020).

Better Life Programme (BLP) For Rural Women: Better Life Programme (BLP) for rural women was founded in Nigeria by Mrs Maryam Babangida (wife of the then president of Nigeria) in 1987. The programme aimed at stimulating and motivating rural women towards achieving better living standards and sensitizing the rest of Nigerians to their problems. Others include; to raise consciousness about their rights, the availability of opportunities and facilities, their social, political and economic responsibilities; encourage recreation and enrich family life; and inculcate the spirit of self-development particularly in the fields of education, business, arts, crafts and agriculture (RGlobal, 2020).

Family Support Programme (FSP): was initiated in 1994 while FEAP was initiated in 1996 by late General Abacha and his wife, Mrs. Maryam Sani Abacha. This programme notably culminated in the creation of the Ministry of Women's Affairs and Social Welfare The programme stressed on areas like health, education, women in development, agriculture, child welfare and youth development, disability, destitution, income generation as well as facilitating the provision of shelter for the less privileged in the society from on-going housing programme of government (RGlobal, 2020).

National Fadama Development Project (NFDP): the first National Fadama Development Project (NFDP-1) was designed in the early 1990s to promote simple low-cost improved irrigation technology under World Bank financing. The main objective of NFDP- I was to sustainably increase the incomes of the fadama users through expansion of farm and non-farm activities with high value-added output The programme covered twelve states of Adamawa, Bauchi, Gombe, Imo, Kaduna, Kebbi, Lagos, Niger, Ogun Oyo, Taraba including the Federal Capital Territory (FCT) (RGlobal, 2020).

National Economic Empowerment and Development Strategy (NEEDS): NEEDS was initiated by Olusegun Obasanjo in 1999. The key elements of this development strategy included poverty eradication, employment generation, wealth creation and value reorientation. NEEDS provided help to agriculture, industry, small and medium scale enterprises and oil and gas (RGlobal, 2020).

National, Special Programme on Food Security (NSPFS): This Programme was launched in January 2002 in all the thirty six states of the federation during the Olusegun Obasanjo's regime. The broad objective of the programme was to increase food production and eliminate rural poverty. Other specific objectives of the programme were: assisting farmers in increasing their output, productivity and income; strengthening the effectiveness of research and extension service training and educating farmers on farm management for effective utilization of resources; supporting governments efforts in the promotion of simple technologies for self-sufficiency; consolidating initial efforts of the programme on pilot areas for maximum output and ease of replication; consolidating gain from on-going for continuity of the programme and

consequent termination of external assisted programmes and projects (RGlobal, 2020).

Root and Tuber Expansion Programme (RTEP): RTEP was launched on 16th April 2003 under Olusegun Obasanjo's administration. It covers 26 states and was designed to address the problem of food production and rural poverty. At the local farmers level, the programme hopes to achieve economic growth, improve access of the poor to social services and carry out intervention measures to protect poor and vulnerable groups (RGlobal, 2020).

Agricultural Transformation Agenda (ATA): The Transformation Agenda of the former president Jonathan administration identified seven sectors as the main growth drivers during the transformation period, 2011-2015, via: agriculture, water resources, solid minerals, manufacturing, oil and gas, trade and commerce as well as culture and tourism (RGlobal, 2020).

Agricultural Promotion Policy (APP): The new policy was geared towards the provision of a conducive legislative and agricultural framework, macro policies, security enhancing physical infrastructure and institutional mechanisms, so as to enhance access to essential inputs, finances, information on innovation, agricultural services and markets (Udegbunam, and Mojeed, 2020).

3.2 Impact of the Agricultural Policies in Nigeria

Agriculture as an indigenous occupation in Nigeria has gone through various phases of development. This development is an effect of government policies and state approach to agriculture which either demeans or heightens the impact of the Sector in the nation (RGlobal, 2020). Agriculture contributes immensely to the Nigeria

economy in various ways, namely, in the provision of food for the increasing population, supply of adequate raw materials (and labour input) to a growing industrial sector, a major source of employment; generation of foreign exchange earnings, and, provision of market (Uche, 2011).

The agricultural sector in Nigeria remains a dominant economic force, contributing 25.2 % (N10.50 trillion) to the nation's GDP as at 2019. While this might seem impressive, according to estimates Nigeria has also lost up to $10 billion (ten billion United States Dollars) in annual export opportunities from groundnut, palm oil, cocoa and cotton alone, due to continuous decline in the production of those commodities (Peachstone and Graeys, 2011).

3.3. Challenges and Problems of Agricultural policies in Nigeria

The Nigerian agricultural policies have undergone metamorphosis at several stages of the country's development, starting from the colonial era to the post-colonial era of 1963. In the early part of the post-colonial era, the country had a policy based on surplus extraction. This was later transformed to an export-led policy, which brought about an improvement in the economy of the nation (TheFinder, 2019).

There are numerous problems of the failures and challenges of Nigeria agricultural policies. However, the following are some of the challenges of Nigerian Agricultural policies; Lack of adequate funding, embezzlement, misappropriation of fund, lack of sufficient agricultural extension service, unclear/undefined objectives (Akarowhe, 2018). The lack of full non-participation of important

groups of stakeholders has led to the agricultural programmes policies failure, increased poverty, and inaccessibility of essential social features with dwindling economic success and failure of agriculture policies (Okafor, 2017).

Ambali and Murana (2017) identified some challenges facimg agricultural policies to include; Non Interaction between and among Stakeholders, the Appalling Level of Financing in Agricultural Sector in Nigeria, poor and Rudimentary Storage Culture, role Conflict between Different Programmes and Projects, short Duration of Agricultural Policies and Programmes, inconsistency and incompatibility of regional policies and programmes with the National Policies/Programmes, Emphasis on Mainly Food and Animal Production, misappropriation and Lack of Fund to Execute a Specific Policy/Programme, inadequate Virile Technical Advisory/Extension Services, lack or Inadequate Monitoring and evaluation of Programme and/or Project.

3.4 Global policies and Agricultural Development Programmes

Healthy, sustainable and inclusive food systems are critical to achieve the world's development goals. Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity, and feed a projected 9.7 billion people by 2050. Growth in the agriculture sector is two to four times more effective in raising incomes among the poorest compared to other sectors. Analyses in 2016 found that 65% of poor working adults made a living through agriculture (World Bank, 2022). Governments throughout the developing world want to provide the poor with an adequate diet and to promote a more productive and efficient agricultural sector.

Global policies on agriculture and development functions on a well defined agricultural policies, especially policies on farm output marketing system. Statutory monopolies, or marketing boards, are commonly used to control the purchase and export of individual crops, both in Africa and elsewhere. Governments usually justify their involvement in marketing with the argument that the private sector is inefficient and can be monopolized by a small number of traders (World Bank, nd).

Global agricultural programmes and policies are strategies and mechanism which helps government to carry out set goals and objective in order to improve the agricultural sector in the short- run and in the long-run the larger society as a result of the positive impacts of such programmes and policies. Globally, Agriculture it seems is back on the development agenda, seen as a key to spurring growth and reduction poverty, and as a key route to meeting the Millennium Development Goals. Continent-wide policy can safeguard each country's independence (Dastagiri, Gajula, Prasana and Immanuelraj, 2012).

4.0 Self-Assessment Exercise(s)

1. List and discuss some of the agricultural policies in Nigeria
2. Discuss the challenges for the failures of the agricultural policies in Nigeria.

5.0 Conclusion

In this unit we have been able to identify some of the agricultural policies in Nigeria. The challenges and also the failures of the agricultural policies in Nigeria were discussed.

6.0 Summary

We can summarize in this unit that;

1. The agricultural sector in Nigeria remains a dominant economic force, contributing.
2. Agriculture as an indigenous occupation in Nigeria has gone through various phases of development. This development is an effect of government policies and state approach to agriculture which either demeans or heightens the impact of the Sector in the nation.

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Unit 2: Stages in Agricultural Growth Process in Nigeria

Contents

1.0 Introduction

Mellor divides agriculture into three stages: Traditional Agriculture; Technologically Dynamics Agriculture Low Capital Technology and Technologically Dynamic Agriculture High Capital Technology (Ibirogba, 2018). However in this unit we will be reviewing the traditional stage of agriculture in Nigeria and the technology driven agricultural stage in Nigeria.

2.0 Intended Learning Outcomes (ILOs)

It is expected that student will be able to;

1. Identify the stages in agricultural development in Nigeria.
2. Explain Agricultural Value Chain and the Growth Process.

3.0 Main Content

3.1 The stage of traditional Agriculture

Nigeria as a country has progressed from the Traditional Agriculture stages down to the Technologically Dynamics Agriculture Low Capital Technology. However, we can say that there is a back and forth movement from the Traditional Agriculture stage to the Technologically Dynamics Agriculture Low Capital Technology. The colonial era in Nigeria (1861 to 1960) placed emphasis on research and extension services. One of the prominent steps of the era was the establishment of the Department of Botanical Research in 1893 in the former Western Nigeria (Ibirogba, 2018).

The traditional stage of agriculture in Nigeria is characterized by the use of crude implements for agricultural production. Farming was at

the subsistence level mainly for household consumption. Although the post-colonial period policies were formulated to actualise more equitable growth in agriculture, the earlier surplus extraction policies were quickly translated into the pursuit of an export-led growth. This led to the demarcation of the country into the Western Region (cocoa), Northern Region (groundnut) and Eastern Region (oil palm), and sequel to this, there was cocoa production revolution in the western region which successes were well renowned as the sources of revenue (Ibirogba, 2018).

Explicitly, the traditional period of agriculture in Nigeria is likened to Mello's traditional agriculture, where agriculture is "technologically stagnant stage in which production is increased largely through slowly increased application of traditional forms of land, labour and capital." The increase in output takes place through an essentially symmetrical expansion of all inputs or through increased input of the already abundant low productivity resources. Declining income and productivity per unit of an input is a common feature of this phase (Aditya, nd).

3.2 The stage of technology driven Agriculture

The technology driven stage of agriculture in Nigeria is characterized by the use of technological driven state of the art in agricultural practices. Improved agricultural technology adoption, such as using improved seed varieties, could inspire the changeover from the presently low productivity, peasant, and subsistence farming to commercial farming (which is able to produce surpluses). Improved agricultural technology adoption has the potential to deepen the market share of agricultural output through which the smallholder farmers' resource use and output diversification decisions could be

guided increasingly by their objective of profit maximization (Awotide, Karimov and Diagne, 2016).

Technological change has been the major driving force for increasing agricultural productivity and promoting agriculture development in all OECD countries (OECD, 2001).

3.3. Agricultural Value Chain and the Growth Process

A 'value chain' in agriculture identifies the set of actors and activities that bring a basic agricultural product from production in the field to final consumption, where at each stage value is added to the product (FAO, 2010). An agricultural value chain can also be explained as the people and activities that bring a basic agricultural product like maize or vegetables or cotton from obtaining inputs and production in the field to the consumer, through stages such as processing, packaging, and distribution (Modern agricultural value chains grow and become more sophisticated as countries industrialize and strengthen their position in global markets (FAO, 2010). A value chain is simply a useful way of understanding how the world of producing, buying and selling things works (Cuddeford, nd). The industrialization and strengthening of agricultural output in the global markets requires an agricultural investment strategy.

Investment is defined as additions to stock of capital that are the sources of future income streams, while commercialization should be understood to be the movement from a subsistence production system to a market-based system. The importance of investment derives from the fact that agricultural growth requires increasing doses of investible fund. This fund translates into capital, which, in turn, transforms various developmental variables to create the ultimate impact, which is economic growth and development (Manyong, Ikpi, Olayemi, Yusuf, Omonona, and Idachaba, 2003).

4.0 Self-Assessment Exercise(s)

1. Discuss the stages in Agricultural development in Nigeria.

5.0 Conclusion

In this unit we have been able to identify the stages of agricultural development in Nigeria. Agricultural Value Chain and the Growth Process were also discussed.

6.0 Summary

We summarize in this unit to say that two (2) key stages of agricultural development (Traditional and technology driven) were the stages of agricultural development in Nigeria.
People and activities process are the basic value Chain and the Growth Process in agricultural development.

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Unit 3: Meaning and concept of Agricultural marketing and produce

Contents

1.0 Introduction

In this unit the meaning and scope of Agricultural marketing is discussed. The unit also contains the information on the evolution of Agricultural marketing as well as the relationship between marketing and production.

2.0 Intended Learning Outcomes (ILOs)

It is expected that at the end of this unit review that students will be able to

1. Define Agricultural marketing
2. Identify and review the scope of Agricultural marketing
3. Discuss the relationship between marketing and production in agricultural development.

3.0 Main Content

3.1 Meaning and Scope of Agricultural Marketing

Agricultural marketing can be defined from both the micro and macro viewpoints. The micro view point is concerned with the individual participants in marketing be it the farmer or the business firm. From this perspective, agricultural marketing can be defined as the performance of all business activities which direct the forward flow of

goods and services to consumers in order to accomplish the producer's objectives. Many people consider marketing as equivalent to selling or transferring the product to another person for a price. Selling is central to the micro concept of marketing but it is only a part of it. Marketing includes packaging, storage, transportation, pricing, financing, risk bearing and even product design.

The macro view point of marketing on the other hand, is a "big picture" view. It examines the total system of economic activities concerned with the flow of agricultural products from producers to final consumers; the kinds of institutions and the price making mechanisms that guide those flows; the interactions among consumers, agribusiness firms, farmers, and even governments that determine the levels of expenditures; and the sharing of those expenditures as income to market participants. Marketing and markets are not the same thing and need to be distinguished from each other. Marketing involves all those legal, physical and economic services which are necessary to make products from the farm available to the consumers:

- in the form and amount desired by the consumers,
- at the place desired by the consumers,
- at the time desired by the consumers, at the price consumers and middle men are willing to pay to take possession.

Thus marketing leads to the creation of form, place, time and possession utilities. For example a ton of wheat grain produced in Kano or Bornu State does not give a bread consumer in Lagos satisfaction until it is transported to a flour mill where it is processed into wheat flour and further transported to a bakery in Lagos where it is transformed into the final product (bread) which gives the consumer the necessary satisfaction. A market on the other hand is

generally an area or setting in which price making forces (demand and supply) operate. It may be a city, state or a place of business in a given town. Such is referred to as a market place. A market also refers to any arrangement that brings buyers and sellers together, it could be physical contact between buyers and sellers or contact by letter writing, telephone, telex or through other means of communication.

3.2 Evolution of Agricultural Marketing

Modern marketing has evolved from a series of exchange systems. Initially, people were concerned with production for consumption and inter-household exchange. Such pattern of production was primarily subsistence in nature providing little or no room for specialization as each household had to produce practically all its need. The existence of marketing is a direct result of specialization of production in the economy. Initially, most farm families were self-sufficient or produced purely to meet subsistence needs. They produced most of the food crops and livestock products they needed on their small land holdings. For example, they ground their own cereal grains into flour, spun their fibre locally, butchered their meat etc. but with time people discovered that their limited and specific resource endowments and talents allowed them to produce some things better than others. Increased demand for goods and services produced out of the farm made specialization necessary. As the individual farmer specialized, it gave rise to the production of marketable surpluses which could not be exchanged easily for goods and services produced out of the farm.

Trade by batter was popular in the early days but due to its obvious disadvantages such as the necessity for double coincidence of wants, lack of unit of measure, difficulty of holding large stocks of

commodities in storage for future exchange etc, the use of money as a medium of exchange evolved. This marked the beginning of the development of an efficient marketing system. Thus with the development of an efficient marketing system, it becomes possible for consumers to enjoy what they cannot produce irrespective of the distance between them and the producers.

3.3 Relationship between Marketing and Production

In a simple sense marketing may be considered as activities which take place in the market. It is the collective term used to describe exchange between buyers and sellers, who attempt to maximize profit or subjective utility. It may be thought of simply as the process of making goods available for consumption. Marketing therefore covers all business functions, including production and in its broadest sense, it covers also all production decisions. If a farmer is producing at a commercial level, he has to think first and foremost of the market outlet for the proposed enterprise.

Thus decisions regarding the variety of crop to grow or the breed of animals to keep, are marketing decisions. Some scholars narrow down the definition of marketing. For example some do not believe that functions such as storage, transportation and processing are part of marketing. Such scholars define marketing essentially as information gathering and communication while others go further by confining marketing to the exchange function only. Although these more restrictive definitions are defensible, they do not entirely escape the production-marketing paradox because communication and negotiation of exchange require productive-resources, at least that of human labor. Resources are combined in various forms in the production process to generate the output, thus production creates utilities.

Marketing on the other hand creates utilities of form, place, time and possession with the goods and services produced. Marketing is therefore part and parcel of the production process. It supplements production in that it makes what is produced available to consumers and users at the time, place and form required. Marketing thus constitutes a bridge between production and consumption.

3.4 Assessing the agricultural marketing theory

Since the 1950s (Kotier, 1967; McCarthy, 1964; Kohls, 1955), is of the idea that general marketing and agricultural marketing theory seem different branches of marketing. This divergence is not fruitful for agricultural marketing. Some scholars in agricultural marketing have been aware of this gap between agricultural marketing and general marketing theory. For instance, Polopolus stated in his presidential address to the American Association of Agricultural Economists: 'There are more arguments that marketing agricultural products is not an isolated operation but an integrated operation' (Polopolus, 1982). Also, various agricultural economists have partially incorporated the marketing management approach in agricultural marketing theory (e.g. Breymeier, 1976; Bateman, 1976; Shaffer, 1983; Padberg & Westgren, 1983; Purcell, 1979; Yon, 1976; Besch, 1981).

In this contribution it is claimed that also in agricultural marketing theory the basic approach to marketing problems should be 'marketing management'. Examining the above, first, the evolution of general marketing and agricultural marketing is discussed briefly as mutually interdependent phenomenon. The discussion is confined to the main similarities and differences of both disciplines. Within a systems framework the marketing management approach to agricultural marketing is elaborated. It is argued that better

coordination between general marketing and agricultural marketing as a discipline is advantageous to agricultural marketing theory. Finally some conclusions are drawn.

The evolution of general marketing and agricultural marketing theory

The Period 1910-1950: the beginning of marketing thought, agricultural marketing and general marketing theory are similar. According to Bartels, 'The beginnings of marketing thought might be dated at the beginning of the twentieth century, for it was between 1900 and 1910 that "marketing" was conceived or discovered and initial expression was given to ideas which became incorporated in the body of marketing thought', and, according to the same author, 'Marketing was a discovery only as "marketing" and is recognized as an idea and not simply as an activity. Until the idea was conceived to which the term "marketing" was applied the simple activity had been called only "trade", "distribution" or "exchange"' (Bartels, 1970). The basic theme of marketing in the 1920s were the activities involved in the transfer of goods and in the exchange of title (Bartels,1970). Three classic approaches to marketing problems were developed namely; the functional, institutional and commodity approach.

These approaches were also taken by agricultural marketing. In fact in the beginning of marketing as a discipline agricultural marketers contributed to general marketing theory. Amongst others, Weld, an agricultural marketer, contributed to the functional approach (Weld, 1920). While from 1920 to 1950 research and conceptual thinking about marketing expanded substantially, in the United States in particular, the functional, institutional and commodity approach in marketing prevailed yet (e.g. Bartels, 1970).

The resemblance between agricultural marketing and general marketing until about 1950 may be brought about by (a) the centrality of distribution problems in marketing and (b) the predominantly economic approach towards marketing problems: 'Where the pre-1940 period was preoccupied with trying to make the same product cheaper the postwar period saw a new dimension added to the competition in which the focus was to try and make the old product better, or even more bold, to try and launch a new product' (McKitterick, 1957). The congruence between general marketing theory and agricultural marketing as a discipline appears also from early definitions of marketing: 'Those business activities involved in the flow of goods and services from production to consumption' (National Association of Marketing Teachers, Autumn 1935) and 'those efforts which effect transfers in the ownership of goods and services and care for their physical distribution' (Clark & Clark, 1947), or 'Marketing is the economic process by means of which goods and services are exchanged and their values determined in terms of money prices' (Duddy & Revzan, 1953).

These definitions compare well with definitions of agricultural marketing in the 1970s: 'Marketing is the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they are in the hands of the ultimate consumer' (Kohls & Downey, 1972). Also in Europe where, at least in the non-Anglophone countries, the term 'marketing' was not used until 1950, and study of the commercial process concentrated on marketing functions such as collection/assembling, sorting, storage and transport.

In Germany and the Netherlands economic study of these marketing functions was investigated in the analysis of 'Handel' (e.g. Schär,

1921, being quoted in Muiswinkel, 1962). Redlich developed a system of functions performed by the trader, similar to the marketing functions (Redlich,1932). After the second world war, markets for many consumer goods changed from 'sellers' markets to 'buyers' markets, amongst other things because of increasing disposable income of consumers, because of increasing production capacity of industries and because of expanding international trade. In conjunction with this change of markets the main change in general marketing was the shift towards marketing management: decision-making with respect to the marketing mix (product, price, promotion, distribution) on the basis of consumer orientation. Marketing became multidisciplinary, in some instances even interdisciplinary: increasingly concepts and research methods were used from behavioral sciences, decision sciences and systems theory. Marketing changed from the consensus 'marketing is essentially an economic activity' and 'the initiator of marketing activities and programmes is the marketer and not the consumer' towards 'marketing is essentially "the exchange of values"' and 'the consumer is more powerful than the marketer', consequently 'behavioral perspectives in place of economic perspectives' are more important 'to develop a realistic marketing theory' (Sheth & Gardner, 1982).

General marketing theory centred on marketing management, that is defined as 'the analysis, planning, implementation, and control of programmes designed to create, build, and maintain beneficial exchanges and relationships with target markets for the purpose of achieving organizational objectives' (Kotier, 1984).

Of course, the importance of consumers and of managerial decision-making was recognized also in the 1930s but did not play such a central role in marketing theory yet the trade structure was regarded

as an impenetrable barrier (McKitterick, 1957). Since the firm establishment of the marketing management approach various new developments emerged in marketing discipline, which are essentially based on marketing management. Some important developments are:

- specialization of marketing management to its use in specific organizations, companies, institutions and markets, such as non-profit marketing, retail marketing, industrial marketing (the marketing of raw materials, capital goods and other production means to producers), marketing of services and export marketing.

- A specific theoretical view towards marketing. Carman (1980) distinguishes six paradigms of marketing: 'the microeconomic paradigm which looks at an abstraction of a market, usually pure competition in a one level structure; the persuasion/attitude change paradigm focusing on one aspect of the process of marketing- the information and persuasion required by one actor to achieve a desired behavior from another; the conflict resolution paradigm whose theories largely have been captured by other paradigms; the general system paradigm, focusing on the interrelationships between institutions in a system; the functionalist paradigm, concerned with decision-making regarding the functions performed by institutions within society; and the social exchange paradigm focusing on the phenomenon of exchange between social actors or institutions regardless of the functions being performed or the institutions involved'.

- Marketing at the level of business units: strategic marketing; marketing at sector level, sector marketing; and marketing from a societal perspective, macro-marketing. These extensions have broadened the marketing discipline as appears from recent definitions, such as those activities that relate an organization

successfully to its environment' (Hughes, 1978) or 'Marketing is a social process by which individuals and groups obtain what they need and want through creating and exchanging products and value with others' (Kotier, 1984). However, there seems to be consensus about what general marketing theory is concerned with. Hunt (1983) summarizes this as follows: 'The behaviors of buyers directed at consummating exchanges; the behaviors of sellers directed at consummating exchanges; the institutional framework directed at consummating/facilitating exchanges; the consequences on society of the behaviors of buyers, the behaviors of sellers and the institutional framework directed at consummating and/or facilitating exchanges.

‘Since the 1950s agricultural marketing has not kept track with general marketing discipline: the marketing management approach did not get foothold in agricultural marketing. Possibly the following reasons have brought about this different evolution: - individual farmers have scarce contacts with the final consumer, and have limited capacities for managing the marketing mix (price, product, promotion and distribution);

- Agricultural marketing is operating often within institutional and technical constraints, like those of government policies;

- The strong adherence of agricultural marketing to economic theory as its scientific foundation, also after 1950, interferes with a multidisciplinary approach to agricultural marketing.

These arguments, however, do not justify that agricultural marketing discipline should refrain from marketing management.

Thus, it seems appropriate to review some important developments in agricultural marketing. While agricultural marketing had absorbed to a limited extent only developments in general marketing theory since the 1950s, has expanded substantially in its familiar field, for

example: market structure analysis (Marion & Mueller, 1983; Connor et al., 1985), marketing efficiency studies (French, 1977), regional and spatial analysis (Takayama & Judge, 1971), economic demand analysis and price analysis (Fox, 1953; McFarquhar, 1971; Tomek, 1983; Wöhlken, 1979) and marketing institutions like future markets, marketing cooperatives and marketing boards (Hoos, 1979; Working, 1953; Gray, 1963).

4.0 Self-Assessment Exercise(s)

1. What is Agricultural Marketing
2. Discuss the evolution of Agricultural Marketing

5.0 Conclusion

In this unit we have able to define Agricultural Marketing, the evolution of Agricultural Marketing have also been reviewed in the unit.

6.0 Summary

Modern marketing has evolved from a series of exchange systems. Agricultural marketing can be defined from both the micro and macro viewpoints. The micro view point is concerned with the individual participants in marketing while the macro view point of marketing on the other hand examines the total system of economic activities concerned with the flow of agricultural products from producers to final consumers.

7.0 References/Further Readings

Module 4: Sustainable Agriculture and Rural Urban Poverty Transition

Module Introduction

This Module has 3 units which contain an introduction of the units, the intended learning outcome, the main contents, a self-assessment, the conclusion, summary as well as the cited references.

Unit 1: Meaning and concept of sustainable Agriculture
Unit 2: Sustainable agriculture; issues and problems
Unit 3: Agricultural Sustainability and the livelihood of poor people

Unit 1: Meaning and concept of sustainable Agriculture

Contents

1.0 Introduction
2.0 Intended Learning Outcomes (ILOs)

1.0 Introduction

Sustainable agriculture is been project as the way forward for food security and availability in the world today. Agriculture has both sustained the rural and urban space. In this unit, the definintion and concepts of sustainable agriculture is discussed. Also the major issues that led to the adoption of sustainability in agricultural development is explained.

2.0 Intended Learning Outcomes (ILOs)

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

1. Define and understand the concept of sustainable agriculture from the positions of various thinkers or authors
2. Have an understanding of the origin and development of sustainability in agricultural discourse
3. List and discuss the major issues that led to the adoption of sustainability in agricultural development.

3.0 Main Content

3.1 Meaning of sustainable agricultural

Sustainable agriculture is the act of farming using principles of ecology, the study of relationships between organisms and their environment. It has been defined as an integrated system of plant and animal production practices having a site-specific application that will last over the long term Das, Mohanty, Sahu, & Sarkar (2020). In agriculture, sustainability is a complex idea with many facets which includes social (having a fair deal with its workers as well as a mutually beneficial relationship with the encircling community), economic (should be a profitable business contributing a robust economy) and environmental (having potential to attenuate air, water and climate pollution, build and maintain healthy soil, manage water wisely and promote biodiversity) aspects. In order to fulfill these criteria, working with the nature will be beneficial rather than working against it. To move in this direction, the following things are to be kept in mind-

- Irreversible changes to the land (e.g., erosion) should be avoided.
- Careful and minimal use of natural resources (e.g., water, energy, soil, plants, animals, biodiversity, ecosystems etc.) should be ensured.
- As long-term stability and productivity are the prerequisites for sustainable agriculture; rather than its complete self-sufficiency, more renewable and varied resources (e.g., wind energy, solar energy etc.) should be used.

- Enough income should be produced to stay on a farm in face of worldwide farm consolidation and infrastructure development.
- The “3 R concept” should be given utmost importance- Reduce, Reuse and Recycle. This will make the farming not only sustainable but also economically feasible. After all, ‘Waste is not waste until we waste it!’
- Diversity within and surrounding the farm should be encouraged. Choosing poly-culture over monoculture (e.g., multi-year crop rotation, inter-cropping, mixed cropping etc.), growing cover crops during off-season when soils might otherwise be left bare, planting trees around the farm (e.g., agro-forestry practices) that will act as windbreaks and also provide habitat for local birds (which can prey on insects that prey on crops), promoting and tolerating natural predators that keep pests away (e.g., snakes that feed on gophers, ladybugs that feed on aphids, spiders that feed on insects which spread diseases to crops).

Similarly, the Oregon State University (2022), saw the term "sustainable agriculture" as created on the word sustain. Thus, before discussing the term "sustainable agriculture" it is helpful to examine a definition of the word sustain. Sustain includes the idea of "keeping up", "supporting" "enduring" and prolonging". Thus, sustainable agriculture implies agricultural systems that will b be prolonged, that is, it will continue to operate over a long period of time. There are many ways to describe how agriculture can be sustainable. The following list summarizes key components of sustainable agricultural systems that have been suggested by various authors;

- A careful stewardship of the earth.
- The maintenance of the earth's biological systems.

- The maintenance of nutrient cycles.
- An ability to meet the need for food indefinitely.
- A system that produces food at a socially acceptable environmental cost and acceptable balance of environmental and economic concerns.
- An incorporation of biological processes such as: nitrogen fixation and beneficial insects into food production.
- Minimal use of off-farm inputs.
- Use of crop rotations to control weeds, diseases and insect pests.
- The use of integrated pest management.
- The use of no-till or minimum-tillage cropping systems.

In a similar way, the American Society of Agronomy has developed the following definition of sustainable agriculture: “A sustainable agriculture is one that, over the long term, enhances the environmental quality and the resource base on which agriculture depends; provides for basic human food and fiber needs; is economically viable; and enhances the quality of life for farmers and society as a whole" (Franci, and Youngberg, 1990).

Sustainable agriculture has evolved from three perspectives: as a system of production to achieve food self-reliance; as a concept of stewardship; and as a vehicle for sustaining rural communities. The concept of sustainability is not new to farming practice, agricultural science, or even to agricultural policy. It is now considered to have been a part of theory and practice in English agriculture for several hundred years until the mid-19th century. The repeal of the English Corn Laws played a major role in the demise of sustainable practices because it signified a shift away from food self-reliance. The back-to-the-land and vegetarian movements of 19th century USA helped shape perceptions of appropriate production practices, and of the

kind of communities to support, and to be supported by, the development of sustainable systems. The term organic, as a descriptor for certain sustainable agriculture systems, appears to have been first widely used by Lord Northbourn (1940) in his book "Look to the Land". Northbourn used the term to describe farming systems that focused on the farm as a dynamic, living, balanced, organic whole, or an organism. The term, thus, had broader meaning than just the use of living materials to achieve farming objectives, a restrictive definition that is often erroneously implied today.

Its original meaning, then, is much closer to the origin of the term organic used in organic chemistry, the study of the chemistry of organisms. Unfortunately, many scientists continue to equate the term with the present-day meaning of organic chemistry, the study of carbon-containing compounds. The term organic was first widely used in the USA by J.I. Rodale, founder of Rodale Press, in the 1950s. Rodale was both the popularizer of the term organic (and by implication notions of sustainability), but also, in the scientific community, the inspiration for the denigration of the term. Rodale failed to convince scientists of the validity of his approach because of his reliance on what were perceived to be outrageous unscientific claims of organic farming's benefits. This was unfortunate as a number of scientists in the USA and Europe were investigating and promoting sustainability in agriculture at the time, most notably Sir Albert Howard and William Albrecht.

The scientific and governmental fascination with using agrichemicals, monoculture, and specialized equipment for food production severely constrained professional interest in questions of sustainability. One other important historical influence on the development of sustainable agriculture was the research on the connection between the condition of the soil, food quality, and human health. Some members of the

medical community in the UK had been performing clinical research experiments on the subject since early in the 20th century. This community was of the view that human health was greatly negatively affected by poor soil management practices in agriculture, particularly poor organic matter management. Although some scientists played a significant role in the early development of sustainable agriculture, almost all scientific disciplines have ignored it, with the notable exception of ecology and agro-ecology.

Agro-ecology has been used since its inception as a means to help explain why sustainable systems are successful, agro-ecologists are now having an influence on our perceptions of sustainability. It is now apparent how agro-ecological principles can be used to design sustainable farming systems. Recently, concepts of sustainable yield in fisheries have contributed to our understanding of sustainability in agriculture.

3.2 Concept of rural urban poverty

It is necessary we understand the link between rural-urban poverty by deconstructing the complex dimensions and conceptualization of poverty. The term poverty has no universally accepted definition because it connotes both subjective and objective economic, social and environmental and spiritual interpretations by different people and culture of the world. Authors have been confronted overtime on what is poverty and who should define it? Most definitions associate poverty with a “lack” or “deficiency” of the necessities required for human survival and welfare. However, there is no consensus about what basic human needs are or how they can be identified.

Two main approaches are discussed here: conventional economic definitions which use income, consumption, or a range of other social indicators to classify poor groups against a common index of material

welfare; and alternative interpretations developed largely by rural anthropologists and social planners working with poor rural communities in the Third World, which allow for local variation in the meaning of poverty, and expand the definition to encompass perceptions of non-material deprivation and social differentiation.

Conventional definitions

a. Definitions based on income or consumption: Few economists would argue that human welfare can be adequately described by income alone. Yet, in practice, income (or consumption) is the most frequently used proxy for welfare. The justification is that (in market-based economies) lack of income is highly correlated with other causes of poverty and is a predictor of future problems of deprivation. Underlying the economists' concept of poverty is the idea of merit goods: goods that society agrees are necessary, and is prepared to ensure that members of society can achieve.

   This is less problematic in the North, where poverty is generally a minority problem, than in the South, where it can be argued that the majority fail to achieve the minimum acceptable standard of living and that society lacks the capacity to make good the deficit Income is defined as command over resources over time or as the level of consumption that can be afforded while retaining capital intact. People are classified as poor when their income (or consumption) is less than that required to meet certain defined needs. For example, the World Bank's World Development Report uses two income cut-off points or poverty lines: those with an income per capita of below US$ 370 per year Washington DC, May; also, (at 1985 purchasing power parity) are deemed poor, while those with less than US $275 per year are extremely poor.

In 1994, 1,390 million people were estimated to fall into the “poor” category. Within countries, income and consumption data have been used by the Bank to distinguish different groups such as the “new poor” (the direct victims of structural adjustment), the “borderline poor” (those on the brink of the poverty line, who are pushed under it by austerity measures) and the “chronic poor”, who were extremely poor even before adjustment began. In addition to calculating the headcount index (the proportion of the population below the poverty line), the Bank assesses the severity of poverty by calculating the poverty gap index (the ratio of the gap between the poverty line and the mean income of the poor expressed as a ratio to the poverty line).

Income-defined poverty lines are problematic for a number of reasons. Income is a useful indicator if we want to identify which people are likely to lack the resources to achieve a socially acceptable standard of living. However, it does not measure accurately their capacity to achieve access (which may be influenced by other factors such as education, information, legal rights, illness, threatened domestic violence or insecurity). Incomes are commonly analyzed at the household level. Yet, individual members of a household do not have equal command over resources, and those with low entitlement to consume resources (due, for example, to their age, gender or social status) may be hidden within relatively prosperous households (10) Moreover, adjustments have to be made in order to compare households of different size. Needs are equally difficult to define in a standardized way.

The items which people regards as essential are influenced by culture and personal preference, and vary from individual to individual. Warm clothing and heating may be required to keep an old

person alive in a London winter but these would be unlikely priorities in Mombasa. Both needs and living costs may vary considerably between rural and urban areas, and between urban settlements of different sizes. Certain
basic items – including fuel, freshwater and building materials have to be purchased in most urban areas, but can be obtained free (apart from the opportunity costs of time and labour spent in collection), or are much cheaper, in many rural areas in the South. Rural dwellers can, in addition, obtain some of their food free from common lands, forests, rivers, lakes or coastal waters – although subsistence agriculture is widespread in urban areas, rent is often payable for the land used. Dietary preferences are likely to vary according to location: in cities there is greater availability of imported foods, promoted through advertising; different working patterns (including, in many countries, higher female participation in the paid labour force), which makes it convenient to purchase prepared meals and snacks; less space at home in which to cook and entertain friends and relatives, reinforcing the need to purchase prepared foods from outside; and possibly, some variation in calorific requirements. It has been estimated that urban food costs are generally 10–15 per cent higher than those in rural areas.

Typically, housing costs are far higher in cities and are a major expense of urban households. In larger cities, people who work in or close to the centre face a trade-off between living in cheaper housing on the periphery and the high monetary and time costs of transport from the suburbs. The poor tend to pay proportionately more for their housing than the better-off, since the unit cost of renting small areas of accommodation in overcrowded, un-serviced and dangerous neighborhoods near the centre can exceed the costs of renting the same amount of accommodation in a higher-quality area (the problem for the poor is that accommodation in up-market areas is

available in larger, non-divisible units or in locations inaccessible to those relying on their feet or public transport to move around). In recognition of these differences, it is common to use separate cut-off levels for urban and rural poverty. However, this is a crude refinement, and cannot capture accurately the diversity of needs and entitlements coexisting within urban and rural populations.

b. **Absolute and relative definitions of poverty**

If poverty is defined in absolute terms, needs are considered to be fixed at a level which provides for subsistence, basic household equipment, and expenditure on essential services such as water, sanitation, health, education and transport. The absolute definition is in common use by the World Bank and governments. However, it does not describe the extent of income inequality within society nor the fact that needs is socially determined and change over time. The absolute definition has to be adjusted periodically to take account of technological developments such as improved methods of sanitation.

The concept of relative poverty is more flexible, and allows for minimum needs to be revised as standards of living in society alter. It reflects the view that poverty imposes withdrawal or exclusion from active membership of society: people are relatively deprived if they cannot obtain "... the conditions of life – that is the diets, amenities, standards and services-which allow them to play the roles, participate in the relationships and follow the customary behaviour which is expected of them by virtue of their membership of society."(13) Under this definition, there could in theory be a higher incidence of poverty in London, New York or Tokyo than in Delhi, Lusaka or Rio de Janeiro. In contrast, very few of the destitute and homeless people living on the streets of London could scrape under the World Bank's

absolute poverty line, which is set well below the minimal social security benefit level for UK citizens.

c. Definitions based on social indicators

Because many aspects of well-being cannot be captured adequately by income or consumption-based measures, supplementary social indicators are sometimes used to define poverty, such as life expectancy, infant mortality, nutrition, the proportion of the household budget spent on food, literacy, school enrolment rates, access to health clinics or drinking water. Again, the idea is to have a standard scale so that different population groups may be compared (Ravallion, Martin, 1992). Townsend, Peter (1993), For a discussion of the method used to compile the Human Development Index, see Kanbur, Ravi (1994), contrast the welfare of rural and urban populations since they avoid the problem of rural–urban price differences. Where a range of indicators are used to describe poverty, as in the World Bank's World Development Report, (14) the different variables may tell conflicting stories about the pattern of deprivation. Thus, in practice, income and consumption measures remain the key way in which poverty is defined, despite the grave deficiencies of using any single indicator of well-being. To overcome this, composite poverty indices have been developed which combine several weighted variables. For example, the UNDP's Human Development Index aggregates income, literacy and life expectancy into a single measure of the standard of living with a scale of values ranging from zero to one, along which countries can be ranked. (15) Other examples include the Physical Quality of Life Index,(16) the Food Security Index and the Relative Welfare Index.(17) Such measures are arbitrary and "aggregate what we should wish to disaggregate". (18) They inevitably miss out important aspects of

well-being, since a limited number of variables can be brought into the calculation.

Moreover, they view poverty from the perspective of external professionals rather than from that of the poor. Two recent studies of poverty in Tanzania used diff e rent social indicators to identify the poorest groups. In Sender and Smith's research in Tanga region, an index of material well-being was compiled by listing 14 different possessions (such as a metal roof, a bicycle and a coat) and counting the number of items that each surveyed household owned. Out of 100 households, just over half (53) had scores of 0–2, and only 15 had scores of over 10. The possessions scores showed strong correlation with access to the major means of production, work in the formal sector, female education and child mortality. Households with scores of 10–14 held six times the land acreage of households with scores of one or zero, were far less likely to sell (and far more likely to buy) land, were 30 times more likely to contain an enumerated sector employee, were twice as likely to have at least one literate family member, and their children were ten times less likely to die. In Mbeya District, Tanzania, the Health and Nutrition District Support (HANDS) Project used nutritional status among children under the age of five to define urban and peri-urban poverty. Child malnutrition was found to be associated statistically with mothers who had no education and no monthly salary, families who had to sell maize from the last harvest, and families with poor housing and lack of assets.

Both research studies found correlation between their chosen indicators and other aspects of poverty, such as landholding and access to education and health services. However, this is not necessarily the case. Ownership of possessions may be a matter of taste rather than a sign of constrained opportunity. As Piachaud points out, people who do not buy meat may be wealthy vegetarians.

Similarly, small children may become malnourished for reasons other than a lack of material resources. Children over the age of one, left in the care of siblings while their parents work, are particularly at risk because of insufficiently frequent feeding. Malnutrition may be more the result of the unequal gender division of labour and long working hours of mothers in Tanzania than of low income levels per se Wrattend (1993).

3.3. Impacts of Sustainable Agriculture on rural Poverty

The Global Multidimensional Poverty Index (MPI) identifies approximately 1.45 billion people as poor, or 26.5 percent of the population in the 104 countries surveyed. About half of them, 706 million, are considered destitute due to the severe deprivations they experience (OPHI, 2018). Most of the extreme poor – about 80 percent – live in rural areas (Castaneda, et al., 2018). The rural extreme poor are different from the urban extreme poor and the non-poor. Their incomes depend greatly on agricultural activities, either from work on their own farms, or in agricultural wage employment. This reliance on agriculture makes the rural extreme poor highly vulnerable to climatic shocks and weather events. While agriculture plays a big role in their income and food security, the rural extreme poor also diversify their sources of income in other nonagricultural activities. Numerous constraints however, impede their economic inclusion in various sectors, such as insufficient access to basic infrastructure (e.g. water, electricity, sanitation, and roads), and inadequate access to public services (e.g. health, education, connectivity, and markets).

The majority of the extreme poor in 2015, numbering about 400 million, lived in low-middle income countries (LMIC), of which about three quarters were concentrated in five countries: India, Nigeria, Bangladesh, Indonesia and Pakistan. With the exception of

Indonesia, these countries are still predominately rural. Recent forecasts by the World Bank (2018b) suggest that Nigeria will soon become (if it has not already) the country with the greatest number of extreme poor. Another 300 million of extreme poor lived in low income countries (LIC) in 2015, where economies are more agricultural based and the prospects of economic growth have been low. LICs are mostly concentrated in sub-Saharan Africa, where the highest numbers of extreme poor are found in the Democratic Republic of Congo, Ethiopia, Madagascar, the United Republic of Tanzania and Uganda (World Bank, 2018a). In sub-Saharan Africa the number of the extreme poor has increased from 276 million in 1990 to 413 million in 2015. Over 41 percent of the population in this region lives in extreme poverty (World Bank, 2018a).

By 2050, the youth population in Sub Saharan Africa will grow by 216 million, and there will be more youth in Sub Saharan Africa than any other continent. The rural extreme poor live across diverse landscapes. Their livelihoods, the challenges they face and the potential pathways out of poverty are conditioned by the territories in which they live, including the agro-ecological systems, productivity of natural resources, linkages to urban areas and population density. While remote areas may lack access to markets and services, they tend to be rich in natural resources and biodiversity (Figure 1). Rough estimates indicate that about 40 percent of the rural extreme poor - around 250 million people- live in forests and savannahs (FAO, 2018a), where agricultural potential is less but natural resources can provide alternative sources of income. The greatest number, 159 million, live in Sub-Saharan Africa and in relative terms, most of the rural extreme poor in Latin America live in forested areas.

Two thirds of the land used for agriculture globally is grassland. In most of these grasslands, highly variable precipitation rates result in

pasture being available in ephemeral and unpredictable concentrations. Extensive and usually mobile pastoral systems have co-evolved within this particular agricultural environment. Estimates of the number of pastoralists worldwide range from 200 million to 500 million, the large majority of whom live in Sub Saharan Africa. About 85 percent of pastoralists and 75 percent of agro-pastoralists live below the poverty line of USD 1.25 per capita per day (De Haan, 2016).

Conflict and climate change constitute key challenges to the eradication of rural poverty, threatening to reverse the progress made over the past few decades. About 59 percent of the extreme poor live in vulnerable and fragile contexts due to climate change and conflicts, or both (Development Initiatives, 2018). As global extreme poverty rates decline, the extreme poor will be increasingly concentrated in contexts of institutional fragility and conflict, mostly in Sub-Saharan Africa (World Bank, 2018b).

4.0 Self-Assessment Exercise(s)

1. Discuss the impacts of Sustainable Agriculture on rural Poverty.
2. What is sustainable agriculture?
3. What is your understanding of rural poverty?

5.0 Conclusion

In this unit we have been able to define sustainable agriculture as well as a review of the nexus between sustainable agriculture and rural poverty.

6.0 Summary

1. In agriculture, sustainability is a complex idea with many facets which includes social, economic and environmental indicators which impacts on agricultural development.
2. Conflict and climate change constitute key challenges to the eradication of rural poverty.

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Unit 2: Sustainable agriculture; issues and problems

Contents

1.0 Introduction

In this unit, the problems of sustainable rural agriculture is analysed as well as the steps in managing sustainable rural agriculture.

2.0 Intended Learning Outcomes (ILOs)

1. The problems of sustainable rural agriculture is identified
2. The steps in managing sustainable rural agriculture is identified

3.0 Main Content

3.1 Problems of sustainable rural agriculture

Agriculture needs not only to provide adequate nutritious food, income, and decent jobs, but also address a host of environmental challenges. Some of the challenges to sustainable rural agriculture include;

1. Growing enough food that can be enough in feeding the world population is which is increasing, given that the amount of arable land per capita is diminishing.
2. Loss of usable land, energy, resources, political will and legal requirements, cost and efficiency pressure.
3. Climate change: Climate change can lead to weather extremes worldwide. In some regions, lower rainfall will lead to longer periods of drought, meaning that the amount of land which was previously adequately supplied with water is reduced (Amazone, nd).

Other clear challenges facing sustainable rural agriculture include; land and water issues; old cultivation techniques; lack of information on marketing; poverty; degradation of natural resources and environmental issues; population growth; inadequate support services; framework and institutional constraints; and lack of agricultural and rural development policies (Shalaby, Al-Zahrani, Baig, Straquadine et al, 2013). Critical areas are in the area of critical environmental, social, economic and institutional challenges which still need to overcome. Other areas are in the persistently high levels of hunger and malnutrition (United Nations, nd).

“Rural communities are facing several challenges in the context of climate change, land degradation, deforestation, biodiversity loss, and fragmentation of natural habitats, poverty, and geographical isolation. The rural population is more prone to extreme poverty, famine, social exclusion, and environmental injustice, particularly in developing countries from Africa, Asia, and Latin America” (Florin-Constantin and Corneliu, 2020). All these problems are constraints to sustainable rural agriculture. Poor agricultural productivity in the Global South is related to the low use of improved seed, use of inappropriate fertilizer, inadequate irrigation, and lack of incentives for farmers in the absence of remunerative markets (Florin-Constantin and Corneliu, 2020).

3.2 Managing sustainable rural agriculture

These are: (i) integration of biological and ecological processes into food production processes such as nutrient cycling, nitrogen fixation, soil conservation, etc., (ii) minimizing the use of those non-renewable resources that cause harm to the environment (iii) Utilize indigenous

knowledge and skills of farmers for sustainability (Fakhrul and Zahurul, 2019).

Three key areas must be sustained in order to be sustainable in agricultural production. The areas should address these three areas namely; economics, environment, and community. A sustainable agriculture must provide a fair and reasonably secure living for farm families (Centre for Integrated Agricultural System, 2022).

4.0 Self-Assessment Exercise(s)

1. Discuss the problems of sustainable rural agriculture.
2. Review the steps in managing sustainable rural agriculture.

5.0 Conclusion

1. We have been able to identify and discuss the problems of sustainable rural agriculture.
2. In managing sustainable rural agriculture, these key three areas namely; economics, environment, and community is imperative.
3. A sustainable agriculture must provide a fair and reasonably secure living for farm families.

6.0 Summary

The rural population is more prone to extreme poverty, famine, social exclusion, and environmental injustice, particularly in developing countries from Africa, Asia, and Latin America

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Unit 3: Issues in Sustainable rural agriculture and development

Contents

1.0 Introduction

In this unit, the emphasis is on the link between Sustainable rural agriculture and development and also identifying those drivers of sustainable rural agriculture.

2.0 Intended Learning Outcomes (ILOs)

1. The nexus between Sustainable rural agriculture and development is identified.
2. The drivers of sustainable rural agriculture are identified.

3.0 Main Content

3.1 The nexus between Sustainable rural agriculture and development

Sustainable rural development involves a holistic approach where daily basic needs of rural populations must be covered by reliable public utilities combined with technical, socioeconomic, and environmental conditions to support regional economies and urban-rural linkages (Florin-Constantin and Corneliu, 2018). The main components of both sustainable farming and conventional farming are exactly the same: soil management, crop management, water management, disease/pest management and waste management. It's the methods used that are often radically different (Dave, nd). Sustainable agriculture and rural development has been defined by FAO as: "the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of the human needs for present and future generations. Such sustainable development (in agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable"(FAO, nd).

Socioeconomic life in most rural regions still revolved around the positive multiplier effect of demand from the farm sector for both services, such as veterinary practices, agricultural advice, farm machinery supplies and maintenance, agrichemical supplies, shops, schools, and health facilities, and the marketing of farm products, including associated transport companies, abattoirs, food-processing factories, and auction markets. On the other hand, land use and the management of the natural environment in rural regions were still dominated by agriculture, and development in the countryside remained an essentially farm-based issue (Bowler. Nd). A sustainable practice of agriculture leads to a healthy environment and

people. How agricultural goods are produced determines for instance the quality of ground water and food and consequently also our human health, and further how much the sector is contributing to climate change (Herger, 2020).

The basic goals of sustainable agriculture are environmental health, economic profitability, and social and economic equity “sometimes referred to as the “three legs” of the sustainability stool”. (National Sustainable Agriculture Coalition, nd). “A holistic approach to agriculture would recognise the linkages between the soil, vegetation, air and water and the way that these both influence, and are influenced by, the farmer’s beliefs, perceptions, ambitions, skills and knowledge, and the social, economic, cultural, and political systems in which the farm operate”(Jo-Anne, 1995). Sustainable Agricultural and Rural Development (SARD) is considered an essential step toward achieving the first Millennium Development Goal (MDG) of eradicating extreme hunger and poverty. In order to achieve this important goal, first it is important to find ways of increasing the incomes of

the rural poor, who mostly depend on upon agriculture for their livelihoods. This means improving development, cooperation, trade and agricultural policy to improve agriculture's contribution to economic development and poverty reduction (John, Stefan, Helena & Reimund, 2009).

3.2 Drivers of sustainable rural agriculture

A sustainable practice of agriculture leads to a healthy environment and people. How agricultural goods are produced determines for instance the quality of ground water and food and consequently also our human health, and further how much the sector is contributing to climate change. Agricultural development has been an effective

instrument for poverty alleviation and economic development in developing countries over the latter half of the twentieth century, and over 80 % of rural people globally still depend on agriculture for their living. However, issues such as water availability, land degradation and an increasing dependence on chemical fertilisers and pesticides continue to be on-going threats to sustainable agricultural development (Luong and Carl, 2014). In order to be sustainable, three areas must be addressed by our agriculture, food, and natural resource systems. These three areas are economics, environment, and community. A sustainable agriculture must provide a fair and reasonably secure living for farm families (Centre for Integrated Agricultural System, 2022).

The sustainability of the agricultural sector worldwide is increasingly being pressurized by ecological, economic, and social developments. In order to be sustainable, three areas must be addressed by our agriculture, food, and natural resource systems. These three areas are economics, environment, and community. A sustainable agriculture must provide a fair and reasonably secure living for farm families. It should minimize harm to the natural environment.

The drivers of sustainable agricultural development should ensure for; Rotating crops and embracing diversity, planting cover crops and perennials, reducing or eliminating tillage, applying integrated pest management (IPM), integrating livestock and crops, adopting agroforestry practices, managing whole systems and landscapes (Union of concerned scientist, 2022). It can work within these elements which include permaculture, agroforestry, mixed farming, multiple cropping, and crop rotation. Basically Sustainable agriculture is defined by three interactive components: economic profitability, environmental stewardship and social responsibility (Ontario Ministry of Agriculture, Food and Rural Affairs, 2015).

5.0 Conclusion

In order to be sustainable, three areas must be addressed by our agriculture, food, and natural resource systems. These three areas are economics, environment, and community.

6.0 Summary

The sustainability of the agricultural sector worldwide is increasingly being pressurized by ecological, economic, and social developments.

7.0 References/Further Readings

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