



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**NATURAL RESOURCES AND SUSTAINABLE DEVELOPMENT: DES  
421**

**FACULTY OF SOCIAL SCIENCES**

**DEPARTMENT DEVELOPMENT STUDIES**

**COURSE GUIDE**

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## **Introduction**

Welcome to DES: 421. Natural Resources and Sustainable Development is a 2-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 Natural Resources and Sustainable Development, and all that it will take you to complete and walk through your way in understating issues in the study of Natural Resources and Sustainable Development. 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 Content**

The course is centered on the basic and broad issues in Natural Resources and Sustainable Development. Natural Resources and Sustainable Development are critical and important areas of the study of development. Your application of the knowledge derived herein will provide you a wider view of issues in development. The areas covered in this guide include; Definition, meaning of Natural Resources, Conceptual definition of natural resources, Principles of natural resources and the environment, Types of natural resources, Nature and pattern of conservation of Natural Resources, An overview of the Natural resources in Nigeria and Africa, Conservation methods- indigenous vs. scientific, Indigenous conservation methods, Scientific conservation methods,

Challenges in natural resources and environmental conservations, The importance of the sustainable use of the natural resources, Adopting Eco-Tourism in sustainable use of the natural resources, Contribution of Sustainable Natural resources to development, Sustainable Marine and coastal area management, Sustainable Forest area management, Natural resources classifications, Renewal and non renewable natural resources, Geographical distribution of Natural resources in Nigeria, Ecological zones in Nigeria, Studies in environmental theories, Environmentally Responsible Behaviour model, Ecological modernization theory, Concept of ecology, Ecosystem, Biodiversity, Concept of Environmental laws, Principles of environmental laws, Environmental Laws in Nigeria, Importance of environmental law, Natural resources and development, Natural resources and poverty reduction, Natural resources and processes in development, Challenges of natural resources and sustainable development, Environmental degradation, Exploration and exploitation of the natural resources, Human population and challenge on natural resources, Urbanization and the challenges of natural resources development, Natural resources, cultural and development, Ecosystem and community development, Sustainable Development –Meaning, Importance of sustainable development, Methods in sustainable environmental management, Sustainable Development Goals,

### **Course Aims**

The aim of this course is to give you in-depth understanding of the study of Natural Resources and Sustainable Development. It will also guide the study on the definition and scope of natural resources, studies in natural resources theories, contextualizing sustainable development and the nexus between natural resources and sustainable development.

## 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 concepts of the definition of Natural resource and sustainable development.
- Understand the scope of sustainable development.
- Describe the theories of Natural resources.
- Understand the Principles of natural resources and the environment.
- Nature of natural resources.
- Natural resources and sustainable development.
- The types of natural resources.
- Understand the Key Concepts in natural resources Analysis.
- Know the importance of the sustainable use of the natural resources.
- Understand Challenges of natural resources and sustainable development.
- Discuss the social and developmental significance of natural resources.
- Understand the importance of natural resources in development.
- Importance of sustainable development.

## **Working Through The 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.

## **Course Material**

The major component of the course, What you have to do and how you should allocate your time to each unit in order to complete the course successfully on time are listed follows:

1. Course guide
2. Study unit
3. Textbook
4. Assignment file
5. Presentation schedule

## **Study Unit**

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

### **MODULE ONE: MEANING, SCOPE AND DEFINITION OF NATURAL RESOURCES**

UNIT 1 Definition, meaning of Natural Resources

UNIT 2 Nature and pattern of conservation of Natural Resources

UNIT 3 Sustainable uses of the natural resources

UNIT 4 Policies on natural resources management

### **MODULE TWO: NATURE OF NATURAL RESOURCES**

UNIT 1 Definition, meaning of the components of the natural resources

UNIT 2 Nature and pattern of conservation of Natural Resources

UNIT 3 Key Concepts in natural resources Analysis

UNIT 4 Environmental laws and protocols

### **MODULE THREE: NEXUS BETWEEN NATURAL RESOURCES AND SUSTAINABLE DEVELOPMENT**

UNIT 1 Issues in natural resources studies

UNIT 2 Natural resources and development

UNIT 3 Challenges of natural resources and sustainable development

UNIT 4 Social and developmental significance of natural resources

## **MODULE FOUR: MEANING, SCOPE AND DEFINITION OF SUSTAINABLE DEVELOPMENT**

UNIT 1 Definition, meaning of Sustainable Development

UNIT 2 Sustainable management of the environment

UNIT 3 Sustainable development theories

Each study unit will take at least two hours, and it include the introduction, objective, main content, self-assessment exercise, conclusion, summary and reference. Other areas border on the Tutor-Marked Assessment (TMA) questions. Some of the self-assessment exercise will necessitate discussion, brainstorming and argument with some of your colleges. You are advised to do so in order to understand and get acquainted with historical economic event as well as notable periods.

There are also textbooks under the reference and other (on-line and off-line) resources for further reading. They are meant to give you additional information if only you can lay your hands on any of them. You are required to study the materials; practice the self- assessment exercise and tutor-marked assignment (TMA) questions for greater and in- depth understanding of the course. By doing so, the stated learning objectives of the course would have been achieved.



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### **Assignment File**

Assignment files and marking scheme will be made available to you. This file presents you with details of the work you must submit to your tutor for marking. The marks you obtain from these assignments shall form part of your final mark for this course. Additional information on assignments will be found in the assignment file and later in this Course Guide in the section on assessment.

There are four assignments in this course. The four course assignments will cover:

Assignment 1 - All TMAs' question in Units 1 – 4 (Module 1 and 2)

Assignment 2 - All TMAs' question in Units 5 – 8 (Module 2 and 3)

Assignment 3 - All TMAs' question in Units 9 – 13 (Module 3 and 4)

Assignment 4 - All TMAs' question in Unit 14 – 16 (Module 4)

### **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.

### **Tutor-Marked Assignments (TMAs)**

There are four tutor-marked assignments in this course. You will submit all the assignments. You are encouraged to work all the questions thoroughly. The TMAs constitute 30% of the total score.

Assignment questions for the units in this course are contained in the Assignment File. You will be able to complete your assignments from the information and materials contained in your set books, reading and study units. However, it is desirable that you demonstrate that you have read and researched more widely than the required minimum. You should use other references to have a broad viewpoint of the subject and also to give you a deeper understanding of the subject.

When you have completed each assignment, send it, together with a TMA form, to your tutor. Make sure that each assignment reaches your tutor on or

before the deadline given in the Presentation File. If for any reason, you cannot complete your work on time, contact your tutor before the assignment is due to discuss the possibility of an extension. Extensions will not be granted after the due date unless there are exceptional circumstances.

### **Final Examination and Grading**

The final examination will be of three hours' duration and have a value of 70% of the total course grade. The examination will consist of questions which reflect the types of self-assessment practice exercises and tutor-marked problems you have previously encountered. All areas of the course will be assessed

Revise the entire course material using the time between finishing the last unit in the module and that of sitting for the final examination to. You might find it useful to review your self-assessment exercises, tutor-marked assignments and comments on them before the examination. The final examination covers information from all parts of the course.

How to Get the Most from this 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).

## **Tutors and Tutorials**

There are some hours of tutorials (2-hours sessions) provided in support of this course. You will be notified of the dates, times and location of these tutorials. Together with the name and phone number of your tutor, as soon as you are allocated a tutorial group.

Your tutor will mark and comment on your assignments, keep a close watch on your progress and on any difficulties you might encounter, and provide assistance to you during the course. You must mail your tutor-marked assignments to your tutor well before the due date (at least two working days are required). They will be marked by your tutor and returned to you as soon as possible.

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

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

You should try your best to attend the tutorials. This is the only chance to have face to face contact with your tutor and to ask questions which are answered instantly. You can raise any problem encountered in the course of your study. To gain the maximum benefit from course tutorials, prepare a question list before attending them. You will learn a lot from participating in discussions actively.

## **MODULE 1: MEANING, SCOPE AND DEFINITION OF NATURAL RESOURCES**

### **Unit 1: Definition, meaning of Natural Resources**

1.0 Introduction

2.0 Objectives

3.0 Main content

3.1 Natural Resources-Meaning

3.2 Conceptual definition of natural resources

3.3 Principles of natural resources and the environment

3.4 Natural resources management

3.5 Types of natural resources

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0

### **UNIT 1: Definition, meaning of Natural Resources**

#### **1.0 INTRODUCTION**

The first unit of the study guide provides an understanding of the definition and concept of Natural Resources. Natural Resources have 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 Natural resources from the various positions and views. It is also an introduction into the meaning of natural resources, principles of natural resources and environment, natural resources management as well as types of natural resources.



## **2.0 OBJECTIVES**

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

1. Define natural resources
2. Have an understanding of the principles of natural resources
3. Review the processes in natural resources management
4. List and discuss the types of natural resources.

## **3.0 MAIN CONTENT**

### **3.1 Natural resources-meaning**

The meaning of natural resources brings to fore different ideas from scholars in the field of environment and development. From the word nature we could deduce that natural resources are those materials and assets that are in nature. Natural resources are natural assets (raw materials) occurring in nature that can be used for economic production or consumption (Glossary of Environment Statistics, 1997). Natural resources are materials that are raw and extracted from the Earth (Angela and Christianly, 2021). Natural resources are also those resources that exist without any actions of humankind, i.e they are there naturally. It can also be defined as those resources that exist (on the planet) independent of human actions. They are the resources that are found in the environment and are developed without the intervention of humans.

Collins dictionary defined natural resources as all the land, forest, energy sources and minerals existing naturally in a place that can be used by people. Merriam-Webster (2022) defined natural resources as those industrial materials and capacities (such as mineral deposits and waterpower) supplied by nature. Natural includes things like minerals, forest, coal etc. that exist in a place and can be used by man (Cambridge dictionary, 2022). It is a material source of wealth, such as timber, fresh water, or a mineral deposit, that occurs in a natural

state and has economic value (Yourdictionary, nd). Natural resources are materials from the Earth that are used to support life and meet people's needs (DHEC's Office of Solid Waste Reduction and Recycling, 2008). It is the material or substance occurring in nature which can be exploited for economic gain (English dictionary, 2022). They are the things that exist freely in nature for human use and don't necessarily need the action of mankind for their generation or production (EarthEclipse, 2022). They are sources of material and energy that are economically accessible in the natural environment in primary form before their transformation by human activity (Insee, 2021).

### **3.2 Conceptual definition of natural resources**

The concept of natural resources brings to the understanding that the meaning could be derived from the point of view of various authors. Their ideas are anchored on the premise that there are certain indicators characterizing the definition of natural resources. Within these assertions is the position of Paul (2003) explaining the definition of natural resources based on certain schools of thought. One school of thought holds that a natural resource must have some economic value (*e. g.* timber or minerals), while others based the definition on esthetic and related values. World Trade Report (2010) defined natural resources as “stocks of materials that exist in the natural environment that are both scarce and economically useful in production or consumption, either in their raw state or after a minimal amount of processing”. From the point of view of land as a natural resources, FAO (1995) stated that natural resources are “those components of land units that are of direct economic use for human population groups living in the area, or expected to move into the area: near-surface climatic conditions; soil and terrain conditions; freshwater conditions; and vegetational and animal conditions in so far as they provide produce”.

“Natural resources provide the all-important basis for human existence and activities. The basic functions of natural resources are often divided into two main functions. Natural resources provide important raw materials for the production of goods and services as well as various environmental services” (European Commission, 2002). “Natural resource is any asset that we can obtain from our environment: water, soil, plants, wind, animals, minerals, the energy of the sun and many others. Natural resources are often seen in terms of economic value, because so many of them are crucial for people’s livelihoods” (CRS and MEAS. 2015). Natural resources provide fundamental support to life and economic processes. natural resource can be defined as "a feature or component of the natural environment that is of value in serving human needs, e.g. soil, water, wildlife, etc. Some natural resources have an economic value (e.g. timber), while others have a 'non-economic' value (United Nations Peace Building Commission, 2007).

### **3.3 Principles of natural resources and the environment management**

Natural resources management is established on these basic principles; legitimacy, transparency, accountability, involvement, fairness, integration, capability, and adaptability. Its entails managing the way people and the natural environment interacts. It is the sustainable utilization of major resources such as land, water, air, minerals, forest etc. as we understand natural resources provide the basic and fundamental life support for humans. This support is for both consumption and for public goods and services. Some of the key area natural resources management is concerned is in the area of sustainable management of land resources, maintaining and enhancing water assets, protecting and enhancing the marine and coastal environment, conserving and recovering biodiversity, enhancing skills, capacity, and engagement and delivering high-quality planning that leads to effective action.

These areas mentioned will abide on these principles; **legitimacy, transparency, accountability, involvement, fairness, integration, capability, and adaptability.**

An example of natural resources management include; **micro-watershed management**, irrigation water management, soil and water conservation, community forestry, community-based coastal zone fisheries management, and conservation of biodiversity. The unusually high rate of natural resources exploitation and misuse could result in irreversible disequilibrium of ecosystem and environment. This would retard economic development and adversely affect man survival of earth. There is therefore need for efficient management of natural resources to maintain their continued availability and improvement in man's living standard (Adeofun and Bada, nd).

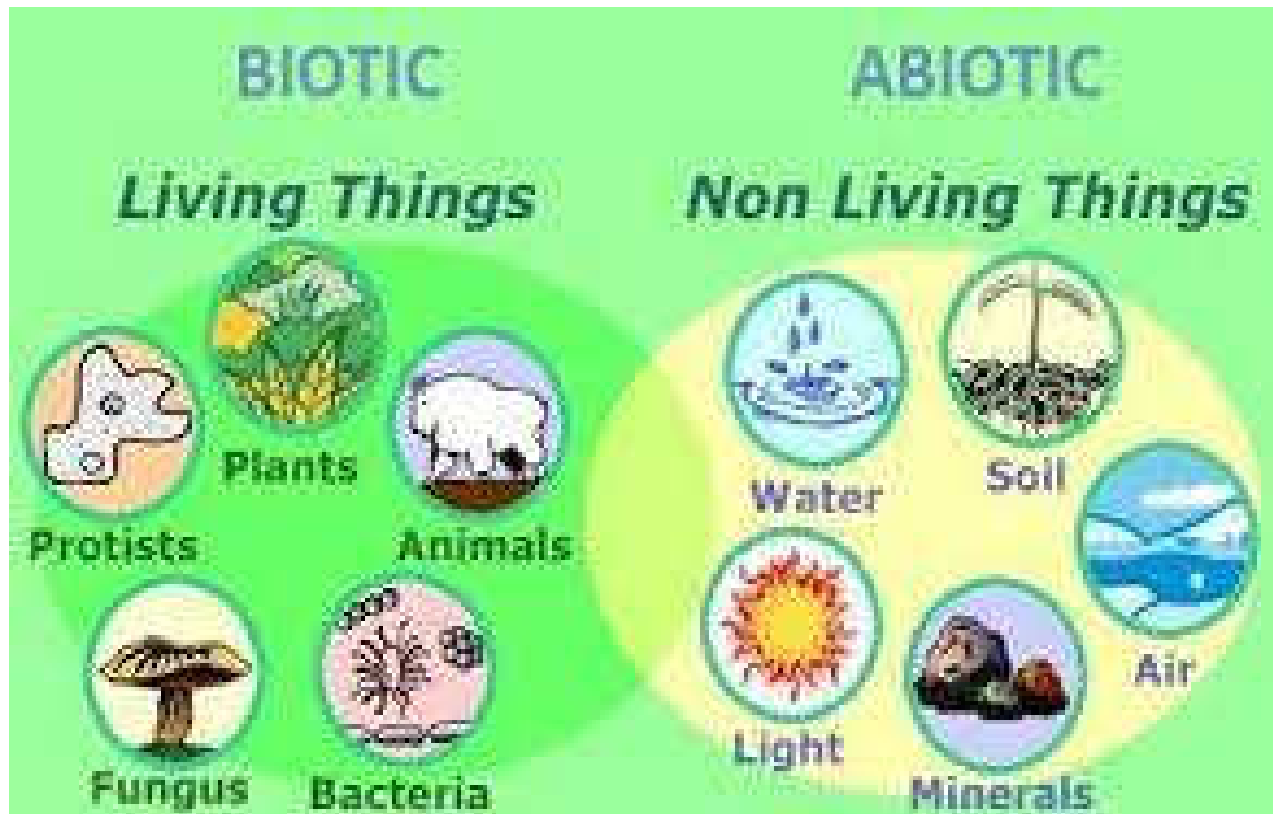
The environmental Principles to which the Environmental will be managed include;

1. Polluter Pays Principle (PPP): the polluter pay principle entails that those who pollutes the environment will held responsible for their action on the environment. It calls for fines when the environment and resources are explored and polluted.
2. The User Pays Principle (UPP): the user pay principle takes into consideration that human need the natural resources for sustenance, however, human should give back to the environment when it is been explored and used.
3. The Precautionary Principle (PP): every actions taken on the environment should be that which will involve serious precaution to mitigate certain environmental hazards

4. Principle of Effectiveness and Efficiency: the degree to which objectives are achieved and the extent to which targeted problems are solved should be effective without reference to costs and, this should be done rightly.
5. The Principle of Responsibility: we are all responsible for the protection of the environment, the corporate institutions, the government and the community.
6. The Principle of Participation: there is the need for all stakeholders (community, governments and institutions) to right and principle to contribute to the sustenance of the environment.

### **3.4 Types of natural resources**

Natural resources can be divided into two; namely biotic and abiotic. Biotic natural resources are those resources that are obtained from the biosphere, i.e living and organic materials. They can include forest and animals. The biotic components of the natural resources can also be the materials that are derived from plants and animals, eg. Fossil fuels like coals and petroleum. The abiotic natural resources are those natural resources that are derived from non-living and non-organic materials. They include air, water, land, gold etc.



Source:

The types of natural resources can also be classified as Inexhaustible natural resources and Exhaustible natural resources. Inexhaustible natural resources are those resources that nature has kept, which is in unlimited supply such as water and sunlight. They are also referred to as renewable resources. The Exhaustible natural resources are those resources that are in limited supply. Their depletion is the result of the activities of man. They are also referred to as non-renewable resources. They include plants and animals, Fossil fuels like natural gas.

#### **4.0 Conclusion**

In this unit we have been able to define natural resources as well as the concepts of natural resources. We also examined the principles of natural resources and the environment management as well as the types of natural resources.

## 5.0 SUMMARY

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

1. The meaning of natural resources
2. The conceptual definition of natural resources
3. The principles of natural resources and environmental management
4. The types of natural resources.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. Provide an explanation of the concept of natural resources
2. What are the principles of natural resources?
3. List and discuss the types of natural resources

## 7.0 References/further readings

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United Nations Peace Building Commission (2007), [Natural Resources: Definitions & Conceptual Issue](http://www.peacebuildinginitiative.org/index818b.html?pageId=2097).  
<http://www.peacebuildinginitiative.org/index818b.html?pageId=2097>

## **Unit 2: Nature and pattern of conservation of Natural Resources**

1.0 Introduction

2.0 Objectives

3.0 Main content

3.1 An overview of the Natural resources in Africa

3.2 Conservation methods- indigenous vs. scientific

3.3 How sustainable is the natural resources

3.4 Challenges in natural resources and environmental conservations

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/further readings

### **1.0 Introduction**

In this unit, we will review the natural resources in Africa; examine also the conservation methods in natural resources conservations. We will also determine how sustainable is the natural resources in Nigeria as well as list and discuss the challenges in natural resource and environmental conservation.

## **2.0 Objectives**

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

1. Identify some of the natural resources in Africa
2. Identify and examine the conservation methods in natural resources conservation
3. Have a clear understanding of how sustainable the natural resources is in Nigeria and
4. Understand the challenges in natural resources and environmental conservation.

## **3.0 Main content**

### **3.1 An overview of the Natural resources in Nigeria and Africa**

Africa has numerous natural resources and they are in large quantity. These natural resources range from land, oil, water, fossil fuels and wildlife. They are also both renewable and non-renewable natural resources. Africa is home to the world's largest arable land, water, oil natural gas, minerals, forest, and wildlife. Africa is home to about 30% of the world's natural gas and 12% of the world's oil reserve. African has 40% of the world's gold and 90% of Chromium and Platinum. Importantly Africa is home to 65% of the world's arable land and 10% of the planets internal renewable fresh water (UNEP, 2022).

Nigeria is a huge country which is rich in natural resources. The Nigerian economy highly depends on these resources. Almost all the states in Nigeria have one type of natural resources and the other. Nigeria is richly endowed with numerous natural resources ranging from industrial metals to various precious stones such as Barites, Gypsum, Kaolin, Marble etc. The lists Lukmon (2019) below are the natural resources domiciled in each of the 36 states in Nigeria.

1	Abia	Gold, Lead/Zinc, Limestone, Oil/Gas & Salt
2	Abuja	Cassiterite, Clay, Dolomite, Gold, Lead/Zinc, Marble & Tantalite
3	Adamawa	Bentonite, Gypsum, Kaolin & Magnesite
4	Akwa Ibom	Clay, Lead/Zinc, Lignite, Limestone, Oil/Gas, Salt & Uranium
5	Anambra	Clay, Glass-Sand, Gypsum, Iron-ore, Lead/Zinc, Lignite, Limestone, Phosphate & Salt
6	Bauchi	Gold, Cassiterite (tine ore), Columbite, Gypsum, Wolfram, Coal, Limestone, Lignite, Iron-ore & Clay
7	Bayelsa	Glau, Gypsum, Lead/Zinc, Lignite, Limestone, Manganese, Oil/Gas & Uranium
8	Benue	Barite, Clay, Coal, Gemstone, Gypsum, Iron-Ore, Lead/Zinc, Limestone, Marble & Salt
9	Borno	Bentonite, Clay, Diatomite, Gypsum, Hydro-carbon, Kaolin & Limestone
10	Delta	Clay, Glass-sand, Gypsum, Iron-ore, Kaolin, Lignite, Marble & Oil/Gas
11	Ebonyi	Gold, Lead/Zinc & Salt
12	Edo	Bitumen, Clay Dolomite, Phosphate, Glass-sand, Gold, Gypsum, Iron-ore, Lignite, Limestone, Marble & Oil/Gas
13	Ekiti	Feldspar, Granite, Kaolin, Syenite & Tantalite
14	Enugu	Coal, Lead/Zinc & Limestone
15	Gombe	Gemstone & Gypsum
16	Imo	Gypsum, Lead/Zinc, Lignite, Limestone, Marcasite, Oil/Gas, Phosphate & Salt
17	Cross River	Barite, Lead/Zinc, Lignite, Limestone, Manganese, Oil/Gas, Salt & Uranium
18	Jigawa	Butyles
19	Kaduna	Amethyst, Aqua Marine, Asbestos, Clay, Fluorite, Gemstone, Gold, Graphite, Kaolin, Hyacinth, Mica, Rock Crystal, Ruby, Sapphire, Sphalerite, Supermalinite, Tantalite, Topaz & Tourmaline
20	Kano	Cassiterite, Copper, Gemstone, Glass-sand, Lead/Zinc, Pyrochlore & Tantalite
21	Katsina	Kaolin, Marble & Salt
22	Kebbi	Gold
23	Kogi	Cole, Dolomite, Feldspar, Gypsum, Iron-ore, Kaolin, Marble, Talc & Tantalite

24	Kwara	Cassiterite, Columbite, Feldspar, Gold, Iron-ore, Marble, Mica & Tantalite
25	Lagos	Bitumen, Clay & Glass-sand
26	Nasarawa	Amethyst (Topaz Garnet), Barytex, Barite, Cassirite, Chalcopyrite, Clay, Columbite, Coking Coal, Dolomite/Marble, Feldspar, Galena, Iron-ore, Limestone, Mica, Salt, Sapphire, Talc, Tantalite, Tourmaline Quartz & Zircon
27	Niger	Gold, Lead/Zinc & Talc
28	Ogun	Bitumen, Clay, Feldspar, Gemstone, Kaolin, Limestone & Phosphate
29	Ondo	Bitumen, Clay, Coal, Dimension Stones, Feldspar, Gemstone, Glass-Sand, Granite, Gypsum, Kaolin, Limestone & Oil/Gas
30	Osun	Columbite, Gold, Granite, Talc, Tantalite & Tourmaline
31	Oyo	Aqua Marine, Cassiterite, Clay, Dolomite, Gemstone, Gold, Kaolin, Marble, Silimonite, Talc & Tantalite
32	Plateau	Barite, Bauxite, Betonite, Bismuth, Cassiterite, Clay, Coal, Emerald, Fluoride, Gemstone, Granite, Iron-ore, Kaolin, Lead/Zinc, Marble, Molybdenite, Phrochlore, Salt, Tantalite/Columbite, Tin & Wolfram
33	Rivers	Clay, Glass-Sand, Lignite, Marble & Oil/Gas
34	Sokoto	Clay, Flakes, Gold, Granite, Gypsum, Kaolin, Laterite, Limestone, Phosphate, Potash, Silica Sand & Salt
35	Taraba	Lead/Zinc, Kaolin
36	Yobe	Soda Ash & Tintomite
37	Zamfara	Coal, Cotton & Gold

### 3.2 Conservation methods- indigenous vs. scientific

Our environment contains biodiversity which is part of the sustenance and livelihood of man. Because the environment is made up of both renewable and non-renewable components of the environment, it becomes important that they will be conserve for sustainability. The need for biodiversity conservation cannot be over emphasized because of the role it plays in the socio economic

lives of the people (Anwadike, 2020). Many countries of the world including Nigeria has began to show much inclination towards conservation practices to avoid imminent extinction of species and ecosystems.

Environmental conservation is a practice that paves the way for protecting the environment and natural resources on the individual, organisational as well as governmental levels. Nature conservation is a movement that focuses on protecting natural resources and wildlife from extinction, while also slowing down the rate of climate change and other detrimental effects. Nature conservation ensures that there is enough biological diversity within the planet's ecosystems, helps establish protected areas, reduces habitat loss, and strives to prevent further destruction (Goodall, 2022). There are various ways of conserving the natural resources. The various ways, Leverageedu (2021), ranges from;

1. Deforestation must be stopped
2. Natural non-renewable resources must be utilized properly
3. Every year, we lose a huge number of forest life due to forest fire. We must find a solution to this.
4. Afforestation is the best way to conserve the environment.
5. Create public awareness.
6. Control pollution and population.
7. Recycle goods.
8. Adopt an environment-friendly lifestyle.
9. Adopt waste management techniques.
10. Species on the verge of extension should be saved.

The various methods of natural resources conservation mention by Goodall (2022) include; tree planting, alternative energy resources, locating and

establishing protected areas, biodiversity protection, hunting restriction and proper planting. While Rinkesh (2022) listed forest conservation, soil conservation, managing waste, recycling, reducing water consumption, controlling pollution and public awareness creation as some of the various methods of conserving the environment.

### **1. Indigenous conservation methods**

Local people who inhabit the environment have indigenous methods of conserving the environment. “For centuries, rural people have encouraged and relied upon biodiversity for their livelihoods. Farmers have managed genetic resources, for as long as they have cultivated crops. For centuries, they have selected varieties of crops and livestock breeds to meet environmental conditions and diverse nutritional and social needs. The immense genetic diversity of traditional farming systems is the product of human innovation and experimentation both historic and ongoing”

Laws and taboos, application of punitive measures on defaulters and Agroforestry were found to be indigenous conservation methods practiced in Nigeria (Tee, Agbidye and Ogwuche, 2015). Among the indigenous methods being used in environmental conservation Omotayo, Chikezie, Adedeji, Adebayo & Kolawole (2019) include the use of local taboos and local courts to try environmental offenders. In other related instance Chukwuone, Adeosun and Chukwuone (2020) mentioned Controlled harvesting, enrichment planting, and fire breaks as indigenous forest management practices. Eneji, Ogundu and Oyelade (2020) work attributed the importance of totemism (forbidden items), creation of protected areas (evil forest, sacred grooves, burial ground), shrines and sanctuaries as some indigenous conservation practices practiced in Nigeria. The use of belief systems and restrictions using taboos were very effective and

majorly the adopted indigenous methods and practices in environmental conservations in most areas in Nigeria (Agomoh, 2016). The use of norms and traditional values had been very efficiently used to promote good planning and discourage maladministration in the area of environmental conservation.

## **2. Scientific conservation methods**

Science is also playing a role in the conservation of the environment. In this manner, the environment can be conserved within the In-situ Conservation and Ex-situ Conservation methods. The In-situ Conservation method involves the conservation of species within their natural habitat, while the Ex-situ Conservation methods involves the breeding and maintenance of endangered species in artificial ecosystems such as zoos, nurseries, botanical gardens, gene banks.

some scientific methods of conserving the environment includes; the use of alternative resources of energy, adequate protection of the existing forest reserves, documentation and publicity of the endangered species and massive a forestation program (Gundu and Adia, 2014).

### **3.3 How sustainable is the natural resources**

## **3.4 Challenges in natural resources and environmental conservations**

Some of the issues that pose a collective threat to biodiversity protection in Nigeria include: i. Exponential increase in population accompanied by intensified industrial activities for economic development; ii. Dependency of the rural population (about 70% of the total population) on biodiversity resources iii. Lack of clear and consistent national policy on biodiversity

conservation; iv. Poor coordination among relevant institutions; and v. Insufficient fund.

Fire outbreak, secret and indiscriminate logging of timber and harvesting of non-timber forest products, grazing, and inadequate finance for mobilizing forest guards and hence insufficient forest guards were the main challenges of forest conservation efforts (Tee, Agbidye and Ogwuche, 2015). Global population growth and food demand, Scarcity of fossil fuel and the use of fossil fuel (Daniele, Laurene, Jean-Yves and Emmanuel (2015) are some of the challenges in natural resources and environmental conservation.



Shivacoti, Ullah and Pradhan (2017) mentioned that deforestation and forest degradation, biodiversity loss, ecosystem degradation, reduction in soil quality, and a reduction in available water quantity as some of the challenges of environmental conservation. Changing Demands on Land Resources, human population growth and resulting land fragmentation are other challenges of environmental conservation. While a study by Texas Park and Wildlife (nd) listed the challenges of environmental conservation to include introduced species, Overgrazing and Fire Suppression, Improper grazing, Reduced Water, Reduced Water Quantity, Limited Understanding of Complex Natural Systems and Climate Change. other areas of challenges to environmental conservation include; government policies, failure of conservation (as a form of land use) to compete effectively with alternative land uses, habitat degradation and blockage of wildlife corridors, overexploitation and illegal resource extraction, wildfires, human population growth, poverty, HIV/AIDS pandemic and human-wildlife conflicts (Jafari, Alfani, Kuruthumu and Ismail, 2013). In another area of challenge in environmental conservation is habitat loss, illegal trade in wildlife, ocean plastic pollution and human population (Fuana and Flora International, 2022).

#### **4.0 Conclusion**

In this unit we have been able to examine the natural resources in Africa and well as the methods in environmental conservation. We have also examined the challenges in natural resources and environmental conservations.

#### **5.0 SUMMARY**

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

1. The natural resources in Nigerian and African
2. The environmental conservation methods practiced in Africa.
3. The challenges in natural resources and environmental conservation

## 6.0 TUTOR-MARKED ASSIGNMENT

1. List and discuss the natural resources found in Nigeria.
2. Discuss the environmental conservation methods practiced in Nigeria.
3. List and discuss the challenges in natural resources and environmental conservation.

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### **Unit 3: Sustainable use of the natural resources**

1.0 Introduction

2.0 Objectives

### 3.0 Main content

#### 3.1 The importance of the sustainable use of the natural resources

#### 3.2 Adopting Eco-Tourism in sustainable use of the natural resources

#### 3.3 Contribution of Natural resources to development

### 4.0 Conclusion

#### 5.1 Summary

#### 5.2 Tutor-Marked Assignment

## **1.0 Introduction**

In this unit, we will discuss issues of sustainable development and the use of natural resources, taking into considerations the importance of the sustainable use of the natural resources, adopting Eco-Tourism in sustainable use of the natural resources and the contribution of Sustainable Natural resources to development

## **2.0 Objectives**

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

1. Discuss the issues in sustainable development and the use of natural resources
2. An understanding of the importance of the sustainable use of the natural resources
3. The importance of eco-tourism in natural resources sustainability and
4. The contribution of sustainable natural resources to development

## **3.0 Main content**

### **3.1 The importance of the sustainable use of the natural resources**

The natural resources which include the flora and fauna, those that are renewable and non renewable is depleting and have been impacted adversely through the activity of man. Their sustainability therefore becomes the sole objective of humans. Every effort at preservation, sustainability and accountability is the basic mandate of all. The natural resources is important to man as it has served mans basic needs.

The goal of sustainable development is to provide resources for the use of present populations without compromising the availability of those resources for future generations, and without causing environmental damage to the survival of other species and natural ecosystems.

It is important to conserve the environment given that;

1. **Some of the natural resources are non-renewable:** non renewable natural resources are resources that will soon or eventually run-out. They are natural resources that are not replenished compared to the manner they are used. Because sustainable development is about providing for the current generation without compromising the future generation, it is important to conserve those non-renewable energy for the future generation and for their sustainability. The non-renewable natural resources include fossile fuels like oil and gas, coal etc
2. **The carrying capacity of the natural resources is low:** the earth's carrying capacity to sustain human is low because of the pressure and activities of man. The pressure on natural resources and the increase in the population of humans, confirms Thomas Malthus theory on population and the capacity of the natural resources to sustain the population. If the environment is not conserved and sustained, they will

deplete fast given the teeming population. The capacity of the earth to sustain humans will be minimal.

3. **Increase in population would put pressure on the resources:** as of June 2021, the world's population is 7.9 billion. The irony of the current increase in population is that the resources to sustain man is depleting. Industrialization and demographic growth is exerting pressure on the natural resources. Environmental degradation has often been the result of man quest to secure food, improve standard of living and provide for shelter. Pressures on resources, resources use are all exerted by and accelerated by population increase.
4. **We are custodians of the natural resources:** the environment is the life sustenance of man. The environment also determines the activities and culture of man. Man owes it as an obligation the custodian of the environment. This is necessary because man depends on the environment for survival, the environment shapes the lifestyle of man, the future generation must be provided for, the activities of corporations and individuals with unsustainable behaviours on the environment must be checked and held accountable on their activity on the environment.
5. **For the provision of the basic need of the future generation:** the environment provides the basic necessity and basic needs of humans. Because the environment provides man with theses necessities, it is important that the environment must be conserved and protected for its continuous harnessing.

“As natural resources play an essential role in supporting the livelihoods of the majority of the world's poor, improvements in managing and extracting natural resources and practices can have huge repercussion on ecosystems,

the environment they rely on, as well as a country's potential to meet the MDGs”(Grynspan, 2012).

### **3.2 Adopting Eco-Tourism in sustainable use of the natural resources**

The environment can be a source and potential for generation of revenue especially within the tourism sector. Within the eco-tourism, communities are encouraged to be part of conservation and receiving economic incentives associated with conserving the environment.

Eco-tourism is an alternative tourism, involving visiting natural areas in order to learn, to study or to carry out activities friendly that are a tourism based on the nature experience, which enables the economic and social development of local communities (Kiper. 2013). Ecotourism help in community development by providing alternative source of livelihood to local community which is more sustainable”. Ecotourism help in environmental protection, wildlife conservation, poverty alleviation and socio-economic development. It provides job for local people and market for their local products. It encourages cultural sensitivity in guest-host relationship (Anup, 2016).

The different forms of ecotourism Anup (2016) include; community based ecotourism, ecosystem tourism, rural tourism, cultural tourism and nature based tourism. Ecotourism is regarded as responsible and quality tourism which undertakes to contribute balance between conservation and development, provide maximum incentives for local people and tourists as well, promote



local culture and economy, and increase the maximum local participation (Yogi, 2010).

### **3.3 Contribution of Sustainable Natural resources to development**

Natural resources, both renewable and non-renewable, and ecosystem services are a part of the real wealth of nations. They are the natural capital out of which other forms of capital are made. They contribute towards fiscal revenue, income, and poverty reduction. Sectors related to natural resources use provide jobs and are often the basis of livelihoods in poorer communities” (OECD, 2011).

Organisation for Economic Co-operation and Development (2011) summarized the contribution of sustainable natural resources to development in the following;

1. “Sustainable natural resources management is as much a question of sustainable economic development as it is of environmental protection.
2. Natural resources have proven to be both opportunity and curse for nations endowed with them.
3. “Getting prices right” for natural resources is of utmost importance for more sustainable management and long-term benefits from resource-related wealth.
4. Multi-stakeholder participation processes improve the robustness and legitimacy of decision making and are more likely to lead to sustainable outcomes.
5. Transparent and effective mechanisms for revenue management are essential instruments for ensuring that natural resource wealth translates into sustained economic development.

6. Knowledge, social and economic conditions are in constant flux, which means that institutions and policies are more likely to succeed over the longer term if they are able to respond and adapt.”

#### **4.0 Conclusion**

In this unit we have been able to discuss the importance of the sustainable use of the natural resources, have an understanding of the adoption of eco-tourism in sustainable development and the contribution of sustainable natural resources to development.

#### **5.0 Summary**

The main focus of this unit is that;

1. The goal of sustainable development is to provide resources for the use of present populations without compromising the availability of those resources for future generations.
2. The environment can be a source and potential for generation of revenue especially within the tourism sector.
3. Natural resources, both renewable and non-renewable, and ecosystem services are a part of the real wealth of nations.

#### **6.0 Tutor-Marked Assignment**

1. List and discuss the goals of sustainable development?

#### **7.0 Reference/further reading**

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#### **Unit 4: Policies on natural resources management**

1.0 Introduction

2.0 objectives

3.0 Main content

3.1 Marine and coastal area management

3.2 Forest management

3.3 theories of natural resources management

4.0 Conclusion

5.1 Summary

5.2 Tutor-Marked Assignment

## **1.0 Introduction**

In this unit the focus is on the area of global development and policies and natural development, other areas of focus include the sustainable marine and coastal area management, sustainable forest areas management and sustainable development and the principles of environment and natural resources management.

## **2.0 objectives**

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

1. the policies of natural resources development
2. the sustainable marine and coastal management policies
3. forest management policies
4. the principles of sustainable development

## **3.0 Main content**

### **3.1 Sustainable Marine and coastal area management**

Products from Marine and coastal areas have sustained man over generations. However, the unsustainable activities of man due to proper regulations and policies have rendered marine lives vulnerable and near extinction. Therefore it is important that there shall be a sustainable management of marine and coastal areas for the future generation.

The Convention on Biological Diversity (CBD), the first global agreement on the conservation and sustainable use of biological diversity, has three main goals: the conservation of biodiversity; sustainable use of the components of biodiversity, and sharing the benefits arising from the commercial and other

utilisation of genetic resources in a fair and equitable way (National Institute for Coastal and Marine Management, 2004).

The marine and coastal management will be sustainably managed (National Institute for Coastal and Marine Management (2004), through; ecosystem principles, sustainable development, integrated approach environmental assessment, governance, adaptive management, the precautionary approach and best available science. Coastal zones provide not only biodiversity-rich ecosystems, natural hazard protection, food and opportunities for the generation of renewable energies but places for tourism, recreation, cultural heritage and aesthetic sites. However, while many of these activities are beneficial to the economy and to human well-being, they are causing increasing pressure on coastal environments (Boteler, 2014).

### **3.2 Sustainable Forest area management**

Humans will always depend on the Products from the forest for food, fuel, shelter and sustenance. However the activities of human on the forest areas should be limited for the sustainable forest areas.



**Example of deforestation, source: (Aniete, A. 2017, the Guardian Nigeria)**

Sustainable forest management is defined as a dynamic and evolving concept which aims to maintain and enhance the economic, social and environmental values of the types of forest, for the benefit of the present and future generation (FAO, 2020).

The policy issues of Food and Agricultural organization of the United Nations (2021) made a the case for forest area protection and management given the following reasons;

1. “World’s forests area is shrinking by the day. By halting deforestation, managing forests sustainably, restoring degraded forests and increasing the global forest area, potentially damaging consequences for the planet and its people can be avoided. Governments need to foster holistic approach that promotes the benefits of forests and trees, engaging all stakeholders. Integrating agricultural and landscape approaches into

forest policies and programmes is essential for addressing drivers of deforestation and forest degradation, also to increase contribution from forests and trees to sustainable agro-forestry landscapes and the SDGs.

2. Forest policy can be an effective instrument for achievement of food security and poverty alleviation. Integrating socioeconomic and natural resources management evidence into forest policy formulation can support combination of policy objectives contributing to deliver balanced solutions to increase food production, generating employment and income, expanding forest cover and fostering multiple benefits.
3. Forest policies and practices through sustainable forest management should not only enhance resilience of forest ecosystems to climate change, but should also serve as fundamental foundation for climate change adaptation and mitigation, providing benefits of continuous sustainable landscape and nexus for both urban and rural communities and thus being essential to the planet's healthy and productive future.
4. Integrating forests and trees into sustainable development strategies requires effective partnerships and society engagement. Clear legal frameworks and coherent policy measures that balance stakeholder interests are part of the enabling environment needed. Evidence-based forest policy and programmes enhances a balanced delivery of environmental and socioeconomic benefits from forests and trees, and can harness forest contributions to achievement of several SDGs, climate change objectives and the Global Forest Goals”.

## **4.0 Conclusion**

We have been able to review the areas in sustainable marine and coastal area management, as well as sustainable forest area management. The principles of sustainable development were also reviewed.

## **5.0 Summary**

The key point to note is that;

1. The marine and coastal management will be sustainably managed through; ecosystem principles, sustainable development, integrated approach environmental assessment, governance, adaptive management, the precautionary approach and best available science.
2. Humans will always depend on the Products from the forest for food, fuel, shelter and sustenance. However the activities of human on the forest areas should be limited for the sustainable forest areas.
3. The unusually high rate of natural resources exploitation and misuse could result in irreversible disequilibrium of ecosystem and environment.

## **6.0 Tutor-Marked Assignment**

1. Discuss the principles of sustainable development

## **7.0 Reference/further reading**

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## **MODULE 2: NATURE OF NATURAL RESOURCES**

### **Unit 1: Definition, meaning of the components of the natural resources**

1.0 Introduction

2.0 Objectives

3.0 Main content

3.1 Natural resources classifications

3.2 Renewal and non renewable natural resources

3.3 Geographical distribution of Natural resources in Nigeria

3.4 Ecological zones in Nigeria

4.0 Conclusion

5.1 Summary

5.2 Tutor-Marked Assignment

#### **1.0 Introduction**

In this unit the classification of natural resources and the definition of renewable and non-renewable natural resources was discussed, other areas of focus include the geographical distribution of natural resources in Nigeria as well as the ecological zones in Nigeria.

#### **2.0 objectives**

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

1. The natural resources classification
2. What constitute the renewable and non-renewable natural resources
3. Geographical distribution of natural resources in Nigeria.
4. The ecological zones in Nigeria.

### **3.0 Main content**

#### **3.1 Natural resources classifications**

Natural resources are classified into Renewable and Non-renewable resources. Some resources, such as minerals or oil, exist as finite stocks, which are non-renewable within an economic time frame. Others, such as timber or solar energy are renewable and, potentially, the flow of services from these resources can be harvested indefinitely. natural resources can be divided into the following types:

1. Biotic: these resources come from living and organic material, such as forests and animals, and include the materials that can be obtained from them. Biotic natural resources also include fossil fuels such as coal and petroleum which are formed from organic matter that has decayed.
2. Abiotic: these resources come from non-living and non-organic material. Examples of these resources include land, fresh water, air, and heavy metals (gold, iron, copper, silver, etc.) (Lumen. Nd).

“Natural resources are also classified based on their renewability:

1. Renewable natural resources: these are resources that can be replenished. Examples of renewable resources include sunlight, air, and wind. They are available continuously and their quantity is not noticeably affected by human consumption. However, renewable resources do not have a rapid recovery rate and are susceptible to depletion if they are overused.
2. Non-renewable natural resources: these resources form extremely slowly and do not naturally form in the environment. A resource is considered to be non-renewable when their rate of consumption exceeds the rate of

recovery. Examples of non-renewable natural resources are minerals and fossil fuels (Lumen, Nd).

According to Kumar (nd) natural resources can be classified according to the source of origin:

1. Biotic resources: these resources come from living and organic material. These include forests, animals, and microorganisms and include the materials that can be obtained from them. Biotic natural resources also include fossil fuels like coal and petroleum etc. since they originate from organic matter that has decayed.
2. Abiotic resources: these resources come from non-living and inorganic material. These resources include land, fresh water, air, and heavy metals (gold, iron, copper, silver, etc.).

On the basis of their stage of development;

1. Potential resources: these are resources that exist in a region and may be used in the future. For example, if a country has petroleum in sedimentary rocks, it is a potential resource until it is actually drilled out of the rock and put to use.<sup>68</sup>

According to

1. Actual resources (Kumar, nd); these are resources that have been surveyed, their quantity and quality has been determined, and they are currently being used. The development of actual resources is dependent on technology.
2. Reserve resources: this is the part of an actual resource that can be developed profitably in the future.

3. Stock resources: these are resources that have been surveyed, but cannot be used due a lack of technology. An example of a stock resource is hydrogen.

On the basis of their occurrence/ ownership;

1. Individual resources: these are resources owned by individuals privately. It includes land owned by a farmer, urban people own plots, houses and other property, plantation, pasture lands, ponds, water in wells etc.
2. Community resources: these include resources that are accessible to all the members of the community like the village grazing grounds, burial grounds, village ponds, public parks, picnic spots, playgrounds in urban areas are accessible to all the people living there.
3. National resources: these include all the resources belonging to the nation because the country has legal powers to acquire even private property for public good. Examples: All minerals, water resources, forests, wildlife, land within the political boundaries and oceanic area up to 12 nautical miles from the coast.
4. International resources: there are available to all countries and have no boundaries. It includes the sunlight, air and the oceanic resources beyond 200km of the Exclusive Economic Zone belong to open ocean.

On the basis of their utility;

1. Natural resources may be forest resource, water resource, food resource, energy resource, land resource etc.

On the basis of availability or exhaustibility;

1. Inexhaustible resources: they are not likely to be exhausted by human's consumption. Example: solar energy, wind power, rainfall, power of tide, hydro power, atomic energy etc.
2. Exhaustible resources: they are likely to be exhausted upon their continuous exploitation as they have limited stock on the earth. Exhaustible resources may be non-renewable and renewable. 1. Non-renewable resources: they lack ability of recycling or replaced after a very long time. Ex. - biological species, minerals, fossils.
3. Renewable resources: the resources which can be renewed and reproduced by physical, chemical or mechanical processes are known as renewable resources. Ex. - water, soil fertility, natural vegetation, wildlife, aquatic animals, humans etc.

### **3.2 Renewal and non renewable natural resources**

Natural resources are classified into Renewable and Non-renewable resources. Renewable resources are an energy source that cannot be depleted and are able to supply a continuous source of clean energy (Resource Library, 2022). It can also be defined the resources that can be used repeatedly and does not run out because it is naturally replaced (Banton, 2021). It is an energy source that is sustainable - something that can't run out, or is endless, like the sun (EDF, nd). Example of renewable energy include; biomass energy, hydropower, wind energy and solar energy.

Non-renewable resources are resources that cannot naturally replenish themselves (National Geographic society, 2022). The four major types of nonrenewable resources include oil, natural gas, coal, and nuclear energy, which are collectively called fossils (National Geographic society, 2022).

### **3.3 Geographical distribution of Natural resources in Nigeria**

Earth's many natural resources, including oil, water, soil, minerals, wind, and sunlight, are unevenly distributed on Earth's surface. In other words, resources are concentrated in specific places because of the processes by which they form. For example, fossil fuels found today were formed by different geologic processes (Houghton, nd). virtually every state in the country have one or many deposit of natural resources.

Here are some natural resources and the areas they are deposited in Nigeria;

1. **Copper:** Copper ore or copper concentrate mineral has been one of the naturally occurring minerals that are available in Earth's crust of Nigeria, the Western part of Africa. They are distribution are mainly in the Northern Part of the country such as Nasarawa, Plateau, Zamfara, Bauchi, Gombe State, Kano State, and also in the south in places like Abia.
2. **Gold:** is located prominently in Iperindo in Osun State and other areas near Maru, Tsohon Birnin Gwari-Kwaga, Gurmana, Anka, Malele, Bin Yauri, and Okolom-Dogondaji.
3. **Lead:** lead deposits is found in Akwa Ibom, Imo, Anambra, Bayelsa, Benue, Enugu, Niger, Ebonyi, FCT, Plateau, Cross River, Taraba, and Zamfara.
4. **Limestone:** majorly deposited in Cross River and Ebonyi states but can still be found in a commercial deposits in Abia, Akwa Ibom, Anambra, Bauchi, Bayelsa, Benue, Borno, Edo, Enugu, Imo, Ogun, Ondo, and Sokoto, making Nigeria the most richly deposited West African country when it comes to Limestone.
5. **Crude oil and gas:** Nigeria has the richest crude oil deposits in Africa and the 4th in the World; it is the 6th largest producer of crude oil and the 5th largest supplier of crude. The areas with abundant crude oil

deposit include; Abia, Akwa Ibom, Rivers, Delta, Bayelsa, Cross River, Imo, Anambra and Ondo State.

6. **Coal:** coal is found majorly in Enugu, Benue, Kogi, Delta, Kwara, Plateau, Abia, Anambra, Bauchi, Edo, Ondo, Adamawa, and Imo.
7. **Silver:** Silver ore is deposited in the northern part of Nigeria, namely Kano and Taraba State.
8. **Iron ore:** Iron ore deposits found in quantities in the Nigerian states like Kaduna, Enugu, Kogi, Niger, Kwara, Bauchi, and Zamfara (Ashagu, 2021).

### 3.4 Ecological zones in Nigeria

The ecological zones in Nigeria described by Keay (1949) in Federal Ministry of Environment (2019), include; “ Mangrove Swamp and Coastal Vegetation, Freshwater Swamp Forest, Lowland Rain Forest, Derived Savanna, Guinea Savanna, Sudan Savanna, and Sahel Savanna”

1. **Mangrove Swamp and Coastal Vegetation:** Mangrove forest is found along the coastal and delta areas of Nigeria where the water is brackish. The most prominent feature of the mangrove forest IS the stilt roots of *Rhizophora* spp (Federal Ministry of Environment, 2019).
2. **Freshwater Swamp Forest:** The Freshwater swamp forest forms a wide belt inland after the mangrove and coastal vegetation. The zone has more open canopy, which may reach 45 m in height, densely tangled, and almost impenetrable undergrowth (Federal Ministry of Environment, 2019).
3. **Lowland Rain Forest Ecological Zone:** is located north of the freshwater swamp forest and south of the Derived Savanna Ecological



Zone to the North. It is an area of dense evergreen forest of tall trees with thick undergrowth consisting of three layers of trees (Federal Ministry of Environment, 2019).

- 4. Derived Savanna Ecological Zone:** The Derived Savanna constitute an east-west band between the Lowland Rain Forest and Guinea Savanna ecological zones, and is characterized by dense populations (Federal Ministry of Environment, 2019).
- 5. Guinea Savanna Ecological Zone:** The Guinea savanna (or savanna woodland/wooded savanna) is the most extensive vegetation in the middle belt of Nigeria, and consist of a mixture of trees and grass. It receives annual rainfalls between 1000 – 1500 mm with about 6-8 months of rainfall. It contains parkland savanna, gallery forests and derived savanna (Federal Ministry of Environment, 2019).
- 6. Sudan Savanna Ecological Zone:** “The Sudan savanna belt is found to the Northern parts of Nigeria, and stretches from the Sokoto Plains through the Northern section of the High Plains of Nigeria to the Chad Basin. It includes areas around Sokoto, Kaduna, Kano and Borno States of Nigeria, comprising an area over a quarter of the country. Rainfall ranges from about 600-1000 mm and the relative humidity is generally below 40%, except for the few rainy months when this can rise to 60% and above” (Federal Ministry of Environment, 2019).
- 7. Sahel Savanna Ecological Zone:** “The Sahel savanna, is found to the extreme Northwest and Northeast of the country, where the annual rainfall is less than 600 mm and with dry seasons exceeding 8 months. Typically the vegetation consists of grasses, open thorn shrub savanna with scattered trees, 4 to 9 m in height most of them are thorny and extensive sparse grasses” (Federal Ministry of Environment, 2019).

## **4.0 Conclusion**

We have been able to examine the classification of natural resources, as well as what constitute the renewable and non-renewable natural resources. The geographical distribution of Nigeria's natural resources explains the areas the natural resources are distributed in Nigeria. The unit explains also the ecological zones in Nigeria. .

## **5.0 Summary**

The key point to note is that;

1. Natural resources are classified based on their renewability, their location and types.
2. Virtually all the states in Nigeria have one form and types of natural resources.

## **6.0 Tutor-Marked Assignment**

1. What are the key factors that determine how natural resources are classified?
2. Mention the natural resources in Nigeria and their geographical location.

## **7.0 Reference/further reading**

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## **Unit 2: Studies in environmental theories**

1.0 Introduction

2.0 Objectives

3.0 Main content

3.1 Resources curse theory

3.2 Environmental determinism theory

3.3 Environmentally Responsible Behaviour model

3.4 Ecological modernization theory

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

**7.0 Reference/further reading**

## **1.0 Introduction**

In this unit we will provide and review identifiable theories of natural resources. Remember theories are set of principles to which the practice of an activity is based. Therefore we will see their relationship in the study of natural resources and sustainable development.

## **2.0 objectives**

At the end of this unit, students will be able to;

- 1 Identify related theories of natural resources
- 2 Link these theories to areas of natural resources management.

## **3.0 Main content**

### **3.1 Resources curse theory**

Countries with abundant natural resources such as gold, diamonds, and crude oil often fail to transform that advantage into favourable development outcomes. This is the major import of the resource curse theory. Nigeria is one case study in the resource curse theory (The conversation, 2021). It is also known as the paradox of plenty or the poverty paradox, is the phenomenon of countries with an abundance of natural resources (such as fossil fuels and certain minerals) having less economic growth, less democracy, or worse development outcomes than countries with fewer natural resources.

In the position of Jonathan (2010) “mineral and fuel abundance in less developed countries (LDCs) tends to generate negative developmental outcomes, including poor economic performance, growth collapses, high levels of corruption, ineffective governance and greater political violence”. It is also noted that “resource wealth undermines the development of political and governance institutions by fostering a rentier institutional culture. In the same instance, resource windfalls can weaken government accountability toward citizens and businesses by decoupling taxation from expenditure” (Adissu and Eric, 2020).

### **3.2 Environmental determinism theory**

Environmental determinism is the belief that the environment, most notably its physical factors such as landforms and climate, determines the patterns of human culture and societal development. Environmental determinists believe that ecological, climatic, and geographical factors alone are responsible for human cultures and individual decisions (Amanda, 2020). “Environmental determinism is the doctrine that human growth, development and activities are controlled by the physical environment” (Lethwaite, 1966 in Alexander,

1999). The proponent of the paradigm was the German geographer and anthropologist Friedrich Ratzel (1844–1904).

### **3.3 Environmentally Responsible Behaviour model**

The Model of Responsible Environmental Behavior indicates that the following variables; intention to act, locus of control (an internalized sense of personal control over the events in one's own life), attitudes, sense of personal responsibility, and knowledge suggested whether a person would adopt a behavior or not within their interaction with the natural resources and environment.

### **3.4 Ecological modernization theory**

Environmental productivity, i.e. productive use of natural resources and environmental media (air, water, soil, ecosystems), can be a source of future growth and development in the same way as labour productivity and capital productivity. Ecological Modernization theory contends that “the relationship between economic activity and innovation in technology and the interventions of the nation-state and civil society are required to achieve best practice environmental outcomes” (Peter, Timothy and Maraseni, 2017).

Ecological Modernization is increasingly used in environmental policy analysis (Christoff, 1996; Spaargaren et al., 2009, Howes et al., 2010 in Peter, Timothy and Maraseni, 2017), because it provides an appropriate framework to explore the roles of actors in society in the process towards achieving best practice environmental outcomes. “The concept is often associated with eco-efficient innovation, namely the introduction of environmentally friendly technologies by increasing resource productivity” (Putri, 2018).

## **4.0 Conclusion**

In this unit we have been able to identify some of the key theories of natural resources as well as their import in the understanding of natural resources and sustainable development.

## **5.0 Summary**

The main point in this unit is that;

1. Countries with abundant natural resources such as gold, diamonds, and crude oil often fail to transform that advantage into favourable development outcomes.
2. Intention to act, attitudes, sense of personal responsibility, and knowledge act upon our interaction with the environment.
3. An appropriate framework is necessary to explore the roles of actors in society in the process towards achieving best practice environmental outcomes. This is outcome of good technology.

## **6.0 Tutor-Marked Assignment**

List and explain the various theories of natural resources studies.

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## **Unit 3 Key Concepts in natural resources Analysis**

1.0 Introduction

2.0 Objectives

3.0 Main contents

3.1 Ecology

3.2 Ecosystem

3.3 Biodiversity

3.4 Approaches to natural resources management

4.0 Conclusion

5.1 Summary

5.2 Tutor-Marked Assignment

### **1.0 Introduction**

In this unit, the focus will be on the Key Concepts in natural resources Analysis. The concept of ecology, ecosystem, biodiversity and the approaches to natural resources management will be discussed.

## **2.0 Objectives**

At the end of this unit, students will be able to;

1. Explain key concepts in natural resources analysis
2. Explain the concept of ecology.
3. Explain the concept of ecosystem.

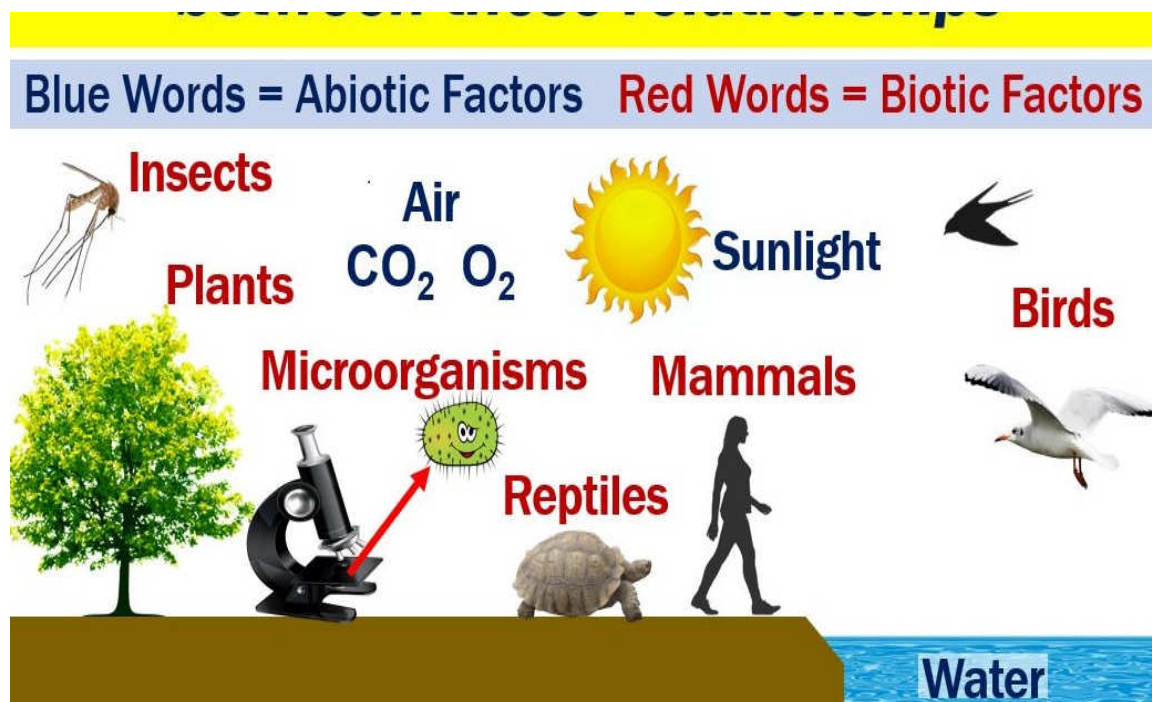
### **3.1 Concept of ecology**

Ecology is the study of the relationship between living organism, including humans and their physical environment (Ecological Society of America, 2022). “Ecology is the branch of science that deals with the study of interactions between living organisms and their physical environment. Both are closely interrelated and they have continuous interaction so that any change in the environment has an effect on the living organisms” (Jagran, 2022). The seven principles of ecology are

1. Maintain diversity and redundancy.
2. Manage connectivity.
3. Manage slow variables and feedbacks.
4. Foster complex adaptive systems thinking.
5. Encourage learning.
6. Broaden participation.
7. Promote polycentric governance systems (Sturle, et al, nd).

Ecology is important as it enriches our world and is crucial for human wellbeing and prosperity. It provides new knowledge of the interdependence between people and nature that is vital for food production, maintaining clean

air and water, and sustaining biodiversity in a changing climate (British Ecological Society, 2022). Ecology helps us to understand how our actions affect the environment. It shows the individuals the extent of damage we cause to the environment. Lack of understanding of ecology has led to the degradation of land and the environment. It has also led to the extinction and endangerment of certain species (Karthik, 2022).



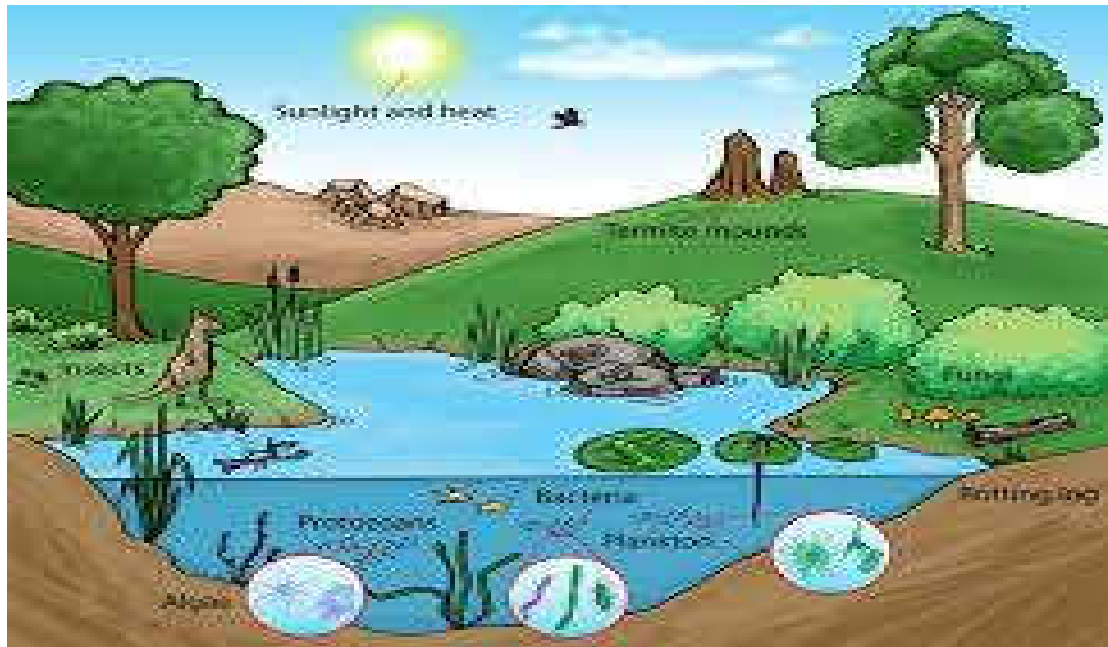
An example of ecological distribution, source: <https://dukarahisi.com/topic-6-ecology-biology-form-6/>

Ecology enriches our world and is crucial for human wellbeing and prosperity. It provides new knowledge of the interdependence between people and nature that is vital for food production, maintaining clean air and water, and sustaining biodiversity in a changing climate (British Ecological Society, 2022).

### 3.2 Ecosystem

The ecosystem is a community or group of living organisms that live in and interact with each other in a specific environment (Youmatter, 2020). The term "ecosystem" was first used in 1935 in a publication by British ecologist Arthur Tansley. "The term was coined by Arthur Roy Clapham, who came up with the word at Tansley's request. Tansley devised the concept to draw attention to the importance of transfers of materials between organisms and their environment" (Tansley, 1935; Willis, 1997).

Ecosystems can generally be classified into two classes such as natural and artificial. Artificial ecosystems are natural regions affected by man's interferences. They are artificial lakes, reservoirs, townships, and cities. Natural ecosystems are basically classified into two major types. They are aquatic ecosystem and terrestrial ecosystem (Tutorialpoint, 2022). "An ecosystem is a community of organisms and their physical environment. Ecosystem recognizes the many ways that an organism interacts with and depends on various parts of its environment" (Bar-Yam, 2011). Ecosystem provides habitat to wild plants and animals. It promotes various food chains and food webs. It controls essential ecological processes and promotes lives, involved in the recycling of nutrients between biotic and abiotic components (Karthik, 2022). In the long run, ecosystems provide crucial services such as pollination, seed dispersal, climate regulation, water purification, nutrient cycling, and control of agricultural pests. Biodiversity also holds value for potential benefits not yet recognized, such as new medicines and other possible unknown services.



An example of an ecosystem; **source: (Elena, 2020, Tsilia Yotuva)**

### **3.3 Biodiversity**

Biodiversity encompasses the variety of life on Earth at all its levels, from genes to ecosystems, and can encompass the evolutionary, ecological, and cultural processes that sustain life. Biodiversity includes not only species we consider rare, threatened, or endangered but also every living thing—from humans to organisms we know little about, such as microbes, fungi, and invertebrates (American Museum of Natural History, 2022).

Biodiversity provides many valuables for man such as food, fuel, shelter, and medicine. Biodiversity has cultural value to humans as well, for spiritual or religious reasons for instance. It is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystem and the ecological complexes of which they are part (Greenfacts, 2022).

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## **Unit 4 Environmental laws and protocols**

### 1.0 Introduction

### 2.0 Objectives

### 3.0 Main contents

#### 3.1 Concept of environmental Law

#### 3.2 Principles of environmental laws

#### 3.3 Environmental laws in Nigeria

#### 3.4 Importance of environmental law

### 3. Conclusion



## 5.1 Summary

### 5.1 Tutor-Marked Assignment

#### **3.1 Concept of Environmental laws**

Environmental law is a body of law, a system of complex and interlocking statutes, common law, treaties, conventions, regulations, and policies that seeks to moderate or eliminate the actual or projected harm to the natural environment resulting from human activities. Britannica (nd) defined environmental as the principles, policies, directives, and regulations enacted and enforced by local, national, or international entities to regulate human treatment of the nonhuman world. Legalcareerpath (2022) defined environmental law as the collection of laws, regulations, agreements and common law that governs how humans interact with their environment.

Environmental laws are the tools which help manage the conservation of natural resources in a country” (Environmental Management, 2017). “Environmental Law is ultimately the product of environmentalism which can be roughly defined as a value system that seeks to redefine humankind’s relationship to nature” (Tarlock, nd).

#### **3.2 Principles of environmental laws**

There are about five (5) key principles of environmental law, namely; Sovereignty and Responsibility Principle, the Precautionary Principle, The Prevention Principle, the "Polluter Pays" Principle, Sustainable Development Principle.

1. Sovereignty and Responsibility Principle:
2. Precautionary Principle:

3. The Prevention Principle:
4. Polluter Pays" Principle:
5. Sustainable Development Principle:

### **3.3 Environmental Laws in Nigeria**

The following laws are some of the environmental laws in Nigeria;

1. Public Health Act.
2. 1917 Factories Act.
3. 1937 Civil Aviation Act.
4. 1964 Antiquities Act, 1915 Live Fish (Control of Importation) Act.
5. 1965. Exclusive Economic Decree.
6. 1964 Navigable Waters Declaration Decree.
7. 1978 Petroleum Decree.
8. 1969 Petroleum (Drilling and production) Regulations.
9. 1969 Oil in Navigable Waters Decree.
10. 1968 Oil Pipelines Act.
11. 1956 Associated Gas Re -Injection (Amendment) Decree.
12. 1985 Nigeria Atomic Energy Commission Decree.
13. 1985 Natural Resources Conservation Council Decree.
14. 1989 River Basins Development Authorities Decree.
15. 1987 Sea Fisheries (licensing) Regulations.
16. 1992 Quarries Decree.
17. 1969 Land Use Decree.
18. 1972 Factories Decree.
19. 1987 National Parks Decree.

Other environmental laws in Nigeria include;

1. National Environmental Protection (Effluent Limitation) Regulations:
2. National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations.
3. National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations.
4. Environmental Impact Assessment Act of 1992 (EIA Act).
5. Harmful Wastes (Special Criminal Provisions etc.) Act of 1988 (Harmful Wastes Act).

Nigeria environmental regulations continue in this manner;

1. Forestry Act 1958,
2. Antiquities Act 1958,
3. Territorial Waters Decree 1967,
4. Oil in Navigable Waters Decree 1968,
5. Petroleum Decree 1969,
6. Quarries Decree 1969;
7. Sea Fisheries Decree 1971,
8. Land Use Decree 1978,
9. National Environmental Protection (Management of Solid and Hazardous Waste) Regulations 1991,
10. Guidelines and Standards for Environmental Pollution Control in Nigeria 1991,
11. Water Resources Act 101 of 1993, and Minerals and Mining Act 1999 (Nabegu, Mustapha and Naibbi, 2017).

In 2011, the following environmental laws came into effect; National Environmental (Protection of Endangered Species in International Trade)

Regulations, National Environmental (Standards for Telecommunications and Broadcasting Facilities) Regulations, National Environmental (Soil Erosion and Flood Control) Regulations, National Environmental (Control of Bush/Forest Fire and Open Burning) Regulations, National Environmental (Domestic and Industrial Plastic, Rubber and Foam Sector) Regulations, National Environmental (Coastal and Marine Areas Protection) Regulations, National Environmental (Construction Sector) Regulations, National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, National Environmental (Non-Metallic Minerals Manufacturing Industries Sector) Regulations, National Environmental (Surface and Groundwater Quality Control) Regulations, National Environmental (Electrical/Electronic Sector) Regulations, 2011 (Oruonye and Ahmed, 2011).

### **3.4Importance of environmental law**

Without environmental laws it will be impossible to manage the use of the environment. Environmental laws is essential for the conduct on the environment, considering that without these laws the environment will be exploited and harmful materials introduced to it. Therefore the main objective of environmental law is the protection of human health as well as the environment (Budnukaeku and Oku, 2021). The enforcement of environmental regulations helps to protect the environment from man's excesses that leads to environmental degradation Oruonye and Ahmed, 2011).

Environmental laws also helps in pollution Prevention, risk Assessment and Risk Reduction, identifying those issues which pose the greatest risks to human health and the environment and taking action to reduce danger on the environment. environmental laws also helps in protecting people and the environment from significant health risks, sponsors and conducts research, and

develops and enforces environmental regulations. Environmental law is necessary to combat issues related to the environment and conservation of natural resources. These issues are related to global warming, climate change, greenhouse gas emissions, acid rain, hunting of endangered species, deforestation, depletion of natural resources, pollution of water, air and soil (Conservative Energy, 2021).

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### **MODULE 3: NEXUS BETWEEN NATURAL RESOURCES AND SUSTAINABLE DEVELOPMENT**

***Unit 1: Issues in natural resources studies***

1.0 Introduction

2.0 objectives

3.0 Main content

4.0 Conclusion

5.1 Summary

5.2 Tutor-Marked Assignment

**Unit 2: Natural resources and development**

1.0 Introduction

2.0 objectives

3.0 Main content

3.1 Natural resources and poverty reduction

3.2 Natural resources and processes in development

4.0 Conclusion

5.1 Summary

5.2 Tutor-Marked Assignment

1.0 Introduction

## 2.0 Objectives

## 3.0 Main content

### **3.1 Natural resources and poverty reduction**

Natural resources are for the use of man. However, what is important is the sustainable use of the natural resources. Natural resources can reduce poverty especially if it sustainably managed by man. Poverty is a global problem that affects citizens around the world. About 1.1 billion people earn less than one dollar per day, and they face daily risks and hardships that determine their very survival (USAID, 2005). Natural resources play a special role in the life of the poor. More than 1.3 billion people depend on fisheries, forests, and agriculture for employment, close to half of all jobs worldwide (USAID, 2005). Natural ecosystems have several characteristics that make them attractive and accessible as a source of income to the rural poor.

“Rural poor of the World, and the poor countries that they live in, do not have much in monetary wealth - but natural resources represents a possible source of income. With the right support, on both the national level as well as from the international community, the economical growth generated from these resources can alleviate poverty sustainably” (Hugo, 2018). Natural resources provide and solve daily needs of man such as clothing, shelter, and food, through farming and rearing of animal for domestic and commercial uses. Man can earn, invest and save money from farm produce.

### **3.2 Natural resources and processes in development**

Resources are important for us as we utilise them to satisfy our wants. Many minerals like iron, copper, mica etc. are used in industries for manufacturing various goods. Minerals like coal and petroleum are used for the generation of



electricity. Natural resources like water and air are indispensable for human life. Natural resource utilization, pollution, and other environmental considerations have become critical to the possibilities of long-run economic growth and by extension sustainable development.

“Natural resources have a double-edge effect on economic growth, in that the intensity of its use raises output, but increases its depletion rate. Natural resource is a key input in the production process that stimulates economic growth” (Musa, 2017). Natural resources, both renewable and non-renewable, and ecosystem services are a part of the real wealth of nations. They are the natural capital out of which other forms of capital are made. They contribute towards fiscal revenue, income, and poverty reduction. Sectors related to natural resources use provide jobs and are often the basis of livelihoods in poorer communities (OECD, 2011). There is wealth in natural resources. In fact, natural resources make up the majority of most countries’ wealth. Countries that are abundant in natural resources, especially non-renewable natural resources, are still seeing the value of those resources rise as developing countries are starting to require more and more energy. This is alongside the increased value of non-renewable natural resources because of their decline. Many countries, therefore, rely on natural resources to keep their economy afloat (IMPOFF, 2020).

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### **Unit 3: Challenges of natural resources and sustainable development**

#### 1.0 Introduction

#### 2.0 objectives

#### 3.0 Main content

##### 3.1 Environmental degradation

##### 3.2 Exploration and exploitation of the natural resources

##### 3.3 Human population and challenge on natural resources

##### 3.4 Urbanization and the challenges of natural resources development

#### 4.0 Conclusion

#### 5.1 Summary

#### 5.2 Tutor-Marked Assignment

#### 1.0 Introduction

#### 2.0 objectives

#### 3.0 Main content

### **3.1 Environmental degradation**

Environmental degradation is a process through which the natural environment is compromised in some way, reducing biological diversity and the general health of the environment. This process can be entirely natural in origin, or it can be accelerated or caused by human activities. (General Multilingual Environmental Thesaurus, 2021). Environmental degradation is a result of the dynamic inters play of socio-economic, institutional and technological activities. Environmental changes may be driven by many factors including economic growth, population growth, urbanization, intensification of agriculture, rising energy use and transportation. Pradip, Ali, and Ahmad (2020) defined environmental degradation as “the deterioration of the environment through depletion of resources which includes all the biotic and abiotic element that form our surrounding that is air, water, soil, pant animals, and all other living and non-living element of the planet of earth”.

Shocking to note in the present environmental problems is that they are caused more by anthropogenic than natural phenomena (Rashwet, 2019). Ecological effect or degradation is created by the consolidation of an effectively substantial and expanding human populace, constantly expanding monetary development or per capita fortune and the application of asset exhausting and polluting technology (Rinkesh, 2022). Rinkesh (2022) listed types of environmental degradation to include;

1. Land and soil degradation.
2. Water degradation.
3. Atmospheric degradation.

### **3.2 Exploration and exploitation of the natural resources**

The natural resources have undergone patterns of exploration and exploitation over time. The exploitation of natural resources is the use of natural resources for economic growth sometimes with a negative connotation of accompanying environmental degradation. It started to emerge on an industrial scale in the 19th century as the extraction and processing of raw materials (such as in mining, steam power, and machinery) developed much further than it had in preindustrial areas. According to the National History Museum, and as stated in Emilie (2021) “the earth’s population has almost doubled since the 70s, with the consumption of natural resources increasing by 45% per capita”. Natural resources and living standards will start declining by 2030 considering the rate at which human beings are depleting, and if immediate action isn’t taken (Emilie, 2021).



**Oil spills. An example of the impact of the exploitation of the natural resources, Source: Murimi (2015), BDO in Pambazuka news.**

The reason why natural resources is overexploited according to Emilie (2021) include;

1. Overpopulation
2. Poor farming practices
3. Logging
4. Pollution
5. Over consumption of natural resources
6. Industrial and technological development.

And the consequences of overexploitation Emilie (2021) include;

1. Water shortage
2. Oil depletion
3. Loss forest covers.
4. Mineral depletion
5. Extinction of species



**Deforestation caused by excessive logging, an example of overexploitation of the natural resources. Credit: Oana and Shutterstock.**

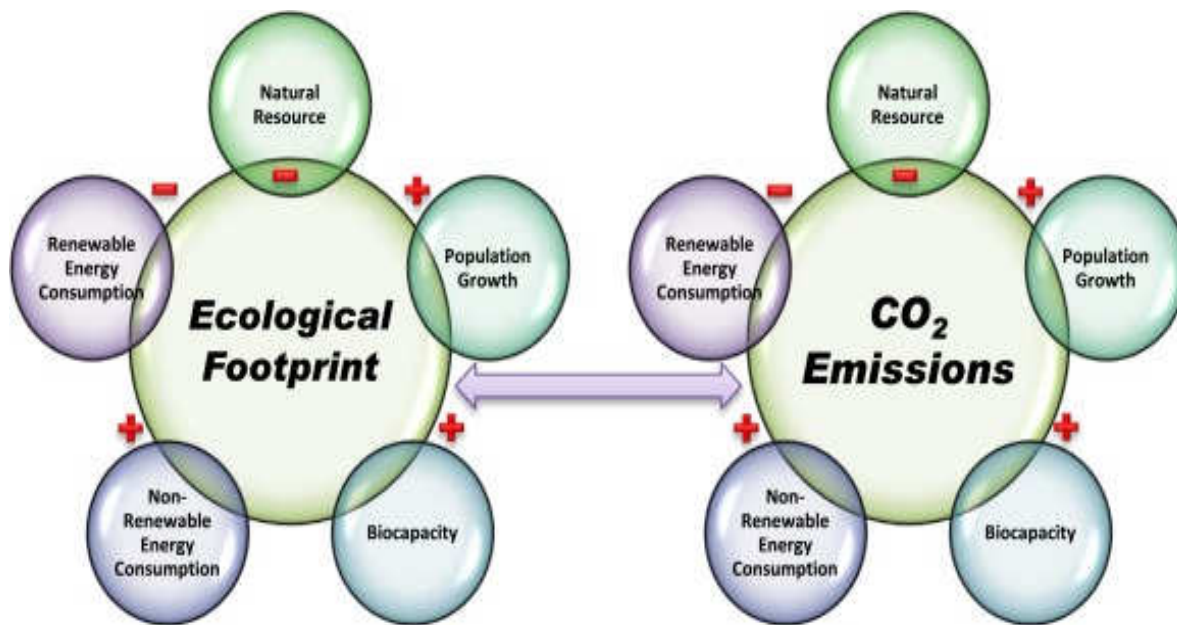
Natural resources exploitation, as explained by Babagana and Muhammed (2012), have caused different types of environmental damages which include “ecological disturbances, destruction of natural flora and fauna, pollution of air, water and land, instability of soil and rock masses, landscape degradation, desertification and global warming, specie extinctions, oil spillage, gas flaring, deforestation, soil erosion, coastal degradation, ozone depletion, ground water contamination, the environmental damage on arable land as well as economic crops and trees”. The overexploitation of natural resources by humans will lead to future consequences on availability of food, increase health hazards and risks of natural disasters (Lampert, 2019).

### **3.3 Human population and challenge on natural resources**

Human populations have close effect on the natural resources. As the human population increases, so also the the need for the natural resources for human needs. As the human population grows so also is the increase in the consumption of natural resources. More humans consume more freshwater, more land, more clothing, etc. The more people on the planet, the more food is need to feed those humans (more fishing, more farming, more deforestation to make room for agriculture and raising livestock (Kate, 2016).

Population growth and natural resources are intricately linked and play role in climate disruption and farmers’ ability to adapt to climate change especially in developing countries with rapid demographic changes and economies mostly dependent on natural resources (Mengistu and Samuel, 2021). Without taking action now, billions of people across the world will face thirst, hunger, slum conditions and conflict in response to droughts, food shortages, urban squalor, migration and ever depleting natural resources, while capacity tries to catch up

with demand (Tim, 2011). Rapid population growth continues to be a major underlying force of environmental degradation and a threat to sustainable use of natural resources. It reduces the quality and quantity of natural resources through overexploitation, intensive farming and land fragmentation. Regions with high population pressure face scarcity of arable land, which leads to shortened/removed fallow period, declining soil fertility and farm income due to farm subdivision (Mengistu and Samuel, 2021).



**A pictorial analysis of the impact of population on the natural environment, sources: Irfan, Fugun and Hoang (2021).**

Rapid population growth plays an important role in declining per capita agricultural land, forest and water resources. The analysis reveals that outcomes of high population growth rates are increasing population density and number of people below poverty line. Population pressure contributes to land degradation and soil erosion, thus affecting productive resource base of the economy. The increasing population numbers and growing affluence have resulted in rapid growth of energy production and consumption. The

environmental effects like ground water and surface water contamination; air pollution and global warming are of growing concern owing to increasing consumption levels (Sarbpriya and Ishita, 2011).

### **3.4 Urbanization and the challenges of natural resources development**

Urbanization process will put pressure on natural resources and the environment. an increase in the share of natural resources leads to a rapid increase in urbanization and urban concentration. Urbanization and human activity within an urban system produces many destructive and irreversible effects on natural environments such as climate change, air pollution, sediment and soil erosion, increased flooding magnitude, and loss of habitat. Cities in an urban environment change the local climate dramatically (Debra, 1999).

Urban populations interact with their environment. Urban people change their environment through their consumption of food, energy, water, and land. And in turn, the polluted urban environment affects the health and quality of life of the urban population (Barbara, 2004). “The destruction of ecologically important wetlands for urban development has potentially negative effects on the environment. These natural defense systems which account for about 6% of the global land area are the transitional areas between terrestrial and aquatic environments, and are one of the world’s most productive natural ecosystems “(Doneika, 2008).

## **4.0 Conclusion**

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#### **Unit 4: Social and developmental significance of natural resources**

1.0 Introduction

2.0 Objectives

3.0 Main content

3.1 Natural resources, cultural and development

3.2 Ecosystem and community development

4.0 Conclusion

5.1 Summary

5.2 Tutor-Marked Assignment

## 1.0 Introduction

## 2.0 Objectives

## 3.0 Main content

### **3.1 Natural resources, cultural and development**

Globally, cultural values of natural resources are increasingly recognized as important for local natural resource management and conservation in and beyond parks. The tendency has been to focus on the direct-use rather than the cultural values and importance of natural resources (Goldman and Shoana, 2013). Contemporary natural resource management is expanding its focus as a result of the dynamic interchange between conservationists and local people residing in or near the world's protected wildlands. "Integration of different cultural perspectives concerning natural resource management at the local level may prove to be the new paradigm in conservation" (Kimberly, 1997).

The issue of sustainable development is a complex one. Environmental and cultural practices are intertwined; and a holistic understanding of their relationship is necessary to achieve socially, economically, and environmentally sustainable development (Christie. 2008).

### **3.2 Ecosystem and community development**

Naturally the ecosystem provides services to humans which make life easy. Also the economy is dependent on the ecosystem, and contributes to the general wellbeing of the individual and community (James et al, 2017). Many communities possess local knowledge about the interactions between humans and ecosystems, and affect ecosystem services and human well-being positively (Carl, Christo, Georgina and Lisen, 2005). "Local communities nurture a mosaic landscape, consisting of sacred places, springs, agroecosystems, and

high mountains, thereby creating a diversity of livelihood options at the local level” (Carl, Christo, Georgina and Lisen, 2005).

Ecosystems provide a sense of place and identity for local people, in addition to other ecosystem services. These intangible values, including aesthetic and recreational values, provide a rationale for management, and precipitate management practices that enhance ecosystem resilience through caretaking and custodianship (Carl, Christo, Georgina and Lisen, 2005). “Ecosystems underpin all human life and activities. The goods and services they provide are vital to sustaining well-being, and to future economic and social development. The benefits ecosystems provide include food, water, timber, air purification, soil formation and pollination”(European Commission, 2009).

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## **MODULE 4: MEANING, SCOPE AND DEFINITION OF SUSTAINABLE DEVELOPMENT**

### **Unit 1: Definition, meaning of Sustainable Development**

1.0 Introduction

2.0 Objectives

3.0 Main content

3.1 Sustainable Development -Meaning

### 3.2 Conceptualizing Sustainable Development

### 3.3 Importance of sustainable development

#### 1.0 Introduction

#### 2.0 Objectives

#### 3.0 Main content

### **3.1 Sustainable Development -Meaning**

Sustainable development is the idea that human societies must live and meet their needs without compromising the ability of future generations to meet their own needs. But the official definition of ecosystem was derived from the Brundtland report in 1987 'Our common future' which defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

### **3.2 Conceptualizing Sustainable Development**

Sustainable development has been defined in various ways, but the most frequently quoted and acceptable definition is the one from Our Common Future, which is also known as the Brundtland Report. It defined sustainable development as the development that meets the need of the present without compromising the ability of the future generation to meet their own needs. Sustainable development is a way of organizing society so that it can exist in the long term. This means taking into account both the imperatives present and those of the future, such as the preservation of the environment and natural resources or social and economic equity (You matter, 2020).

The overall goal of sustainable development (SD) is the long-term stability of the economy and environment; this is only achievable through the integration and acknowledgement of economic, environmental, and social concerns throughout the decision making process (Emas, 2015). Sustainable development centres around inter- and intragenerational equity anchored essentially on three-dimensional distinct but interconnected pillars, namely the environment, economy, and society (Mensah and Casdevall, 2019). It is an enlarged view of development that extends beyond simple measures of “growth”. It raises quality of life (happiness, satisfaction, secured and descent life, fair, equitable and accessible). It is a long-term thinking with a commitment to social equity and fair distribution of benefits and costs, both geographically and across current and future generations. It means living in a way to create lasting economic prosperity, environmental health, and social justice for current and future generations (Bhandari and Abe nd),





### **3.3 Importance of sustainable development**

Sustainable development is important for man and also for the environment. Without sustainable development the natural resources will be overexploited and the future generation will not benefit from the environment. sustainable development is important because it entails;

1. Using the available resources judiciously and working towards maintaining the ecological balance.
2. Preventing degradation of the environment
3. To prevent overexploitation of scarce resources.

Sustainable development is important since it will;

1. Ensure the achievement of harmony between environmental sustainability, economic sustainability, and socio-political sustainability.
2. Ensure the conservation and enhancing the natural environment.
3. Direct the pattern and ways in which we develop and use technologies in harnessing the natural resources..
4. Ensure that basic needs of employment, food, energy, water, and sanitation are met.
5. The right of individuals to a healthy, safe, and clean environment.
6. Ensures the reduction of pollution, poverty, and unemployment.

### **4.0 Conclusion**

#### **5.1 Summary**

#### **5.2 Tutor-Marked Assignment**

## **Unit 2 Sustainable management of the environment**

### **1.0 Introduction**

### **2.0 Objectives**

### **3.0 Main content**

#### **3.1 Methods in sustainable environmental management**

It is the goal of sustainable development in environmental management, however what is important the way forward and the methods in environmental management.

#### **3.2 Sustainable Development Goals**

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs) (United Nation, 2015). The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

The 17 SDGs are: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4) Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reduced Inequality, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life On Land,

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