

**COURSE
GUIDE**

**DES 421
NATURAL RESOURCES AND SUSTAINABLE
DEVELOPMENT**

Course Team Dr. Emina William Uli (Course Writers) -NOUN
Dr. Agomoh Maduabuchi John (Course Writers) -
University, Ogboko Imo State.
Prof. Sofri Joab-Peterside (Course Editor)-
University of Port Harcourt
Mrs. J.G. Owonuwa (Copy Editor) - NOUN



NATIONAL OPEN UNIVERSITY OF NIGERIA

© 2022 by NOUN Press
National Open University of Nigeria
Headquarters
University Village
Plot 91, Cadastral Zone
Nnamdi Azikiwe Expressway
Jabi, Abuja

Lagos Office
14/16 Ahmadu Bello Way
Victoria Island, Lagos

e-mail: centralinfo@nou.edu.ng
URL: www.nou.edu.ng

All rights reserved. No part of this book may be reproduced, in any form or by any means, without permission in writing from the publisher.

Printed, 2022

ISBN: 978-978-058-368-2

CONTENTS

Introduction	iv
Course Competencies	v
Course Objectives	v
Working Through this Course	vi
Study Units	vi
References and Further Readings	vii
Presentation Schedule	xx
Assessment	xx
Tutor-Marked Assignments (TMAs)	xx
Final Examination and Grading	xxi
How to get the Most from the Course	xxi
Online Facilitation	xxiii

INTRODUCTION

Welcome to DES: 421. Natural Resources and Sustainable Development is a 3-credit and one- semester undergraduate course for developments studies students. The course is sixteen units spread across fourteen lectures week. This course guide provides you with an insight into the study of 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.

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 COMPETENCIES

This course provides the student;

- The awareness on the importance of natural resources in sustainable development
- The importance of the sustainable use of the natural resources
- A unified approach to the challenges of natural resources and sustainable development.
- The judgmental decision on social and developmental significance of natural resources

COURSE OBJECTIVES

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.

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 THIS COURSE

To successfully complete this course, you are required to read the study units, referenced books and other materials on the course.

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

STUDY UNITS

There are 13 units in this course which should be studied carefully and diligently.

Module 1 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 2 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 3 Nexus Between Natural Resources and Sustainable Development

- Unit 1 Natural Resources and Development
- Unit 2 Challenges of Natural Resources and Sustainable

	Development
Unit 3	Social and Developmental Significance of Natural resources
Module 4	Meaning, Scope and Definition of Sustainable Development
unit 1	Definition, Meaning of Sustainable Development
Unit 2	Sustainable Management of the Environment

REFERENCES AND FURTHER READINGS

- Adeofun, C. O. & Bada, B. S. (n.d). Principles of natural resources management. Lecture note, EMT 301, http://unaab.edu.ng/wp-content/uploads/2009/12/464_EMT%20301.pdf
- Adissu, L. & Eric, W. (2020), Are natural resources a curse, a blessing or a double-edged sword?
<https://www.brookings.edu/blog/future-development/2020/07/16/are-natural-resources-a-curse-a-blessing-or-a-double-edged-sword/>
- Agomoh, M. J. (2016). Indigenous knowledge system and environmental conservation practices in Umuahia South Local Government Area, Abia State. A PhD dissertation in partial fulfillment of the requirements for the award of Doctor of Philosophy (Ph.D) degree in Sociology of Development University of Port Harcourt.
- Agrawal, A. (1997). Community in Conservation: Beyond Enchantment and Disenchantment. Conservation Development Forum working paper, Gainesville, FI, April.
- Agrawal, A. & Gibsson, C. (Eds.) (2001). Communities and the Environment. New Brunswick, N. J. Rutgers University Press.
- AID Environment, National Institute for Coastal and Marine Management (2004). Integrated Marine and Coastal Area Management (IMCAM) approaches for implementing the Convention on Biological Diversity. Montreal, Canada: Secretariat of the Convention on Biological Diversity. (CBD Technical Series no. 14).
- Alexander, D.E. (1999) Environmental determinism. In: Environmental Geology. Encyclopedia of Earth Science. Springer, Dordrecht. https://doi.org/10.1007/1-4020-4494-1_11

- Amanda, B. (2020), What is environmental determinism
<https://www.thoughtco.com/environmental-determinism-and-geography-1434499#:~:text=Environmental%20determinism%20is%20the%20belief,human%20culture%20and%20societal%20development.>
- American Museum of Natural History (2022), What is biodiversity.
[https://www.amnh.org/research/center-for-biodiversity-conservation/what-is-biodiversity#:~:text=The%20term%20biodiversity%20\(from%20%E2%80%9Cbiological,cultural%20processes%20that%20sustain%20life.](https://www.amnh.org/research/center-for-biodiversity-conservation/what-is-biodiversity#:~:text=The%20term%20biodiversity%20(from%20%E2%80%9Cbiological,cultural%20processes%20that%20sustain%20life.)
- Angela, L. S. & Christianly, C. (2021). What are natural resources? Definitions and types. <https://study.com/academy/lesson/what-are-natural-resources-definition-lesson-quiz.html>
- Anup, K. P. (2016). Ecosystem and its role in sustainable development in Nepal. <https://www.intechopen.com/books/advances-in-landscape-architecture/role-of-ecotourism-in-sustainable-d> Accessed 23/3/2021
- Anwadike, B.C. (2020). Biodiversity Conservation in Nigeria: Perception, Challenges and Possible Remedies Volume 8 - Issue 4.
- Ashagu, J. (2021). 13 Nigeria Natural Resources, Their Locations And Uses. <https://rnn.ng/13-nigeria-natural-resources-their-locations-and-uses/>
- Babagana, G. & Muhammed, M. A. (2012), Environmental impact of natural resources exploitation in Nigeria and the way forward. Journal of Applied Technology in Environmental Sanitation, 2 (2): 95-102.
- Banton, C. (2021). What Is a Renewable Resource? https://www.investopedia.com/terms/r/renewable_resource.asp
- Barbara, B. T. (2004). Urbanization: An environmental force to be reckoned with. <https://www.prb.org/resources/urbanization-an-environmental-force-to-be-reckoned-with/>
- Bar-Yam, Y. (2011). Ecosystem. <https://necsi.edu/ecosystem.>
- Borrini-Fayerabend, G. (1996). Collaborative Management of Protected Areas (CCAs): Tailoring the Approach to the Context.

- Boteler, B. (2014). "Coastal Zones: Achieving Sustainable Management". *Science for Environment Policy*, Vol. No. 46. 1-16.
- British Ecological Society (2022). What is ecology? <https://www.britishecologicalsociety.org/about/what-is-ecology/#:~:text=Why%20is%20ecology%20important%3F,biodiversity%20in%20a%20changing%20climate>.
- Brockington, Dan. 2002. *Forest Conservation: The preservation of the Mkomazi Game Reserve, Tanzania*. Bloomington: Indiana University Press.
- Budnukaeku, A. C. & Oku, H. (2021). Environmental laws and management agencies in Nigeria– what hope for desecrated landscape. *Biodiversity journal*, Vol 5(1).
- Carl, Christo, Georgina & Lisen (2005), *Communities, ecosystems and livelihoods*.
https://www.researchgate.net/publication/229076656_Communities_ecosystems_and_livelihoods.
- Carley, C. & Christie, I. 2000. *Managing Sustainable Development*. Earthscan Publications Ltd, London and Sterling, VA.
- Christie, M. (2008), "Traditional Natural Resource Use and Development in Northeast Thailand" . Senior Honors Projects. Paper 107.
<http://digitalcommons.uri.edu/srhonorsprog/107>
<http://digitalcommons.uri.edu/srhonorsprog/107>
- Chukwuone, N. A., Adeosun, K. P. & Chukwuone, C. A. (2020), Socioeconomic factors affecting households' use of indigenous forest management practices in managing non-wood forest products: evidence from forest communities in Nigeria derived savannah. [https://www.cell.com/heliyon/pdf/S2405-8440\(20\)32124-1.pdf](https://www.cell.com/heliyon/pdf/S2405-8440(20)32124-1.pdf).
- Collins dictionary. Natural resources.
<https://www.collinsdictionary.com/dictionary/english/natural-resources>.
- Conservative Energy, (2021). What is environmental law? <https://www.conserve-energy-future.com/environmental-law-and-its-components.php>.

- CRS and MEAS. (2015). Understanding natural resources: A SMART Skills manual. Catholic Relief Services, Baltimore, MD, and Modernizing Extension and Advisory Services project, University of Illinois at Urbana-Champaign.
- Daniele, C., Laurene, F., Jean-Yves, J. & Emmanuel, T. (2015), Challenges of Managing and Using Natural Resources. k: Family Farming and the Worlds to Come (pp.217-232).
- Debra, E. (1999).Urbanization and its Human Influence. Seminar in Global Sustainability, University of California, Irvine. March.
- Definition of natural resources from the Cambridge Advanced Learner's Dictionary & Thesaurus © Cambridge University Press.
- Defries, R. S. & Malone, T. (Eds.). Global Environmental Change and Our Common Future: Papers from a Forum, National Academy of Sciences, Washington.
- DHEC's Office of Solid Waste Reduction and Recycling, (2008). Natural resources. <https://scdhec.gov/sites/default/files/Library/OR-0689.pdf>.
- Doneika, S. (2008), The effects of urbanization on natural resources in Jamaica. 44th ISOCARP Congress.
- Earth Eclipse, (2022). What are natural resources? <https://eartheclipse.com/environment/types-and-threats-to-natural-resources.html>
- Ecological Society of America (2022), What is ecology. <https://www.esa.org/about/what-does-ecology-have-to-do-with-me/#:~:text=Ecology%20is%20the%20study%20of,and%20the%20world%20around%20them>.
- EDF, (n.d). Types of renewable energy. <https://www.edfenergy.com/for-home/energywise/renewable-energy-sources>.
- Emilie, B. (2021), Consequences of over exploitation of natural resources. <https://ecojungle.net/post/consequences-of-overexploitation-of-natural-resources/>

- Eneji, C.V.V., Ogundu, C.N. & Oyelade, I. A. (2020), Indigenous Cultural Practices and Natural Resources Conservation in Owerri, Imo State, Nigeria. *Advances in Social Sciences Research Journal* – Vol.6, No.8.
- English dictionary, (2022). Natural resources.
https://www.lexico.com/definition/natural_resources
- Environmental Management (2017). Environmental policies and legislation.
- European Commission (2009), Ecosystem Goods and Services.
https://ec.europa.eu/environment/pubs/pdf/factsheets/Eco-systems%20goods%20and%20Services/Ecosystem_EN.pdf
- European Commission (2021), Decent work and economic growth.
https://ec.europa.eu/international-partnerships/sdg/decent-work-and-economic-growth_en#:~:text=The%208th%20Sustainable%20Development%20Goal,for%20equal%20work%20by%202030
- European Commission, (2002). Analysis of Selected Concepts on Resource Management A Study to Support the Development of a Thematic Community Strategy on the Sustainable Use of Resources.
<https://ec.europa.eu/environment/archives/natres/pdf/cowlstudy.pdf>
- FAO (1995), Planning for sustainable use of land resources towards a new approach. Task Managership for Chapter 10 of Agenda 21 of the United Nations Conference on Environment and Development (UNCED).
- FAO (2020). Sustainable forest management.
[http://www.fao.org/forestry/sfm/en/#:~:text=Sustainable%20forest%20management%20\(SFM\)%20i](http://www.fao.org/forestry/sfm/en/#:~:text=Sustainable%20forest%20management%20(SFM)%20i)
- Federal Ministry of Environment (2019). National Forest Reference Emission Level (FREL) for the Federal Republic of Nigeria
https://redd.unfccc.int/files/2019_submission_frel_nigeria.pdf
- Fisher, R. J. (1995). Collaborative Management of Forests for Conservation and International Development. Gland, Switzerland: IUCN-The World Conservation Union.
- Fuana & Flora International (2022), Planet under pressure.
<https://www.fauna-flora.org/conservation-challenges/>

General Multilingual EnvironmentalThesaurus, (2021). environmental degradation.

<https://www.eionet.europa.eu/gemet/en/concept/15154#:~:text=Environmental%20degradation%20is%20a%20process,or%20caused%20by%20human%20activities.>

Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, 1997.

Glowka, L. (et al.). 1994. A Guide to the Convention on Biological Diversity. Gland, Switzerland, and Cambridge, UK: IUCN- The World Conservation Union.

Goldma, T. & Shoana, S. (2013), Cultural values of natural resources among the San people neighbouring Kgalagadi Transfrontier Park, South Africa. Local Environment, 20:1, 18-33, DOI: 10.1080/13549839.2013.818950

Goodall, J. (2022). Understanding nature conservation: 6 conservation methods. <https://www.masterclass.com/articles/nature-conservation-explained#6-nature-conservation-methods>

Greenfacts (2022). Biodiversity & Human Well-being. <https://www.greenfacts.org/en/biodiversity/1-3/1-define-biodiversity.htm>

Grynspan, R. (2012). Rebeca Grynspan: "The role of natural resources in promoting sustainable development" the occasion of the Opening of the 67th UN General Assembly side event on "The Role of Natural Resources in Promoting Sustainable Development"UN New York, 28 September.

Gundu, E. G. & Adia, J.E (2014) Conservation methods of endangered species.

Houghton, M. F. (n.d). The distribution of natural resources. <https://www.bbsd.org/packets/weekfour/science6.pdf>

Hugo, A. (2018). Environment and Poverty Times: Pro-poor growth issue. <https://www.grida.no/resources/7305>

IMPOFF, (2020), Understanding the Importance of Natural Resources. <https://impoff.com/importance-of-natural-resources/>

- Insee (2021). Natural resources. <https://www.insee.fr/en/metadonnees/definition/c2198>
- Irfan, K., Fugun, H. & Hoang, P. L. (2021). The impact of natural resources, energy consumption, and population growth on environmental quality: Fresh evidence from the United States of America.
- Jafari, R. K., Alfani, A. R., Kuruthumu, A. M. & Ismail, S. S. (2013), Emerging issues and challenges in conservation of biodiversity in the rangelands of Tanzania. *Nature conservation* 6:1-29.
- Jagran, P. (2022). Basic Concepts related to the Environment and Ecology. <https://www.jagranjosh.com/general-knowledge/basic-concepts-related-to-the-environment-and-ecology-1518784514-1>.
- James (et al.). (2017). The role of ecosystem services in community well-being. (Ed.). Levant, H. *Ecosystem services and global ecology*. DOI10.5772/intechopen.71316.
- Joint SDG Fund (2015). GOAL 7: Affordable and clean energy. <https://www.jointsdgfund.org/sustainable-development-goals/goal-7-affordable-and-clean-energy#:~:text=Ensuring%20universal%20access%20to%20affordable,and%20industry%20by%2014%20percent>.
- Jonathan, D. J. (2010), The 'Resource Curse': Theory and Evidence (ARI). https://www.files.ethz.ch/isn/125773/ARI172-2010_DiJohn_Resource_Curse_Theory_Evidence_Africa_Latin_America.pdf
- Karthik, (2022). Why is the ecosystem important. <https://byjus.com/biology/importance-of-ecosystem/#:~:text=Importance%20of%20Ecosystem%3A,between%20biotic%20and%20abiotic%20components>.
- Kate, M. (2016). How does human population growth affect natural resources? <https://socratic.org/questions/how-does-human-population-growth-affect-natural-resources>.
- Kimberly, A. W. (1997). Conservation and Culture: Natural Resource Management and the Local Voice. *Journal of ecological anthropology*. Vol 1(1).

- Kiper, T. (2013). Role of ecotourism in sustainable development. <https://www.intechopen.com/books/advances-in-landscape-architecture/role-of-ecotourism-in-sustainable-d> Accessed 23/3/2021
- Lampert, A. (2019). Over-exploitation of natural resources is followed by inevitable declines in economic growth and discount rate. *Nat Commun* 10, 1419 (2019). <https://doi.org/10.1038/s41467-019-09246-2>.
- Legalcareerpath (2022). What is environmental law? <https://legalcareerpath.com/what-is-environmental-law/>
- Leverageedu (2021). Environmental conservation. <https://leverageedu.com/blog/environmental-conservation/>
- Lukmon, J. (2019). list of natural resources in Nigeria. <https://aboutnigerians.com/amp/list-of-natural-resources-in-nigeria-and-their-location/>
- Lumen, (N.d). Introduction to Natural Resource Economics. <https://courses.lumenlearning.com/boundlesseconomics/chapter/introduction-to-natural-resource-economics/>
- Mannion, A. M. (1999). *Global Environmental Change: A Natural and Cultural Environmental History*. Longman Scientific and Technical London.
- Mengistu, M.M. & Samuel, F. A. (2021). The Impact of Population Growth on Natural Resources and Farmers' Capacity to Adapt to Climate Change in Low-Income Countries. https://www.researchgate.net/publication/350101251_The_Impact_of_Population_Growth_on_Natural_Resources_and_Farmers'_Capacity_to_Adapt_to_Climate_Change_in_Low-Income_Countries
- Murimi, P. K. (2015). Conservation of nature and natural resources. <https://www.pambazuka.org/land-environment/conservation-nature-and-natural-resources>.
- Musa, J. I. (2017). Emerging issues in economic development. <https://www.intechopen.com/chapters/56599>

- Nabegu, Mustapha, A. B. & Naibbi, A. I. (2017). Environmental Regulations in Nigeria: A Mini Review. *International journal of environmental sciences and natural resources*. Mini Review, Vol 5(1).
- National Geographic (2015). Sustainable Development Goal 6: Clean Water and Sanitation. <https://education.nationalgeographic.org/resource/sustainable-development-goal-6-clean-water-and-sanitation>
- National Geographic society, (2022). Non-renewable resources. <https://www.nationalgeographic.org/encyclopedia/nonrenewable-resources/#:~:text=There%20are%20four%20major%20types,the%20name%20%E2%80%9Cfossil%E2%80%9D%20fuels>
- Natural resource.” Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriam-webster.com/dictionary/natural%20resource>. Accessed 19 Feb. 2022.
- OECD(2011). The economic significance of natural resources: key points for reformers in Eastern Europe, caucasus and Central Asia. http://www.oecd.org/env/outreach/2011_AB_Economic%20significance%20of%20NR%20in%20EECC
- OECD, (2011). The economic significance of natural resources: Key points for reformers in Eastern Europe, Caucasus and Central Asia. https://www.oecd.org/env/outreach/2011_AB_Economic%20significance%20of%20NR%20in%20EECCA_ENG.pdf
- Omotayo, O.L., Chikezie, J., Adedeji, E.O., Adebayo, O.A. & Kolawole, G.T. (2019). Roles of indigenous conservation methods in the sustainable development of osun sacred grove in Osogbo, Osun State Nigeria. *Journal of Tourism and Heritage Studies*. Vol. 8, No. 2.
- Oruonye, E.D. & Ahmed, Y. M. (2011). The role of enforcement in environmental protection in Nigeria. *World Journal of Advanced Research and Reviews*, 2020, 07(01), 048–056.
- Paul, F. (2003), Definition of natural resources. <https://www.cga.ct.gov/2003/olrdata/env/rpt/2003-R-0296.htm>.

- Peluso, N. & Watts, M. (Eds.). (2001). *Violent Environments*. Ithaca, N. Y. Cornell University Press.
- Peter, J. G., Timothy, C. & Maraseni, T. N. (2017). *Business, organized labour and climate policy. Forging a role at the negotiation table. A monograph* <https://doi.org/10.4337/9781786430120>
- Poffenberger, M. (1990a). *keepers of the Forest: Land Management Alternatives in Southeast Asia*. West Hartford, Conn: Kumarian Press.
- Poffenberger, M. (1990b). *Joint of Forest Land: Experiences from South Asia*. New Delhi: Ford Foundation.
- Poffenberger, M. (1996). *From Chipko to Uttaranchal: Development, Environment, and Social Protest in the Ghrwal Himalayas, India in Liberation Ecologies: Environment, Development, Social Movements*, ed. R. Peet and M. Watts. London Routledge.
- Pradip, Ali & Ahmad (2020). *An introduction to environmental degradation: Causes, consequence and mitigation. Environmental Degradation: Causes and Remediation Strategies (pp.1-20)*.
- Putri, S. A. E. (2018). *What is ecological modernization* <https://alyadjunas19.medium.com/what-is-ecological-modernization-79d313dc1b96>.
- Rashwet, (2019). *Economics, technology and environmental protection.* <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-degradation>.
- Ribot, J. C. (1996). *Participation without Representation: Chiefs, Councils and Forestry Law in the West African Sahel. Cultural Survival Quarterly* 20(3) 40-44.
- Rinkesh (2022), *environmental conservation.* <https://www.conserve-energy-future.com/methods-and-importance-of-environmental-conservation.php>
- Rinkesh, (2022). *What is environmental degradation?* <https://www.conserve-energy-future.com/causes-and-effects-of-environmental-degradation.php>

- Ritchie, Roser, Mispy, Ortiz-Ospina (2018). "Measuring progress towards the Sustainable Development Goals." SDG-Tracker.org, website.
- Sarbapriya & Ishita (2011). Impact of Population Growth on Environmental Degradation: Case of India. *Journal of Economics and Sustainable Development*, Vol.2, No.8.
- Schroeder, R. (1999). Community, Forestry, and Conditionality in the Gambia. *Arica* 69(1): 1-22.
- Science and Engineering for Industry Pages 37-55.
<https://www.sciencedirect.com/science/article/pii/B978012811989100004X>
- Shivacoti, G., Ullah, R. & Pradhan, U. (2017), Challenges of Sustainable Natural Resources Management in Dynamic Asia, (Ed.) *Redefining Diversity & Dynamics of Natural Resources Management in Asia*, Volume 1.
- Sturle, (et al.). (n.d). Applying resilience thinking seven principles for building resilience in social-ecological systems.
<https://www.stockholmresilience.org/download/18.10119fc11455d3c557d6928/1459560241272/SRC+Applying+Resilience+final.pdf>.
- Tansley, A. G. (1935). "The Use and Abuse of Vegetational Concepts and Terms" . *Ecology*.
- Tarlock, A. D. (n.d). Environmental laws and their enforcement. Vol. I - History of Environmental Law - *Encyclopedia of Life Support Systems (EOLSS)*.
- Tarnowski, C. (2002). *Forest Places, Political Spaces: The Social Implications of Community Forestry in Nepal*. Ph.D. diss., University of Georgia, Athens.
- Tee, Agbidye & Ogwuche (2015). Indigenous forest conservation practices in Benue state, Nigeria. *Journal of Agriculture Forestry and the Social Sciences* 12(1):182.
- Texas Park and Wildlife (n.d) Conservation challenges.
<https://tpwd.texas.gov/education/resources/keep-texas-wild/one-state/conservation-challenges>.
- The Global Goals (nd). Live on land.
<https://www.globalgoals.org/goals/15-life-on-land/>

- Theconversation (2021). Is the resource curse hard-baked into African economies? China's approach hints that it may not be. <https://theconversation.com/is-the-resource-curse-hard-baked-into-african-economies-chinas-approach-hints-that-it-may-not-be-167397>
- Tim, F. (2011). Population growth: the defining challenge of the 21st Century. <https://www.nato.int/docu/review/articles/2011/02/14/population-growth-the-defining-challenge-of-the-21st-century/index.html>.
- Turner, B. L., Clark, W. C., Kates, R. W., Richards, J. T. & Mayer, W. B.(Eds.). (1990). The Earth as transformed by Human Action. Cambridge University Press, Cambridge.
- Tutorialpoint, (2022). Classification of ecosystem. https://www.tutorialspoint.com/environmental_studies/environmental_studies_classification_of_ecosystem.htm
- UNEP, (2022). Our work in Africa. www.unep.org. retrieved 25/02/2022
- UNICEF (2021), GOAL 3: Good health and well-being. <https://data.unicef.org/sdgs/goal-3-good-health-wellbeing/>
- United Nation (2015). SUSTAINABLE DEVELOPMENT GOAL 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation. <https://sdg-tracker.org/infrastructure-industrialization>
- United Nation (2021). End hunger, achieve food security and improved nutrition and promote sustainable agriculture. <https://sdgs.un.org/goals/goal2>
- United Nation, (2015), Sustainable Development Goals. https://en.wikipedia.org/wiki/Sustainable_Development_Goals
- United Nation, (2015), Sustainable Development Goals. https://en.wikipedia.org/wiki/Sustainable_Development_Goals
- United Nations (2015), Sustainable Cities and Communities. <https://nigeria.un.org/en/sdgs/11>
- United Nations Department of Economic and Social Affairs (2015), Climate Change. <https://sdgs.un.org/topics/climate-change>.

- United Nations Environmental Programme(UNEP),1999. Global Environmental Outlook. 2000. UNEP/Earthscan, London.
- United Nations Peace Building Commission (2007), Natural Resources: Definitions & Conceptual Issue. <http://www.peacebuildinginitiative.org/index818b.html?pageId=2097>
- USAID (2005), Issues in Poverty Reduction and Natural Resource Management. <https://www.usaid.gov/sites/default/files/documents/1862/issues-in-poverty-reduction-and-natural-resource-management.pdf>
- Verrengia, J. (2002). Wyoming Doctor Recruits Army in Africa to Save Animals from Poachers. Environmental news Network. 17 October.
- Wellesley Institute (2022). Life below water. <https://www.wellesleyinstitute.com/un-sustainable-development-goals/life-below-water/>
- Western, D., Wright, R. & Strum, S. (Eds.). (1994). Natural Connections: Perspectives in Community –Based Conservation. Washington D, D.C.: Island Press.
- White, A. T., Zeitlin, L., Hale, Y. & Cortesi, (Eds.). (1994). Collaborative and Community-Based Management of Coral Reefs: Lessons from Experience. West Harford, Conn; Kumarian Press.
- Willis, A.J. (1997). "The Ecosystem: An Evolving Concept Viewed Historically". *Functional Ecology*. 11 (2): 268–271.
- Wilson, R. K. (2003). Community-Based Management and national Forests in Western United States: Five Challenges. *Policy Matters* 12-181-89.
- World Bank. (1996). The World Bank Participation Sourcebook. Washington, D.C, World Bank.
- World Trade Report (2010), Natural resources: Definitions, trade patterns and globalization. https://www.wto.org/english/res_e/booksp_e/anrep_e/wtr10-2b_e.pdf

Yogi, H. N. (2010). Eco-tourism and sustainability: opportunities and challenges in the case of Nepal. Master thesis department of sustainable development university of Uppsala Autumn.

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.

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 per cent 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 per cent 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 per cent 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 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 provide 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 diary or a wall calendar. Whatever method you choose to use, you should decide on and write in your own dates for working through each unit.

3. Once you have created your own study schedule, do everything you can to stick to it. The major reason that students fail is that they get behind with their course work. If you get into difficulties with your schedule, please let your tutor know before it is too late for help.
4. Turn to Unit 1 and read the introduction and the objectives for the unit.
5. Assemble the study materials. Information about what you need for a unit is given in the 'Overview' at the beginning of each unit. You will also need both the study unit you are working on and one of your set books on your desk at the same time.
6. Work through the unit. The content of the unit itself has been arranged to provide a sequence for you to follow. As you work through the unit you will be instructed to read sections from your set books or other articles. Use the unit to guide your reading.
7. Up-to-date course information will be continuously delivered to you at the study centre.
8. Work before the relevant due date (about 4 weeks before due dates), get the Assignment File for the next required assignment. Keep in mind that you will learn a lot by doing the assignments carefully. They have been designed to help you meet the objectives of the course and, therefore, will help you pass the exam. Submit all assignments no later than the due date.
9. Review the objectives for each study unit to confirm that you have achieved them. If you feel unsure about any of the objectives, review the study material or consult your tutor.
10. When you are confident that you have achieved a unit's objectives, you can then start on the next unit. Proceed unit by unit through the course and try to pace your study so that you keep yourself on schedule.
11. When you have submitted an assignment to your tutor for marking do not wait for it return before starting on the next units. Keep to your schedule. When the assignment is returned, pay particular attention to your tutor's comments, both on the tutor-marked assignment form and also written on the assignment. Consult your tutor as soon as possible if you have any questions or problems.
12. After completing the last unit, review the course and prepare yourself for the final examination. Check that you have achieved

the unit objectives (listed at the beginning of each unit) and the course objectives (listed in this Course Guide).

ONLINE FACILITATION

For semester the course is taken, you have about eight (8) weeks of online facilitation on this course. During the online presentation, you are probably made available with notes and video materials from the course facilitator. These materials intend to enable you read through the materials.

**MAIN
COURSE**

CONTENTS

Module 1	Meaning, Scope and Definition of Natural Resources	1
Unit 1	(Definition, Meaning of Natural Resources)	1
Unit 2	Nature and Pattern of Conservation of Natural Resources	12
Unit 3	Sustainable use of the Natural Resources	27
Unit 4	Policies on Natural Resources Management	33
Module 2	Nature of Natural Resources	38
Unit 1	Definition, Meaning of the Components of the Natural Resources	38
Unit 2	Studies in Environmental Theories	47
Unit 3	Key Concepts in Natural Resources Analysis	52
Unit 4	Environmental Laws and Protocols	59
Module 3	Nexus between Natural Resources and Sustainable Development	66
Unit 1	Natural Resources and Development	66
Unit 2	Challenges of Natural Resources And Sustainable Development	70
Unit 3	social and Developmental Significance of Natural Resources	79
Module 4	Meaning, Scope and Definition of Sustainable Development	89
Unit 1	Definition, Meaning of Sustainable Development	89
Unit 2	Sustainable Management of the Environment	88

MODULE 1 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 use of the Natural Resources
- Unit 4 Policies on Natural Resources Management

UNIT 1 DEFINITION, MEANING OF NATURAL RESOURCES

Unit Structure

- 1.1 Introduction
- 1.2 Intended Learning Outcomes (ILOs)
- 1.3 Natural Resources-Meaning
 - 1.3.1 Conceptual Definition of Natural Resources
- 1.4 Principles of Natural Resources and the Environment
- 1.5 Types of Natural Resources
- 1.6 Summary
- 1.7 References/Further Readings/Web Resources
- 1.8 Possible Answers to Self-Assessment Exercise(s)



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.

The rise of industrialism has no doubt, transformed the planet in ways that natural processes and previous civilizations would have taken centuries to achieve. The obvious consequences of this trend have been dramatic changes to the environment, the most fundamental being the effect on the chemistry of the atmosphere and the genetic diversity of

the planet. These changes have given rise to fear of a global environmental crisis. Consequently, there are persistent calls for a shift from exploitative industrialism- “business as usual “to something called “sustainable development”. Hence there is need for the Course Content to consider what kind of development can be defined as sustainable, especially The Major Trends and Consequences:

- Population growth and poverty
- Land conservation and degradation (deforestation)
- Urbanization/Intensification of land use due to population growth
- Industrialization and
- The effect of globalization



1.2 Intended Learning Outcomes (ILOs)

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

- discuss and conceptualize the definition of natural resources
- analyse the principles of natural resources
- demonstrate an understanding of the types of natural resources.
- evaluate the processes in natural resources management



1.3 Natural Resources-Meaning

In broad terms, a resource is any material object, natural or synthetic, that has or produces some value. Majority of works on resources have tended to focus the analyses on a single resource, especially oil. The politics and dynamics of resource management in Nigeria make imperative to consider a broader view of resources, one that encompasses the totality of natural and human endowment of a country or region. Such broad definition would include as resources elements like human population, minerals, fuels and gas; forests, livestock; wildlife and fisheries; as well as flora and fauna. In context, resource refers to the totality of social and physical endowments or assets of a particular country. In defining resources, there is need to consider their classification, the basis of which is usually a distinction between renewability and non-renewability. The former includes forests, wildlife, livestock, and the unifying factor is their capacities for regeneration. The later include non-living mineral or fuel resources that are not replaceable. In practical terms this distinction is better conceptualized as

a continuum, for all resources-renewable and non-renewable-form a single continuum from the most renewable to the least renewable.

Unfortunately, in Nigeria especially, in the South-South region definition of natural resources have tended to reduce the conception of resources to oil. Since the discovery of oil, the sharing of revenue accruing there- from has constituted the most contentious political problems. Historically, the Colonial Mineral Ordinance (1914) laid the foundation of state control and management of mineral resources. Although this policy had undergone several transformations, subsequent Nigerian Constitutions reinforced state control over resources thereby imposed specific management regime that projected narrow notion of resources. Laws such as the Petroleum Act (1969) and the Land Use Act (1978) further reinforced this control. Embedded in the Land Use Act is the notion of eminent domain-a centralized administrative control of land whereby all land rights are vested in the State. Emergence of statutory tenure system based on statutory code drawn by the Federal Government that reflects values and interests of the State is a corollary of the centralization process. Due to different origins and principles upon which customary and statutory tenure systems are based, they produce differing practice on ground, and together constitute a set of overlapping and often contradictory mechanisms for deciding how access to land and resources should be allocated.

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 recourses 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 (Your dictionary, 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 (Earth Eclipse, 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).

Self-Assessment Exercises 1

1. Provide an explanation of the concept of natural resources.
2. What is your understanding of natural resource?

1.3.1 Conceptual Definition of Natural Resources

The conceptual meaning of natural resources is established on the assertion that certain environmental indicators make it's concepts divergent based on the positions of different scholars. Within these assertions is the position of Paul (2003) who explained natural resources based on the position of 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 resource, 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).

Self-Assessment Exercises 2

1. Provide an explanation of the definition of natural resources from the perspective of Food and Agricultural Organization (1995).
2. Provide an explanation of the definition of natural resources from the perspective of European Commission, 2002.

1.4 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. It 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.

NRM is a collective action problem requiring diverse actors – governments, farmers, business, communities and NGOs – to integrate their activities so that improvements in the condition of natural resources can be achieved. NRM is a collective action problem requiring diverse actors – governments, farmers, business, communities and NGOs – to integrate their activities so that improvements in the condition of natural resources can be achieved.

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, n.d.).

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 action 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.

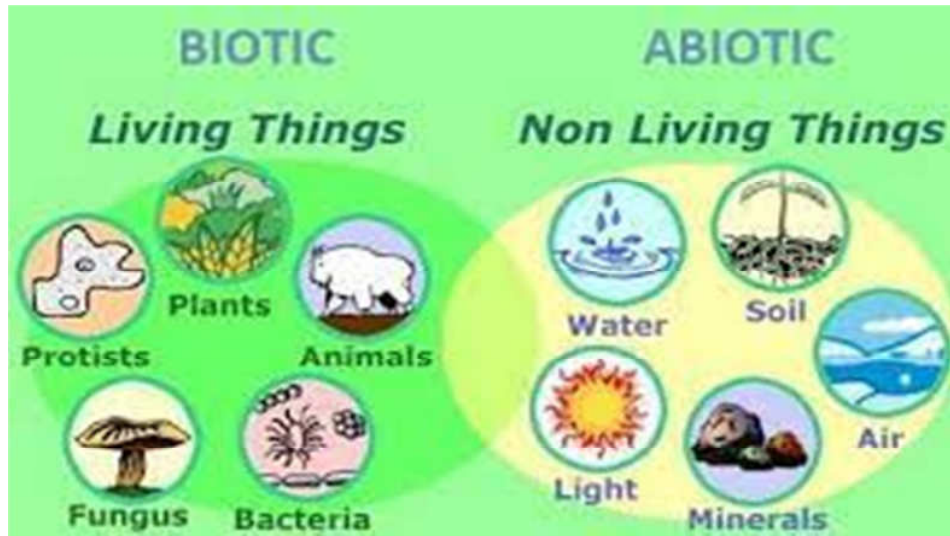
Self-Assessment Exercises 3

1. What are the basic principles of Natural resources management?
2. List and discuss the environmental Principles to which the Environmental will be managed.

1.5 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, e.g., 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: <https://khanstudy.in/biotic-and-abiotic-resources>.

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.

Self-Assessment Exercises 4

1. Discuss the types of natural resources.
2. Define Inexhaustible natural resources and exhaustible natural



1.6 Summary

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. From the word nature we could deduce that natural resources are those materials and assets that are in nature. Natural resources which are divided into biotic and abiotic resources provide the basic and fundamental life support for humans.



1.7 References/Further Readings/Web Resources

Angela, L. S. & Christianly, C. (2021). What are natural resources? Definitions and types. <https://study.com/academy/lesson/what-are-natural-resources-definition-lesson-quiz.html>

Collins dictionary. Natural resources. <https://www.collinsdictionary.com/dictionary/english/natural-resources>

CRS and MEAS. (2015). Understanding natural resources: A SMART Skills manual. Catholic Relief Services, Baltimore, MD, and Modernizing Extension and Advisory Services project, University of Illinois at Urbana-Champaign.

Definition of natural resources from the Cambridge Advanced Learner's Dictionary & Thesaurus © Cambridge University Press).

DHEC's Office of Solid Waste Reduction and Recycling, (2008). Natural resources. <https://scdhec.gov/sites/default/files/Library/OR-0689.pdf>

Earth Eclipse, (2022). What are natural resources? <https://eartheclipse.com/environment/types-and-threats-to-natural-resources.html>

English dictionary, (2022). Natural resources. https://www.lexico.com/definition/natural_resources

European Commission, (2002). Analysis of Selected Concepts on Resource Management A Study to Support the Development of a Thematic Community Strategy on the Sustainable Use of Resources. <https://ec.europa.eu/environment/archives/natres/pdf/cowlstudy.pdf>

FAO (1995), Planning for sustainable use of land resources towards a new approach. Task Managership for Chapter 10 of Agenda 21 of the United Nations Conference on Environment and Development (UNCED).

Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, 1997.

- Insee (2021). Natural resources.
<https://www.insee.fr/en/metadonnees/definition/c2198>
- Merriam-Webster.com Dictionary, Merriam-Webster,
<https://www.merriam-webster.com/dictionary/natural%20resource>. Accessed 19 Feb. 2022. Natural resource.”
- Paul, F. (2003), Definition of natural resources.
<https://www.cga.ct.gov/2003/olrdata/env/rpt/2003-R-0296.htm>
- United Nations Peace Building Commission (2007), Natural Resources: Definitions & Conceptual Issue.
<http://www.peacebuildinginitiative.org/index818b.html?pageId=2097>
- World Trade Report (2010), Natural resources: Definitions, trade patterns and globalization.
https://www.wto.org/english/res_e/booksp_e/anrep_e/wtr10-2b_e.pdf



1.8 Possible Answers to SAEs

Answers to SAEs 1

1. 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).
2. A natural resource is any resources in the nature for the use of man.

Answers to SAEs 2

1. 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”.
2. Natural resources is an important raw materials for the production of goods and services as well as various environmental services” (European Commission, 2002).

Answers to SAEs 3

1. Natural resources management is established on these basic principles; legitimacy, transparency, accountability, involvement, fairness, integration, capability, and adaptability.
2. The environmental Principles to which the Environmental will be managed include;
3. 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.
4. 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.
5. The Precautionary Principle (PP): every actions taken on the environment should be that which will involve serious precaution to mitigate certain environmental hazards
6. 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.

7. The Principle of Responsibility: we are all responsible for the protection of the environment, the corporate institutions, the government and the community.
8. 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.

Answers to SAEs 4

1. 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.
2. 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.

UNIT 2 NATURE AND PATTERN OF CONSERVATION OF NATURAL RESOURCES

Unit Structure

- 2.1 Introduction
- 2.2 Intended Learning Outcomes (ILOs)
- 2.3 An overview of the Natural Resources in Africa
- 2.4 Conservation Methods- Indigenous vs. Scientific
 - 2.4.1 Conservation Organizations' Approaches to Natural Resources Management: The Participatory Management Debate.
 - 2.4.2 The Debate for and against Participatory Management of Natural Resources
- 2.5 Challenges in Natural Resources and Environmental Conservations.
- 2.6 Summary
- 2.7 References/Further Readings/Web Resources
- 2.8 Possible Answers to Self-Assessment Exercise(s)



2.1 Introduction

In this unit, we will review the natural resources in Africa; examine also the conservation methods in natural resources conservations. We will also review Conservation Organizations' Approaches to Natural Resources Management and also discuss the Debate for and against Participatory Management of Natural Resources as well as list and discuss the challenges in natural resource and environmental conservation.



2.2 Intended Learning Outcomes

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

- discuss some of the natural resources in Africa.
- analyse the conservation methods in natural resources conservation
- demonstrate an understanding of how sustainable the natural resources is in Nigeria
- evaluate the challenges in natural resources and environmental conservation.



2.3 An Overview of the Natural Resources in 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 per cent of the world's oil reserve. African has 40 per cent of the world's gold and 90 per cent of Chromium and Platinum. Importantly Africa is home to 65 per cent of the world's arable land and 10 per cent 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 Glay, Gypsum, Lead/Zinc, Lignite, Limestone, Maganese, 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 & Tatum
- 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, Flosper, Gemstone, Gold, Graphite, Kaolin, Hyanite, Mica, Rock Crystal, Ruby, Sapphire, Sihnite, Superntinite, Tentalime, Topaz & Tourmaline
- 20 Kano Gassiterite, Copper, Gemstone, Glass-sand, Lead/Zinc, Pyrochinre & Tantalite
- 21 Kastina Kaolin, Marble & Salt
- 22 Kebbi Gold
- 23 Kogi Cole, Dolomite, Feldspar, Gypsum, Iron-ore, Kaolin, Marble, Talc & Tantalite
- 24 KwaraCassiterite, 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, Limstone, Mica, Salt, Sapphire, Talc, Tantalite, Tourmaline Quartz& Zireon
- 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 Pleteau Barite, Bauxite, Betonite, Bismuth, Cassiterite, Clay, Coal, Emeral, 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

Self-Assessment Exercises 1

1. What are some of the natural resources in Africa?
2. List some of the natural resources in Nigeria.

2.4 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 begun 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).

Self-Assessment Exercises 2

1. Define environmental conservation.
2. Provide an explanation of indigenous and scientific conservation methods.

2.4.1 Conservation Organizations' Approaches to Natural Resources Management: The Participatory Management Debate

Management of natural resources is an arena wherein power struggles are continually played out. Resource management involves sharing the costs and benefits of management, often times this leads to a situation where the weak and underprivileged segments of society consistently receive a smaller share of benefits and higher share of costs. Article 8, 10 and 11 of the Convention on Biological Diversity (Glowka et al. 1994) which became effective in December 1993 provided an important entry point for arguing for the respect of customary rights and the equitable sharing of the benefits of natural resources. Yet there remains considerable disagreement as to the importance of socio-political concerns and capacities compared with biological ones. However, the severing of the relationship between the people and the land is at the root of current environmental problems. Against this backdrop, community-based natural resource management becomes attractive for both the protection of bio-diversity and the promotion of sustainable livelihoods (Borrini-Feyerabend et al, 2004). Participatory management remains a much-debated subject among panoply of practitioners and scholars searching for the most politically and economically appropriate means of managing and conserving natural resources. Between enthusiastic proponents and skeptical opponents, we find a variety of policies, or voices generating a remarkable cacophony. Hence, there is need for this Course to provide an over of the issues involved in the debate as appears here-under.

In many cases, participatory management settings appear to make the difference. Participatory management describes a situation in which two or more actors with specific interest and concern about a set of natural resources (e.g. forests, water, fisheries, and wildlife) are involved in its management in a substantial way. Defined in this manner, participatory management resembles collaborative (Poffenberger, 1990a; Borrini-Feyerabend 1996) joint (Poffenberger, 1990b; Fisher 1995; Poffenberger 1996), and community-based management (Messerschmidt 1993; Western, Wright, and Struni 1994; White et al, 1994). The point of interest is that each of these approaches share a trajectory that can be traced back to early community-development programmes of the 1950s and 1960s, when participation arose out of a much greater concern with large scale centrally planned and managed projects.

For our purpose we conceive participatory management as a partnership among social actors with legitimate interests, capacities, and commitment regarding the natural resources at stake. The partnership specifies their management functions and guarantees their benefits and

costs, rights and responsibilities. In some cases, a legal jurisdiction exists that belongs to a government agency or some individual landowners. It is easily the case that states rarely legally recognized customary ownership of the resources in question by indigenous peoples or local communities. More often, the state retains ownership of the resources in question but grants some special access rights and management responsibilities to the indigenous and local communities (Borrini-Feyerabend with Tarnowski, 2005).

The attractive and innovative feature of participatory management is the understanding of the advantages of going beyond strict legal jurisdiction as conventionally understood (such as private property or government mandate) and recognizing the capacities and entitlements of variety of concerned groups, individuals, and organizations on the basis of various grounds. This recognition of multiple rights and interests marks a significant departure from legalistic top-down management.

In practice, participatory management entails a process by which the concerned organizations, groups, and individuals (often labeled stakeholders or actors) come together to discuss, agree upon, and support in practice a given course of action. Through that process stakeholders usually develop some co-management plans and complimentary agreements, and set up one or more organizations to address ongoing management decisions and take required actions. This implies that participatory management of natural resources is opened up to a plurality of social actors and becomes more experimental and opened (Borrini-Feyerabend with Tarnowski, 2005). Importantly, participatory management can embrace various sorts of power-sharing agreements, from the most skewed (an agency in charge, with other stakeholders in only advisory roles) to the most egalitarian (a board of directors where all stakeholders are represented).

Key Features of Participatory Management

- The understanding that for every set of natural resources there exist a variety of social actors (stakeholders) possessing relevant and usually different interests and concerns. And because change is always occurring in societies, the needs and interests of actors evolve, and new actors need to be continually recognized and dealt with.
- A second important recognition is that different social actors possess different capacities and comparative advantages needed to optimally manage a particular resource (Borrini-Feyerabend et al. 2000). Indeed, effective resources management requires as many capacities as inputs as possible.
- A third fact, often overlooked, is that indigenous and local communities possess unique capacities-knowledge, skill,

- institutions, and resources rooted in local history and local conditions-that can be put to use for the benefit of conservation.
- A fourth fact, also not always event to people not involved in ecological sciences, is that our knowledge about the functioning of ecosystems is very limited. This is true of very complex system. Consequently, decisions cannot be derived from only science or only by the strict application of a plan or set of established rules. Rather we require a process of ongoing review and improvement.
 - It is pertinent to note that we are dealing with an extremely consequential subject. The point of fact is that the management of natural resources involves crucial economic and livelihood decisions in every society, making it a realm of political power par excellence. This should be a surprise because the control of the land, the water, mineral and biological resources, space, and the permission to use resources is what secular power is all about. Unfortunately, cases abound to underscore the fact such power is not always used fair and just ways. In fact, decision-making authority and the sharing of benefits and responsibilities in managing natural resources are typically distributed in an inequitable manner (Schroeder 1999; Ribot 1999; Tarnowski 2000), accountability in natural resource management is the exception rather than the rule. In such circumstance, violence remains a favourite means of pushing one's "entitlement" (Peluso and Watts 2001; Verrengia 2002).

Self-Assessment Exercises 3

1. What is participatory management in environmental conservation?
2. Discuss the key features of participatory management in environmental conservation.

Note: Use this information for other sections and probably sub-sections.

2.4.2 The Debate for and against Participatory Management of Natural Resources

Although we argue that participatory management is the best approach to natural resource management, it remains a much-debated subject among panoply of practitioners and scholars searching for the most politically and economically appropriate means of managing and conserving natural resources. In what follows below, we provide

summary of some divergent positions on the efficacy or otherwise of participatory management.

- Some conservationists offer several powerful arguments against participatory management. For them, conservation of nature is an imperative and duty for every state. Consequently, adoption or experiments of participatory management can water down conservation objectives and contaminate them with other aims such as economic or cultural interests of local stakeholders (Cigler and Loomis 1998; Brockington 2002). They argue that states have a clear moral obligation to future generations; they need to ensure that unique habitats and species are conserved. The implication that flows from this is that once basic decisions about conserving a territory have been taken, no compromise is possible, and local people must simply resign themselves to finding their livelihoods elsewhere.
- Participatory management entails an economic or utilitarian cost-benefit analysis: The process of negotiating agreements around resource management among various stakeholders is expensive and time consuming. It demands a variety of human and institutional capacities and investments in communication and negotiation processes that bear fruit only over the long-term. Many management interventions, however, must be made quickly, and this makes participatory an inappropriate strategy (Wagner 2001; Brockington 2002).
- For indigenous peoples' and community rights advocates (entities usually considered to be beneficiaries of participatory management) participatory management is a compromise stand with respect to the goal of social recognition of exclusive indigenous or community rights over ancestral domain. States appropriated indigenous people's claims and control over resources in a violent and unjust manner and should not now possess a right to participate in managing indigenous people's resources. The state may be in control now, but should relinquish full authority and control over the management of resources. Indigenous and community groups should not be involved in a process that, simply or explicitly, recognizes the rights of others over their own land.
- Although the above summary of opposition against participatory management is not by any means exhaustive, let us now turn to some arguments in support of participatory management.
- We have stated somewhere earlier in this address that status-quo management of natural resources is too often based on inequitable distribution cost and benefits. In many cases states and agencies have alienated resources from the poor and marginalized groups, providing no or too small compensation for them and resource users. They even disregard information that

suggests that biodiversity has been sustained and even promoted through local indigenous use and management practices. The point of interest is that if participatory management framework is adopted as a policy choice, it would give voice to the minorities that currently have none. It would transform a situation in which too often, only the state or agency staff are in control and expatriate professionals prepare management plans without consulting local leaders and resource users.

- Some stakeholders possess a wealth of local knowledge, experience, skills, and comparative advantages that should be put to use in the management of resources. This implies that if the negotiation process is successful, all parties in the participatory management agreement will benefit, including the environment.
- The point of fact is that there is any region in the world where indigenous peoples do not co-exist with a national state. In truth, the relationship may still be unfair and exploitative, but every step that goes in the right direction is a good steep. If the negotiation is skillful and productive, small rights may be a prelude to the recognition of larger rights (Agrawal and Gibson 2001).
- Participatory management integrates conservation efforts into broader socio-political agenda, increasing public awareness of conservation issues building trust among different sectors of society, and increasing a sense of political, social, and economic security and stability that is essential for long-term investment (world Bank 1996; Agrawal 1997). At a more general level, it contributes to a democratic and mature society.

The arguments for those in favour and against participatory management are each persuasive in their own way underscoring the fact that the management of natural resources is an arena where power struggles are continually played out; and that resource management involves sharing the costs and benefits of management, and this leads to a situation where the weak and underprivileged sectors of society consistently receive a small share of benefits and a higher share of costs (Ribot 1999; Schroeder 1999; Brockington 2003).

Self-Assessment Exercises 4

1. Discuss some of the merits in participatory management in environmental conservation.
2. Discuss the key demerits of participatory management in environmental conservation.

Note: Use this information for other sections and probably sub-

2.5 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 per cent 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 (n.d.) 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 Ismai, 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).

Self-Assessment Exercises 5

1. Discuss some of the challenges in natural resources and environmental conservations.
2. Provide an explanation of the impact of population increase as a problem in environmental conservation.

Note: Use this information for other sections and probably sub-sections.



2.5 Summary

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. Africa has numerous natural resources and they are in large quantity. These natural resources range from land, oil, water, fossil fuels and wildlife.

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.



2.7 References/Further Readings/Web Resources

- Agomoh, M. J. (2016). Indigenous knowledge system and environmental conservation practices in Umuahia South Local Government Area, Abia State. A PhD dissertation in partial fulfillment of the requirements for the award of Doctor of Philosophy (Ph.D) degree in Sociology of Development University of Port Harcourt.
- Anwadike, B.C. (2020), Biodiversity Conservation in Nigeria: Perception, Challenges and Possible Remedies Volume 8 - Issue 4
- Chukwuone, N. A., Adeosun, K. P. & Chukwuone, C. A. (2020), Socioeconomic factors affecting households' use of indigenous forest management practices in managing non-wood forest products: evidence from forest communities in Nigeria derived savannah. [https://www.cell.com/heliyon/pdf/S2405-8440\(20\)32124-1.pdf](https://www.cell.com/heliyon/pdf/S2405-8440(20)32124-1.pdf)
- Daniele, C., Laurene, F., Jean-Yves, J. and Emmanuel, T. (2015), Challenges of Managing and Using Natural Resources. k: Family Farming and the Worlds to Come (pp.217-232).
- Eneji, C.V.V., Ogundu, C.N. & Oyelade, I. A. (2020). Indigenous Cultural Practices and Natural Resources Conservation in Owerri, Imo State, Nigeria. *Advances in Social Sciences Research Journal* – Vol.6, No.8.

- Goodall, J. (2022). Understanding nature conservation: 6 conservation methods. <https://www.masterclass.com/articles/nature-conservation-explained#6-nature-conservation-methods>
- Gundu, E. G. & Adia, J.E. (2014). Conservation methods of endangered species.
- Leverageedu (2021). Environmental conservation. <https://leverageedu.com/blog/environmental-conservation/>
- Lukmon, J. (2019) list of natural resources in Nigeria. <https://aboutnigerians.com/amp/list-of-natural-resources-in-nigeria-and-their-location/>
- Omotayo O.L, Chikezie J., Adedeji, E.O., Adebayo, O.A. & Kolawole, G.T. (2019). Roles of indigenous conservation methods in the sustainable development of osun sacred grove in Osogbo, Osun State Nigeria. *Journal of Tourism and Heritage Studies*. Vol. 8, No. 2.
- Rinkesh (2022), environmental conservation. <https://www.conserve-energy-future.com/methods-and-importance-of-environmental-conservation.php>
- Shivacoti, G., Ullah, R. & Pradhan, U. (2017). Challenges of Sustainable Natural Resources Management in Dynamic Asia, (Ed.) *Redefining Diversity & Dynamics of Natural Resources Management in Asia*, Volume 1.
- Tee, Agbidye & Ogwuche (2015). Indigenous forest conservation practices in Benue state, Nigeria. *Journal of Agriculture Forestry and the Social Sciences* 12(1):182.
- Texas Park & Wildlife (n.d.). Conservation challenges. <https://tpwd.texas.gov/education/resources/keep-texas-wild/one-state/conservation-challenges>.
- UNEP, (2022), Our work in Africa. www.unep.org. retrieved 25/02/2022
- Jafari R. K., Alfani, A. R., Kuruthumu, A. M. & Ismail, S. S. (2013). Emerging issues and challenges in conservation of biodiversity in the rangelands of Tanzania. *Nature conservation* 6:1-29.

Fuana & Flora International (2022). Planet under pressure.
<https://www.fauna-flora.org/conservation-challenges/>

2.8 Possible Answers to SAEs

Answers to SAEs 1

1. Africa has numerous natural resources and they are in large quantity. These natural resources range from land, oil, water, fossil fuels and wildlife.
2. Nigeria is richly endowed with numerous natural resources ranging from industrial metals to various precious stones such as Barites, Gypsum, Kaolin, Marble etc.

Answers to SAEs 2

1. 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.
2. 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”. In the other instance, 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.

Answers to SAEs 3

1. Participatory management entails a process by which the concerned organizations, groups, and individuals (often labeled stakeholders or actors) come together to discuss, agree upon, and support in practice a given course of action.
2. Key Features of Participatory Management includes;
 - The understanding that for every set of natural resources there exist a variety of social actors (stakeholders) possessing relevant and usually different interests and concerns.

- Different social actors possess different capacities and comparative advantages needed to optimally manage a particular resource.
- Indigenous and local communities possess unique capacities-knowledge, skill, institutions, and resources rooted in local history and local conditions-that can be put to use for the benefit of conservation.
- Our knowledge about the functioning of ecosystems is very limited.
- The management of natural resources involves crucial economic and livelihood decisions in every society.

Answers to SAEs 4

1. Conservation of nature is an imperative and duty for every state. Consequently, adoption or experiments of participatory management can water down conservation objectives and contaminate them with other aims such as economic or cultural interests of local stakeholders. States have a clear moral obligation to future generations; they need to ensure that unique habitats and species are conserved. The implication that flows from this is that once basic decisions about conserving a territory have been taken, no compromise is possible, and local people must simply resign themselves to finding their livelihoods elsewhere.
2. Status-quo management of natural resources is too often based on inequitable distribution cost and benefits. In many cases states and agencies have alienated resources from the poor and marginalized groups, providing no or too small compensation for them and resource users. They even disregard information that suggests that biodiversity has been sustained and even promoted through local indigenous use and management practices.

Answers to SAEs 5

1. 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.
2. As population increases so is the pressure on natural resources. Population increase ensures that more space are cleared to meet the needs of urbanization, food production, pressure on land.

UNIT 3 **SUSTAINABLE USE OF THE NATURAL RESOURCES**

Unit Structure

- 3.1 Introduction
- 3.2 Intended Learning Outcomes
- 3.3 The importance of the sustainable use of the natural resources
- 3.4 Adopting Eco-Tourism in sustainable use of the natural resources
- 3.5 Contribution of Natural resources to development
- 3.6 Summary
- 3.7 References/Further Readings/Web Resources
- 3.8 Possible Answers to Self-Assessment Exercises (SAEs)



3.1 Introduction

In this unit, we discussed the 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.



3.2 Intended Learning Outcomes

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

- discuss the issues in sustainable development and the use of natural resources
- analyse the importance of the sustainable use of the natural resources
- write the importance of eco-tourism in natural resources sustainability and
- evaluate the contribution of sustainable natural resources to development.



3.3 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 are important to man as it has served man's 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 these 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”(Grynspar, 2012).

Self-Assessment Exercises 1

1. Discuss the importance of the sustainable use of the natural resources.
2. Discuss the goal of sustainable development.

3.4 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).

Self-Assessment Exercises 2

1. What is Eco-tourism?
2. Provide an explanation of the importance of Eco-tourism.

3.5 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.”

Self-Assessment Exercises 3

1. Discuss the contribution of Sustainable Natural resources to development.
2. Discuss the importance of Natural resources to poverty reduction.



3.6 Summary

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. The main focus of this unit is that; 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. The environment can be a source and potential for generation of revenue especially within the tourism sector. Natural resources, both renewable and non-renewable, and ecosystem services are a part of the real wealth of nations.



3.7 References/Further Readings/Web Resources

- Anup, K. P. (2016). Ecosystem and its role in sustainable development in Nepal. <https://www.intechopen.com/books/advances-in-landscape-architecture/role-of-ecotourism-in-sustainable-d> Accessed 23/3/2021
- Grynsplan, R. (2012). Rebeca Grynsplan: "The role of natural resources in promoting sustainable development" the occasion of the Opening of the 67th UN General Assembly side event on "The Role of Natural Resources in Promoting Sustainable Development" UN New York, 28 September.
- Kiper. T. (2013). Role of ecotourism in sustainable development. <https://www.intechopen.com/books/advances-in-landscape-architecture/role-of-ecotourism-in-sustainable-d> Accessed 23/3/2021
- OECD(2011) The economic significance of natural resources: key points for reformers in Eastern Europe, caucasus and Central Asia. http://www.oecd.org/env/outreach/2011_AB_Economic%20significance%20of%20NR%20in%20EECC
- Yogi, H. N. (2010). Eco-tourism and sustainability: opportunities and challenges in the case of Nepal. Master thesis department of sustainable development university of Uppsala Autumn



3.8 Possible Answers to SAEs

Answers to SAEs 1

1. It is important to conserve the environment given that;
 - Some of the natural resources are non-renewable.
 - The carrying capacity of the natural resources is low.
 - Increase in population would put pressure on the resources.
 - 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.
 - For the provision of the basic need of the future generation
2. 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.

Answers to SAEs 2

1. 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.
2. Ecotourism helps in community development by providing alternative source of livelihood to local community which is more sustainable”. Ecotourism helps 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

Answers to SAEs 3

1. “Sustainable natural resources management is as much a question of sustainable economic development as it is of environmental protection. Natural resources have proven to be both opportunity and curse for nations endowed with them. “Getting prices right” for natural resources is of utmost importance for more sustainable management and long-term benefits from resource-related wealth.
2. 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.

UNIT 4 POLICIES ON NATURAL RESOURCES MANAGEMENT

Unit structure

- 4.1 Introduction
- 4.2 Intended Learning Outcomes
- 4.3 Marine and Coastal Area Management
- 4.4 Sustainable Forest Area Management

- 4.5 Summary
- 4.6 References/Further Readings/Web Resources
- 4.7 Possible Answers to Self-Assessment Exercises



4.1 Introduction

Policies play a significant role in understanding the global focus on natural resources development and management. In the last unit we discussed the sustainable use of natural resources. In this unit we have focused 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.



4.2 Intended Learning Outcomes

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

- Discuss the policies of natural resources development.
- Analyse the sustainable marine and coastal management policies.
- Write the forest management policies.
- Evaluate the principles of sustainable development



4.3 Marine and Coastal Area Management

Products from Marine and coastal areas have sustained man over generations. However, the unsustainable activities of man due to lack of the 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).

Self-Assessment Exercises 1

1. Discuss the Three (3) main goals of The Convention on Biological Diversity.
2. How can the marine and coastal management be sustainably managed?

4.4 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 and management.



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”.

Self-Assessment Exercises 2

1. What is Sustainable Forest management?
2. Why is it important for the sustainable forest management?



4.5 Summary

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.

The key point to note is that;

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.

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.

The unusually high rate of natural resources exploitation and misuse could result in irreversible disequilibrium of ecosystem and environment.



4.6 References/Further Readings/Web Resources

Adeofun, C. O. and Bada, B. S. (nd). Principles of natural resources management. Lecture note, EMT 301, http://unaab.edu.ng/wp-content/uploads/2009/12/464_EMT%20301.pdf

AID Environment, National Institute for Coastal and Marine Management (2004). Integrated Marine and Coastal Area Management (IMCAM) approaches for implementing the Convention on Biological Diversity. Montreal, Canada: Secretariat of the Convention on Biological Diversity. (CBD Technical Series no. 14).

Boteler, B. (2014). “Coastal Zones: Achieving Sustainable Management”. Science for Environment Policy, Vol. No. 46. 1-16.

FAO (2020). Sustainable forest management. [http://www.fao.org/forestry/sfm/en/#:~:text=Sustainable%20forest%20management%20\(SFM\)%20](http://www.fao.org/forestry/sfm/en/#:~:text=Sustainable%20forest%20management%20(SFM)%20)



4.7 Possible Answers to SAEs

Answers to SAEs 1

1. 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.
2. 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. Coastal zones provide not only biodiversity-rich ecosystems, natural hazard protection, food and opportunities for the generation of renewable energies.

Answers to SAEs 2

1. 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.
2. It is important for the sustainable forest management because;
 - World's forests area is shrinking by the day.
 - Forest policy can be an effective instrument for achievement of food security and poverty alleviation.
 - 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.
 - A balanced delivery of environmental and socioeconomic benefits from forests and trees, and contributions to achievement of several SDGs, climate change objectives and the Global Forest Goals”.

MODULE 2 NATURE OF NATURAL RESOURCES

Unit 1	Definition, Meaning of the Components of the Natural Resources
Unit 2	Studies in Environmental Theories
Unit 3	Key Concepts in Natural Resources Analysis
Unit 4	Environmental Laws and Protocols

UNIT 1 DEFINITION, MEANING OF THE COMPONENTS OF THE NATURAL RESOURCES

Unit Structure

- 1.1 Introduction
- 1.2 Intended Learning Outcomes
- 1.3 Natural Resources Classifications
- 1.4 Renewal and Non-renewable Natural Resources
- 1.5 Geographical Distribution of Natural Resources in Nigeria
- 1.6 Ecological Zones in Nigeria
- 1.7 Summary
- 1.8 References/Further Readings/Web Resources



1.1 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.



1.2 Intended Learning Outcomes

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

- discuss the policies of natural resources development.
- analyse what constitute the renewable and non-renewable natural resources.
- write the various Geographical distributions of natural resources in Nigeria.
- evaluate the ecological zones in Nigeria.



1.3 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 slow 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 (n.d.) 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.

According to

1. Actual resources (Kumar, n.d.); 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, e.g. - water, soil fertility, natural vegetation, wildlife, aquatic animals, humans etc.

Self-Assessment Exercises 1

1. Discuss the classification of natural resources.
2. Define Biotic and Abiotic natural resource

1.4 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, n.d.). 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).

Self-Assessment Exercises 2

1. Define renewable and Non-renewable natural resources.

1.5 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, n.d.). 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 deposit 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 have the richest crude oil deposits in Africa and the fourth in the World; it is the sixth largest producer of crude oil and the fifth 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).

Self-Assessment Exercises 3

1. Mention the natural resources in Nigeria and their geographical location.

1.6 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 six to eight 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 per cent, except for the few rainy months when this can rise to 60 per cent 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, four to nine m in height most of them are thorny and extensive sparse grasses” (Federal Ministry of Environment, 2019).

Self-Assessment Exercises 4

1. List the ecological zones in Nigeria.
2. Discuss the Sudan and Sahal Ecological zones in Nigeria.



1.6 Summary

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.

The key point to note is that; Natural resources are classified based on their renewability, their location and types. Virtually all the states in Nigeria have one form and types of natural resources.



1.7 References/Further Readings/Web Resources

Ashagu, J. (2021). 13 Nigeria Natural Resources, Their Locations and Uses. <https://rnn.ng/13-nigeria-natural-resources-their-locations-and-uses>.

Banton, C. (2021). What Is a Renewable Resource? https://www.investopedia.com/terms/r/renewable_resource.asp

EDF, (n.d.), Types of renewable energy. <https://www.edfenergy.com/for-home/energywise/renewable-energy-sources>

Federal Ministry of Environment (2019). National Forest Reference Emission Level (FREL) for the Federal Republic of Nigeria https://redd.unfccc.int/files/2019_submission_frel_nigeria.pdf

Houghton, M. F. (n.d.). The distribution of natural resources. <https://www.bbsd.org/packets/weekfour/science6.pdf>

Lumen. (n.d.). Introduction to Natural Resource Economics. <https://courses.lumenlearning.com/boundlesseconomics/chapter/introduction-to-natural-resource-economics/>

National Geographic society, (2022). Non-renewable resources. <https://www.nationalgeographic.org/encyclopedia/nonrenewable-resources/#:~:text=There%20are%20four%20major%20types,the%20name%20%E2%80%9Cfossil%E2%80%9D%20fuels>



1.8 Possible Answers to SAEs

Answers to SAEs 1

1. 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.
2. 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.
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.).

Answers to SAEs 2

1. 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.
2. 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

Answers to SAEs 3

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 deposit 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 have 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).

Answers to SAEs 4

1. 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”
2. 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 per cent, except for the few rainy months when this can rise to 60 per cent and above” (Federal Ministry of Environment, 2019).
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, four to nine m in height most of them are thorny and extensive sparse grasses” (Federal Ministry of Environment, 2019).

UNIT 2 STUDIES IN ENVIRONMENTAL THEORIES

Unit Structure

- 2.1 Introduction
- 2.2 Intended Learning Outcomes
- 2.3 Resources Curse Theory
- 2.4 Environmental Determinism Theory
- 2.5 Environmentally Responsible Behaviour Model
- 2.6 Ecological Modernization Theory
- 2.7 Summary
- 2.8 References/Further Readings/Web Resources
- 2.9 Possible Answers to Self-Assessment Exercise(s)



2.1 Introduction

In the last unit, we provided the definition, meaning of the components of the natural resources as well as the ecological zones in Nigeria. 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.



2.2 Intended Learning Outcomes

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

- discuss the related theories of natural resources.
- analyse the importance of theories in the study of natural resources.
- write the theoretical issues of Natural resources.
- evaluate the link of these theories to areas of natural resources management.



2.3 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).

Self-Assessment Exercises 1

1. Define resource curse theory
2. How is the resource curse theory an explanation of problems of natural resources management in Nigeria?

2.4 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).

2.5 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 behaviour or not within their interaction with the natural resources and environment.

Self-Assessment Exercises 2

1. Define Environmental determinism theory.
2. What is the key assumption of Environmentally Responsible Behaviour model?

2.6 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).

Self-Assessment Exercises 3

1. Discuss the Ecological modernization theory



2.7 Summary

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.

The main point in this unit is that;

Countries with abundant natural resources such as gold, diamonds, and crude oil often fail to transform that advantage into favourable development outcomes. Intention to act, attitudes, sense of personal responsibility, and knowledge act upon our interaction with the environment. 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.



2.8 References/Further Readings/Web Resources

- Adissu, L. & Eric, W. (2020). Are natural resources a curse, a blessing or a double-edged sword?
<https://www.brookings.edu/blog/future-development/2020/07/16/are-natural-resources-a-curse-a-blessing-or-a-double-edged-sword/>
- Alexander, D.E. (1999). Environmental determinism. In: Environmental Geology. Encyclopedia of Earth Science. Springer, Dordrecht.
https://doi.org/10.1007/1-4020-4494-1_11
- Amanda, B. (2020). What is environmental determinism
<https://www.thoughtco.com/environmental-determinism-and-geography-1434499#:~:text=Environmental%20determinism%20is%20the%20belief,human%20culture%20and%20societal%20development.>
- Jonathan, D. J. (2010). The ‘Resource Curse’: Theory and Evidence (ARI).
https://www.files.ethz.ch/isn/125773/ARI172-2010_DiJohn_Resource_Curse_Theory_Evidence_Africa_Latin_America.pdf
- Peter, J. G., Timothy, C. & Maraseni, T. N. (2017), Business, organized labour and climate policy. Forging a role at the negotiation table. A monograph <https://doi.org/10.4337/9781786430120>
- Putri, S. A. E. (2018). What is ecological modernization
[https://alyadjunas19.medium.com/what-is-ecological-modernization-79d313dc1b96.](https://alyadjunas19.medium.com/what-is-ecological-modernization-79d313dc1b96)
- The conversation (2021). Is the resource curse hard-baked into African economies? China’s approach hints that it may not be.
<https://theconversation.com/is-the-resource-curse-hard-baked-into-african-economies-chinas-approach-hints-that-it-may-not-be-167397>



2.8 Possible Answers to SAEs

Answers to SAEs 1

1. The major import of the resource curse theory is that countries with abundant natural resources such as gold, diamonds, and crude oil often fail to transform that advantage into favourable development outcomes.
2. Nigeria 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 because they have not effectively utilized the resources.

Answers to SAEs 2

1. 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.
2. 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.

Answers to SAEs 3

1. 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”

UNIT 3 KEY CONCEPTS IN NATURAL RESOURCES ANALYSIS

Unit structure

- 3.1 Introduction
- 3.2 Intended Learning Outcomes (ILOs)
- 3.3 Concept of Ecology
- 3.4 Ecosystem
- 3.5 Biodiversity
- 3.6 Summary
- 3.7 References/Further Readings/Web Resources
- 3,8 Possible Answers to Self-Assessment Exercises



3.1 Introduction

There are key concepts in the study of natural resources. Their understanding is important in discussing the issues in natural resources. In the last unit we discussed some key theories in the study of natural resources. 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.



3.2 Intended Learning Outcomes

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

- discuss key concepts in natural resources analysis
- analyse the concept of ecology
- write the concept of ecosystem
- evaluate the approaches to natural resources management.



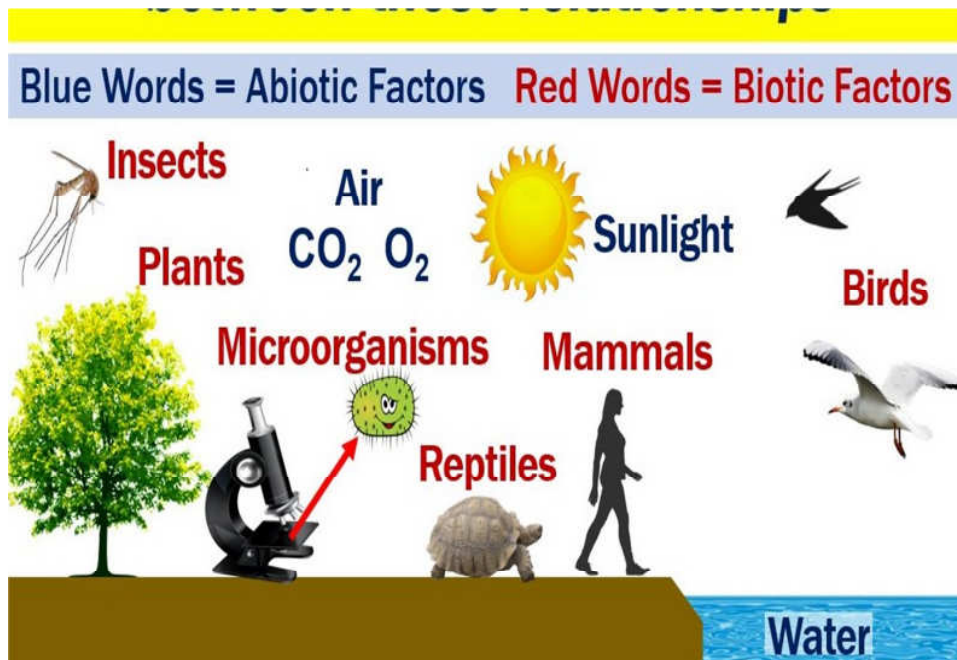
3.3 Concept of Ecology

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).

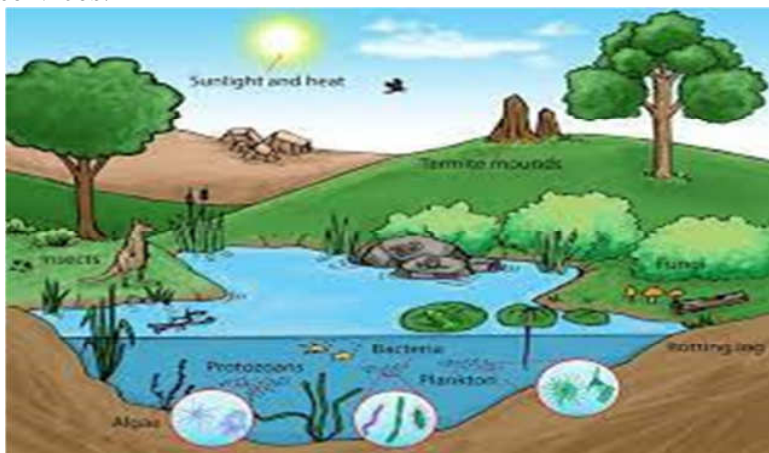
3.4 Ecosystem

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)

Self-Assessment Exercises 1

1. Discuss the concept of Ecology.
2. What is an Ecosystem?

3.5 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).

Self-Assessment Exercises 2

1. What is Biodiversity?
2. What is the importance of Biodiversity?

**3.6 Summary**

In this unit, you have been able to identify the key concepts in natural resources analysis, with Ecosystem, Biodiversity and ecology as the area of focus.

Biodiversity provides many valuables for man such as food, fuel, shelter, and medicine. Ecosystem provides habitat to wild plants and animals. It promotes various food chains and food webs. Ecology is important as it enriches our world and is crucial for human wellbeing and prosperity.



3.7 References/Further Readings/Web Resources

American Museum of Natural History (2022). What is biodiversity. [https://www.amnh.org/research/center-for-biodiversity-conservation/what-is-biodiversity#:~:text=The%20term%20biodiversity%20\(from%20%E2%80%9Cbiological,cultural%20processes%20that%20sustain%20life.](https://www.amnh.org/research/center-for-biodiversity-conservation/what-is-biodiversity#:~:text=The%20term%20biodiversity%20(from%20%E2%80%9Cbiological,cultural%20processes%20that%20sustain%20life.)

Bar-Yam, Y. (2011). Ecosystem. <https://necsi.edu/ecosystem.>

British Ecological Society (2022). What is ecology? <https://www.britishecologicalsociety.org/about/what-is-ecology/#:~:text=Why%20is%20ecology%20important%3F,biodiversity%20in%20a%20changing%20climate.>

Ecological Society of America (2022). What is ecology. <https://www.esa.org/about/what-does-ecology-have-to-do-with-me/#:~:text=Ecology%20is%20the%20study%20of,and%20the%20world%20around%20them.>

Greenfacts (2022). Biodiversity & Human Well-being. <https://www.greenfacts.org/en/biodiversity/1-3/1-define-biodiversity.htm>

Jagran, P. (2022). Basic Concepts related to the Environment and Ecology. <https://www.jagranjosh.com/general-knowledge/basic-concepts-related-to-the-environment-and-ecology-1518784514-1>

Karthik, (2022). Why is the ecosystem important. <https://byjus.com/biology/importance-of-ecosystem/#:~:text=Importance%20of%20Ecosystem%3A,between%20biotic%20and%20abiotic%20components.>

Sturle, et al, (n.d.), Applying resilience thinking seven principles for building resilience in social-ecological systems. <https://www.stockholmresilience.org/download/18.10119fc11455d3c557d6928/1459560241272/SRC+Applying+Resilience+final.pdf>

Tansley, A. G. (1935). "The Use and Abuse of Vegetational Concepts and Terms" . Ecology.

Tutorialpoint, (2022), Classification of ecosystem.
https://www.tutorialspoint.com/environmental_studies/environmental_studies_classification_of_ecosystem.htm

Willis, A.J. (1997). "The Ecosystem: An Evolving Concept Viewed Historically". *Functional Ecology*. 11 (2): 268–271.



3.8 Possible Answers to SAEs

Answers to SAEs 1

1. Ecology is the study of the relationship between living organism, including humans and their physical environment. It is the branch of science that deals with the study of interactions between living organisms and their physical environment.
2. 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".

Answers to SAEs 2

1. 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.
2. 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.

UNIT 4 ENVIRONMENTAL LAWS AND PROTOCOLS

Unit Structure

- 4.1 Introduction
- 4.2 Intended Learning Outcomes (ILOs)
- 4.3 Concept of Environmental Law
- 4.4 Principles of Environmental Laws
- 4.5 Environmental Laws in Nigeria
- 4.6 Importance of Environmental Law
- 4.7 Summary
- 4.8 References/Further Readings/Web Resources
- 4.9 Possible Answers to Self-Assessment Exercises



4.1 Introduction

Without environmental laws it will be impossible to manage the use of the environment. Environmental laws is essential for the conduct on the environment. In the last unit we identified the key concepts in natural resources analysis, with Ecosystem, Biodiversity and ecology as the area of focus. In this unit, the concept of environmental Law is explained. The unit also contains the analysis of the Principles of environmental laws as well as the various Environmental laws in Nigeria. The Importance of the various environmental laws is also explained here in the unit.



4.2 Intended Learning Outcomes

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

- discuss environmental Law
- analyse the Principles of environmental laws is identified
- write the key features of environmental laws.
- evaluate the Importance of the various environmental laws



4.3 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).

1.4 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:

Self-Assessment Exercises 1

1. Discuss the concept of environmental law.
2. What are the five (5) key principles of environmental law?

4.5 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).

Self-Assessment Exercises 2

1. List and discuss some of the environmental laws in Nigeria.
2. Discuss some of the environmental laws that came into effect in 2011.

4.6 Importance 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 help 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 help 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).

Self-Assessment Exercises 3

1. Discuss the importance of environmental laws in Nigeria.



4.7 Summary

At the end of this unit, the students can define Environmental Law and reviewed in the unit. The various environmental laws are discussed in this unit as well as a review of some of the Importance of environmental law in Nigeria.

It is summarized in this unit that; 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.



4.7 References/Further Readings/Web Resources

Budnukaeku, A. C. & Oku, H. (2021). Environmental laws and management agencies in Nigeria– what hope for desecrated landscape. Biodiversity journal, Vol 5(1).

Conservative Energy, (2021). What is environmental law?
<https://www.conserve-energy-future.com/environmental-law-and-its-components.php>

Environmental Management (2017). Environmental policies and legislation.

Legalcareerpath (2022). What is environmental law?
<https://legalcareerpath.com/what-is-environmental-law/>

Nabegu, Mustapha, A. B. & Naibbi, A. I. (2017). Environmental Regulations in Nigeria: A Mini Review. International journal of environmental sciences and natural resources. Mini Review, Vol 5(1).

Oruonye, E.D. & Ahmed, Y. M. (2011). The role of enforcement in environmental protection in Nigeria. World Journal of Advanced Research and Reviews, 2020, 07(01), 048–056.

Science and Engineering for Industry Pages 37-55.
<https://www.sciencedirect.com/science/article/pii/B978012811989100004X>

Tarlock, A. D. (nd). Environmental laws and their enforcement. Vol. I - History of Environmental Law - Encyclopedia of Life Support Systems (EOLSS).



4.8 Possible Answers to SAEs

Answers to SAEs 1

1. 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.
2. 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.

Answers to SAEs 2

1. Some environmental laws in Nigeria include;
 - National Environmental Protection (Effluent Limitation) Regulations.
 - National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations.
 - National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations.
 - Environmental Impact Assessment Act of 1992 (EIA Act).
 - Harmful Wastes (Special Criminal Provisions etc.) Act of 1988 (Harmful Wastes Act).
2. 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,

Answers to SAEs 3

1. 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.

MODULE 3 NEXUS BETWEEN NATURAL RESOURCES AND SUSTAINABLE DEVELOPMENT

Unit 1	Natural Resources and Development
Unit 2	Challenges of Natural Resources And Sustainable Development
Unit 3	social and Developmental Significance of Natural Resources

UNIT 1 NATURAL RESOURCES AND DEVELOPMENT

Unit Structure

- 1.1 Introduction
- 1.2 Intended Learning Outcomes (ILOs)
- 1.3 Natural Resources and Poverty Reduction
- 1.4 Natural Resources and Process in Development
- 1.5 Summary
- 1.6 References/Further Readings/Web Resources
- 1.7 Possible Answers to Self-Assessment Exercises



1.1 Introduction

This unit is a linkage of Natural resources and development. Key areas of review include Natural resources and poverty reduction, natural resources and process in development



1.2 Intended Learning Outcomes

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

- Discuss Key linkages between Natural resources and development
- Analyse Key linkages between Natural resources and poverty reduction
- Demonstrate an understanding of key uses of natural resources.
- Evaluate the importance of natural resources to man.



1.3 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 economic 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.

Self-Assessment Exercises 1

1. Discuss the linkage between Natural resources and poverty reduction.

1.4 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).

Self-Assessment Exercises 2

- | |
|--|
| <p>1. Discuss the linkage between Natural resources and development.</p> |
|--|



1.5 Summary

In this unit we have discussed the importance of Natural resources in development. The linkage between Natural resources and poverty reduction is also reviewed. Natural resources can reduce poverty especially if it is sustainably managed by man. Natural resource is a key input in the production process that stimulates economic growth”.



1.6 References/Further Readings/Web Resources

Hugo, A. (2018). Environment and Poverty Times: Pro-poor growth issue. <https://www.grida.no/resources/7305>

IMPOFF, (2020), Understanding the Importance of Natural Resources. <https://impoff.com/importance-of-natural-resources/>

Musa, J. I. (2017). Emerging issues in economic development. <https://www.intechopen.com/chapters/56599>

OECD, (2011). The economic significance of natural resources: Key points for reformers in Eastern Europe, Caucasus and Central Asia.

https://www.oecd.org/env/outreach/2011_AB_Economic%20significanc%20of%20NR%20in%20EECCA_ENG.pdf

USAID (2005), Issues in Poverty Reduction and Natural Resource Management.

<https://www.usaid.gov/sites/default/files/documents/1862/issues-in-poverty-reduction-and-natural-resource-management.pdf>



1.8 Possible Answers to SAEs

Answers to SAEs 1

1. 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. 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

Answers to SAEs 2

1. 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.
2. 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.

UNIT 2 CHALLENGES OF NATURAL RESOURCES AND SUSTAINABLE DEVELOPMENT

Unit Structure

- 2.1 Introduction
- 2.2 Intended Learning Outcomes (ILOs)
- 2.3 Environmental Degradation
- 2.4 Exploration and Exploitation of the Natural Resources
- 2.5 Human Population and Challenge on Natural Resources
- 2.6 Urbanization and the Challenges of Natural Resources Development
- 2.7 Summary
- 2.8 References/Further Readings/Web Resources
- 2.9 Possible Answers to Self- Assessment Exercises



2.1 Introduction

This unit is a review of the Challenges of natural resources and sustainable development. It also contains a conceptual clarification of Environmental degradation. The issue of exploration and exploitation of the natural resources as well as a review of human population and challenge on natural resources and also an analysis of urbanization and the challenges of natural resources development



2.2 Intended Learning Outcomes

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

- discuss the Challenges of natural resources in sustainable development is identified
- analyse the conceptual clarification Environmental degradation
- demonstrate an understanding of Urbanization and the impact on natural resources development identified
- evaluate the types of environmental degradation.



2.3 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.

Self-Assessment Exercises 1

1. What is Environmental degradation?
2. List the types of Environmental Degradation.

2.4 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 cent 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).

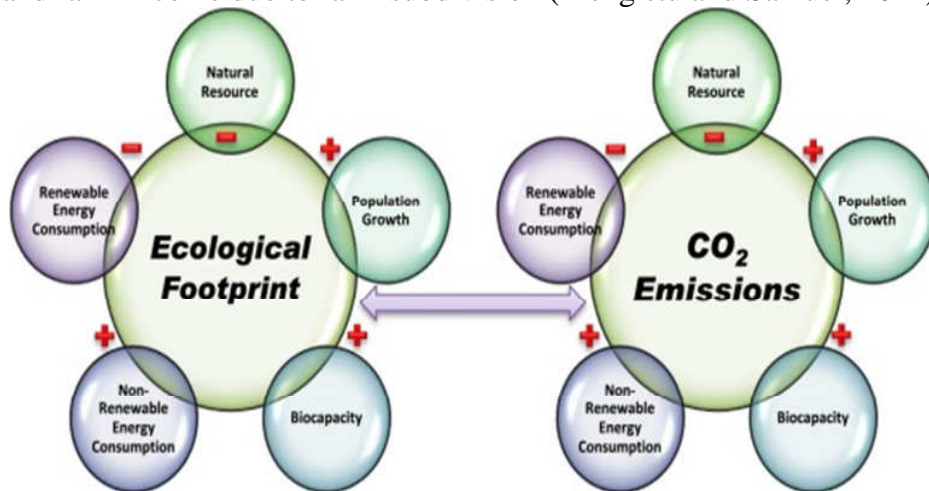
Self-Assessment Exercises 2

1. Provide an explanation of the exploitation of natural resources.
2. What are the reasons why natural resources is overexploited?

2.5 Human Population and Challenge on Natural Resources

Human populations have close effect on the natural resources. As the human population increases, so also 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).

2.6 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).

Self-Assessment Exercises 3

1. Discuss the impact of rapid population growth on the natural resources.
2. Discuss the impact of urbanization on the natural resources.



2.7 Summary

In this unit, the concept of Environmental degradation is explained. The impact the exploration and exploitation of the natural resources on the environment is reviewed as well as a discuss on the impact of human population, Urbanization on the natural resources.

Urbanization process will put pressure on natural resources and the environment. Rapid population growth plays an important role in declining per capita agricultural land, forest and water resources. Environmental degradation is a result of the dynamic inters play of socio-economic, institutional and technological activities.



2.8 References/Further Readings/Web Resources

- Babagana, G. & Muhammed, M. A. (2012). Environmental impact of natural resources exploitation in Nigeria and the way forward. *Journal of Applied Technology in Environmental Sanitation*, 2 (2): 95-102.
- Barbara, B. T. (2004). Urbanization: An environmental force to be reckoned with. <https://www.prb.org/resources/urbanization-an-environmental-force-to-be-reckoned-with/>
- Debra, E. (1999). Urbanization and its Human Influence. Seminar in Global Sustainability, University of California, Irvine. March.
- Doneika, S. (2008). The effects of urbanization on natural resources in Jamaica. 44th ISOCARP Congress.
- Emilie, B. (2021). Consequences of over exploitation of natural resources. <https://ecojungle.net/post/consequences-of-overexploitation-of-natural-resources/>
- General Multilingual EnvironmentalThesaurus, (2021), environmental degradation. <https://www.eionet.europa.eu/gemet/en/concept/15154#:~:text=Environmental%20degradation%20is%20a%20process,or%20caused%20by%20human%20activities.>
- Irfan, K., Fugun, H. & Hoang, P. L. (2021). The impact of natural resources, energy consumption, and population growth on environmental quality: Fresh evidence from the United States of America.
- Kate, M. (2016). How does human population growth affect natural resources? <https://socratic.org/questions/how-does-human-population-growth-affect-natural-resources>
- Lampert, A. (2019). Over-exploitation of natural resources is followed by inevitable declines in economic growth and discount rate. *Nat Commun* 10, 1419. <https://doi.org/10.1038/s41467-019-09246-2>

- Mengistu, M.M. & Samuel, F. A. (2021). The Impact of Population Growth on Natural Resources and Farmers' Capacity to Adapt to Climate Change in Low-Income Countries. https://www.researchgate.net/publication/350101251_The_Impact_of_Population_Growth_on_Natural_Resources_and_Farmers'_Capacity_to_Adapt_to_Climate_Change_in_Low-Income_Countries
- Murimi, P. K. (2015), Conservation of nature and natural resources. <https://www.pambazuka.org/land-environment/conservation-nature-and-natural-resources>.
- Pradip, Ali & Ahmad (2020), An introduction to environmental degradation: Causes, consequence and mitigation. Environmental Degradation: Causes and Remediation Strategies (pp.1-20).
- Rashwet, (2019). Economics, technology and environmental protection. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-degradation>
- Rinkesh, (2022). What is environmental degradation? <https://www.conserve-energy-future.com/causes-and-effects-of-environmental-degradation.php>
- Sarabpriya & Ishita (2011). Impact of Population Growth on Environmental Degradation: Case of India. Journal of Economics and Sustainable Development, Vol.2, No.8.
- Tim, F. (2011), Population growth: the defining challenge of the 21st Century. <https://www.nato.int/docu/review/articles/2011/02/14/population-growth-the-defining-challenge-of-the-21st-century/index.html>



1.8 Possible Answers to SAEs

Answers to SAEs 1

1. 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.
2. The types of environmental degradation to include;
 1. Land and soil degradation.
 2. Water degradation.
 3. Atmospheric degradation.

Answers to SAEs 2

1. Natural resources exploitation 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”.
2. The reason why natural resources is overexploited include;
 1. Overpopulation
 2. Poor farming practices
 3. Logging
 4. Pollution
 5. Over consumption of natural resources
 6. Industrial and technological development.

Answers to SAEs 3

1. 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.
2. 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.

UNIT 3 **SOCIAL AND DEVELOPMENTAL SIGNIFICANCE OF NATURAL RESOURCES**

Unit Structure

- 3.1 Introduction
- 3.2 Intended Learning Outcomes (ILOs)
- 3.3 Natural Resources, Cultural and Development
- 3.4 Ecosystem and Community Development
- 3.5 Summary
- 3.6 References/Further Readings/Web Resources
- 3.8 Possible Answers to Self-Assessment Exercise(s)



3.1 Introduction

Globally, cultural values of natural resources are increasingly recognized as important for local natural resource management and conservation. In the last unit we have discussed the challenges of natural resources and sustainable development. In this we will take a review of the Social and developmental significance of natural resources. In it is a review of Natural resources, cultural and development as well as the relationship between ecosystem and community development.



3.2 Intended Learning Outcomes (ILOs)

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

- discuss the linkages between Natural resources, cultural and development is identified
- analyse the impact of natural resources on culture
- demonstrate the importance of ecosystem in community development
- evaluate the linkage between ecosystem and community development is identified.



3.3 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).

3.4 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).

Self-Assessment Exercises 1

1. Discuss the linkage between Natural resources, cultural and development.
2. Discuss the linkage between ecosystem and community development.



3.5 Summary

In this unit we have been able to; discuss the linkage between Natural resources, cultural and development. Discuss the linkage between ecosystem and community development.

Ecosystems provide a sense of place and identity for local people, in addition to other ecosystem services. Many communities possess local knowledge about the interactions between humans and ecosystems, and affect ecosystem services and human well-being positively.



3.6 References/Further Readings/web Resources

Carl, Christo, Georgina & Lisen (2005), Communities, ecosystems and livelihoods.

https://www.researchgate.net/publication/229076656_Communities_ecosystems_and_livelihoods

Christie, M. (2008). "Traditional Natural Resource Use and Development in Northeast Thailand" . Senior Honors Projects. Paper 107.

<http://digitalcommons.uri.edu/srhonorsprog/107><http://digitalcommons.uri.edu/srhonorsprog/107>

European Commission (2009). Ecosystem Goods and Services.

https://ec.europa.eu/environment/pubs/pdf/factsheets/Ecosystems%20goods%20and%20Services/Ecosystem_EN.pdf

Goldma, T. & Shoana, S. (2013). Cultural values of natural resources among the San people neighbouring Kgalagadi Transfrontier Park, South Africa. *Local Environment*, 20:1, 18-33, DOI: 10.1080/13549839.2013.818950

James et al, (2017),.The role of ecosystem services in community well-being. (Ed.). Levant, H. *Ecosystem services and global ecology*. DOI10.5772/intechopen.71316

Kimberly, A. W. (1997). Conservation and Culture: Natural Resource Management and the Local Voice. *Journal of ecological anthropology*. Vol 1(1).



3.7 Possible Answers to SAEs

Answers to SAEs 1

1. 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".
2. 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.

MODULE 4 MEANING, SCOPE AND DEFINITION OF SUSTAINABLE DEVELOPMENT

- Unit 1 Definition, Meaning of Sustainable
Development
- Unit 2 Sustainable Management of the
Environment

UNIT 1 DEFINITION, MEANING OF SUSTAINABLE DEVELOPMENT

Unit Structure

- 1.1 Introduction
- 1.2 Intended Learning Outcomes
- 1.3 Sustainable Development -Meaning
- 1.4 Conceptualizing Sustainable Development
 - 1.4.1 Importance of Sustainable Development
- 1.5 Summary
- 1.6 References/Further Readings/Web Resources
- 1.7 Possible Answers to Self-Assessment Exercises



1.1 Introduction

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 development. In this unit is the conceptualization of Sustainable Development. It is also a review of the Importance of sustainable development.



1.2 Intended Learning Outcomes

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

- discuss the issues in sustainable development
- analyse the impact of sustainable development to the society
- demonstrate an understanding of Sustainable Development is identified
- evaluate the Importance of sustainable development is identified.



1.3 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".

1.4 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 n.d.).



Source:<https://vanianinis.blogspot.com/2021/07/sustainable-development-goal-malaysia.html>

1.5 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.

Self-Assessment Exercises 1

1. What is sustainable development?
2. What are the importance of sustainable?

**1.6 Summary**

In this unit we have been able to define and provide a conceptual definition of sustainable development. The importance of sustainable development is also discussed in this unit.

We can summarize in this unit that; without sustainable development the natural resources will be overexploited and the future generation will not benefit from the environment. The overall goal of sustainable development (SD) is the long-term stability of the economy and environment.

**1.7 References/Further Readings/Web Resources**

Emas, R. (2015). The Concept of Sustainable Development: Definition and Defining Principles. Brief for GSDR 2015. https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015_SD_concept_definiton_rev.pdf

Mensah, J. & Ricart Casadevall, S. (2019). Sustainable Development: Meaning, History, Principles, Pillars, and Implications for Human Action: Literature Review. *Cogent Social Sciences*, 5, Article ID: 1653531. <https://doi.org/10.1080/23311886.2019.1653531>



1.8 Possible Answers to SAEs

Answers to SAEs 1

1. 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.
2. Sustainable development is important because it entails;
 - Using the available resources judiciously and working towards maintaining the ecological balance.
 - Preventing degradation of the environment
 - To prevent overexploitation of scarce resources.
 - Sustainable development is important since it will.
 - Ensure the achievement of harmony between environmental sustainability, economic sustainability, and socio-political sustainability.
 - Ensure the conservation and enhancing the natural environment.
 - Direct the pattern and ways in which we develop and use technologies in harnessing the natural resources.
 - Ensure that basic needs of employment, food, energy, water, and sanitation are met.
 - The right of individuals to a healthy, safe, and clean environment.
 - Ensures the reduction of pollution, poverty, and unemployment.

UNIT 2 SUSTAINABLE MANAGEMENT OF THE ENVIRONMENT

Unit Structure

- 2.1 Introduction
- 2.2 Intended Learning Outcomes (ILOs)
- 2.3 Methods in Sustainable Environmental Management
- 2.4 Sustainable Development Goals
- 2.5 Challenges of Implementation
- 2.6 Summary
- 2.7 References/Further Readings/Web Resources
- 2.8 Possible Answers to Self-Assessment Exercises



2.1 Introduction

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. In the last unit we discussed the concept of sustainable development as well as the importance of sustainable development. In this unit is the review of the methods in sustainable environmental management as well as a review of the Sustainable Development Goals. The challenges of the Implementation of the Sustainable Development Goals are also discussed here.



2.2 Intended Learning Outcomes

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

- discuss sustainable Development Goals.
- analyse the methods in sustainable environmental management.
- write an outline of the SDGs.
- evaluate the Challenges of Implementation of sustainable Development Goals.



3.1 Methods in Sustainable Environmental Management

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

Recycling and reuse of materials: The product should be designed in a way that it is easy to recycle the used product.

Minimization of waste:.. The most approved way to minimize waste is to minimize the material used for the manufacturing (EnggStaff, 2019).

2.3 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). Sustainable Development Goals (SDGs) or Global Goals are a collection of 17 International Global Goals designed to be a “blue print to achieve a better for all. The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by year 2030. They are included in United Nations Resolution called Agenda 2030 or what is colloquially known as Agenda 2030. The SDGs were developed in the Post-2015 Development Agenda as the future global development framework to succeed the Millennium Development Goals which ended in 2015.

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, (16) Peace, Justice, and Strong Institutions, (17) Partnerships for the Goals (United Nation, 2015).

- No Poverty: it aims to end poverty in all its forms everywhere. “Its objectives include ensuring that the entire population and especially the poorest and most vulnerable have equal rights to economic resources, access to basic services, property and land control, natural resources and new technologies”
- Zero Hunger: “aims to end hunger and all forms of malnutrition by 2030. It also commits to universal access to safe, nutritious and sufficient food at all times of the year” (United Nation, 2021).

- Good Health and Well-being: The goal of Good Health and Well-being of the SDG is to prevent needless suffering from preventable diseases and premature death by focusing on key targets that boost the health of a country's overall population (UNICEF, nd).
- Gender-Equality: The wide spread consensus is that progress on all of the SDGs will be stalled if women's empowerment and gender equality are not prioritized and treated holistically. Against this backdrop, the SDGs look to policy makers as well as private sector executives and board members to work toward gender equality. Consequently, gender equality is mainstreamed throughout the SDG framework by ensuring that as much as possible sex-disaggregated data as possible are collected.
- Education for Sustainable Development (ESD) is explicitly recognized by UNESCO as a basis for which it promotes the Global Citizenship Education as a complimentary approach. It is pertinent to emphasize ESD's importance for all the other 16 SDGs. With its overall aim to develop cross-cutting sustainability competencies in all learners, the EDS is an essential contribution to all efforts to achieve the SDGs.
- Clean Water and Sanitation: focuses on ensuring a clean and stable water supply and effective water sanitation for all people by the year 2030 (National Geographic, 2015).
- Affordable and Clean Energy: this goal ensures a universal access to affordable electricity by 2030. This will be achieved by means of investing in clean energy sources such as solar, wind and thermal (Joint SDG Fund, 2015).
- Industry, Innovation and Infrastructure: The goal is to “develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all (United Nation, 2015).
- Decent Work and Economic Growth: “aims at ensuring inclusive and sustainable economic growth around the world, notably by: achieving full employment, decent and productive work for all, and equal pay for equal work by 2030” (European Commission, 2021).

- **Reduced Inequality:** The goal is aims at “reducing inequality within and among countries. This SDG calls for reducing inequalities in income as well as those based on age, sex, disability, race, ethnicity, origin, religion or economic or other status within a country” (United Nations Office for Outer Space Affairs, 2021).
- **Sustainable Cities and Communities:** The aim of this goal is to make cities clean, safe, human inclusive and resilient (United Nations, 2015).
- **Responsible Consumption and Production:** this goal ensures for the promoting of resource and energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and a better quality of life for all (Ritchie, Roser, Mispy, Ortiz-Ospina, 2018).
- **Climate Action:** the aim of this goal is to focus on the integration of climate change measures into national policies, the improvement of education, awareness-raising and institutional capacity on climate change mitigation, adaptation, impact reduction and early warnings (United Nations Department of Economic and Social Affairs, 2015).
- **Life below Water:** this goal ensure that the oceans, seas and marine are conserved and sustainably his will be achieved if the oceans, seas and marine resources for sustainable development are prevented and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution (Wellesley Institute, 2022).
- **Life On Land:** this goal ensures for the promoting of a sustainable use of our ecosystems and preserving biodiversity is not a cause (The Global Goals, nd).
- **Peace, Justice, and Strong Institutions:** the aim of the goal is to promote just, peaceful and inclusive societies, where conflict is reduced.
- **Partnerships for the Goals:** the goal is to “assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress, partnerships for the Goals” (United Nation, 2015).

Self-Assessment Exercises 1

1. Discuss some of the sustainable development goals.
2. What are some of the methods in sustainable environmental management?

2.4 Challenges of Implementation

Environmental management is much more than biophysical manipulation and control-it concerns the mutually beneficial management of the humankind-nature interaction to ensure environmental and social equality for future generations. This kind of environmental management begins with a sense of collective vision about the future, and continues with difficult decisions about the appropriate balance between industrial production, consumption and environmental quality. The nature of these decisions implies that the realization of sustainable development, no matter how it is defined and on what scale, is an intensely political process involving continual trade-offs between economic, social and biophysical needs and objectives. It is a political process of mediation in which old Right-Left thinking is largely irrelevant. This no doubt, is the fascinating human dimension in environmental management (Carley & Christie, 2000).

The objectives of sustainable development and integrated environmental development challenges pose problems for institutions, national and international, that were established on the basis of narrow pre-occupations and compartmentalized concerns. Governments' general response to the speed and scale of global changes has been a reluctance to recognize sufficiently the need to change themselves.

The point of fact is that the challenges are both interdependent and integrated requiring comprehensive approaches and popular participation. Yet, most of the institutions facing those challenges tend to be independent, fragmented, working to relatively narrow mandates with close decision processes. Those responsible for managing natural resources and protecting the environment are institutionally separated from those managing the economy. The real world of interlocked economic and ecological systems will not change; the policies and institutions concerned must. Thus, there is a growing need for effective international co-operation to manage ecological and economic interdependence. Yet at the same time, confidence in international organizations is diminishing and support for them dwindling.

Self-Assessment Exercises 2

1. What are some of the challenges of Implementation of the SDGs.



2.5 Summary

In this unit we have discussed the Sustainable Development Goals as well as the challenges of implementation of 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.

The objectives of sustainable development and integrated environmental development challenges pose problems for institutions, national and international.



2.5 References/Further Readings/Web Resources

- Agrawal, A. (1997). *Community in Conservation: Beyond Enchantment and Disenchantment*. Conservation Development Forum working paper, Gainesville, FL, April.
- Agrawal, A. & Gibsson, C. (Eds.). (2001). *Communities and the Environment*. New Brunswick, N. J. Rutgers University Press.
- Borrini-Fayerabend, G. (1996). *Collaborative Management of Protected Areas (CCAs): Tailoring the Approach to the Context*.
- Brockington, Dan. (2002). *Forest Conservation: The preservation of the Mkomazi Game Reserve, Tanzania*. Bloomington: Indiana University Press.
- Carley, C. & Christie, I. (2000). *Managing Sustainable Development*. Earthscan Publications Ltd, London and Sterling, VA.
- Defries, R. S. & Malone, T. (Eds.). *Global Environmental Change and Our Common Future: Papers from a Forum*, National Academy of Sciences, Washington.

- European Commission (2021). Decent work and economic growth. https://ec.europa.eu/international-partnerships/sdg/decent-work-and-economic-growth_en#:~:text=The%208th%20Sustainable%20Development%20Goal,for%20equal%20work%20by%202030
- Fisher, R. J. (1995). Collaborative Management of Forests for Conservation and International Development. Gland, Switzerland: IUCN-The World Conservation Union.
- Glowka, L., et al. (1994). A Guide to the Convention on Biological Diversity. Gland, Switzerland, and Cambridge, UK: IUCN- The World Conservation Union.
- Joint SDG Fund (2015). GOAL 7: Affordable and clean energy. <https://www.jointsdgfund.org/sustainable-development-goals/goal-7-affordable-and-clean-energy#:~:text=Ensuring%20universal%20access%20to%20affordable,and%20industry%20by%2014%20percent>.
- Mannion, A. M. (1999). Global Environmental Change: A Natural and Cultural Environmental History. Longman Scientific and Technical London.
- National Geographic (2015). Sustainable Development Goal 6: Clean Water and Sanitation. <https://education.nationalgeographic.org/resource/sustainable-development-goal-6-clean-water-and-sanitation>
- Peluso, N. & M. Watts, (Eds.). (2001). Violent Environments. Ithaca, N. Y. Cornell University Press.
- Poffenberger, M. (1990a). keepers of the Forest: Land Management Alternatives in Southeast Asia. West Hartford, Conn: Kumarian Press.
- Poffenberger, M. (1990b). Joint of Forest Land: Experiences from South Asia. New Delhi: Ford Foundation.
- Poffenberger, M. (1996). From Chipko to Uttaranchal: Development, Environment, and Social Protest in the Ghrwal Himalayas, India in Liberation Ecologies: Environment, Development, Social Movements, ed. R. Peet and M. Watts. London Routledge.

- Ribot, J. C. (1996). Participation without Representation: Chiefs, Councils and Forestry Law in the West African Sahel. *Cultural Survival Quarterly* 20(3) 40-44.
- Ritchie, Roser, Mispy, Ortiz-Ospina (2018)."Measuring progress towards the Sustainable Development Goals." *SDG-Tracker.org*, website.
- Schroeder, R. (1999). Community, Forestry, and Conditionality in the Gambia. *Arica* 69(1): 1-22.
- Tarnowski, C. (2002). Forest Places, Political Spaces: The Social Implications of Community Forestry in Nepal. Ph.D. diss., University of Georgia, Athens.
- The Global Goals (n.d.). Live on land. <https://www.globalgoals.org/goals/15-life-on-land/>
- Turner, B. L. Clark, W. C, Kates, R. W, Richards, J. T & Mayer, W. B.(Eds.). (1990). *The Earth as transformed by Human Action*. Cambridge University Press, Cambridge.
- UNICEF (2021), GOAL 3: Good health and well-being. <https://data.unicef.org/sdgs/goal-3-good-health-wellbeing/>
- United Nation (2015). SUSTAINABLE DEVELOPMENT GOAL 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation. <https://sdg-tracker.org/infrastructure-industrialization>
- United Nation (2021). End hunger, achieve food security and improved nutrition and promote sustainable agriculture. <https://sdgs.un.org/goals/goal2>
- United Nation, (2015). Sustainable Development Goals. https://en.wikipedia.org/wiki/Sustainable_Development_Goals
- United Nations (2015), Sustainable Cities and Communities. <https://nigeria.un.org/en/sdgs/11>
- United Nations Department of Economic and Social Affairs (2015), Climate Change. <https://sdgs.un.org/topics/climate-change>.
- United Nations Environmental Programme(UNEP),1999. *Global Environmental Outlook*. 2000. UNEP/Earthscan, London.

- Verrengia, J. (2002). Wyoming Doctor Recruits Army in Africa to Save Animals from Poachers. Environmental news Network. 17 October.
- Wellesley Institute (2022). Life below water. <https://www.wellesleyinstitute.com/un-sustainable-development-goals/life-below-water/>
- Western, D., Wright, R. & Strum, S. (Eds.). (1994). Natural Connections: Perspectives in Community –Based Conservation. Washington D, D.C.: Island Press.
- White, A. T., Zeitlin, L., Hale, Y. & Cortesi, (Eds.). (1994). Collaborative and Community-Based Management of Coral Reefs: Lessons from Experience. West Harford, Conn; Kumarian Press.
- Wilson, R. K. (2003). Community-Based Management and national Forests in Western United States: Five Challenges. Policy Matters 12-181-89.
- World Bank (1996). The World Bank Participation Sourcebook. Washington, D.C, World Bank.



1.8 Possible Answers to SAEs

Answers to SAEs 1

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, (16) Peace, Justice, and Strong Institutions, (17) Partnerships for the Goals (United Nation, 2015).

No Poverty: it aims to end poverty in all its forms everywhere. “Its objectives include ensuring that the entire population and especially the poorest and most vulnerable have equal rights to economic resources, access to basic services, property and land control, natural resources and new technologies”

Zero Hunger: “aims to end hunger and all forms of malnutrition by 2030. It also commits to universal access to safe, nutritious and sufficient food at all times of the year” (United Nation, 2021).

Good Health and Well-being: The goal of Good Health and Well-being of the SDG is to prevent needless suffering from preventable diseases and premature death by focusing on key targets that boost the health of a country's overall population (UNICEF, nd).

Answers to SAEs 2

Those responsible for managing natural resources and protecting the environment are institutionally separated from those managing the economy. The real world of interlocked economic and ecological systems will not change; the policies and institutions concerned must. Thus, there is a growing need for effective international co-operation to manage ecological and economic interdependence. Yet at the same time, confidence in international organizations is diminishing and support for them dwindling.