



**FEDERAL UNIVERSITY OF TECHNOLOGY
MINNA**

**TOWARDS A SUSTAINABLE SOIL
SECURITY IN SUB-SAHARAN AFRICA:
THE ROLE OF NITROGEN FIXING LEGUMES**

By

PROF. AKIM OSARHIEMEN OSUNDE *(FSSSN)*

*M.Sc. (Nitra), PhD (Vienna)
Professor of Soil Science*

INAUGURAL LECTURE SERIES 35

6TH AUGUST, 2015



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DEDICATION

This lecture is dedicated to my late father Alhaji Dirisu Adams Osunde who sacrificed so much for my education and provided the proper upbringing and the enabling environment for me to achieve the greatest height in my academic career.

Introduction

It is with deep humility and immense gratitude to my Creator that I stand before this august gathering in the very first week of the month of August to deliver the 35th Inaugural lecture of the Federal University of Technology, Minna. This lecture is the ninth from the School of Agriculture and Agricultural Technology and the second from the Department of Soil Science and Land Management. I feel indeed highly honoured and privileged to be called upon to deliver this lecture covering the subject matter of SOIL SECURITY particularly this year 2015, a year designated by the 68th session of the United Nations General Assembly as the International Year of Soils. I am delivering this inaugural lecture exactly nine years after my elevation to the exalted status of a Professor. Considering the age of this University, if there were to be a categorization of Professors as it is the case in the University of Ibadan, I can be regarded as an Adult Professor in the Federal University of Technology, Minna.

Mr. Vice-Chancellor Sir, this landmark and auspicious occasion can only come once in the life of an academic. Inaugural lectures offer a rare and unique opportunity to assemble the “town and the gown” together to discuss a subject matter of topical interest and to highlight one's contribution to knowledge in a very succinct and simple language that can be comprehended by a larger part of the audience. I have therefore in all sincerity tried my best to remove major scientific technicalities from this lecture thus making it as simple as possible.

The central theme of this lecture is “Soil Security” (which in simple terms means “the well-being of the soil”) with particular reference to Sub-Saharan Africa, and it is made up of five main parts. The first part deals with the basic definition of soil and the objectives of the UN declaration of the International Year of Soils. The second part introduces the concept of soil security, the characteristics of the six global environmental challenges and

their interrelationship with soil security. The third part highlights the challenges to sustainable soil security in Sub-Saharan Africa; the fourth part discusses the role of nitrogen fixing legumes in the sustenance of soil security, while the fifth part welcomes this august audience to share my personal experience and humble contributions. The lecture concludes with some recommendations and suggestions.

On this note Mr. Vice-Chancellor sir, may I crave your indulgence and permission to present my Inaugural lecture entitled: ***Towards a sustainable soil security in sub-Saharan Africa: The role of Nitrogen Fixing Legumes.***

What is Soil?

There are as divergent definitions of soil as there are concepts and viewpoints concerning this important product of nature. The highway engineer for example views the soil as that material on which a roadbed is to be placed. The mining engineer on the other hand views the soil as the debris covering the rocks and minerals he needs to excavate. The geologist also appears to lean more to the engineering definition of the soil. For a soil scientist however, a simple and unambiguous description of the soil is that of *"the transformation product of unconsolidated mineral and organic substances on the surface of the earth under the influence of environmental factors operating over a very long time and having a defined organization and morphology"*. It is the growing medium for plants and the basis of life for animals and humankind.

The upper limit of soil is air or shallow water. At its margins, it grades to deep water or to barren areas of rock or ice. Its lower limit to the not-soil beneath is perhaps the most difficult to define, but is normally considered as the lower limit of biological activity, which generally coincides with the common rooting depth of native perennial plants (Soil Survey Staff, 1975).

2015 – The year of the Soil

Soils are fundamental to life on Earth and are a key enabling resource, central to the creation of a host of goods and services integral to ecosystems and human well-being. They are the reservoir for at least a quarter of global biodiversity, and therefore require the same attention as above-ground biodiversity.

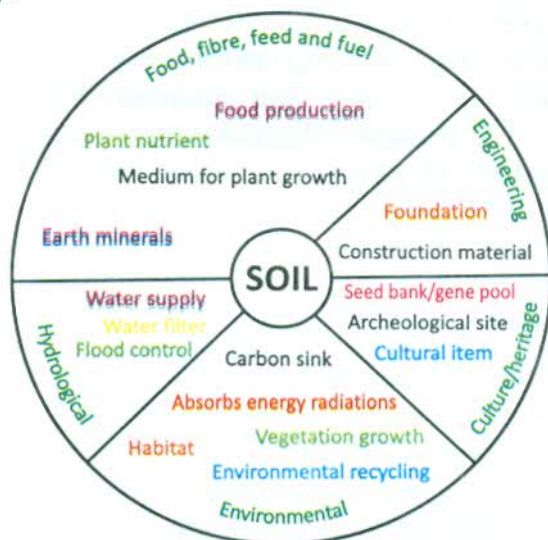


Figure 1. A diagrammatic representation of the various ecosystem roles of soil
(Adapted from: FAO, 2013)

Recognizing that the sustainability of soils is key to addressing the pressures of a growing population and that recognition, advocacy and support for promoting sustainable management of soils can contribute to healthy soils and thus to a food secure world and to stable and sustainably used ecosystems, the 68th UN General Assembly ([A/RES/68/232](#)) designated 5th December as **World Soil Day** and declared 2015 the **International Year of Soils (IYS)**.

The specific objectives of the IYS 2015 are to:

- Raise full awareness among civil society and decision

makers about the profound importance of soil for human life;

- Educate the public about the crucial role soil plays in food security, climate change adaptation and mitigation, essential ecosystem services, poverty alleviation and sustainable development;
- Support effective policies and actions for the sustainable management and protection of soil resources;
- Promote investment in sustainable soil management activities to develop and maintain healthy soils for different land users and population groups;
- Strengthen initiatives in connection with the SDG process (Sustainable Development Goals) and Post-2015 agenda;
- Advocate for rapid capacity enhancement for soil information collection and monitoring at all levels (global, regional and national).

In line with the above, the Soil Science Society of Nigeria in October, 2014 issued a press statement urging every Nigerian to take good advantage of these events to promote the importance of soil to our health, well being and socioeconomic growth. The Society encourages people to treat our beloved country's soil with the care it deserves so that it will continue to sustain our lives and livelihood.

This lecture, Mr. Chairman, ladies and gentlemen, is in part inspired by the aspiration to draw the attention of global audience to the centrality of soils to human existence and hence the need for its sustainable exploitation and security.

The Concept of Soil Security

The term "Soil Security" is a new concept that has arisen in response to an emerging international concern about the increasingly urgent challenges facing the global soil stock. Soil security thus refers to the maintenance and improvement of the world's soil resources to produce food, fibre and freshwater,

