



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Presented at the FIG Working Week 2024,
19-24 May 2024 in Accra, Ghana

Geo-agriculture for Climate Resilience: Towards Pioneering Anticipatory Adaptation in Namibia

Presenter: Ntwala Vanessa Simataa

Date: 21 May 2024

Authors: Ntwala Vanessa SIMATAA, Laina ALEXANDER, Penehafo RICARDO, Catharine MARENGA, Mario SIUKUTA and Uchendu Eugene CHIGBU (Namibia).

ORGANISED BY



PLATINUM SPONSORS





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Contents

Introduction

In Brief: Climate change in Africa at large

Climate Change Scenarios in Namibia

Climate change and Land tenure

The impact of Climate change on agriculture and agriculture on climate change

Unveiling geo-agriculture

Rocks for Crops: Experiences from Cameroon

The climate change benefits of geo-agriculture

How geo-agriculture assists with SDGs and climate change benefits of geo-agriculture

Conclusion and recommendations





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Introduction

Climate change is a widely acknowledged worldwide concern, albeit one that is perceived differently depending on a country's socioeconomic development. Several academics have stated that climate change is a complex issue with ecological, environmental, socio-political, and socioeconomic implications.

This presentation explores the need to pioneer anticipatory adaptation with geo-agriculture in Namibia.

The paper outlines the challenges posed by climate change to important sectors such as agriculture in Namibia and Africa, while introducing the potential of Geo-agriculture as a solution to enhance soil fertility and crop yields. It explores the benefits, challenges, and opportunities associated with Geo-agriculture adoption, highlighting its alignment with key Sustainable Development Goals (SDGs) and proposing strategies for its promotion and integration at household level in achieving sustainable development.





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

In Brief: Climate change in Africa at large

Africa is vulnerable to climate change because majority of the population rely on agriculture, meanwhile, agriculture relies heavily on rainfall. Over the years, climate change has caused shifts in precipitation patterns, lowering annual rainfall.

Land uses in northern Namibia regions are typically agricultural and livestock farming while these regions receive higher rainfall compared to the southern areas.

Historically, the rainfall seasons were approximately experienced during November-December; however, due to climate variations recent years have witnessed a shift to January through April, this has affected crop yields negatively.

Results in reduced crop output caused by heat and drought stress which in the long term may cause soil degradation, among other drivers such as deforestation, urbanization and intense agricultural activities. Soil degradation is the loss of soil quality or health caused by a variety of human or natural factors.

ORGANISED BY



PLATINUM SPONSORS



GEOSA
General Authority for Surveying
and Geospatial Information





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Climate change and Land tenure

Land tenure incorporates the involved relationships between people and land, involving the exercise of rights, restrictions, and responsibilities over land resources.

Land tenure systems in Sub-Saharan Africa affect agricultural productivity, and land tenure systems do not provide enough security for investments or for lenders to support such investments.

In contrast, several studies have investigated and recommended land tenure to be a long-term climate change adaptive mechanism at the household level and for soil conservation practices for improved crop yields.

Additionally, tenure security influences decision-making and behaviors at the household level, promoting soil conservation efforts which contributes to long-term community adaptive capacity.

ORGANISED BY



PLATINUM SPONSORS





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

The impact of Climate change on agriculture and agriculture on climate change

Agriculture impact on climate change

- Food and agricultural industry accounts for 30-40% emissions total.
- N2O and CH4 emissions, from fertilizer use, are the significant contributors.
- This has consequences for climate change mitigation methods.

Agricultural Impact on climate change

Climate change impact on agriculture

Climate change impact on agriculture

- Agricultural sector In Namibia contributes to the majority of country's GDP (7%-10% of total GDP)
- A sum of 70% of Namibia's population relies on rain-fed crop production for a living.
- Namibia's agriculture sector is vulnerable to climate change.
- Urgent mitigation and adaptation strategies are needed.



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Unveiling geo-agriculture

Geo-agriculture is the study and application of cultivating seeds to maturity in geological formations (rocks) (with or without the use of soils and fertilizers).

The concept of agricultural geology has emerged as a potential solution, harnessing the untapped potential of rocks to enhance crop production while simultaneously addressing critical Sustainable Development Goals (SDGs) such as zero hunger, good health and well-being, and climate action.

Van Straaten (2002), provided a detailed explanation of the chemical composition of bedrock types that can be sources for nutrient supplements in farming practices.

Edwards and Lim (2017) reviewed the potential of utilizing crushed volcanic rocks inter alia to mitigate against the effects of climate change. This is through the weathering of these rock types which results in the forming of minerals carbonate phases, taking up CO₂ from the atmosphere, and can benefit agriculture.

ORGANISED BY



PLATINUM SPONSORS





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Rocks for Crops: Experiences from Cameroon



- Geological Agriculture (GeoAg), pioneered by Richard Campbell, offers a revolutionary approach to cultivating plants and vegetables without soil and fertilizers, aiming to reduce food costs and promote health. Driven by the vision of Dr. Ndamsa Dickson from the University of Bamenda (UBa), GeoAg has gained momentum globally, particularly in Africa, with partnerships formed with institutions like RADA (Reconciliation and Development Association). Collaboration with academic institutions across Africa and the United States has facilitated knowledge sharing and research advancement in GeoAg.
- Despite initial challenges, the project saw success in 2020, with the implementation of distance learning programs and practical training sessions. The Ministry of Agriculture in Cameroon has embraced GeoAg, leading to its successful implementation, with RADA urging collective effort for nationwide adoption. RADA, as a non-governmental organization, advocates for sustainable development through community problem-solving and employment creation, underpinning the transformative potential of Geo-Agriculture in Cameroon and beyond.



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

The climate change benefits of geo-agriculture



Source: Queen's Commonwealth Trust, 2021

- No Soil Use
- No fertilizer Use
- Less watering requirements
- Auto-composting
- Improving organic ecosystem
- Attractive
- Durable life long use
- Capable of growing many plants type
- Cost efficient
- Sustainable
- High nutritional values
- Scalable



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

How geo-agriculture assists with SDGs and climate change benefits of geo-agriculture

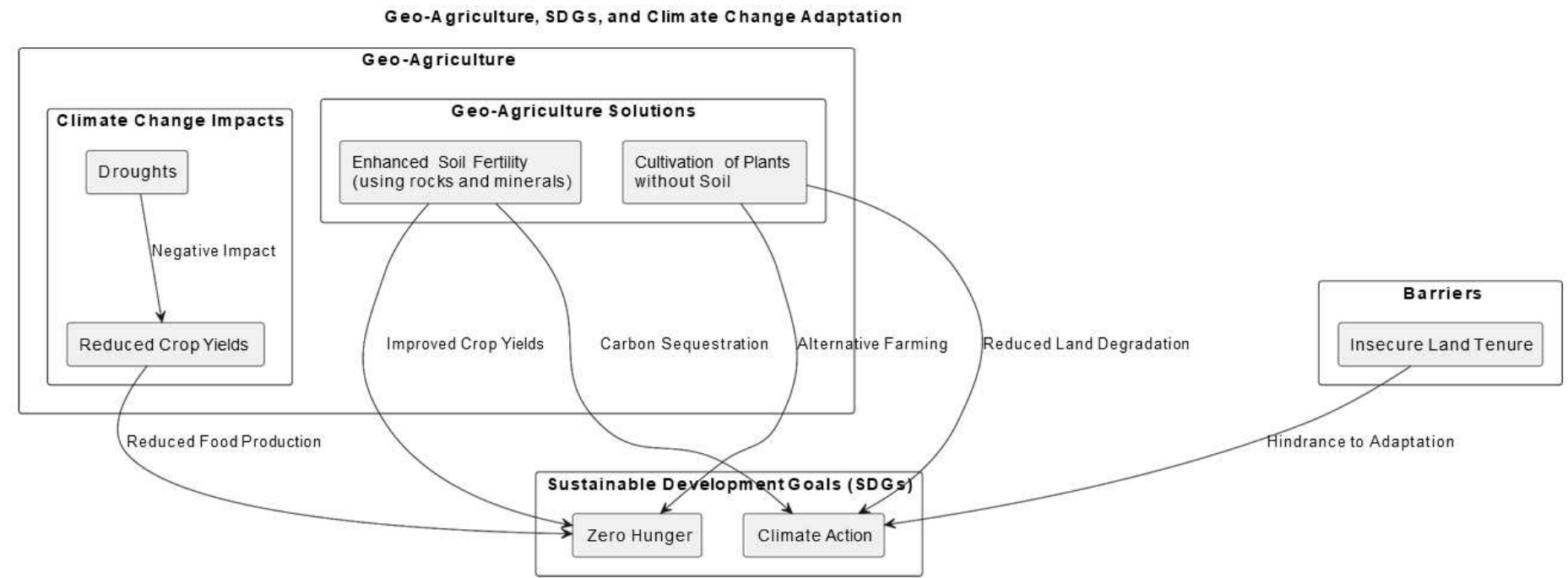




FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Conclusion and recommendations

Climate change constitutes negative impacts in Namibia and Africa at large.

Among the effects experienced is droughts and long-term soil degradation which affect imperative sectors such as agriculture. As a result, countries like Namibia experience gradual reduce in crop production.

The geosphere abundantly consists of minerals that are essential for agricultural production.

Land tenure, as previously demonstrated, has proven to cause the unwillingness of farmers to adopt long-term adaptation strategies. Secondly, farmers may lack or may be unwilling to educate on understanding of geo-agriculture and how it influences agricultural productivity.

Hence, it is important for collaborative approaches such as government bodies, NGOs and local communities to streamline education of geo-agriculture.

ORGANISED BY



PLATINUM SPONSORS





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

Thank you



ORGANISED BY



PLATINUM SPONSORS

