CALL FOR BOOK CHAPTERS

BOOK TITLE:

Climate Change, Pollution and National Insecurity: Triple Tragedy against Food Insecurity, Biotechnology and Environmental Resources Management in Nigeria"

SUBMISSION CRITERIA:

- File format: MS Word only, 12-point, 1.5 line spacing. Chapters should not exceed 25 pages.
- All submissions should be original work, and not sent to any publisher

SUB- THEMES:

1. Insecurity: Impacts on Agro-Allied Industries, and Food production,
2. Climate Change and Adaptation of Management Practices in Crop and Animal Production
3. Climate Change Impacts on Biotechnology and Optimal Production
4. Environmental Resources Policy: Forestry and Climate Change Challenges, Pollution, Floods, and Water Management,
5. Environmental Conservation: Sustainability, Food Security, Resource Management and Food Production
6. Biodiversity and Climate Change: Impact of Climate Change on Fishery and Aquaculture
7. Market Driven Economy and Environmental Resource Exploitation
8. Biotechnology, Food Security and Climate Change
9. Soil Conservation Management :Climate Change and Food Sufficiency
10. Polities, Policy and Environmental Resource Management
11. Extension Services Drives, Climate Change and Food Security
12. Information Management: Impact of climate change Climate Change on food security, Environmental resources and sustainability
13. Food Security, Biodiversity, Biotechnology and Policy Framework.

IMPORTANT DATES

Submission – 30th November, 2023 to 20th February 2024 Acceptance and notification – 29th February 2024
The final date for submission of the corrected version is 5th March 2024
Publication March 2024
Scholars are at liberty to propose and write on other topical issues not captured by the themes presented above, but in line with the subject matter.

EDITORS:

1. Professor Abdulluahi Mustapha, FSAEREM
Director General of NABDA;
2. Professor P. C. Mmom, FSAEREM
Hon. Commissioner of Education, Rivers State
3. Prof. (Amb). Ahmad M. makarfi, FSAEREM
Nigerian Ambassador to Brazil
4. Professor Ignatius Onimawo FSAEREM
Fmr. Vice-Chancellor, Ambrose Alli University, Edo State/ National Vice President of SAEREM
5. Professor Ani Nkang, FSAEREM
Fmr. Vice-Chancellor, Arthur Jarvis University, Akpabuyo, Cross River State.

CORRESPONDING EDITOR :
Eteyen E. Nyong , Ph.D,
Secretary General of SAEREM,
All chapters should be submitted to:
saerem10@gmail.com or eenyong16@gmail.com ;Telephone: +2348053614197

SOCIETY FOR AGRICULTURE, ENVIRONMENTAL RESOURCES AND MANAGEMENT (SAEREM)

BOOK OF CONFERENCEPROCEEDINGS

6th INTERNATIONAL ANNUAL CONFERENCE (SAEREM/ UNICROSS2023)

THEME:

CLIMATE CHANGE, POLLUTION, FLOODS, WATER MANAGEMENT, FOOD SECURITY, BIODIVERSITY AND POLICY FRAMEWORK

DATE: 13th - 17th November, 2023
VENUE: University of Cross River State, Calabar, Nigeria.

Note:

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

SAEREM/UNICROSS2023 CENTRAL ORGANIZING COMMITTEE (COC)

1. **Prof. I. A. Onimawo - - Chairman-In-Council**
2. **Prof. Stephen Ibitoye**
3. **Prof. O. A. Owolabi**
4. **Prof. M. A. Sule**
5. **Prof. O. E. Umunna**
6. **Dr. I. O. Ogbonna**
7. **Dr. A. U. Bello**
8. **Dr. Peter. Oko**
9. **Dr. C. M. Tasie**
10. **Dr. E. E. Nyong - - - Secretary General**

LOCAL ORGANISING COMMITTEE (LOC)

Prof. Sam Udo - - - - Chairman
Dr. Monday Oniah - - - Secretary
Dr. Eyong Oduba Organising - Secretary

CALL FOR BOOK CHAPTER

SUBMISSIONCRITERIA

File format: MS Word only, 12-point, 1.5 line spacing. Chapters should not exceed 25 pages. All submissions should be original work, and not sent to any publisher.

BOOK TITLE: Climate Change, Pollution and National Insecurity: Triple Tragedy against Food Insecurity, Biotechnology and Environmental Resources Management in Nigeria,

SUB- THEMES:

1 Insecurity: Impacts on Agro-Allied Industries, and Food production,
2. Climate Change and Adaptation Management Practices in Crop and Animal Production
3. Climate Change Impacts on Biotechnology and Optimal Production

2. Environmental Resources Policy: Forestry and Climate Change Challenges
3. Environmental Conservation: Sustainability, Food Security, Resource Management and Food Production
4. Biodiversity and Climate Change: Impact of Climate Change on Fishery and Aquaculture
5. Market Driven Economy and Environmental Resource Exploitation
6. Biotechnology, Food Security and Climate Change
7. Soil Conservation Management :Climate Change and Food Sufficiency
8. Polities, Policy and Environmental Resource Management
9. Extension Services Drives, Climate Change and Food Security
10. Climate Change, Pollution, Floods, and Water Management,
11. Food Security, Biodiversity, Biotechnology and Policy Framework.

IMPORTANT DATES

Submission – 30th November, 2023 to 20th February 2024 Acceptance and notification – 29th February 2024
The final date for submission of the corrected version is 5th March 2024 Publication March 2024
Scholars are at liberty to propose and write on other topical issues not captured by the themes presented above, but in line with the subject matter.

EDITORS

1. Professor Abdulluahi Mustapha, FSAEREM
   Director General of NABDA;
2. Professor P. C. Mmom, FSAEREM
   Hon. Commissioner of Education, Rivers State
3. Prof. (Amb). Ahmad Muhammad makarfi, FSAEREM
   Nigerian Ambassador to Brazil
4. Professor Ignatius Onimawo FSAEREM
   Fmr. Vice-Chancellor, Ambrose Alli University, Edo Stat/
   National Vice President of SAEREM
5. Professor Ani Nkang, FSAEREM
   Fmr. Vice-Chancellor, Arthur Jarvis University, Akpabuyo, Cross River State.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Note:

Note:

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

CORRESPONDING EDITOR
Eteyen E. Nyong , Ph.D, FSAEREM
Secretary General of SAEREM,
All chapters should be submitted to: saerem10@gmail.com or eenyong16@gmail.com
Telephone: +2348053614197

CHAIRMAN'S OPENING SPEECH AT THE 6TH INTERNATIONAL SAEREM CONFERENCE HOLDING IN CROSS RIVER STATE UNIVERSITY CALABAR (13th-17th November 2023)

BY PROFESSOR IGNATIUS AKHAKHIA ONIMAWO *PhD, FNSN, FSAEREM, FPAM, FNSBMB, KSJI*
National Vice President of Saerem
Vice-Chancellor, Ave Maria University, Piyanko Abuja

I welcome all the participants to the 6th International conference of the Society for Agriculture, Environmental Resources and Management (SAEREM). This year's conference is rightly focusing attention on climate change, pollution, floods, water management, alongside food security and biodiversity.

Food security is threatened by climate change with all the attendants' sub-sections of floods, pollution and biodiversity. The classical definition of Food security is paraphrased thus:

"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996)".

This definition gives rise to four dimensions of food security: availability of food, accessibility (economically and physically), utilization (the way it is used and assimilated by the human body-nutrition) and stability of these three dimensions.

Climate change threatens to reverse the progress made so far globally in the fight against hunger and malnutrition. As highlighted by the latest assessment report of the Intergovernmental Panel on Climate change (IPCC), climate change augments and intensifies risks to food security for the most vulnerable countries and populations. Four out of the eight key risks induced by climate change identified by IPCC have direct consequences for food security:

- Loss of rural livelihoods and income
- Loss of marine and coastal ecosystems, and livelihoods

- Loss of terrestrial and inland water ecosystems, and livelihoods
- Food insecurity and breakdown of food systems

The earliest and the more impacted are the most vulnerable countries and populations, including in arid and semi-arid areas, landlocked countries and small island developing states.

Climate change is projected to also have broader impacts through effects on trade flows, food markets and price stability and could introduce new risks for human health. Concerted efforts to respond to climate change are needed immediately to safeguard the capacity of food systems to ensure global good security.

Agriculture is understood here in its broad sense, covering crops and livestock production as well as forestry, fisheries and aquaculture. Climate change generates considerable uncertainty about future water availability in many regions. It is already affecting precipitation, runoff and snow/ice melt, with effects on hydrological systems, water quality and water temperature, as well as on groundwater recharge.

In many regions of the world, increased water scarcity under climate change is presenting major challenges for climate adaptation. Sea-level rise trigger floods that are not only detrimental to residents around the area but also wash away farmlands and crops. Floods also in many cases bring about pollution with attendant health consequences.

According to FAO, at national level exposure to climate risks can trigger shocks on agricultural production and food availability, with risks of market disruptions, effects on supply and storage systems, as well as increases in agricultural commodity prices (food and feed), impacting accessibility and stability of food supplies for the entire population, particularly in countries with significant shares of the population spending a large part of their income on food.

This triggers macro-economic effects for countries for which agriculture is an important part of GDP and/or constitutes an important source of employment. Climatic risks can also hinder agricultural development by discouraging investments.

At global level, the vagaries of weather occasioned by climate change, impacting areas of global importance for food supplies can have remote impacts through effects on: (i) supply flows and food price spikes, with increased market volatility; and (ii) impacts on bilateral contracts and/or import/export behaviour.

At this conference several other perspectives of the theme will be discussed by the distinguished speakers at this year conference. It is also expected that various mitigation methods will be explored.

It is also expected that at the end of the conference policy framework will be fashioned out to Nigeria proceed in the right direction. It must be noted that the best form of security is food security. Any nation that successfully tackles food security will achieve other forms of security.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Note:

Determinants of Fish Catch Among Fishing Villages along Shiroro Dam Niger State, Nigeria

Alhassan, Y.J[1] Sanchi, I.D [2*], Manga, T. A[3] and Sabo, A. Y[4]

1. Department of Agricultural Economics and Extension, Federal University Wukari, Taraba State, Nigeria. yohannaj@fuwukari.edu.ng 08137206435

2, 3 and 4 Department of Agricultural Economics and Extension, Federal University of Agriculture Zuru, Kebbi State, Nigeria.

ABSTRACT

The paper assessed the determinants of fish catch among fishing villages along shiroro dam Niger state, Nigeria. Questionnaire schedule was used to collect data from 460 respondents. Multi-stage and proportionate sampling techniques were used in selecting the respondents. Descriptive statistical tools (frequency distribution count, percentages and mean) and inferential statistics (linear regression) were used for data analysis. The results of the study showed that majority of the respondents (51.3%) were within the age bracket of 29-41years, indicating that respondents were middle aged young fishers who fall within the active fishing age. As regards marital status, 87.0% of the respondents were married with an average household size of 13 persons. Linear regression estimates of the determinants of fish catch shows that four of the eight factors in the model (Household size X^1, Access to extension X^2, Fishing experience X^3, and membership of association X^4) were found to be significant in determining the quantity of fish caught at both 1%and 5% levels of significance. In conclusion, the research showed that, artisanal fishing activity is important in the lives of the fishers along the two dams and thus need to be sustained. The study therefore, recommended that financial institutions should grant credit facilities to practicing fishers and collaterals for accessing such credit should be made easy. Government should provide improved fishing and processing inputs to fishers at subsidized rate. Fisher extension agents should enlighten fishers on new fishing techniques.

***Key Words**: Determinants, Fish Catch, Fishing Villages, Shiroro Dam, Niger State*

KEYNOTE SPEAKER
CLIMATE CHANGE, FLOODS, FOOD SECURITY, POLICY FRAMEWORK AND BIODIVERSITY

PROF. ANI NKANG, *FSAEREM,*
Fmr. Vice-Chancellor, Arthur Jarvis University, Akpabuyo, Cross River State.

The survival of humanity depends on healthy ecosystems, i.e., the community of living organisms (plants, animals, people) interacting with the non-living components of their environment. Unfortunately, humanity is busy exploiting and to some extent destroying the ecosystems. Ecosystem loss deprives the world of carbon sinks, like forests and wetlands when we can least afford to lose them. Ecosystems provide numerous services vital for the well-being of the natural world and human society. For instance, forests act as sinks, absorbing and storing large amounts of the carbon that contribute to climate change. Forests also play a crucial role in acting as natural barriers against storms. Disruptions of the delicate balance of an ecosystem can lead to loss of biodiversity and degradation of ecosystem services. The Nigerian environment today is experiencing a variety of environmental woes, including-

- Erosion (Sheet, gully, coastal, marine)
- Flooding (River flooding, urban flooding)
- Oil and Industrial pollution and wastes
- Deforestation
- Loss of Biodiversity

LOSS OF BIODIVERSITY

These environmental problems are associated with the loss of biodiversity, the variability of the living organisms in an ecosystem. Biodiversity and its maintenance are very important for sustaining life on Earth. Nigeria has striking biodiversity and is home to over 7,895 plant species. The biodiversity of Nigeria's Niger Delta is of regional and global importance as it is a center of endemism and habitat for a great variety of coastal and estuarine flora and fauna (World Bank 1995). The Cross River State, which holds about 31% of Nigeria's remaining forests and forest reserves, occurs within the Guinea Forest Hotspot, the eighth most important biodiversity hotspot in the world.

Biodiversity holds enormous potential for transforming Nigeria's agricultural and industrial systems to contribute to economic change and poverty reduction. Biodiversity is indispensable to food security, sustainable development and the supply of vital ecosystem services. It is a key resource in efforts to increase food production and helps to make production systems and livelihoods more resilient to shocks and stresses, including those associated with climate change. Biodiversity contributes in

numerous ways to the livelihoods of many households, particularly those with limited access to external production inputs or living in marginal areas with harsh production environments. Biodiversity is an essential component of all ecosystems. It plays a role in food webs, trophic dynamics, ecosystem diversity, and biological productivity. Biodiversity, Biotechnology, and Indigenous Knowledge are emphasized in Cluster 1 of NEPAD's plan of action as follows:

- Conservation and sustainable use of biodiversity. Biodiversity holds enormous potential for transforming our agricultural and industrial systems.
- Biodiversity is grossly underutilized but being lost at an alarming rate.
- Conservation and sustainable use of biodiversity are knowledge-intensive
- Programme activities include improving the quality of gene banks, adding value to biodiversity and generating natural products through bio-prospecting (-the search for wild species, genes, and their products).

The loss of biodiversity can, therefore, have profound impacts on the functioning of natural and managed ecosystems and the ability of ecosystems to deliver ecological services to human societies. Biodiversity acts as biological insurance against potential disruptions caused by environmental changes.

The main threats to biodiversity can be classified as:

- Direct drivers that explicitly influence ecosystem processes. include land use change, climate change, invasive species, overexploitation, and pollution.
- Indirect drivers, such as changes in human population, incomes, or lifestyle. These operate more diffusely, by altering one or more direct drivers.

Loss of biodiversity is driven by economic and social drivers (population growth and urbanization), environmental drivers (climate change, natural disasters, pests, invasive species), changes in land and water use management, pollution, external inputs (fertilizers, pesticides), overexploitation and overharvesting policies (FAO 2014, 2019).

Climate Change

Climate change is defined in Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC) as 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes (IPCC 2014).

It is now generally believed globally that climate change is a grave and mounting threat to a healthy planet on which human well-being depends. In simple terms, **'Climate change'** describes the ongoing increase in global average temperature and its effects on Earth, otherwise referred to as global

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Farm Resources Affecting Yam Production In Obudu Local Government Area Of Cross River State, Nigeria.

Oniah. M.O., Edem T. O., Osim, O. O. And Ovat K. E.

Department of Agricultural Economics and Extension, Faculty of Agriculture and Forestry, Cross River University of Technology PMB 102 Obubra, Cross River State, Nigeria

Email: oniahmon@yahoo.com

ABSTRACT

The study examined farm resources in yam production in Obudu Local Government Area of Cross River State, Nigeria in the 2021 cropping season. Both primary and secondary sources were obtained for the study. A purposive random sampling technique was used to collect data through questionnaire and interview from 120 respondents. Simple averages, percentages and multiple regression analysis were used to examine the data collected. It was revealed that 80.5% of the respondents were males while 17.5% were females, 89% had farming experience of between 6-15 years and 69.5% fund their farm operations from personal savings. The multiple regression analysis revealed that resources of farm size, farm capital, yam seedlings, fertilizer application and farm credit significantly affect yam production in the study area. The coefficient of determination R^2 was 0.822 indicating that about 82% of the variables of farm resources investigated affect yam production in the area. The farmers had a total gross farm margin of N23, 400,000, a net farm income of N20, 600,000, a gross margin per hectare of N250.000 and a benefit cost ratio of 3.19. The constraints facing yam production in the study area were identified to include, land fragmentation, high cost of fertilizer, high cost of yam seedlings, lack of improved yam seedlings and lack of credit facilities. Land reforms is suggested as to allow yam farmers good access to farm land while fertilizers should be made available to farmers at the right time, quantity and at cheaper rate to boost yam production.

Key Words: Farm resources, yam production and constraints

Socioeconomic Analysis of Cereal Crop Farmers Uptake Of Improved Storage Systems for Enhance Livelihood in Niger State, Nigeria

Tsado, J. H[1]., Ajayi, O. J[1]., Mohammed, Y[1]., Jibrin, S[1]., Mamman, E[2]. And Balgees S[1].

[1] Department of Agricultural Extension and Rural Development,

[2] Department of Crop production

Federal University of Technology, Minn a, Nigeria

* Email: haruna.tsado@futminna.edu.ng

ABSTRACT

This study analyzed the uptake of improved storage systems of cereal crop farmers for enhanced livelihood in Niger State, Nigeria. A total number of 135 respondents were used for the study . The results of the study revealed that the respondents were still in their active and productive age, with mean age of 39 years and large proportion (75.6%) were married with a mean household size of 5 persons. Also, majority (78.5%) had one form of formal education or the other, with a mean farming experience of 21 years. The most adopted improved storage systems were warehouse storage systems (2.88), treated sacks (= 2.88) and treated leathers (2.87). The result of the poisson regression model revealed that age (-1.41), education (3.53), farm size (1.92) access to credit (2.46), access to storage facilities (1.41) and extension cont act (4.44) significantly and positively influence the uptake of improved storage systems of cereal crop farmers in exception of age which is negative and had inverse relation with uptake of storage systems. Uptake of improved cereal crops storage systems had positive effects on the cereal crop farmers livelihood because it has led to increase in their income (RII-0.81), food availability (RII -0.80) and ensure food security (RII -0.78). Constraints encountered were high cost of storage facilities (=2.41) and serious problem of insects and pests (=2.12). The study recommended that improved storage systems of cereal crops should be jointly provided through intervention by the government, NGOs and through community efforts.

Keywords: Cereal crop farmers, uptake, improved storage systems, livelihood

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

warming. Global warming is primarily caused by the use of fossil fuels, deforestation, and unsustainable agricultural and industrial practices which cause increased greenhouse gases that trap heat in Earth's lower atmosphere. A report from the Intergovernmental Panel on Climate Change **(IPCC 2014)** made the following conclusions:

- It is indisputable that human activities are causing climate change and human influence is making extreme impacts, including heat waves, heavy rainfall, and droughts, more frequent and severe. Climate impacts and risks are becoming increasingly complex and more difficult to manage. Multiple climate hazards will coincide. Climate risks will interact with other threats to compound the overall risk. Risks will cascade across sectors and regions.
- Human activities have warmed the planet at a rate not seen in the past 2000 years and a global warming of 1.5°C within the next two decades is expected. This level of warming is a threat to human well-being and the health of the planet.
- We are not on track to achieve a climate-resilient, sustainable world. Action on adaptation has increased but progress is uneven and we are not adapting fast enough.
- Climate change is already affecting every region on Earth, in multiple ways. The changes we experience will increase with further warming.
- Humanity is running out of time to limit global warming to 1.5°C over pre-industrial levels.

The world's hottest year in recorded history is 2023, with temperatures that exceed 1.5°C above pre-industrial levels for first time. July and August 2023 saw global temperatures reaching the Paris Agreement target of 1.5°C above pre-industrial levels. If current trends continue, the temperature rise might be up to 2.8°C above pre-industrial levels by the end of the century (ABC News 2023).

Climate change is evident **in Nigeria** and is reflected in drought, rising sea levels, erosion, rising temperatures, more frequent floods and extreme weather conditions. At least 6000 km^2 of land has been lost to expanding gullies, causing destruction to infrastructure in both rural and urban areas of the country. The gullies have removed significant areas of land from high value cultivation/production, thus diminishing agricultural land and food security. Sediment run-off from eroded gullies and associated deposition of sand has significantly contributed to water quality decline, siltation of the water bodies and loss of the natural riparian vegetation. The undisturbed riparian zone has the capacity to filter, metabolize and bioaccumulate nutrients and pollutants.

Southeastern Nigeria is a hotspot for massive gully erosion. The rapidly expanding gullies have contributed to the erosion of above-ground and below-ground floral and faunal biodiversity in the country and other impacts including loss of human life and loss of both built and natural assets (e.g., roads, drainage, housing, farmlands, community assets, silted waterways, and port). The disruption of ecosystems and loss of components of biodiversity can be devastating, not only materially, but also

psychologically and spiritually. Root causes for the gullies differ from site-to-site but are largely human-induced. These include improper road design and construction particularly for adequate cross-drainage (Plates 1-3); fragmented and inadequate scale of response; poor or incomplete rehabilitation works; inadequate land use planning; and destructive and unsustainable land-use practices. Climate change amplifies the situation with droughts, extreme precipitation intensity, and floods (ABC News, 2023).

Fig. 1.4: Satellite imagery showing locations (yellow dots) of some priority erosion sites in Calabar. Calabar lies between the valleys of two rivers: the Great Qua River (East) and the Calabar River (West).

PERFORMANCE OF BROILER FED DIETS CONTAINING SWEET POTATO AS A SUBSTITUTE TO MAIZE

I. S. Harande[1] , Ewuola K.M[2]., and Dabai S.A[1]

[1]Department of Animal Science, Federal University of Agriculture Zuru, P. M. B. 28 Zuru, Kebbi State Nigeria.

[2]Department of Animal Science, University of Abuja, Abuja, Nigeria.

ABSTRACT

This study was conducted in the Poultry Research Unit, Federal University of Agriculture Zuru, Kebbi State, Nigeria. To determine the performance of broilers fed diets contain graded level of cassava (Manihot esculenta) flour meal(CMF) at 0% (T1), 20% (T2) and 30% (T3) were compounded respectively. In eight weeks experiment, one hundred and fifty (150) Ross 308 day old chicks were used in the experiment in a complete Randomised Design. The birds were grouped in to three (3) dietary treatments and replicated five times, each treatment had 50 chicks and each replicated contain 10 chicks. From the parameters measured; feed intake, body weight gain, feed conversion ratio and mortality rate. The results of final body weight, body weight gain and mortality were not significantly different ($P>0.05$) for all the treatments. While feed intake and feed conversion ratio showed that there was significant difference ($P<0.05$). Based on the results obtained in this study, it could be concluded that feeding broilers with sweet potato meal at 30% level of inclusion can substitute maize in the diet of broilers without adverse effects on their growth performance.

Growth and economic performance of finisher broilers served pineapple (Ananas comosus L.) peel extract as a supplementary sources of vitamin and mineral

[1]Dabai, S.A., [2]Bello, S. [2]Umar, Y., [1]I.S. Harande and [3]I.S Bamalli[11]

Department of Animal Science, Federal University of Agriculture Zuru Kebbi State, PMB 28, Zuru – Nigeria.[2]Department of Animal Science, Faculty of Agriculture, Kebbi State University of Science and Technology, PMB 1144, Aliero, Nigeria.[3]Department of Agricultural Education, Federal College of Education Federal College of Education, P.M.B 1041, Zaria – Nigeria

Corresponding author: saidualiyudabai2014@gmail.com;

ABSTRACT

The study was conducted to investigate the effect of vitamins-minerals premix and pineapple peel extract (PPE) supplementation on the growth and economic performance of broiler finisher birds in drinking water. A total of one hundred and forty-four (144) 28-day old finisher broilers were randomly assigned into four treatments namely: T1 drinking (water only), T2 (5g vitamins-minerals premix), T3 (40 PPE) and T4 (80 ml PPE). Each treatment was replicated thrice with twelve (12) birds in each replicate in a completely randomized design (CRD). Parameters measured were body weight, body weight gain, feed intake, feed conversion ratio (FCR) and mortality. The study also evaluated cost of feed per kilogram, cost of feed consumed, cost of feed per Kg weight gain and cost of total revenue were also evaluated. Results of the growth performance parameters showed no significant (P>0.05) difference across the treatments for all the parameters evaluated except for body weight gain. Significantly (P<0.05) higher weight gain of 796.51 g/bird was recorded for birds in T4, followed by T3 (689.32 g/bird), T2 (589.48 g/bird) and T1 (483.02 g/bird). On the other hand, the results of economic parameters showed that the cost of feed per kilogram, cost of feed consumed and cost of feed per Kg weight decreased with the inclusion of PPE in the water. In conclusion, administering PPE in drinking water of finisher broilers has great nutritional and economic effectiveness hence; supplementation up to 40ml maximizes growth and increased profitability of broiler enterprises.

Key words: Performance, extract, pineapple, broiler

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Plate 1: Satellite Imagery of the Gully Erosion Sites in Ikot Nkebre NEWMAP Project Area. Run off from gully fingers discharge into the Ikot Nkebre stream (Calabar Municipality).

Plates 2a (above) and b (below): Section of gully sites at Ikot Nkebre showing failed roads and failed surface drains respectively.

Plate 3. Discharge point of gully fingers at Ikot Nkebre stream channel showing extensive sand deposition and sand mining activities.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Perceived effect of Climate Change on Cassava Farmers in South-South Nigeria

Nyong, E. E[1], Zuru, I. I.[2] and Ngozi Vera Ben-Osaro[3]

[1]Department of Agricultural Economics and Extension, Akwa Ibom State University.

[2]Department of Agricultural Economics and Extension, Federal University of Agriculture Zuru, Kebbi State, Nigeria.

[3]Department of Adult Education and Community Development, Rivers State University Port Harcourt.

ABSTRACT

The study assessed the perceived effect of climate change on cassava crop farmers in Uyo Local Government Area, Akwa Ibom State, Nigeria. A multi-stage sampling procedure was used to obtain the necessary data. Descriptive statistics of mean, frequency, tables and percentages as well as the use of Likert Scale were the analytical technique used for the study. The result should that 72.5% of the respondents were in their youthful ages. The result shows that majority of the cassava farmers were female with an outcome of 57.5%. A household size of 1-3 persons was predominant with an outcome of 60%. The result shows that farming experience of cassava farmers between 0-2 years had the highest outcome of 53.3%. in an attempt to evaluate the awareness of climate change information in the study that, they were aware of climate change information in the study area shows that a meanscore of 2.0 had a perceived knowledge of climate change information. Some of the perceived climate change information in the study area are; Late rainfall (2.40), Inadequate rainfall (2.01), increased flooding (2.26), incidence of weed (2.02), decline in soil fertility (2.20). Many constraints limiting the perception and awareness of climate change information with a meanscore of 2.0 and above are; Lack of access to weather forecast technology (2.08), poor transportation (2.03), Inadequate supply of farm input (2.29). The recommendation from the study will be a pool for further research in the area of climate change information in the study area.

Carcass and organs weight characteristics of broiler birds fed diets containing varying inclusion levels of dried watermelon peel meal

[1]Dabai, S.A. [2]Bello, S., [2]Ribah, M.I., and [2]Senchi, M.H., [1]I.S. Harande and [3]I.S Bamalli

[1]Department of Animal Science, Faculty of Agriculture, Federal University of Agriculture Zuru, PMB, Zuru, Nigeria

[2]Department of Animal Science, Faculty of Agriculture, Kebbi State University of Science and Technology, PMB 1144, Aliero, Nigeria.

[3]Department of Agricultural Education, Federal College of Education Federal College of Education, P.M.B 1041, Zaria – Nigeria

Corresponding author: saidualiyudabai2014@gmail.com;

ABSTRACT

The demands for broiler meat is increasing due to population whereas production cost of such meat has remained high due to high cost of convectional feed. Carcass and organ weight characteristics of ninety-six (96) 2-weeks old broiler birds fed dried watermelon peel meal was investigated. Watermelon peel meal was included at 0, 1.25, 2.5 and 3.75% dietary inclusion levels as replacement for wheat offal to form (Diet 1, Diet 2, Diet 3 and Diet 4 respectively). The birds were randomly allocated to four treatment groups replicated thrice to have 8 birds per replicate, and were fed the experimental diets ad libitum for 4 weeks under a deep litter management system. At day 28, one bird replicate was slaughtered for the evaluation of carcass and organs weight characteristics. There were no significant (P>0.05) differences in live weight, carcass weight, dressing %, thigh, shank, wing and neck. Significantly (P<0.05) higher breast muscle of 109.67g/bird was recorded on birds fed 3.75% DWMP compared to other groups. For the organs weight, no significant effect on liver, heart, lung, intestine, pancreas and gizzard (P>0.05). Based on the carcass and organs weight characteristics of birds, dried watermelon meal can be included up to 3.75% in the diet of birds at the starter phase without any harmful effect on their carcass and organs.

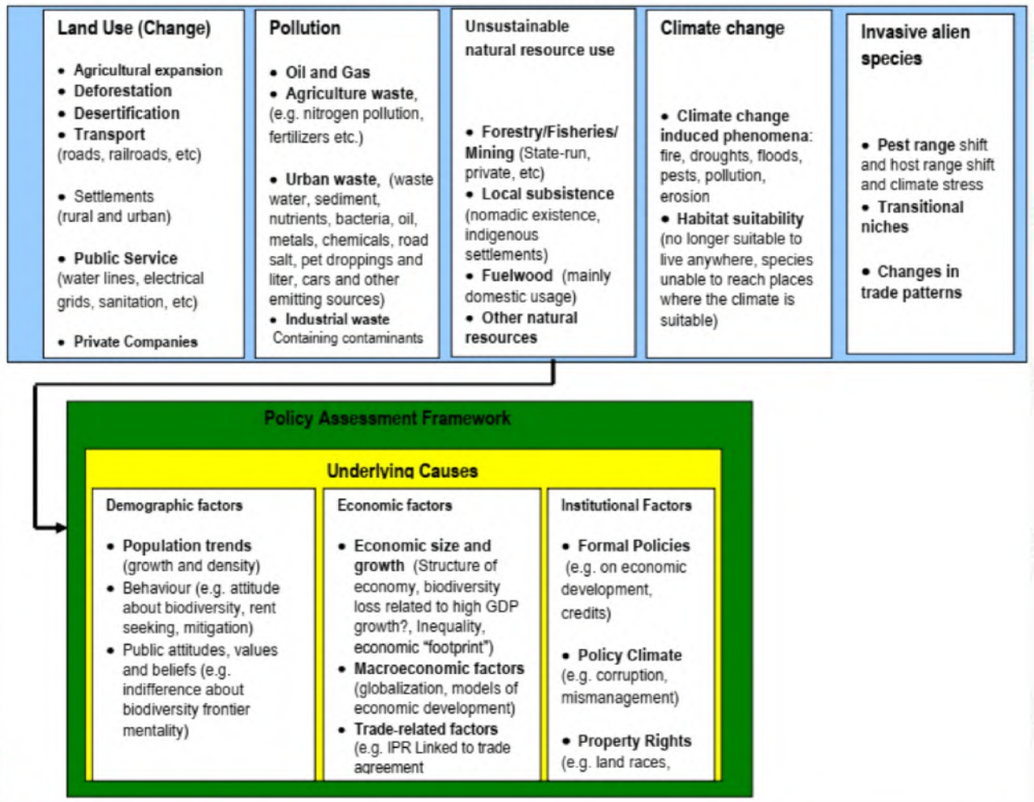
Keywords: Carcass, Characteristics, Broilers, Watermelon

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Food Security:

Food systems encompass food availability (production, distribution and exchange), food access (affordability, allocation and preference) and food utilization (nutritional and societal values and safety). Any stress to the food system diminishes food security. Stresses may be induced by various factors including urbanization and globalization, climate change and/or other agents of environmental change (e.g., conflict, pandemics), with increased severity when acting in combination. Climate change may act food systems through direct effects on crop production (e.g., changes in rainfall leading to drought or flooding, or warmer or cooler temperatures leading to changes in the length of growing season), or indirectly on markets, food prices and supply chain infrastructure. There are multiple socio-economic and bio-physical factors that affect food systems and hence food security. Consequently, the capacity to adapt food systems to reduce their vulnerability to climate change is varied. Improved systems of food production, food distribution and economic access may all contribute to food systems adapted to cope with climate change, but it is important to ensure that such changes contribute to sustainability (Gregory et al., 2005).

KEY DRIVERS OF BIODIVERSITY LOSS



- Land use change and conversion of habitat to other land uses, pollution, unsustainable natural resources use, and possibly climate change. These are the major direct causes of biodiversity loss.
- Economic systems and policies that fail to value the environment and its resources. That is, failures in governance, appropriate decision making and institutional functioning, as well as economic and market forces. Lack of adequate knowledge and understanding of the processes in ecosystems, which conserve biodiversity, and provide ecosystem services is pervasive among decision-makers. Poor governance means that much biodiversity is lost due to illegal activity.
- Legal and institutional systems that promote unsustainable exploitation.
- Underlying causes such as market failure, externalities and inadequate property rights can result in biodiversity loss.

Mitigation and adaptation policy

The IPCC (2014) describes climate mitigation as the transition from the fossil fuel economy, where burning fossil fuels to produce energy and emissions to make things to an economy that produces zero emissions; that is to remove carbon emissions from every part of the economy in order to prevent further global heating. The elimination or reduction of sources or enhancing sinks of greenhouse gases requires human intervention, in addition to reducing the sources of other substances which may contribute directly or indirectly to limiting climate change. This includes the reduction of particulate matter (PM) emissions that can directly alter the radiation balance or measures that control emissions of carbon monoxide, nitrogen oxides (NOx), Volatile Organic Compounds (VOCs) and other pollutants that can alter the concentration of tropospheric ozone (O_3) which has an indirect effect on the climate.

Reducing emissions: Nigeria Energy Transition Plan

Changing energy production and consumption systems to rapidly reduce emissions will be extremely challenging. There is a need to move issues of climate from a marginal position to being a central theme in policy decisions and to acquire relevant technical, economic, and legal advice on how best to reduce energy consumption and emissions, expand renewables, and ensure reliable power supply, calculating costs and how to spread them across producers and consumers. Equity and inclusion will pose major challenges – from phasing out fossil fuel subsidies to enabling the poor to maintain and expand their access to power and affordable transport. Compensation (subsidies) will be necessary, but should not be concentrated on a small but vocal group of those involved in coal mining or oil production, or the larger scale and wealthier consumers, but fairly and inclusively benefit those most vulnerable to higher prices or reduced availability of power during the transition.

Nigeria is a signatory to the Paris Agreement to reduce emissions and is committed to eliminating gas flaring by 2030. In the new National Forest Policy, efforts will be made to stimulate the adoption of climate-smart agriculture and the planting of trees. Climate-smart agricultural innovations will focus on water conservation, including the widespread implementation of solar-powered drip irrigation systems and rainwater harvesting techniques.The revised 2020 National Forest Policy, which replaces the 2006 National Forest Policy, *sets out strategies for addressing emerging environmental issues like climate change*. The increasing vulnerability to extreme climatic change in Nigeria is exacerbated by urbanization, which is pushing more people into capital cities resulting in encroachment on flood plains and coastal areas, heightening the risks of coastal floods. There is need

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Effect of Artisanal Fisheries Activities on Food Security Status of Fishing Communities along Kainji Dam, Nigeria

Alhassan, Y. J[1], Sanchi, I. D[2]. Sabo, A.Y[2]. and Manga, T. A[2]

1. Department of Agricultural Economics and Extension, Federal University Wukari, Taraba State, Nigeria 2. Department of Agricultural Economics and Extension, Federal University of Agriculture Zuru, Kebbi State, Nigeria

yohannaj@fuwukari.edu.ngNigeria. ishaqsanchi@gmail.com

ABSTRACT

This study determined the effect of artisanal fisheries activities on food security status of the fishing communities along Shiroro dam, Nigeria. Questionnaire schedule was used to collect data from 460 respondents. Multi-stage and proportionate sampling techniques were used in selecting the respondents. Both descriptive (Frequency distribution count, percentages, mean and ranking) and inferential statistics (logit regression) were used for data analysis. The results of the study showed that majority of the respondents (51.3%) were within the age bracket of 29-41years, indicating that respondents were middle aged young fishers who fall within the active fishing age. As regards marital status, 87.0% of the respondents were married with an average household size of 6-13 persons. The findings on artisanal fisheries activities engagement by fishers shows that 79.1% indicated fish catch and marketing as the most highly engaged activity that ranked 1st, closely followed by fish catch, processing and marketing with 63.3% respondents ranking 2nd. Similarly, fish catch, transportation and marketing had 54.8% respondents and was ranked 3rd, with fish catch, packaging and marketing having 48.7% and ranking 4th. The Logit regression estimates of the effect of artisanal fisheries on income of fishers shows that the coefficients with respect to household size X_1 (with a t-value 3.42), access to credit X_2 (with a t-value 2.57), age of the fishers X_3 (with a t-value 4.24), fishing experience X_4, (t-value 2.77), livelihood diversification X_5(t-value 4.12) and income from fishing X_6 (t-value 2.21) were statistically significant at 1% level of significance while access to extension X_7 (t-value 2.17) was significant at 5% level of significance. In conclusion, the study showed that, artisanal fisheries activities is an important livelihood activity in the lives of the fishers along the dam as it enhances food security and improved livelihood conditions. The fishers had low level of educational status as most of them acquired only secondary school education. There was disparity in income of the fishers because their income was not evenly distributed and that many of them were poor. The study therefore recommended that government should give financial assistance to the fishers to enable them to seamlessly undertake their fishing, processing and trading activities to improve their livelihood conditions. Government should provide improved fishing and processing inputs to fishers at subsidized rate.

Key words: Effect, Artisanal Fisheries Activities, Food Security, Fishing Communities Kainji Dam

Connection between Indoor Air Quality and Human Health

Ogboru, R. O[1], Joshua D. K[1], Ofordu C. S[2] and Ibrahim, T. I[1]

[1]Research Coordinating Unit: Forestry Research Institute of Nigeria, Oyo State, Nigeria

[2]Environmental Modelling and Biometrics: Forestry Research Institute of Nigeria, Oyo State, Nigeria:

Corresponding Author's Email: rachov44@gmail.com

ABSTRACT

Indoor Air Quality (IAQ) is of emerging concern nowadays because individuals spend more time indoors than outdoors and are often unconscious of exposure to indoor air pollutants frequently. Indoor air pollutants (IAP) have weighty health impacts, particularly on vulnerable inhabitants such as children, pregnant women, and individuals who form the larger populace. This paper reviews the various sources of indoor air pollution which are classified as combustion sources, household wastes, tobacco smoke, building materials, biological pollutants, radon, and electrical equipment which give rise to pre-existing respiratory or cardiovascular conditions and some cancers due to daily exposure. Studies captured in this review revealed that we have strategies for improving indoor air quality thereby mitigating their impact. These include phytoremediation, increased ventilation, using plant-based cleaning products, and avoiding tobacco smoke among others can help to create healthier indoor environments. Goal 3 of the SDGs Development Agenda of the United Nations identified the need to improve indoor air quality to ensure healthy lives and reduce the number of deaths from hazardous chemicals and air pollution. It is however recommended that potted ornamental plants should be encouraged in the indoor environment at homes and offices to enable us to breathe cleaner air as we spend more time indoors than outdoors.

***Keywords**: Indoor Air Quality (IAQ), Indoor Air Pollution (IAP), Health, Ornamental Plants, and Sustainable Development Goals (SDGs)*

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

to implement policy interventions and allocate increased funding for climate-related projects to protect properties and lives in susceptible areas (including coastal states and flood plains) and build resilience to climate change impacts. Such policies must include the agricultural sector, a major contributor of the greenhouse gas methane (CH_4) and nitrous oxide (N_2O), in order to promote adapted food systems to help mitigate climate change.

During the 2021 UN Climate Change Conference in Glasgow (COP26), Nigeria unveiled her Energy Transition Plan (ETP) to show a commitment towards achieving net zero carbon by the year 2060. All the 170 participating countries ultimately agreed to a provision calling for a phase-down of coal power and a phase-out of "inefficient" fossil fuel subsidies. Coal, oil and gas are the main drivers of global warming. Nigeria's plan included a timeline and framework for achieving reduced emissions in certain sector of the country such as Oil and Gas, Cooking, Transport and Industry and Power.

The Nigerian ETP key sector encompasses:

- **Power**: The ETP aims to increase the share of renewable energy in the power sector to 30% by 2030 and 60% by 2060. This will be achieved through the deployment of solar, wind, and hydro power projects, as well as the development of a national grid.
- **Cooking**: The ETP aims to transition to clean cooking fuels by 2030. This will be achieved through the promotion of solar-powered cooking stoves and the development of a national gas grid.
- **Industry**: The ETP aims to decarbonize the industrial sector by 2060. This will be achieved through the adoption of energy-efficient technologies and the use of renewable energy sources.
- **Transportation**: The ETP aims to electrify the transportation sector by 2060. This will be achieved through the deployment of electric vehicles and the development of a national charging infrastructure.

Gas is expected to play a critical role as a transition fuel in the power and cooking sectors, with significant investment opportunities in the solar, wind, and hydrogen sectors.

CLIMATE CHANGE ADAPTATION

Adaptation is the process of adjustment to actual or expected climate and its effects in order to moderate harm or exploit beneficial opportunities. In the context of climate change, it is the process of adjustment to actual climate and its effects. Human intervention may facilitate this adaptation. Adaptation has different types including anticipatory versus reactive, autonomous versus planned and incremental versus transformational adaptation. Adaptation is often seen as having five general stages: (a) awareness, (b) assessment, (c) planning, (d) implementation and (e) monitoring and evaluation (IPCC 2014). Adaptation in natural systems includes autonomous adjustments through ecological and evolutionary processes. The role of species, biodiversity and ecosystems in such adaptation options can range from the rehabilitation or restoration of ecosystems (e.g., wetlands or mangroves) to hybrid combinations of green (natural systems) and grey (anthropogenic) infrastructure (IPCC 2014).

Adaptation actions for ecosystems and biodiversity include:

- Networks of Protected Areas.
- Assisted migration and evolution might reduce extirpation and extinction.
- Adaptation and mitigation increase space for nature and benefit society.
- Ecosystem-based Adaptation and Nature-based Solutions.

Adaptation options can be facilitated by actions which increase the solution space such as consideration of local knowledge, new regulations and incentives but may also decrease due to climatic and non-climatic stressors and maladaptation.

Strengthening Climate change adaptation

(a) Biodiversity:

Nigeria is losing biodiversity at an alarming rate due to the high deforestation rate (approximately 350,000-400,000 hectares per year). There is a general intensification of forest exploitation against an absence of clear responsibilities concerning forest management or reforestation. Forest conversion has left Nigeria's forests less diverse in terms of the ecosystems, species and within-species genetic resources (low species Diversity index). Many native plants which add value to the rural economy have limited geographic distribution and thus require some protection. The conservation of biodiversity is essential for ensuring ecosystem function at a local, regional and global level. Nigeria, as a signatory to the Convention on Biological Diversity, is expected to invest in research and innovation to generate technologies for conservation and sustainable use of biodiversity (NEPAD 2005). The National Biodiversity Strategy and Action Plan (Federal Ministry of Environment) also identifies bio-prospecting, agro-biodiversity, medicinal plants conservation and plantations of indigenous tree crops as essential for mitigating environmental problems.

The Convention on Biological Diversity defines "*Ex situ conservation*" as "the conservation of components of biological diversity outside their natural habitats." This may involve the maintenance of live organisms at sites such as botanic gardens, field genebanks or storage of seeds. Seed banking provides a cost effective means of conserving genetic diversity for research and conservation. Target 8 of the Global Strategy for Plant Conservation requires that "At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes" (CBD 2011). *Ex situ* conservation of such species, which aren't traded internationally, will protect and improve biodiversity. Establishing *ex-situ* conservation facility for native plant species will serve as a safety net against accidental loss of biodiversity.

Bio-prospecting

Bio-prospecting can add value to biodiversity through generation of natural products. Ethnobotanical research of customary knowledge of local farmers and resource users can provide important information on indigenous plants used medicinally and as food (nutraceuticals like dietary fibre, carotenoids, polyphenols etc. that play roles in health and infant development, ranging from antioxidant ability to immunity enhancement).

(b) Flood and erosion control:

The Nigeria Erosion and Watershed Management Project (NEWMAP), which was initiated in 2012, is a multi-sector project supported by The World Bank and the Global Environment Facility (GEF) to help mitigate severe erosion problems in the country. The GEF support includes windows targeting climate adaptation, land degradation, sustainable forest management and biodiversity.

The project embraced integrated methods centered around active community involvement. Too often, well-intended erosion control and slope stabilization programs do not recognize and incorporate vegetation as a legitimate design tool to address erosion problems. Incorporation of vegetation in should seek to achieve an enhanced 'wild state' with native species as this will more appropriately reflect local ecological conditions and increase the potential to support a high level of biodiversity.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Competencies for Improved Employment growth and Agricultural Development

*HAMISU, Sa'adu and GARBA, Lawal

Department of Agricultural Economics & Extension, Federal University of Agriculture Zuru, P.M.B 28, Zuru, Kebbi State, Nigeria.

*Corresponding author: HAMISU, Sa'adu; shamisu@fuaz.edu.ng

ABSTRACT

The study examines the competency potentials of College of Agriculture Zuru graduates for employment growth and agricultural development. The objectives of this study were to; assess the levels of training programme received on agricultural development, evaluate the effect of training received on employability of the respondents, determine the job satisfaction of the respondents and identify the problems hindering the achievement of agricultural development in the study area. A snow ball sampling method was used for this study with a sample size of two hundred (200) respondents. Data collected were analyzed using percentages, means and Pearson Product Moment Correlation (PPMC). The result revealed that respondents agreed that programme planning and evaluation, extension teaching and communication skills, resource management, research methodology skills, problem solving skill, value addition and professionalism respectively were the perceived training programme received. The result shows that training received by the respondents had impact on their employability, standard of living. .Also, results reveals that the perceived level of job satisfaction are remunerations, access to job allowance, consistent rate of promotion, participation in special programme/projects, access to training/workshop/seminar and conducive office facility respectively. Consequently, the result reveals that lacks of stable government policies, inadequate remunerations, inadequate transportation facilities, lack of hazard allowances, inadequate staffing, and lack of sufficient work facilities, inadequate ICT experience was the problems hindering the achievement of agricultural development are some of the problems hindering the achievement of agricultural development. Furthermore, the study indicates a significant influence of socio-economic characteristics on perceived training received. The study concludes that graduates from college of agriculture Zuru had acquired skills for agricultural development. The study recommends that students of agriculture should be motivated for hazard allowance, promptly promotion and sufficient work facilities for better agricultural development.

KEY WORDS: Competencies, Training, Employment, Agricultural, Graduates, De

Impact of Moisture Content on Maize (Zea *mays* L.) Germination Parameters as Influenced by Sun Drying

[1]Tolulope Matthew AWOPEGBA* and [1]Magret Ifeoluwa FOLORUNSHO
[1]Department of Agricultural Technology, Ekiti State Polytechnic, Isan-Ekiti, Nigeria
* Corresponding Author: +2348066563742; tmawopegba@ekspoly.edu.ng

ABSTRACT

When growing seedlings for commercial purposes, excellent seed quality is crucial. Seed quality influences germination rate because seeds that sprout slower typically produce lower-quality seedlings. In numerous plants, seed moisture content has a significant impact on seed germinating speed. This study investigates the impact of various moisture content (MC) reductions on maize germination parameters and determines the moisture content level essential for maize germination. *A comprehensive laboratory experiment was laid out in a completely randomized design (CRD) consisting of five treatments and three replicates. The treatment levels were maize seeds not sun dried after collection (control), maize seed sun dried for 3 days, maize seed sun dried for 6 days, maize seed sun dried for 9 days, and maize seed sun dried for 12 days. Data were obtained on shoot length, root length, seedling length, germination percentage (GP), germination energy (GE), mean germination time (MGT), and seedling vigour index (SVI). All germination parameters were taken and calculated and the experiment was terminated two weeks after planting (WAP). Results indicated that the control significantly ($p<0.05$) performed better than other treatments for all the germination parameters. It was determined that maize with moisture content of 9.4% and below had low germination ability. This study concludes that the impacts of reduced moisture content on maize's physical properties (quality, texture, shape), chemical composition (fat and starch content), and biological characteristics (seed viability) resulted in the low germination ability of maize seeds.*

Keywords: Germination parameters, maize seed, moisture content reduction, sun drying.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Therefore, natural regeneration of vegetation cover could be a low-cost and effective community-driven approach that can bring entire landscapes back into production. Endangered and vulnerable plant and animal species can potentially be restored by habitat restoration allowing natural regeneration. The NEWMAP has successfully connected poverty reduction efforts with sustainable ecosystems and enhanced disaster-risk prevention and has impacted positively on the well-being and safety of over 12 million individuals across 23 states in Nigeria. NEWMAP implemented various mechanisms to safeguard Nigerians from the potential impacts of future climate change. The project restored dozens of gully sites and built nearly 60 catchments to effectively control erosion. Stormwater diversion plans were devised and solid waste management was improved to reduce the likelihood of flooding during heavy rainfall events.

NEWMAP supports actions to stabilize and rehabilitate the gully sites and the underlying causes of gully erosion using both structural and vegetative measures. The NEWMAP project has promoted environmental restoration and long-term protection of habitats and has helped to strengthen existing populations of plants and animals by providing a framework to sustainably integrate natural resource management with community livelihoods. NEWMAP has brought the concept of forest non-renewable biomass (fNRB) to the fore (Fig. 1). Harvesting in a sustainable manner that does not exceed an area's annual growth rate is viewed as renewable, as woody biomass stocks will remain constant or potentially increase; whereas harvesting at a rate that exceeds an area's annual growth rate is non-renewable, as it would lead to a decline in woody biomass stocks. Emissions caused by burning woody biomass from renewable sources could therefore be offset by re-growth. This means there would be no overall change to carbon stocks, and no climate impact. NEWMAP has promoted greater terrestrial carbon accumulation from vegetation expansion or protection and sustainable management of forest resources. These efforts are aimed at fortifying the nation against the adverse effects of climate change by providing ecosystem-based adaptation solutions to build resilience to climate risks and help communities adapt to impacts that devastated lives and livelihoods, while also safeguarding biodiversity, improving health outcomes, bolstering food security, delivering economic benefits and enhancing carbon sequestration. These adaptive measures are expected to be upscaled and implemented by other impacted communities.

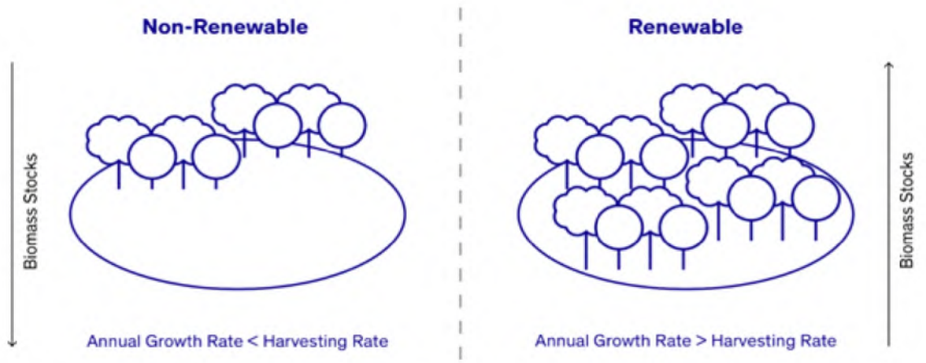


Fig. 1. Harvesting in a sustainable manner that does not exceed an area's annual growth rate is viewed as renewable, as woody biomass stocks will remain constant or potentially increase; whereas harvesting at a rate that exceeds an area's annual growth rate is non-renewable, as it would lead to a decline in woody biomass stocks. fNRB values close to 90% suggest rapid depletion of all accessible biomass in an area.

POLICIES AND LEGISLATION

Nigeria ratified the Paris Agreement, an international deal aimed at tackling climate change, in 2017 and has pledged to reduce its greenhouse gas emissions by 20% by 2030 with the condition of 45% of international support. COP 26 (UN Climate Change 2021 Conference of the Parties) is also committed to halting and reversing forest loss and land degradation by 2030. However, do we have adequate legislation/regulations to ensure sustainability of Protected Area systems (public or community PAs)? The major threats faced by PAs in Nigeria are:

- Human intrusions (Housing and settlements etc)
- Commercial and Industrial Areas
- Farming and grazing (agricultural expansion and intensification)
- Drug cultivation
- Energy production and mining (within PAs)
- Transportation
- Tourism
- Biological resources use (wild food, bush meat etc)
- Modifications of natural systems (dams, forest fragmentation without wildlife passages...)
- Climate Change (temperature extremes, droughts, floods, habitat shifting…)
- What is the PAs legal status? Does gazetting or covenanting offer protection? Do the law enforcement staff have the capacity/resources to enforce legislation?

Developing mitigation capacity?

Worldwide action to achieve climate resilience and sustainable development is increasingly urgent. Accelerated and equitable climate action in mitigating, and adapting to, climate change impacts is critical to sustainable development. Nigeria through it's policy directives has identified with this trend. However, the capacity to reduce anthropogenic greenhouse gas emissions or to enhance natural sinks depends on a country's ability. Ability refers to skills, competencies, fitness, and proficiencies that a country has attained and depends on technology, institutions, wealth, equity, infrastructure, and information. Is Nigeria ready to fund meaningful research, for both climate change mitigation and adaptation? The IPCC's Fifth Assessment Report estimates that climate finance will need to increase dramatically, at least 3-6 times by 2030 to achieve mitigation goals, alone. Mitigative capacity is rooted in a country's sustainable development path. Do we have a sustainable development path? That is, decision-making that achieves the UN Sustainable Development Goals (SDGs), lowers greenhouse gas emissions, limits global warming and enables adaptation could help lead to a climate-resilient world (IPCC 2014). This is where the journey begins. The SAEREM workshop is therefore to be highly commended as it will bring together critical stakeholders in the climate change crisis. The issue of mainstreaming climate change and biodiversity into priority economic sectors will be brought to the fore. It will therefore be worthwhile that policy makers/implementers attend crucial workshops such as this. This workshop will also play a major role in training and awareness (Capacity Building) as well as our collective efforts to adapt to and mitigate climate change risks/impacts. If we fail to ensure a just transition, inequity will be exacerbated and the future we desire will elude humanity.

Thank you for your attention.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

A Decade-Long Observation of Weather Trends at Ile-Ife, A Tropical Rainforest Location in Southwestern Nigeria

[1,2]Chris A. Fayose*, [2]Morakinyo A. B. Fakorede, [3]Olugbenga. O. Jegede, [4]Olaniran J. Mathew

[1] Department of Agricultural Technology, Ekiti State Polytechnic, Isan Ekiti, Nigeria

[2] Department of Crop Production and Protection, Obafemi Awolowo University, Ile-Ife, Nigeria

[3] Department of Physics Obafemi Awolowo University, Ile-Ife, Nigeria

4 Institute of Ecology and Environmental Studies, Obafemi Awolowo University, Ile-Ife, Nigeria

* Corresponding author: +2348060365729, adegoke_chris@yahoo.com

ABSTRACT

The natural variability often associated with weather events has become even more extreme and highly unpredictable as climate change intensifies. This has cast considerable uncertainty around rain-fed agriculture as we continue to witness more frequent dry spells, which have resulted in complete crop failure many times. Unfortunately, there has been no accurate weather report at the location in the past couple of decades amidst the prevailing climate change scenarios. Weather data monitored over 10 years was obtained from the automatic weather stations (AWS) located on the Teaching and Research Farm, and the Institute of Ecology and Environmental Sciences, of Obafemi Awolowo University (OAU), Ile-Ife. Mean, standard deviation, range, and regression analyses as well as variation indices were computed on solar radiation, air temperature, rainfall, and air relative humidity data from 2011 to 2020. Results showed high variability in the weather factors throughout the observation. Frequent false starts of rainfall and early retreat are now typical at the location; with increased average air temperature. Farmers should avoid going to farm with the first few showers in March and April. Also, supplementary irrigation must be put in place to cushion the effect of a sudden dry spell which has now become a characteristic feature at the location.

Keywords: Agronomy, climatology, climate change impact and adaptation, drought, weather variability.

Impacts of Economic Value and Taste Preference in Bushmeat Harvesting in Oban Hills Region of Cross River National Park, Nigeria

S. O. ADEDOYIN

Department of Forestry and Wildlife, Faculty of Agriculture, Prince Abubakar Audu University, Anyigba, Nigeria

Correspondence Author: *adedoyin.so.mnim@gmail.com*

ABSTRACT

This study assessed the impacts of economic value and taste preference in harvesting some species of bushmeat in Cross River National Park. Purposive sampling was used to select a sample of the local respondents and study communities. At Ifumkpa community, the most hunted species was Cercopithecus spp. (26.3%), Ekuri community: Thryonomys swinderianus (52.4%). The outcome was slightly different at Esang community: Thryonomys swinderianus (50.0%) was the most hunted animal. In Aking/Osomba community, Cercopithecus spp. (36.8%) had the highest hunting rate. In Ekang, Cercopithecus spp. (33.3%) had the highest hunting percentage. Communities' members hunted these wildlife species due to their economic value and taste preference. It was also revealed from the study that for every wildlife species hunted in all the five communities for their taste, there was one threatened species. This is evident in Aking/Osomba and Ekang communities (12.5%). Also, for every hunted species of wildlife for economic value, there was one threatened species as in Ekuri community (20.0%) and Aking/Osomba community (16.7%). It is therefore imperative to protect wildlife resources through protected area system and development of biodiversity and corridors. These efforts would have to be done in full collaboration with local communities, national, international bodies and non-governmental organizations.

Keywords: Bushmeat harvesting, Cross River National Park, Economic value, Taste preference

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

REFERENCES

ABC News (2023) –2023 on track to be world's hottest year on record, temperatures exceed 1.5oC above pre-industrial levels for first time Australia Broadcasting Corporation News (posted Sept 10, 2023).

CBD (2011). Global Strategy for plant conservation // Target 2011-2020. Convention on Biodiversity, Targets (cbd.int) FRIDAY // 2.4.2011

FAO (2014) The State of The World's Forest Genetic Resources, Commission on Genetic Resources For Food And Agriculture, Food And Agriculture Organization, Rome.

FAO (2015): Global Forest Resources Assessment 2015, Forest reference emission levels for the Federal Republic of Nigeria: A jurisdictional approach focused on Cross River State, Federal Department of Forestry, Federal Ministry of Environment, Nigeria. Food and Agriculture Organization, Rome.

FAO (2019). The State of the World's Biodiversity for Food and Agriculture, J. Bélanger & D. Pilling (eds.). FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome. 572 pp. (http://www.fao.org/3/CA3129EN/CA3129EN.pdf).

Gregory, P. J., J.S.I Ingram, and M Brklacich (2005) Climate change and food security Philos Trans R Soc Lond B Biol Sci. 2005 Nov 29; 360(1463): 2139–2148.

IPCC, 2014: *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

NEPAD (2005) Africa's Science and Technology Consolidated Plan of Action, New Economic Partnership for Africa's Development/African Union 59pp.

Nkang A (2012) Development of Biodiversity and Sustainable Forest Management Activities for the Nigeria Erosion and Watershed Management Project (NEWMAP), Report submitted to World Bank/GEF, Washington DC, 140pp, April 2012.

LEAD SPEAKER ONE

EFFECT OF CLIMATE CHANGE ON FOOD SECURITY AND ENVIRONMENTAL RESOURCES

Prof. Stephen N. Ochang; Head of Obubra Campus & Dead of Faculty of Agriculture, University of Cross River State, Nigeria

INTRODUCTION

It is a truism that we are living in a period of climate change. Anyone who has lived for about six decades or more cannot fail to have noticed that that the climate has changed from what it used to be. Climate can be defined as the long-term pattern of weather conditions in an area. Some scientists are of the opinion that the weather conditions that can be used as the climate of an area must have been averaged over a period of 30-35years. Climate change is so very obvious that no one can fail to notice it. It is noticeable in various changing climatic indices – rising temperatures, changes in rainfall patterns, acidification of the oceans, altered habitat and ecosystems, outbreak of diseases and several other negative effects. In this paper, an attempt will be made to examine how climate change affects food security and environmental resources.

Food production depends to a large extent on a number of climatic factors. So when there is change in these factors on account of climate change, food production is severely affected. Climate change poses a big threat to food security in Nigeria, affecting both subsistence and commercial farming. Climate change can result in too little or too much rainfall, neither of which is good for food production. While declining rainfall in northern areas of Nigeria is causing increasing desertification, increasing rainfall in southern Nigeria is causing flooding. The change in climate can favour an increase in diseases and pests, thereby leading to declining agricultural production.

What Causes Climate Change?

Climate change can come from natural or man-made causes. There are natural phenomena that can alter the average weather conditions prevailing in a given area. For instance, changes occurring within or inside the sun can affect the intensity of sunlight reaching the earth, and if the amount of sunshine that reaches the earth increases beyond what had hitherto been experienced, it will lead to higher temperatures which will, in turn, cause earth warming. When there is volcanic eruption (a purely natural phenomenon), it will emit aerosols and release carbon dioxide (CO_2) into the atmosphere. Carbon dioxide is a green-house gas which exerts a warming effect on the earth. Greenhouse gases are basically gases in the Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere,

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Factors Influencing Women's Participation in Household Food Security: A Case Study of Makurdi Metropolis Benue State Nigeria

Omede, U. David

Department Of Agricultural Education, Federal College Of Education Odugbo, Benue State, Nigeri:

Author's Email: ugbedave@gmail.com

ABSTRACT

This study focused on factors influencing women participation in household food security in Makurdi Metropolis of Benue State, Nigeria. Data were collected using interview schedule administered to one hundred (100) respondents randomly selected from five (5) wards in the study area using multi stage random sampling techniques. Result on level of participation in household food security of women showed that 62.0% of respondents fully participate in household food security indicating that women account for more than half of the labour required to produce food consumed in the study area. Logistic regression model was used to determine factors influencing women participation in household food security. The result showed that the coefficient of annual income was positive and statistically significant (Wald test 3.354; P <0.10). This implies that annual income can influence the probability of women's full participation in household food security in the study area. Government policies should be designed and implemented to create programs that will enable women to use and benefit from their own resources and capabilities.

Key Words: Contribution, Women, Household, Food Security

Willingness to Pay for Pome Modern Treatment Technologies for Environmental Sustainability by Smallholder Oil Palm Farmers in Agbo, Delta State, Nigeria.

Okere, R. A[1], Apeh, C. C[2], Bankole, A. S[1], Garba, I. D[1] and Oghogho, I. A[1]

[1]Agricultural Economics Division, Nigerian Institute for Oil Palm Research, Benin, Edo State.

Department of Agricultural Economics, University of Agriculture and Environmental Sciences, Umuagwo, Imo State.

Author's Email: richy4chima@yahoo.com*

ABSTRACT

The dearth of knowledge on the environmental hazard caused by the release of POME by smallholder oil palm farmers as a bane of health hazard emerged this study. This tends to know the willingness of these farmers to pay for modern POME treatment technologies for environmental sustainability with the objectives of examining their socioeconomic features and determining the factors responsible for their willingness to pay for the technologies. A random sample was employed for 133 respondents from a sample frame of 200 farmers to get valid sample size of 120 respondents from the list of contact farmers in the area at 95% confidence level. The data were analyzed with descriptive statistics like frequencies and percentages for the socioeconomic characteristics and probit model for the determinants of the willingness to pay for POME modern treatment technologies. The result showed 66% of the farmers fell within ages of 45-65 years were in the middle age, 96% married, 17% post primary education, 92% of 1-6 household sizes and 97% farm size of 1-4 hectares. The probit result revealed that age, marital status, household size. transportation cost and distance had negative and significant effects while educational level, farm size, farming experience, income, extension services and extension visits had positive and significant effects on the willingness to pay for the modern POME treatment technologies. The study suggests that there should be enhanced education / training through increasing farmers income with a synergy to biotechnological and allied institutions to reduce the waste to enhance environmental sustainability.

Keywords: Environmental Sustainability, Modern Treatment Technologies, POME, Smallholder

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

but they prevent the heat that the sunlight brings from leaving the atmosphere. Hence, greenhouse gases raise the surface temperature of planets such as the Earth. The main gases responsible for the greenhouse effect include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and water vapor. In addition to these natural compounds, synthetic fluorinated gases like the following (Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF_6), Nitrogen trifluoride (NF_3) also function as greenhouse gases.

A number of human activities have been incriminated in contributing to climate change. Nzeh *et al.*, (2016) lists such activities to include industrialization, burning of fossil fuel, gas flaring, urbanization, changes in global patterns of land use and agriculture. IPCC (2007) and Nzeh (2008) mention human activities that reduce the amount of carbon sinks, and therefore, alter the climate of the area in question, to include deforestation, alterations in land use, water.

The Concept of Food Security

There has been a plethora of definitions of the concept of Food Security since it was first used over five decades ago. The current widely accepted definition of food security emanated from the Food and Agriculture Organization (FAO) annual report on food security "The State of Food Insecurity in the World, 2001": In that report, Food security was defined as "*a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*" (FAO, 2002). In 2009, during the World Summit on Food Security, a fourth dimension was added, namely – stability – as the short-term time indicator of the ability of food systems to withstand shocks, whether natural or man-made (FAO, 2009).

There are four dimensions of food security that have been identified according to the definition (FAO, 2008). 1) **Availability**: there should be enough food produced locally and imported from abroad to meet the needs of the populace. 2) **Accessibility**: The food that is available should reach the consumer, who should be in a position (has enough money) buy it. There should be provision in the social system to cater for the less fortunate. 3) **Utilization**: The individual must be able to eat adequate amounts both in quantity and quality of food in order to live a healthy and full life to realize his or her potential. Food and water must be safe and clean, and thus adequate water and sanitation are also involved at this level. A person must also be physically healthy to be able to digest and utilize the food consumed. The fourth dimension is **Stability**: There should be sufficient food to meet the needs of all households in the country that is also accessible to them and that can withstand perturbations or shocks to the food

chain system whether caused by natural disasters (climate, earth-quakes) or those that are man-made (wars, economic crises). Thus, it may be seen that food security exists at a number of levels.

Peng and Berry (2019) posit that Availability has a National dimension; Accessibility has a Household dimension; Utilization has great impact at Individual level; and Stability may be considered as a time dimension that affects all the levels. All four of these dimensions must be intact for full food security.

How Does Climate Change Affects Food Security?

Climate change does affect food security as we can see from the under listed points.

1. **Crop production**: Climate change alters weather patterns, bringing about conditions that are less favourable for food production. Climate change can lead to conditions of droughts, floods, heatwaves, and storms, each of which can have a negative effect on food crop production. Incidences of crop failures, reduced yields, and poor crop quality have been experienced which were directly attributable to climate change. Changes in weather elements like temperature and rainfall patterns can alter the area that is suitable for growing some crops, thereby affecting agricultural productivity.

2. **Animal production**: Not only is the production of crops affected by climate change, livestock and fisheries production are equally affected. Livestock and fisheries are important sources of animal protein needed by the populace. Livestock and fisheries are crucial sources of food and income for many communities. When climate change brings about increased temperatures that alter the weather conditions that the animals are used to, a number of unfavourable issues arise: heat stress, increased prevalence of diseases, and reduced forage availability for their consumption. In fisheries, climate change impacts the availability and distribution of fish species, species that cannot adapt to the new conditions may gradually decline and eventually become extinct. Declining fish stocks affects, directly, those who dwell in coastal communities whose dependence is on fishing for their livelihoods.

3. **Water availability:** Climate change has a direct impact on water availability because of its disruption of the water cycle. When the water cycle is disrupted, water availability for irrigation and agricultural practices is affected. Changes in rainfall patterns can lead to water scarcity or excessive rainfall, either of which poses great challenges for crop production. Water scarcity can lead to poor crop yield and thus, making farming unprofitable; while too much precipitation can result in soil erosion, nutrient depletion, waterlogging and even flooding.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Soil and Water Resources Management: Climate Change Mitigation for Food Security

Egbebi, I. A.[1] and Egbebi, O. E.[2]

[1]Department of Agricultural Technology, Ekiti State Polytechnic, Isan – Ekiti

[2]Department of Soil Science and Land Resources Management, Obafemi Awolowo University, Ile – Ife *Corresponding author:email: iyiolaegbebi@yahoo.com, ia*egbebi@ekspoly.edu.ng*

ABSTRACT

Climate change effects on water availability has led to its scarcity in tropical regions with risk of agricultural droughts affecting crops and the entire ecosystem. Soil and man now face the threat of inadequate water and its resources on a regular basis. Sustainable soil management practices adapted to environmental conditions enhances interactions among soil water and plants, which can mitigate the impacts of climate change. Soil and water resources management is considered sustainable to mitigate climate change if; soil water storage is improved, soil erosion is controlled, soil structure is improved through the application of soil organic matter and soil sequesters substantial carbon from the atmosphere and stores it within the vegetation. Climate change affects ecosystems in many ways as it controls how plants and animals interact with their physical environment. These calls for serious concern for humanity as the changes threatens the natural ecosystem and will have significant implications on global food production. The increasing population of the world will require more food and water thereby stressing water resources and damaging the environment. This could affect the availability and quality of some foods and farmers ability to cultivate and manage certain crops. There is the need to improve water resources management, maintain biodiversity and sustainability of freshwater ecosystem. This study identified the ecological dynamics of climate change impacts, the vulnerability, resistance and management interventions that may assist the ecosystem resilience to climate change.

Keywords: Climate change, Water management, Soil management, Ecosystem, Population

The Effect of Changes in Crop Production Pattern on Income of Small Holder Farmers in Katsina-Ala Local Government Area Of Benue State.

[1]OkO, PETER E.; [2]KOROM TERNA.; [1]Odey David U.

[1]Department of Environmental Resource Management ,University of Calabar, Calabar.
[2]Department of Geography and Environmental Science, University of Calabar, Calabar.
Email: okopeter36@yahoo.com

ABSTRACT

*The study examined the effect of changes in crop production pattern on the income of smallholder farmers in Katsina-Ala Local Government Area of Benue State. The researcher adopted a descriptive survey design where three hundred (300) copies of semi-structured questionnaire were distributed using disproportionate stratified random sampling. The research was premised on two hypotheses: Ho_1 - there is no significant difference between the crop types cultivated now and thirty years ago in the study area and **Ho_2** - the change in crop production pattern has no significant effect on the income of smallholder farmers in Katsina-Ala Local Government Area. These hypotheses were tested using standard deviation and student t-test. The result revealed that there is a significant difference between the crop types cultivated by farmers thirty years ago and now. The result further indicated that the change in crop production pattern has significantly contributed to increasing income levels of the farmers in the study area. It was therefore, concluded that change in crop production pattern has occurred in Katsina-Ala Local Government Area and that marketability is the prime factor occasioning the change from the production of one crop to another in the study area. The formation of co-operative societies and local thrift societies by the farmers as well as the practice of dry season farming along the extensive flood plains of the rivers found in the study area through the construction of a multi-purpose dam were among some of the recommendations raised.*

Keywords: Change, crop production pattern, income, smallholder farmers.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

4. **Food availability and affordability**: As we have mentioned above, climate change affects the production of both crops and animals that are used for food. From our knowledge of elementary economics, we know that when supply decreases as it happens when climate change brings about poor yields from crop and animal production, and demand remains unchanged, it will lead to an increase in price. In other words, climate change-induced crop failures, reduced yields, and increased input costs can lead to higher food prices. When this happens, affordability becomes a problem. The poor in the society will not be able to afford to buy food at high prices. The lower availability and increased demand for certain food items can disproportionately affect the vulnerable in the society who will be unable to afford the food they require both in quantity and quality, thereby suffer malnutrition and food insecurity. Hence, food availability and affordability are seriously affected by climate change. It is further compounded by the fact that climate change can bring about higher temperatures and increased humidity that can exacerbate the situation of food shortages and price volatility by hastening the spoilage of perishable food products, and reducing their shelf life and quality.

5. **Land degradation and loss**: Climate change has been implicated in land degradation and loss through factors like soil erosion, salinization, desertification, and deforestation. Degraded lands costs a lot to be rehabilitated. Without rehabilitation, degraded lands have reduced productivity, making it challenging to meet the growing food demand for a growing human population. In addition to the above, climate change brings about events like rise in sea-level and coastal erosion that can result in the loss of arable land, particularly in low-lying coastal areas, further exacerbating the challenge of food production.

Effect of Climate Change on the Environment and its Resources

Climate change has a profound effect on the environment. This it does by causing ecosystem disruption which affects the structure, functioning, and stability of ecosystems in in a number of ways:

1. **Alteration in species distributions**: A combination of rising temperatures and changing rainfall patterns occasioned by the climate change can cause shifts in the geographical distribution of plant and animal species. Species that were originally found in an area may move to higher latitudes or elevations to find suitable habitats, while others may become may become locally extinct as their preferred climate conditions have become altered. These shifts in the distribution of the range where these plants and animals have as their natural habitat can lead to changes in the faunal and floral interactions and dynamics within ecosystems.

2. **Altered Phenology**: Phenology is the study of natural seasonal events in plants and animals. It is nature's calendar: when a particular plant blooms, when fishes produce their young ones, usually during the peak of the rainy season when rivers are flooded and contain a lot of food materials washed into the channel from the banks, many birds time their nesting so that eggs hatch when insects are available to serve as food for the nestlings, and so on. Phenology is a key component of life on earth. But, when phenology is altered on account of changes in temperature and precipitation patterns, it can lead to mismatches in the timing of life cycles. This will have an adverse effect on survival of species and the continuity of life. For example, if there is a shift in flower blooming that no longer aligns with the arrival of pollinators, it will adversely affect plant reproduction and consequently, the availability of food resources for other species.

3. **Alteration in primary productivity**: Climate change affects the rate at which plants convert sunlight into biomass through photosynthesis, a phenomenon referred to as primary productivity. Changes in temperature, precipitation, and CO_2 concentrations brought about by climate change can influence plant growth and nutrient availability, which can, in turn, alter ecosystem productivity. This can have cascading effects throughout the food web, impacting species that rely on primary production for food and habitat.

4. **Increased risk of species invasions and changes in the ecosystem**: Climate change alters the habitat for native species; and create new opportunities for invasive species to establish themselves in ecosystems. As temperature and climatic conditions become more favorable for exotic or non-native species, they may outcompete native species for resources and disrupt ecosystem dynamics. Invasive species can, in turn, alter habitat structure and nutrient cycling, leading to substantial changes in ecosystem composition and functioning.

5. **Habitat loss and degradation**: Climate change contributes to habitat loss and degradation brought about by changing rainfall patterns, rise in sea-level rise, melting glaciers, and more frequent occurrences of wildfires. Wildfires burn down the vegetation such that species that are naturally adapted to such habitats become severely decimated or disappear entirely. In other words, climate change is the harbinger of extinction. Ecosystems that are sensitive to climate changes, such as coral reefs and polar regions, are particularly vulnerable.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Innovative Farming Practices in Cross River State: Farmers' Perspectives on Sack Farming.

Eta[1], H.C, Ayi[2], N.A. Iyamah[1], D. A. and Emmanuel[1], E. J.

[1]Department of Agricultural Extension and Rural Sociology, University of Calabar, Nigeria

[2]Department of Agricultural Economics and Extension, University of Cross River State, Nigeria

Corresponding author: nsa.ayi@gmail.com;

ABSTRACT

This study investigates the perception of farmers regarding sack farming in Calabar Metropolis, Cross River State, Nigeria. Agriculture, as a fundamental human activity, faces challenges in meeting the demands of a growing population, resulting in food shortages and food imports. Sack farming, an innovative approach, is proposed to address these challenges by allowing crop cultivation in limited spaces, reducing environmental impacts, and increasing crop yields. Despite its potential benefits, there has been limited research on farmers' perceptions of sack farming in Calabar Metropolis. The objectives of the study were threefold: (1) to describe the socio-economic characteristics of farmers practicing sack farming, (2) to ascertain farmers' perceptions of sack farming, and (3) to identify the types of crops grown using this method. The study was conducted in Calabar Metropolis, characterized by a tropical monsoon climate suitable for crops like okra, yam, cassava, pumpkin, waterleaf, and more. Snowball sampling procedure was adopted to enlist 40 farmers for the study. Data were collected using structured questionnaires and analyzed using descriptive statistics. A list of perception questions was obtained from the literature and presented to respondents on a 5-point Likert-type scale, as Strongly Agree (SA) = 5, Agreed (A) = 4, Undecided (U) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1, to rate their level of perception. The findings revealed that the majority of respondents were between the ages of 18 and 47, educated, and had small household sizes. Most had limited contact with extension agents, indicating limited access to agricultural knowledge. Additionally, sack farming was perceived positively, with farmers highlighting its advantages, such as ease of cultivation and improved farm income. Tomatoes, cucumbers, and peppers were the most commonly grown crops in sacks, while others like mushrooms, cabbages, and carrots were less common. In conclusion, sack farming holds promise for addressing agricultural challenges in Calabar Metropolis. To promote its adoption, the study recommends the organization of agricultural training programs by the Ministry of Agriculture and financial assistance from research institutes and the government for acquiring more durable and biodegradable sacks. Sack farming has the potential to enhance food production, income, and sustainability in the region while mitigating environmental concerns.

Keywords: Sack farming**,** Perception, Agriculture**,** Calabar Metropolis**,** Sustainable agriculture

Building Financial Resilience and Socio-Ecological Adaptation to Climate Change and Food Security in Flood-Prone Farming Communities of South-East States, Nigeria

*Odili, Okwuchukwu, Agbaeze, Clifford Chilasa &Ezeudu, Ikenna Jude
Department of Banking and Finance, College of Management Sciences, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria.
*Corresponding,author,Email::palmereck@gmail.com;odili.okwuchukwu@mouau.edu.ngagbaeze.clifford@mouau.edu.ng cliffagbaeze@gmail.com; ikennaezeudu2014@yahoo.com

ABSTRACT

This study examined the financial and socio-ecological vulnerability and adaptive responses employed in dealing with climate change and food security by households in flood-prone farming communities of South-East states, Nigeria. Methodology adopted include questionnaire, focus group discussions and key informant interviews. 400 households were sampled using multi-stage, stratified and random sampling methods and the data were analysed using descriptive and inferential statistics. Results show that financial and socio-ecological vulnerability strongly depends on gender, age, years of experience, level of education, social safety nets, micro-credit access, income diversification, and engagement in farmers' cooperatives. The findings also show that coastal communities have a wide range of early warning signs that alert them of forthcoming changing climate and seasonal flooding, namely singing of birds, infestation of insects, water colour, floats of leaves and consecutive rainfalls. The findings further revealed that coastal farming communities developed adaptation and resilience financial and socio-ecological measures to respond to climate variability impacts, such as reducing household expenses, increasing social involvement in farmers' cooperatives, relocation, re-enforcement of foundation, changeing crop planting and harvesting period. This study recommends government sustainable policies, strategies and programmes that will ensure social security, provide food safety nets, insurance scheme, and micro-credit access to the coastal communities and at the same time enhance income diversification, cooperative associationship, increase knowledge about climate change, improve alternative skills and involve farmers' in adaptation planning to enhance financial resilience and socio-ecological adaptation and minimize food insecurity.

Keywords: Financial resilience, socio-ecological adaptation, climate change, food security, insurance scheme, micro-credit access

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

6. **Increased vulnerability to perturbations**: Climate change can increase the vulnerability of ecosystems to environmental perturbations such as wildfires, droughts, floods, and disease outbreaks. As the environment experiences higher temperatures and prolonged droughts, for example, the drier conditions become more susceptible to wildfires. Such perturbations or disturbances can lead to species loss, changes in community composition, and long-lasting impacts on ecosystem structure and function.

7. **Disruption of ecological interactions**: There is usually a balance in the ecological interactions among components of an ecosystem. Climate change can disrupt such critical ecological interactions, thus affecting predator-prey relationships, pollination, and symbiosis. If for instance, the predator population become unduly favoured by the change in climate and they then blossom astronomically, they will wipe out the prey organisms on which they feed. If that were to happen, they themselves (the predators) will become endangered because what they feed on is no longer available.

Mitigating the effect of climate change on food security and environmental resources

We need a multi-faceted approach to address the impacts of climate change on food security. As we have seen earlier, climate change has natural and man-made causes. That is why a multi-faceted approach is required. We need to take measures that will enhance climate resilience in agriculture, as well as promote sustainable land and water management practices. We need to invest in research and technology for climate-smart agriculture, like precision agriculture that is practiced in Israel. There should be a deliberate policy to support small-scale farmers and vulnerable communities. Every effort should be made to reduce greenhouse gas emissions so as to reduce the intensity of climate change.

Ecosystem protection and conservation must be intentionally pursued. Interest should be on adopting measures that that will lead to the preservation of biodiversity. This is important because plant and animal species that are allowed to go into extinction cannot be recovered. It is recommended that as a country, we should implement adaptive management strategies that are crucial for mitigating the disruptive effects of climate change on ecosystems. This includes efforts to reduce greenhouse gas emissions, restore degraded habitats, establish protected areas, and manage ecosystems in a way that enhances their resilience to climate change.

Practical ways to reduce greenhouse gas emissions and alleviate the impacts of climate change:

1. **Adoption of clean and renewable energy**: If we make a policy shift away from widespread use of fossil fuels to meet our energy needs and transition to renewable energy sources, such as solar, wind, hydro, and geothermal power, it will significantly reduce greenhouse gas emissions into the atmosphere. If government summons the political will and intentionally make substantial investment in renewable energy infrastructure as a policy thrust, we will achieve great results.

2. **Enhancing energy efficiency**: We can intentionally make use of energy-efficient technologies, building codes, vehicle electrification, and public transportation to improve energy efficiency across sectors, including buildings, transportation, and industrial processes. When this is done, it will be seen that energy consumption and associated greenhouse gas emissions have drastically reduced.

3**. Promotion of sustainable transportation**: Promoting sustainable transportation, such as walking, cycling, and public transportation, can reduce reliance on transport systems that depend on fossil fuels. Adopting the use of electric vehicles that do not emit greenhouse gases is the way to go. A combination of the use of clean fuels and the deployment of more fuel-efficient vehicles will produce a clean environment which will be good for everyone.

4. **Proper forest management and sustainable land use**: Protecting forest and restoring forests through afforestation programmes, as well as managing agricultural lands sustainably, can play a vital role in mitigating climate change. Forest conservation measures reduces deforestation and promotes carbon sequestration. Nigeria is ranked among the leading carbon emitters in the world, placed at the 17th position in the global emission profile (Dunne, 2023). Between 2010 and 2019, Nigeria lost 86, 700 hectares of tropical forest, releasing 19.6MtCO_2 (Ushuki *et al*., 2021). Sustainable agriculture practices, such as agroforestry and organic farming, which can improve soil health and reduce greenhouse gas emissions from agriculture should be adopted.

5. **Adopting proper waste management system**: All human societies generate waste from the activities of daily living. Adopting proper waste management practices, including recycling of non-biodegradable materials, composting, and waste-to-energy conversion, helps reduce methane emissions from landfills. Recycling of synthetic non-biodegradable materials help to minimize waste generation and handle the problem of plastic pollution; these being crucial for mitigating climate change.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Climate Change: An Anthropogenic Consequence

*Oyedeji, O.F[1]., Alade, A.A[1]., Adebusuyi, G.A[1]., Sowunmi, L.I[1]. and Obekpa, N.B[2]
[1]Forestry Institute of Nigeria, PMB 5054, Jericho Hill, Ibadan, Nigeria
[2]Federal College of Forestry Mechanization, Afaka, Kaduna, Nigeria
*Correspondence: faitholuseye@gmail.com

ABSTRACT

Industrial revolution by humans has posed serious threat to our climate. Our climate is changing and the evidence is conspicuous. Weather patterns are shifting, sea levels are rising, glaciers are retreating, precipitations are changing and the world is becoming warmer. If these activities should continue without drastic measures, there is bound to be a greater effect on the social, ecological and economical sustainability. As a result of increased temperature, there could be continuous loss of biodiversity which could make the ecosystem lose its balance; change in weather and precipitation pattern could lead to flood and drought. Hence, the need to curb the causes of climate change by taking the right measures to reduce its negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes. This study therefore, presents an overview of Climate Change with the aim of analyzing its concept, causes and looking at the effects that anthropogenic activities have posed to our climate with a view to providing solution to it.

Keywords: climate change, global warming, gre*enhouse gases, anthropogenic activities

Implication of agricultural land-use and management practices on food insecurity among rural households in south-west states, Nigeria.

Ganiyu, Muibat Omolara[1], Ajala, Adedolapo Adekemi[2], Ogunwole-Olapade, Folayimi[3], Ayinla, Rasheed Ayodele[4] and Raufu Mufutau Oyedapo[5]

[1, 2 &3]Department of Agricultural Economics, Faculty of Agric Sciences, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

[4]Department of Agricultural Extension and Rural Development, Ejigbo Campus, Osun State University, Nigeria;

moganiyu@lautech.edu.ng

ABSTRACT

The frequent research emphasis on global food insecurity is due to millions of people suffering from undernourishment particularly in low and middle-income countries like Nigeria. However, many literatures recognize agricultural food system as one of important measures in promoting food security. In consequence, this study analyzed the impact of agricultural land-use and management practices on food insecurity among rural households in southwest states, Nigeria. The sampling procedure involved a multistage selection of 340 rural household heads and cross-section data were collected during 2022 crop production season through a well designed questionnaire. Descriptive statistics, food security index and probit regression model were employed to analyze the data according to the research objectives. The major findings revealed that more than half (53%) of household heads are food insecure while the rest (47%) are food secure. About 67% of household heads were male and still in their productive stage as signified by their average age (47.7years). Exactly 81% of the household heads were married, the household size was about 6 persons and farm size cultivated was 2.63ha on the average. Total monthly expenditure was N322424.9 while food security index is 0.479412. Land management measures applied were crop rotation, organic manure, minimum tillage and fertilizer application while arable cropping system dominates among food insecure land users, majority of food secure land users were also dominated the cash cropping practice. Probit regression model exhibits that on-farm income, arable cropping, cash cropping practice, mixed farming, fertilizer application and land management measure were significantly impacted on food insecurity status among farm household heads. The study therefore suggests arable cropping, cash cropping practice and mixed farming as essential agricultural land-use options that reduce food insecurity. Also, fertilizer application and other land management measures like crop rotation, organic manure, and minimum tillage are identified and recommended for farm households to adopt for improving agricultural food production. Policy related to food security in Nigeria and global world therefore is being encouraged to consider the implication of agricultural land-use and management practices on food security.

Keywords: agricultural land-use, land management practices, food insecurity, household heads, southwest states, Nigeria

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

6. **Keying into climate-friendly policies and regulations:** National and sub-national governments should key into international policies and also formulate local ones that play a significant role in mitigating climate change. Policies like the Reducing Emission from Deforestation and Forest Degradation (REDD) formulated in 2007 (Ushuki *et al*., 2021) should be warmly embraced. Similar policies like carbon pricing, emissions trading schemes, renewable energy targets, energy efficiency standards, and incentives for clean technologies are to be pursued.

7. **Embracing adaptation measures**: To support mitigation efforts, adaptation measures are necessary to build resilience to the impacts of climate change. These include developing climate-resilient infrastructure, implementing early warning systems, improving water management practices, and supporting vulnerable communities to cope with climate-related challenges.

8. **Creating awareness and improving environmental education**: Creating awareness about climate change and its impacts is essential for mobilizing action at all levels. Education about the need to protect the environment should be pursued vigorously. Public engagement campaigns should be mounted that are aimed at promoting behavioral changes, foster sustainable practices, and encourage individuals, communities, and businesses to contribute to climate solutions.

Conclusion

Climate change affects everybody. It is important, therefore, that synergy be forged between governments, businesses, and individuals to collectively pursue the agenda of mitigating the effects of climate change and build a sustainable future. Government cannot do it alone, neither can individual do it without government participation. Only the pooled efforts all can birth a future we all will be happy and comfortable to live in.

Practical ways to reduce greenhouse gas emissions and alleviate the impacts of climate change:

1. **Adoption of clean and renewable energy**: If we make a policy shift away from widespread use of fossil fuels to meet our energy needs and transition to renewable energy sources, such as solar, wind, hydro, and geothermal power, it will significantly reduce greenhouse gas emissions into the atmosphere. If government summons the political will and intentionally make substantial investment in renewable energy infrastructure as a policy thrust, we will achieve great results.

2. **Enhancing energy efficiency**: We can intentionally make use of energy-efficient technologies, building codes, vehicle electrification, and public transportation to improve energy efficiency across sectors, including buildings, transportation, and industrial processes. When this is done, it will be seen that energy consumption and associated greenhouse gas emissions have drastically reduced.

3**. Promotion of sustainable transportation**: Promoting sustainable transportation, such as walking, cycling, and public transportation, can reduce reliance on transport systems that depend on fossil fuels. Adopting the use of electric vehicles that do not emit greenhouse gases is the way to go. A combination of the use of clean fuels and the deployment of more fuel-efficient vehicles will produce a clean environment which will be good for everyone.

4. **Proper forest management and sustainable land use**: Protecting forest and restoring forests through afforestation programmes, as well as managing agricultural lands sustainably, can play a vital role in mitigating climate change. Forest conservation measures reduces deforestation and promotes carbon sequestration. Nigeria is ranked among the leading carbon emitters in the world, placed at the 17th position in the global emission profile (Dunne, 2023). Between 2010 and 2019, Nigeria lost 86, 700 hectares of tropical forest, releasing 19.6MtCO_2 (Ushuki *et al*., 2021). Sustainable agriculture practices, such as agroforestry and organic farming, which can improve soil health and reduce greenhouse gas emissions from agriculture should be adopted.

5. **Adopting proper waste management system**: All human societies generate waste from the activities of daily living. Adopting proper waste management practices, including recycling of non-biodegradable materials, composting, and waste-to-energy conversion, helps reduce methane emissions from landfills. Recycling of synthetic non-biodegradable materials help to minimize waste generation and handle the problem of plastic pollution; these being crucial for mitigating climate change.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Land Suitability Evaluation Of Selected Soils For Cassava Production In Akwa Ibom State, Nigeria

*Okon, U. M. and John, U. N.

Department of Soil Science and Land Resources Management, University of Uyo, Akwa Ibom State, Nigeria

Corresponding Author: u645221@gmail.com or unwanaokon286@gmail.com,

ABSTRACT

This study was conducted to evaluate the suitability of selected soils for the cultivation of cassava in Akwa Ibom State for food security. Based on parent material, topography and drainage, four soil types were selected for the study. Profile pits were dug in each soil type at representative location. A total of fifteen (15) profile pits were sunk and described based on FAO (2006) guidelines for profile description. Soil samples were collected based on genetic horizons for laboratory analysis. Results from the study revealed that the soils were moderately deep to deep, predominantly varied from sand to sandy clay loam texture with very strongly acid (pH 4.5-5.0) – moderately acid (pH 5.6-60). In the following soil fertility parameters: organic matter was moderate (1.95-2.24 %), high (2.87 %) and very high (3.62 %) in soil types 1 and 3, 4 and 2, Total N was low in all the sites studied, cation exchange capacity was very low (44.16 cmolkg^{-1}), low (7.58 cmolkg^{-1}) and moderate (13.36-16.64 cmolkg^{-1}) in soil types 1, 3 and 2 and 4, exchangeable K was low (0.04-0.16 cmolkg^{-1}) in the entire study area, Av. P was low (5.60-9.83 mgkg^{-1}), moderate (18.88) and high (45.01 mgkg^{-1}) in soil types 1 and 3, 2 and 3, while base saturation was high (64.07-87.52 %) and moderate (55.51 %) in soil type 1, 2, 4 and 3. The result of land suitability evaluation revealed that the land is currently not suitable for the cultivation of cassava. Soil types 1, 3 and 4 were currently not suitable (N1) (25.30) and the major limitation for the cultivation of cassava was fertility (low TN, pH and Exch. K in all soil types, while Av. P was specifically indicated in soil type 1); while soil type 2 was also currently not suitable (N1) (9.6) and major limitations for cassava cultivation were wetness (inadequate oxygen availability) and fertility (low TN, Av. P, Exch. K and pH). Management techniques such as application of chemical fertilizer and organic matter to enhance nutrient holding capacity of the soils and supply deficient nutrients will in turn raise the productivity of these soils. In addition, it is highly recommended that regular soil test should be carried out for proper fertilizer application as well as land suitability evaluation to ascertain whether the land is suitable for the cultivation of cassava or other crops.

Key words: *Land suitability, evaluation, cassava production*

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Agricultural Biodiversity Conservation Techniques among Farmers in Ogoja Agricultural Zone of Cross Rivers State

Iyamah, D. A[1]., Mbu M. M.[2], Ogar, P. O.[3], Eta, H. C.[4], Isa, U. K. [5], Elemi, G. F.[6], and Aya, C. F.[7]
1,3,4,6,&7, Department of Agricultural Extension & Rural Sociology, University of Calabar.
2, Department of Environmental Education, Faculty of Education, University of Calabar
5, College of Agriculture, Jalengo, Taraba State.
Corresponding Author email: doraiyamah@yahoo.com

ABSTRACT

This study analysed the agricultural biodiversity conservation techniques among farmers in Ogoja agricultural zone of cords river state. The objectives of the study were to; ascertain crop farmers' awareness of agro-biodiversity conservation techniques and sources of information on agrobiodiversity conservation, access the various types of agro-biodiversity conservation techniques adopted by farmers in the study area and analyzed the reason/benefits of adopting agro-biodiversity conservation techniques. A multistage random sampling procedure was adopted for the study and structured questionnaires were administered to 180 respondents. The data were analyzed using descriptive statistics such as frequency count, percentages, mean and ranking. The results showed that farmers were aware of agro-biodiversity conservation techniques. Specifically, 100% were aware of mixed cropping, 98.9% were aware of mulching, 97.2% were aware of collection and preservation of seeds, 95% were aware of agroforestry, 94.4% were aware of bush fallowing, 93.3% were aware of mixed, farming, 88.3% were aware of soil and water conservation and 83.3% were aware of cover cropping. Most of the farmers 32.6% got awareness of agro-biodiversity conservation through personal observation, knowledge and personal experience.Results also show that the types of agro-biodiversity conservation techniques adopted include, mixed cropping, 97.2%, mulching, 96.1%, shifting cultivation, 93.3%, intercropping, 94.4%, shifting cultivation, 93.3%, agroforestry, 92.2%, manner application and soil and water conservation with 83.3% cover cropping, 83.3% and afforestation, 77.7%. result also shows that the reasons/benefits of adopting agro-biodiversity conservation were ranked and food security and sustainable production ranked 1st, supply of medicine and industrial materials ranked 2nd while economic benefits and support to communities ranked 3rd. The study therefore recommended that agricultural extension agents should educate farmers on agro-biodiversity conservation and also farmers should be enlightened on the benefits of agro-biodiversity conservation techniques.

REFERENCES

Dunne, D. (2023). The Carbon Brief Profile: Nigeria. https://www. Carbonbrief.org/the-carbon-brief-profile-nigeria/ accessed on 30th September, 2023.

FAO, 2002. The State of Food Insecurity in the World 2001. FAO, Rome.

FAO, 2008. Food Security Information for Action: Practical Guides. EC - FAO Food Security Programme, Rome.

FAO, 2009. Declaration of the World Food Summit on Food Security. FAO, Rome.

Intergovernmental Panel on Climate Change (IPCC), (2007). Summary for Policy Makers. In climate change (2007): Impacts, Adaptation and Vulnerability. Contribution of working Group 11 to the fourth assessment report of the Intergovernmental panel on climate change..

Nzeh, C.E.P. (2008). Economic Valuation of Deforestation in Enugu State, Nigeria. An unpublished Ph.D research proposal presented to Department of Agricultural Economics, University of Nigeria, Nsukka.

Nzeh, E. C., Uke, P. C., Attamah, D. C., Nzeh, D. C., and Agu, O. (2016). Climate Change and Agricultural Production in Nigeria: A Review of Status, Causes and Consequences. *Nigerian Agricultural Policy Research Journal*. Issue 1, Volume 1. http://aprnetworkng.org

Ushuki, A. A., Wang, Y., Bisong, F. and Antoraskis, A. S. (2021). Livelihood Impacts of Forest Carbon Protection in the context of Redd+ in Cross River State, Southeast Nigeria. *Sustainability* 2021, 13(9), 5081. https://doi.org/10.3390/su13095081. Accessed on 30th September, 2023.

Peng, W., Berry, E.M. (2019). The Concept of Food Security. In: Ferranti, P., Berry, E.M., Anderson, J.R. (Eds.), *Encyclopedia of Food Security and Sustainability*, vol. 2, pp. 1–7. Elsevier.

LEAD SPEAKER TWO

IMPACT OF CLIMATE CHANGE AND POLLUTION ON FORESTRY, WILDLIFE AND BIODIVERSITY RESOURCES.

Prof. Augustine. Ogogo; National President, Wildlife Society of Nigeria

INTRODUCTION

Climate change is one of the most important environmental issues facing the world today. There is wide spread consensus in the scientific community and even among politicians that climate change is happening and that the impacts are already with us. It has become one of the major global challenges of the 21st century. Nigeria's climate is already changing (Nigerian Meteorological Agency (NIMET), 2008). Climate change is an abnormal variation in the earth's climate that usually occurs over durations ranging from decades to millions of years. Evidence show that global mean temperature increased by 0.6° during the 20th century with the 6 hottest years occurring between 1997 and 2007 (IPCC 2007).

Ozone layer reflects uv radiation from the sun back to outer space and allows only the rays that are not harmful to pass through it and reach the earth's surface. On earth, the heat that is generated by the sun's rays is allowed to pass through ozone layer back to outer space thereby cooling the earth. The current scientific consensus attributes the major causes of climate change to anthropogenic (human) activities associated with agriculture, fossil fuel and change in land use which result in the release of greenhouse gases such as carbon (IV) oxide (CO_2), methane (CH_4), Nitrous oxide (N_2O) and water vapour which consequently destroy the ozone (O_3) layer.

GREENHOUSE GASES

Six chief greenhouse gases have been recognized. They include but are not limited to:

1. Carbon Dioxide (CO_2
2. Methane (CH_4)
3. Chlorofloro Carbon
4. Nitrous oxide
5. Water vapour
6. Ozone O_3

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Population Growth and Biodiversity Loss in Tiv Land of Benue State

[1]Dr.Asaasuen, Terngu; [2]Prof. Francis I. Okpiliya; [3]Dr. Peter E. Oko; & [1]Ako, Benjamin Tavershima.

[1]Department of Geography,College of Education Katsina-Ala, Benue State

[2]Department of Geography & Environmental Science, University of Calabar, Calabar

[3]Department of Environmental Resource Management, University of Calabar, Calabar [1]Department of Integrated Science, College of Education Katsina- Ala ,Benue State ternguas@gmail.com; okopeter36@yahoo.com

ABSTRACT

The earth's natural environment has increasingly degenerated in the area of flora and fauna as well as fungi. In fact, over the past decades, multiple species of fungi, plants and animals including microorganisms like bacteria have vanished from the face of the earth thereby reducing the efficacy with which the earth's ecosystems articulate. This paper using correlation statistics as a basis for empirical analysis of primary data based on responses from the questionnaire and secondary data sources like journal articles and textbooks examines population growth affiliations such as settlement expansions, intensification of agriculture, forest depletion and wildlife extinction as major causes of loss of biodiversity in the forest ecosystems of Tiv land in Benue State. Similarly, the paper examines the adverse effects of above issues on natural and socioeconomic phenomena including climate change, deforestation, soil erosion and other aspects of environmental degradation as well as a drop in agricultural output and lowering incomes especially among rural localities of the study area among others. The paper recommends immediate regulatory measures for proliferation of settlements in rural areas, agricultural, mechanization, forestation programmer, conservation of wildlife through legislative actions, making conservation to pay and harsh punitive measures for offenders as possible remedies to biodiversity loss so as to reverse the trend of extinction to regeneration.

Keywords: Population Growth, Biodiversity Loss, Environment, Wild life and Extinction.

ADAPTATION STRATEGIES FOR CLIMATE CHANGE EFFECTS ON LIVESTOCK PRODUCTION IN OGOJA AGRICULTURAL ZONE OF CROSS RIVER STATE

Iyamah, D. A[1]; Ogar P. O.[2], Eta, H. C.[3], Mbu, M . M.[4], Elemi, G. F.[5], Isa, U. K.[6], Eremi E. O.[7]
1, 2, 3, 5, & 7, Department of Agricultural Extension & Rural sociology, University of Calabar,
4, Department of Environmental Education, Faculty of Education, University of Calabar
6, College of Agriculture, Jalingo, Taraba State.
Corresponding Author's Email: doraiyamah@yahoo.com

ABSTRACT

This study was conducted in Ogoja Agricultural Zone of Cross River State, Nigeria to access the Adaptation strategies for climate change effects on livestock production in Ogoja Agricultural Zone of Cross River State. The study ascertained the socio-economic characteristics of livestock farmers in the study area, Ascertained the effect of climate change on livestock production and identified the various adaptation strategies used by livestock farmers in the study area. Data were collected using a structured questionnaire. A multi-staged sampling technique was used in the study to generate 200 respondents. The data from the questionnaire were analyzed using descriptive statistics. The results showed that a higher proportion (80%) of respondents were males, (45%) of the respondents were between the ages of 45-50years, majority (65%) of the respondents were married (50%) had only secondary education, (50%) had between 6-10 children, majority (49%) had, income between 201,000-250,000 per annum while majority (50%) of the respondents had spent a period between 7-11 years in livestock farming. All the thirteen effect of climate change on livestock ranging from the reduction in growth performance of livestock to the causing of mortality in animals were positive. Rearing of livestock under intensive conditions ranked the first adaptation strategy adopted by livestock farmers while the disposal of livestock when the weather appears unfavourable ranked 13th. The study therefore recommends that livestock farmers should be encouraged to get loans to be able to practice adaptation strategies, indigenous breeds of livestock should be reared using proper breeding strategies and also, early warning and forecasting systems for livestock disease should be developed.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

After the Second World War, the developed countries of Japan, America, Britain, France Russia China etc. Started the industrial revolution. Many industries sprang up for the manufacturing of cars, tractors, machines and electronics. In the process, fossil fuels were used and greenhouse gases were emitted into the atmosphere.

1 Impact of Climate Change

There are noticeable consequences of climate change in Nigeria such as intense thunderstorms, widespread floods and incessant droughts. These impacts could manifest in food security challenges, damage to infrastructure and social dislocation. Additional impacts include threat to health as rising temperature could bring about diseases such as chronic heat rashes, Cerebro-Spinal Meningitis (CSM), stroke, malaria and other related diseases. Climate change affects every citizen, every part of our environment and our natural resources, and thus practically every aspect of our lives, our economy, our urban and sub-urban development patterns (Ekpoh 2009).

Impact on Agriculture

drought/eratic rainfall
-Rain comes too late
-it is heavy with windstorm
- Distribution of rain is not even
- flood destroys crops, houses and kill human beings.
- Heat waves kill pollinators, eggs and young of animals and birds.
- Dries up necter which pollinators seek in flowers
- Pollinators cannot forage under heavy rain

Short day and long day plants are affected (Aydinalp, 2008).

Flooding and Land Slides

Flooding of water bodies is a result of deforestation or removal of vegetation. In an intact forest, the leaves of the trees break the velocity of raindrops that come from the sky. Next, the water flows gradually from the leaves through the branches to the stem. Most of it then flows down the stem to the ground. The rain drops that come directly from the tree canopy to the ground collect on forest litter on the forest floor. The water then sips gradually into the ground. Thus percolation or infiltration is enhanced. Run off is reduced and flooding and siltation of rivers and streams is prevented.

On the other hand, where vegetation has been removed, rain drops from the sky strike bare soil directly, first the soil particles are loosened, and transported to river beds causing siltation of the rivers. Soil erosion also starts gradually from sheet erosion and progress to gully erosion. There is little or no percolation or infiltration of water and run-off is enormous causing serious floods. Anthropogenic activities exacerbate the impact of climate change (Lal, 2018).

For a number of years now Nigeria has been experiencing flooding of the major rivers and streams. Rivers Benue and Niger have been overflowing their banks on a yearly basis, the worst being the floods of 2012 in which many lives were lost and thousands of people displaced (See plates 14 and 15). In June 2012, a typical example of the devastating impact of Climate change occurred at Buanchor in Boki Local Government Area. Heavy rain fell in the area for three days non-stop. On the third day, as the people gathered at the village square to celebrate Cassava festival, the torrential rain caused land slide. The nearby Afi mountain virtually came down. The mountain had been weakened by constant burning, farming and logging making it prone to land slide. Big boulders as high as this roof came rolling down from the mountain leveling everything on their path. Trees were uprooted and ground to a pulp. Houses were swept away and some buried in the mud, bridges were swept away. When they came back from the playground Some people could not identify the position that their houses were located. Many wildlife species were killed, economic activities were grounded for months (See plates 24 to 29).

Plates 14: Floods in parts of Nigeria

Plates 15: Floods in parts of Nigeria

Evaluation of Artisanal Fishers Livelihood Sustainability Status along Shiroro and Kainji Dams, Nigeria.

Alhassan Y. John [1], Muhammad A. Muhammad[2], Ayeni M. Durojaye [3] and Elisha Ikpe[4]

1. Department of Agricultural Economics and Extension, Federal University Wukari, Taraba State, Nigeria; 2. Department of Agricultural Economics and Extension, Federal University of Agriculture Zuru, Kebbi State, Nigeria; 4. Department of Agricultural Economics and Extension, Land Mark University, Umu-aran, Kwara State, Nigeria; 3. Department of Geography education, Federal College of Education Odugbo, Benue State, Nigeria

ABSTRACT

The study evaluated artisanal fishers' livelihood sustainability status along Shiroro and Kainji Dams, Nigeria. Multi -stage sampling technique was used to select 402 respondents for the study. Semi - structured interview schedule was employed for data collection. Data were analysed using percentages, mean, standard deviation, sustainability index and Herfindel li velihood index. Most respondents (88.6%) were engaged in non -fishing livelihood activities especially crop farming and livestock rearing. The study found that respondents' access to fishing ground ($\bar{x}$ =4.66, SD= 0.61) and agricultural land ($\bar{x}$ =3.61, SD= 0.89) was sustainable. Social assets among the respondents indicated good entry point for policy advocacy and intervention. The sustainability index (0.57) of the respondents indicated that the livelihoods of the respondents are unsustainable. The Herfindel livelihood diversification index (LDI $_H$ = 0.43) revealed a high level of diversification among the respondents. The study concludes that livelihoods around Shiroro and Kainji Dams are unsustainable to the fishers' household. It is recommended that government should enhance fisheries activities by making available adequate mitigating strategies for increased and sustainable fish yield.

Keywords: Evaluation, Artisanal Fishers, Livelihood Sustainability Status, Fisheries Livelihood activities, Shiroro and Kainji Dams.

NANOBIOTECHNOLOGY AS AN ALTERNATIVE WASTE WATER TREATMENT MEASURE.

Hannah Edim Etta PhD

Department of Animal and Environmental Biology, Faculty of Biological Sciences, University of Cross River State, Calabar.

ABSTRACT

Wastewater is an offshoot of industrialization, modernization and advanced civilization which has come to stay. It is imperative that measures be put in place to to find ways of making wastewater reusable or at least harmless to the ecosystem. One of such very recent measures is the use of nanobiomaterials to remediate wastewater. Nanobiomaterials present a high surface to volume ratio, a high level of sensitivity and reactivity, are easy to come by and are highly functional. These qualities make them suitable for wastewater treatment application. A review of several such materials and their application in waste water treatment is being presented.

Keywords: Wastewater; Nanomaterial; Nanotechnology; Nanobiotechnology; water treatment

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Plate 16: Flood at Buanchor

Plate 17: Primary Schoool Buanchor submerged by mud in 2012

Plate 18: Trees uprooted by landslide

Plate 19: Bridge Swept away

POLUTION:

The word pollution is derived from Greek meaning "Defilement" pollution is an undesirable change in the physical, chemical or biological characteristics of our air, land and water that may or will harmfully affect human life or that of other desirable species, or industrial processes, living conditions, cultural assets or that may or will waste or deteriorate our raw material resources.

According to Royal Commission OR Environmental Pollution, pollution is the introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems damage to structure or amenity or interferences with legitimate uses of the environment.

The Federal Environmental Protection Agency (FEPA) Act of 1990, defined pollution as "man-made or man-aided alteration of chemical", physical or biological quality of the environment or beyond acceptable limits and "pollutants" shall be construed accordingly.

AIR POLLUTION

Atmospheric pollution occurs from natural and artificial causes; natural causes include dust from volcanic eruptions or the harmattan haze; artificial causes are mainly anthropogenic (i.e. man made). There causes have been intensified since the Industrial Revolution. The main artificial causes of atmospheric pollution have been through the burning of coal and through the increasing use of sulphur containing fuels.

The ozone layer in the atmosphere plays an important role in shielding the earth surface including the plants, animals and human being from the direct effect of radiation from the sun. Chlorofluorocarbon (CFC) are gases used in refrigeration and air conditioning units. Research suggests that the effect of CFC would be to allow more ultraviolet light to reach the earth which would result in an increase in the incidence of mutation resulting in diseases like skin cancer. It could also destroy the planktons, the bases of food chains in all aquatic ecosystems. The "green house gases" namely carbon dioxide (cO_2) and methane (CH_4), Nitrous oxide (NO_2) also act as agents that alter the ozone layer. They deplete the ozone layer and are known as ozone depleting substances (ODS). All these adersely interfere with the earth's cooling effect resulting in the so-called h "hole-in-sky" phenomenon.

Industrial activities, which include combustion processes, automatic engines, metallurgical processes of petroleum operations, scent manufacture, all produce pollutants either in the form of aerosols (.e.g dust, fluoride, fumes, mist, smoke and spray), gasses (e.g. SO_2, NO_2, CO, CO_2, NH_3, H_2S and NO) vapour (e.g. organic acids, solvents, hydrocarbons and odours).

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

A Comparative Analysis of Household Fresh Fish and Dried Fish Consumption Expenditure in Port Harcourt Metropolis, River State, Nigeria

Mercy Ebere Ndubueze-Ogaraku, Ebisine Patience Feke & *Oyoburuoma N. Ihunwo*
Department of Agricultural Economics and Agribusiness Management, Faculty of Agriculture, University of Port Harcourt, East-West Road, Choba, Port Harcourt, Rivers State, Nigeria
Corresponding email: mercy.onu@uniport.edu.ng

ABSTRACT

The study compared households' consumption expenditure on fresh fish and dried fish in Port Harcourt Metropolis, Rivers State, Nigeria. Socioeconomic characteristics of the fish consumers were described, differentials in expenditure of fresh fish and dried fish consumption was determined and effects of socio-economic variables on household's consumption expenditure of fish products were estimated. 80 respondents were randomly selected from 4 locations in the study area. Descriptive statistical tools such as percent, mean and multiple regression model were used in the data analysis. The results indicated that an average amount spent on fresh and dried per monthly were ₦992,250.00 and ₦1,166,400.00 respectively. Fish types consumed as fresh and dried among other fish products was mainly catfish with 57.5 % and 45.0% respectively. 87.5% of consumers purchased fresh fish product from open market while 53.8% purchased dried fish products from the open market. Regression results showed that monthly income, fish availability and age of the respondents were positive and statistically significant at 1% level while price of the commodity and occupation were also positive but statistically significant at 5% and 10% level respectively. The result indicated a z statistics value of 2.94 and -2.651 respectively with a p value of 0.000 for fresh and dried fish under a 2 tailed test respectively. Therefore, the null hypothesis that states that there is no significant difference in the quantity and expenditure of fresh fish and dried fish was statistically different. The study recommends that farmers should be encouraged to produce more cat fish, since it was the highest sought for and consumed fish products in the area.

Keywords: Comparative, fresh fish, dried fish, consumption expenditure, household.

Assessment of Socio-economic livelihood of Pangannu Village -Zaria Local Government Area, - Kaduna State.

Idris, Rakiya kabir
Federal college of Education Zaria.;rakidris@gmail.com

ABSTRACT

This research aims at assessing the rural Socio-economic livelihood of Pangannu Village of Zaria Local Government Area in Kaduna State. The objectives of the study include; to identify the livelihood activities, physical infrastructure and utilities, governing institutions and land tenure systems of Pangannu community. Reconnaissance Survey was carried out to acquaint the researcher with the area, random sampling technique was used to distribute 100 copies of questionnaires for this research. The research revealed that farming is the predominant occupation (57%) in the study area and 70% of the respondents source their materials locally. The research also showed that social infrastructure facilities are mostly in bad condition, The main source of electricity energy is the Power Holding Corporation of Nigeria (PHCN), the percentage of households with electricity is high with 99% of the respondents, roads within the village are mainly dirt filled and in bad condition. It is recommended that there is need for repair and construction of standard road network and drainage system to accommodate storm water flows, construction of standard healthcare and educational facilities.

Keyword: Socio-economic, livelihood,Community,Pangannu and Rural.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

After the Second World War, the developed countries of Japan, America, Britain, France Russia China etc. Started the industrial revolution. Many industries sprang up for the manufacturing of cars, tractors, machines and electronics. In the process, fossil fuels were used and greenhouse gases were emitted into the atmosphere.

1 Impact of Climate Change

There are noticeable consequences of climate change in Nigeria such as intense thunderstorms, widespread floods and incessant droughts. These impacts could manifest in food security challenges, damage to infrastructure and social dislocation. Additional impacts include threat to health as rising temperature could bring about diseases such as chronic heat rashes, Cerebro-Spinal Meningitis (CSM), stroke, malaria and other related diseases. Climate change affects every citizen, every part of our environment and our natural resources, and thus practically every aspect of our lives, our economy, our urban and sub-urban development patterns (Ekpoh 2009).

Impact on Agriculture

drought/eratic rainfall
-Rain comes too late
-it is heavy with windstorm
- Distribution of rain is not even
- flood destroys crops, houses and kill human beings.
- Heat waves kill pollinators, eggs and young of animals and birds.
- Dries up necter which pollinators seek in flowers
- Pollinators cannot forage under heavy rain
Short day and long day plants are affected (Aydinalp, 2008).

Flooding and Land Slides

Flooding of water bodies is a result of deforestation or removal of vegetation. In an intact forest, the leaves of the trees break the velocity of raindrops that come from the sky. Next, the water flows gradually from the leaves through the branches to the stem. Most of it then flows down the stem to the ground. The rain drops that come directly from the tree canopy to the ground collect on forest litter on the forest floor. The water then sips gradually into the ground. Thus percolation or infiltration is enhanced. Run off is reduced and flooding and siltation of rivers and streams is prevented.

There is also the problem of non-point pollution of air by agrochemicals especially pesticides e.g. DDT).

GAS FLARING

Gases produced during the drilling of crude oil are mainly hydrocarbon when burnt, they produce carbon dioxide and water vapour which go into the atmosphere. Other pollutant gasses such as SO_2, H_2S and No_2 are also produced in the process of gas flaring. The accumulation of these acid gases give rise to "acid rain". Flaring of petroleum associated gas in Nigeria contributed up to 0.02% of the world's CO_2 emissions.

Impact of Air Pollution

Air pollution is a significant risk factor for multiple health conditions including respiratory infections, heart disease and lung cancer according to WHO. The health effect caused by air pollution may include difficulty in breathing, sneezing, coughing, asthma and aggravation of existing respiratory and cardiac conditions.

Environmental Impact of Air Pollution

➢ ACID RAIN- PPt that is acidic So2, NO, NO2

➢ Impact- trees are killed

Table 1. Pollutants, Sources and their effect on the environment.

Pollutants	**Sources**	**Effects on vegetation**
Aldehydes	Photochemical reactions	Necrosis
Ozone (O_3)	Photochemical reaction of hydrocarbon and nitrogen oxides from fuel combustion, refuse burning, and evaporation from petroleum products.	Bleaching, pigmentation, growth suppression and early abscission
Nitrogen dioxide (NO_2)	High temperature combustion of coal, oil, gas and gasoline in power plants and internal combustion engines	Irregular white or brown lesions suppressed growth in many plants.
Amnonia and sulfur dioxide	Thermal power plants, oil and petroleum refineries	Bleached spots, bleached areas between veins, bleached margins, chlorosis, growth suppression. early abscission, reduction in yield and tissue collapse.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Prediction of Cumulative Infiltration Rates for Soils of Akoko-Edo Local Government Area, Edo State Using Philip's and Kostiakov's Infiltration Models

Agbai, Williams Perekekeme and Chokor, Joseph Utienyi

1. Department of Crop and Soil Science, Faculty of Agriculture, Niger Delta University, Wilberforce Island, Amassoma, Bayelsa State

2. Department of Soil Science and Land Management, Faculty of Agriculture, University of Benin, Benin City, Edo State, Nigeria

Contact address of Corresponding author: Email: agbaiwilliams@gmail.com

ABSTRACT

Divers soil studies have been carried out in Akoko Edo Local Government Area of Edo state, but with little or no available data on the infiltration capacity of the soils of the area. The study was carried out to determine the efficiency of Philips and Kostiakov's infiltration models to predict the cumulative rates for the soils of Akoko Edo Local Government Area of Edo State. The result showed that Philip's model predicted a cumulative infiltration of 24.2 cm for Ikpeshi soil, 67.6 cm for Unem-Nekhua and 27.1 cm for Ososo soils. Kostiakov's infiltration model predicted a cumulative infiltration of 28.1 cm for Ikpeshi, 66.4 cm for Unem-Nekhua and 26.3 cm for Ososo soils. The Index of infiltrability for Ikpeshi soils was 19.81 cm/hr, Unem-Nekhua (49.61 cm/hr) and Ososo soils (21.46 cm/hr). The Coefficient of Variation for both Philip's and Kostiakov's model was lower than one (1) for the study areas. The Coefficient of Determination for Philip's model recorded the higher values (0.94, 0.98, 0.99) over Kostiakov's model (0.88, 0.83, 0.95) across the three study areas (Ikpeshi, Unem-Nekhua and Ososo). Philip's model showed greater efficiency as its Root Mean Squared Error (0.37 – 2.20) was lower than that of Kostiakov (3.15 – 5.41). The efficiency of Philip's model was reiterated as its Nash Sutcliffe Model Efficiency value was higher and closest to 1 (0.921 – 0.998) than Kostiakov model (0.735 – 0.918). The efficiency indexes for both models showed that they can estimate cumulative infiltration for the soils of Akoko Edo Local Government Area but with Philip's model having the higher efficiency. Irrigation designs can be carried out for the Ikpeshi soils after soil amendment has been done. Ososo and Unem-Nekhua soils can efficiently utilize water with limited water loss.

Keywords: sorptivity, transmissivity, water movement, prediction

The Impact of Sea Robbery on Artisanal Fish Production in Akwa Ibom State, Nigeria

Ibok, Ibanga Bassey & Nyong, Eteyen Edet

Department of Agricultural Economics and ExtensionAkwa Ibom State University, Obio Akpa.

Email: ibangus4god@gmail.com

ABSTRACT

The study focused on the Impact of Sea Robbery on Artisanal Fish Production in Akwa Ibom State, Nigeria. The specific objectives were to compare the income of the fisher-folks affected by sea robbery and those not affected; estimate and compare costs and returns in artisanal fish production by both groups of fisher folks; and determine and compare the effect of socio-economic characteristics on the level of fish output of fisher folks affected by sea robbery and those not affected. Multi-stage random sampling technique was used to select the sample size of 202 respondents (fisher folks) for the study area. Data were collected using a structured questionnaire and interpersonal interviews. The data were analyzed using descriptive statistics such as means, percentages, frequency, and table, while inferential statistics such as student t-test and multiple regressions, were employed to test the hypotheses, also budgetary technique was used to costs and returns. Distribution of respondents by income shows the mean income of ₦764,534.65 for fisher folks not attacked by sea robbers, while fisher folks attacked by sea robbers has the mean income of ₦351,990.10. Costs and returns analysis revealed returns on investment (ROI) of ₦0.55 for fisher folks attacked by sea robbers, meaning at every one naira invested in the fish production, the profit is ₦0.55 while returns on investment (ROI) revealed ₦0.79 for fisher folks not attacked by sea robbers, meaning at every one naira invested in the fish production, the profit is ₦0.79. The multiple regression results for both fisher folks attacked and those not attacked by the sea robbers on the output (k.g) and socio-economic characteristics shows a positive relationship for both groups. The study recommended increase surveillance and patrol along waterways in the study area especially rural fishing settlements. This will assist to abate the surge of sea robbery which has high level of negative interference with fishing activities in the study area.

Keywords: Robbery, Artisanal, Interpersonal, fisher folks

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Chlorine (Cl_2)	Leaks in chlorine storage tanks, hydrochlor ic acid mists	Affects epidermis and mesophyll of plants.
Hydrogen fluoride	Phosphate rack processing, aluminum industry and ceramic works and fiberglass manufacturing	Epidermis and mesophyll of grapes, large seed fruits, pimes and fluorosis in animals.
Pesticides and Herbicides	Agricultural operations	Defoliation dwarfing, curting, twisting, growth reduction die back.
Particulates	Cement industries, thermal power plants, blasting crushing and processing industries	Affects quality of plants, redness v igour and hardness and interferences with photosynthesis due to plugging leaf stomata and blocking of light.
Mercury (Hg)	Processing of mercury containing ores, burning of coal and oil	Greenhouse crops, and floral parts of all vegetations are affected, a bscission and growth reduction occur in most plants,

DISEASE	**SYMTOMS**
Epinasty	Downward curling of leaf
Abscission	Dropping of leaves
Narcrosis	Dead areas on leaf
Chlorosis	Loss or reduction of chlorophyll causing yellowing of leaf
Epinasty	Downward curling of leaf
Abscission	Dropping of leaves

OILSPILLAGE

Energy from oil: Oil has been used as fuel for transportation and for electricity generation in factories, to drive machineries, produce heat and by-products such as asphalt, wax as in crayons and candles; medicines, ink, plastics, fertilizers, pesticides, paints and vanishes among others. All of these have industrial and economic utilities.

Presently, the world uses about 2.73 billion gallons of oil per day and much of these have to be transported over considerable distances. About 32 billion gallons of oil are at sea, everyday, being transported and in the course of this and other processing conditions, spillage do occur to degrade the environment. Oil spillages are possible on storage tanks, pipelines, oil wells, transportation in tankers and vessels. Oil spillage could result from:

1. Accidents through carelessness
2. Unavoidable catastrophes relating to weather and earthquakes and
3. Intentional spills resulting from terrorism, war, vandalism or careless dumps.

Within the first two days of a spill, 1 ppm of oil could cause toxic exposure for invertebrate larvae; 1000 ppm for fish. Birds' feather, water repellency can be significantly reduced while animal could lose their insulating properties.

NOISE POLLUTION

Any sound which by reason of its intensity, interferes with speech is damaging to hearing or otherwise is annoying is referred to as noise. Noise therefore is undesirable due to be adverse effects on human beings and their environment including land, structures, domestic animals, wildlife and ecological system.

Noise can cause hearing changes and losses, interfere with speech communication and can cause annoyance. Additional effect of noise include disruption of sleep and rest, reduction in work performance, property devaluation resulting from sonic booms, and wild animals.

Sources of Noise

It is however difficult to accurately define noise because one person's noise may be another person's pleasure. E.g. rock or some fuji music may be enjoyable to one person, nerve-wracking to another. The louder a sound, the more likely it is to be considered a noise.

Industrial or workplace noise from occupational exposure or workers to noise from industrial machines or exposure of neighborhood population to noise from factories nearby.

Construction and demolition noise in factories also generate intenseand intrusive noise. Constitution equipment are operated by loud diesel engine and air compressors.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Economic and Environmental Impact of Gully Erosion on Croppable Land in Calabar Metropolis, Cross River State, Nigeria

*Edet, Eyo O; Effiong, Mfonobong O.; Agbachom, Emmanuel E. and Uwah, Eno D.
Department of Agricultural Economics,University of Calabar, Calabar, Nigeria,
Correspondence: eyoorok53@yahoo.com; mfonnkang@yahoo.com

ABSTRACT

The study assessed the economic and environmental impact of gully erosion on croppable land in Calabar Metropolis, Cross River State, Nigeria. It investigated the rising cases of extreme rainfall conditions that culminated in severe gully erosion menace leading to the degradation of the environment including croppable agricultural lands, buildings that have rendered people homeless. Specifically, the paper examined the impact of gully erosion menace on leafy vegetation farmers, building infrastructure and the distortions of the aesthetics in the Calabar Metropolis and to take photographic view of the degradable areas within the Metropolis. Data for the study was obtained using the survey approach which includes questionnaire administration, observations, interviews and photography. Fifty (50) questionnaires were purposively administered to affected residents including farmers whose farmland had been swept(15), those whose farmland are under threats (10), those whose buildings have been swallowed by the gullies (15) and those whose buildings are under various degrees of threats (10) in the study area. GIS was used to record the coordinates of each of the gully erosion sites. The study revealed that respondents whose farmlands had been swept away by the gully and those whose buildings had been swallowed completely constituted 30% (monthly income category between #15,000.00 – #35, 000.00 and #120,000.00 – #150,000.00 respectfully) of the sampled residents while those whose farmlands are under threats and whose building are under varying degrees of threats constituted 20% (income category between #151,000.00 – #180,000.00 per month) within the study area. Photographs of the gullies in the vulnerable sites covering Calabar Metropolis were taken and documented. The study showed various degrees of impact of gully erosion on buildings and farmlands in Edim Otop, loss of crops and croppable land valued at millions of naira in Ikot Ekpo, Nyak Assang, Atakpa and Ikot Awatim Gullies. The paper is strongly advocating institutional and infrastructural support systems in the area of Environmental Impact Assessment as a policy, creating ecological trust funds, tree planting, legislations, ab initio.

Key Words: Croppable land, Economic and Environmental Impact, Calabar Metropolis, Gully Erosion

ASSESSMENT OF RURAL HOUSEHOLDS' WILLINGNESS TO PAY FOR HEALTHCARE INSURANCE IN BAUCHI STATE OF NIGERIA

Sadiq, Mohammed Sanusi[1] and Ahmad, Muhammad Makarfi[2]

[1]*Department of Agricultural Economics and Extension, FUD, Dutse, Nigeria*

[2]*Department of Agricultural Economics and Extension, BUK, Kano, Nigeria*

Author's correspondence address: Sadiq, Mohammed Sanusi, Department of Agricultural Economics and Extension, FUD, P.M.B. 7156, Dutse, Nigeria

Email: sadiqsanusi30@gmail.com

ABSTRACT

Contrary to previous studies on agriculture, cross-disciplinary studies on the value of health risk reduction (VHRR), value of statistical life (VSL), and value of statistical case (VSC) are extremely uncommon in Nigeria and the study area specifically. In light of the lack of information, this study will likely use the VSL and VSC methodologies to address the "benefit transfer" on environmental health risk reduction linked to morbidity incidence within the agricultural sector. Consequently, this research aimed at determining rural households' willingness-to-pay (WTP) for healthcare insurance in Bauchi State of Nigeria. Using an easy-cost route approach, cross-sectional data were elicited by a well-structured questionnaire coupled with an interview schedule from a total of 319 households selected through a multi-stage random sampling technique. Besides, to achieve the specified objectives, the collected data were subjected to both descriptive and inferential statistics. Empirically, malaria and typhoid were the major morbidity affecting the households and averagely cost a household an economic whooping sum of N70, 944.70 per month. Consequently, majority, though marginally above half of the sampled households, showed interest in social healthcare insurance in order to have access to better healthcare services. However, premium rate is a portend threat to sustainability of the scheme as evident by its inverse relationship with WTP, thus a spoon-feeding premium rate at take-off is suggested pending when beneficial impact of the scheme manifested in the lives of the majority in the study area. Besides, old age, poor agricultural holdings and lack of credit facilities were the stumbling blocks to WTP for healthcare insurance in the study area. Therefore, the study advises policymakers to improvise social safety health coverage for the old-aged households and provide adequate credit facilities- leverage for income generation, thereby enhancing the scope and sustainability of social healthcare insurance in the study area.

Keywords: Healthcare; Insurance; Morbidity; WTP; Rural households; Nigeria

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Other sources of noise include, highway vehicles, aircraft, railway systems, internal combustion and building equipment. They also include noise from typewriters and chain saws.

Noise measurements are expressed by "sound pressure level" (SPL) which is the logarithmic ratio of the sound to a reference pressure level. The reference pressure level is 0.0002 ubar, the threshold of human hearing. SPL is expressed as a unit of power known as decibel (dB).

Known technologies for limiting noise exposure include placing walls or screen between worker and source of noise, wearing ear plugs and muffs and using sound proof equipment, turbo devices etc. when possible.

WATER POLLUTION

When a water body is loaded with waste material or heat such that its natural ability for self-purification can no longer cope with the situation, it is polluted.

Good quality water is water which is convenient and safe to use and palatable for drinking purposes. It should be clean, tasteless, colourless, ordourless and free from poisonous, corroding, staining substances and disease causing organism.

Indices used to measure quality standards are dissolved oxygen, chlorine, coliform bacteria, turbidity, PH, total alkalinity phenols, detergents, total hardness, temperature, floating debris, grease and oils and toxic chemicals.

EUTROPHICATION

The gradual increase in the concentration of phosphorous, nitrogen and other plant nutrients in an ageing aquatic ecosystem such as a lake. The productivity or fertility of such ecosystem increases as the amount of organic material that can be broken down into nutrients increase. This material enters the ecosystem primarily by run-of from land that carries debris and products of the reproduction and death of terrestrial organisms.

Blooms or great concentration of algae and microscopic organisms often develop on the surface, preventing the light penetration and oxygen absorption necessary for underwater ecosystem.

Cultural eutrophication occurs when man speeds up the aging process by allowing excessive amounts of nutrients in such forms as sewage detergents and fertilizers to enter the ecosystem.

SOLID WASTE

This refers to any useless, unwanted or discarded material that is not liquid or gas. Solid waste is material of solid or semisolid character the possessor no longer considers of sufficient value to retain.

Nature of Solid Waste

Solid waste can be divided into two types according to their sources, the industrial and commercial waste and the domestic waste. It can also be classified into two in line with the nature of waste:

1. Biodegradable and
2. Non-biodegradable waste

Industrial and commercial solid waste are waste generated in the course of manufacturing and commercial processes and they include wastes paper, pieces of glass, saw dust, metal scraps, bottles, cans, cement dust etc.

Domestic solid waste on the other hand are by-products of house-keeping activities and consumption e.g. leaves, brooms, left-over foods, old clothes, etc. some of these wastes may be toxic, inflammable or not, biodegradable or not.

Biodegradable wastes are domestic or industrial wastes that can be rapidly decomposed by natural processes or engineering systems. They include items such as leaves, bones, rags and various food items.

Non-biodegradable waste are substances that cannot be broken down or decomposed by natural means. Examples are toxic waste, cans, bottles, metal chips, nails and plastic materials polythene bags constitute very serious environmental problems in Nigeria. The long-term effect on the soil may be very devastating as water will neither percolate nor will soil processes operate efficiently.

Agricultural Waster

Normally, crop residues and animal manure are returned to the land, but in recent times, concentration of activities has resulted in a concentration of waste that cannot be absorbed by the land. Fruit or vegetable cannery has been large of unwanted materials. Similarly, intensive threshing of grain in towns generate waste. In some cities, poultry and pigs are kept in factory-like condition where is no local site to spread dressing of car cases is usually done near the market for the meat. Most of these towns and cities have no processing plants to utilize the animal by-products. The unwanted parts are dumped in an open land.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Effects of N PK fertilizer on the growth and yield of Basil plant *(Ocimum gratissimum)*

+AGBA, O.A, Abam Prince, Kekong A.M., Aboh, A.A, and Ejie, T

+Department of Agronomy, Faculty of Agriculture and Forestry, Obubra, Cross River University of Technology, Cross River State.

+Corresponding Author E.mail-aakongwubel@yahoo.com

ABSTRACT

Field experiments were carried out to determine effects of N P K 20:10:10 fertilizer rates on the growth and yield of Basil plant or Scent leaf (Ocimum gratissimum) in Cross River University of Technology, Teaching and Research farm, Department of Agronomy, Obubra, Cross River state in 2021 and 2022 cropping seasons. The experimental design was a randomized complete block design. Treatments were seven rates of NPK 20:10:10 fertilizer at 0, 50, 100, 150. 200, 250 and 400kg/ha replicated three times. Results showed that application of NPK 20:10:10 fertilizer significantly increased the growth and yield of Basil plant or Scent leaf (Ocimum gratissimum). Nitrogen at 400 kg/ha promoted the tallest plant height and highest number of leaves and branches per plant. The highest Fresh leaf yield and dry matter of plant fractions were obtained in plots treated with 250kg /ha of NPK 20:10:10 fertilizer in both 2021 and 2022 cropping seasons. Based on this result farmers are advised to apply 250kg/ha of NPK 20:10:10 fertilizer in cultivating Basil plant or Scent leaf (Ocimum gratissimum) for optimum growth and yield under Obubra ultisol condition of Cross River State.

Prevention of Malnutrition through Food Security and Sustainable Agriculture: SDG2

*Ugor, Mcvin A. **Odey, Michael O. ***Oko, Blessing O. ****Okete, James A.
*Department of Biochemistry, University of Calabar
**Department of Biochemistry, University of Calabar
***Department of Mass Communication, University of Nigeria
****Department of Zoology, Joseph Sarwuan Tarka University, Makurdi
amcvin@gmail.com; oketeagada@gmail.com; ogerioko@gmail.com

ABSTRACT

Malnutrition is one of the world's major public health and development concerns. A report by the National Nutrition and Health Survey (2018) indicates that in Nigeria, 37 percent of children are stunted, 18 per cent suffer from wasting, while twenty-nine per cent suffer from underweight. The prevalence of malnutrition in Nigeria goes beyond the ability to purchase food. It is ingrained in the structural, cultural and physiological predispositions that hinder Nigerians from considering nutrition as a priority in the light of other challenges, insecurity inclusive. The eradication of hunger and all forms of malnutrition therefore requires the Sustainable Development Goal two targets and indicators to be aligned with the four pillars of food security, which calls for availability of sufficient food, having the economic and physical means to obtain a nutritious diet, having adequate dietary intake, as well as stability; this paper underscored the need to prevent malnutrition through food security and sustainable agriculture, with focus on sdg2. While highlighting the need for the relevant agencies to effectively combat insecurity in the country, the paper called for the placement of children with severe acute malnutrition on therapeutic feeding programmes, sustaining inter-governmental partnerships in tackling hunger, and providing sustainable agricultural services through innovative programmes, as part of ways to achieve SDG2 targets.

Keywords: Malnutrition, Food Security, Sustainable Agriculture, Sustainable Development,

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

OTHER URBAN WASTE

Construction Waste: waste at construction sites can be a dealt with on site in most rural areas; but as buildings increase in size and complexity, the waste gets more. A multi-store building produces a vast quantity of waste materials.

Hospital waste: Clinics and dressing stations have waste which are obviously dangerous unless treated carefully. Contaminated materials consist of surgical dressing of all kinds (especially those from suppurating sores), after birth and surplus or expired drugs. Disposable syringes are now commonly used and are a dangerous attraction of children if freely discarded.

Open drains are used as receptable for rubbish in most of our cities. Because of the high intensity of rainfall, they are usually roadside channels rather than underground sewers and have to be constantly cleared of accumulated sand, which is contaminated of domestic waste and human excreta.

EFFECT OF POLLUTION ON WILDLIFE AND BIODIVERSITY

Many heavy metals, toxic s, persistent organic poolutants (POPs), and other air pollutants affect wildlife by entering the food chain and damaging the supply and quality of food.

Once consumed, many of these pollutants collect and are stored within the animal's tissues. 9Airpollution effect on wild animals-Canada https://www.canada.ca> ecosystem (2012)

Pollutants, Sources and their effect on the environment.

Pollutants Sources Effects on vegetation Aldehydes Photochemical reactions Necrosis Photochemical reaction of hydrocarbon and nitrogen oxides from fuel combustion, refuse burning, and evaporation from petroleum products.

Bleaching, pigmentation, growth suppression and early abscission Nitrogen dioxide (NO2) High temperature combustion of coal, oil, gas and gasoline in power plants and internal combustion engines Irregular white or brown lesions suppressed growth in many plants. Amnonia and sulfur dioxide

Thermal power plants, oil and petroleum refineries Bleached spots, bleached areas between veins, bleached margins, chlorosis, growth suppression. early abscission, reduction in yield and tissue collapse.

Chlorine (Cl2) Leaks in chlorine storage tanks, hydrochloric acid mists Affects epidermis and mesophyll of plants. Hydrogen fluoride Phosphate rack processing, aluminum industry and ceramic

works and fiberglass manufacturing affect Epidermis and mesophyll of grapes, large seed fruits, pines and fluorosis in animals.

Pesticides and Herbicides in Agricultural operations cause defoliation dwarfing, curling, twisting, growth reduction and die back.

Particulates from Cement industries, thermal power plants, blasting crushing and processing industries Affects quality of plants, redness vigour and hardness and interferences with photosynthesis due to plugging leaf stomata and blocking of light.

Mercury (Hg) Processing of mercury containing ores, burning of coal and oil Greenhouse crops, and floral parts of all vegetations are affected, abscission and growth reduction occur in most plants,

Due to the complex nature of relationships between organisms in an ecosystem, the release of pollutants into the environment can not only kill organisms outright, but they can also change the conditions and processes occurring within a system and result

THE WAY FORWARD

CONSERVATION OF NATURAL RESOURCES

Conservation is essential to man, because life depends on the proper functioning of the biosphere the relatively narrow zone of air, water, soil and rock in which all life on earth exists. The ultimate purpose of conservation is to maintain the biosphere in a healthy operating condition.

Several species of plants and animals have disappeared at an alarming rate during the last 200-300 years. It is estimated that about 25,000 species of plants and animals are now on the verge of extinction. This is due to reckless hunting of birds, mammals, reptiles, fishes and amphibian and overgrazing of grassland and deforestation.

Aims and objectives of Conservation:

- Preservation of the country side as it is, essentially as an area of pleasure
- Preservation of Natural communities and their species of plants and animals for scientific study as living museums of wildlife.
- To use land wisely, that is, to ensure that it produces enough natural products such as food, timber and minerals for human needs as well as the non-material benefits of recreation amenity and scientific study.
- To preserve portions of natural systems as veritable sources of genetic materials multiplication and to save potentially useful but currently unknown plant species which would otherwise be permanently lost.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

INSECTICIDAL EFFECTS OF *Moringa oleifera* (DRUMSTICK) PLANT ON MAJOR PESTS OF OKRA (*Abelmoschus esculentus*) IN CROSS RIVER STATE

[1]Abo Iso Nta, [1]Eneawan E. Oku, [1]Inyang Godwin Ikpeme,
[1]Daniel Bassey, [2]Daniel Offiong Etim, [2]Rosemary Anietie Bassey, and [3]*Bassey Etta Agbo
[1]Zoology and Environmental Biology Department, Faculty of Biological Sciences, University of Calabar, Calabar, Nigeria
[2]Botany Department, Faculty of Biological Sciences, University of Calabar, Calabar, Nigeria
[3]Microbiology Department, Faculty of Biological Sciences, University of Calabar, Calabar, Nigeria

ABSTRACT

The use of synthetic insecticides in pests control has been one of the contemporary issues in the world because of its hazardous effects on man and his environment. This led to the idea of investigating the efficacy of plant products as alternative for the control of pest.Survey was carried out to assess the distribution and occurrence of major insect pests of okra (Abelmoschus esculentus) in four Local Government Areas (Calabar South, Akpabuyo, Biase and Odukpani) in Cross River State. Laboratory and supporting field studies were conducted to test the insecticidal effect of powdered preparation of Moringa oleifera on major insect pests of okra. Fifty grams (50 g) of different powdered preparations of different parts and their combination (prepared in the ratio of 1:1:1:1:1) were mixed separately 50 cl with water and applied on the okra plant using a dispenser. Data were collected before and after 1st and 2nd application of plant substance. Five grams (5g) of plant powders, their combination and one selective synthetic insecticide were mixed with two hundred grams (200g) okra seed to comparetheir repellent, anti oviposition and adult mortality effect on insect pests of okra. Results of the surveillance study revealed four orders, seven families and seven species of insect pests including whiteflies (Bemisia tabaci, Gennadius), aphids (Aphis gossypii, Glover), beetles (PodagricaSjostedti, Sjostedt), mealy bug (Phenacoccussolenopsis, Tinsley), wingless grasshoppers (Phaulacridium vittatum, Hilger), leaf-rollers (Haritalodes derogate, Fabricius) and fruit-borers (Helicoverpa armigera, Hubner) as the most prominent pests causing damage at various growth stages of the crop. Among all these insect pests of okra flea beetles were the most prevalent and most destructive insect pest. Comparison of aphid infestation and occurrence in the four Local Government Areas surveyed showed highest counts (36.52%) in Calabar South than any other with lower infestation in Biase. Highest Mealy bug counts were observed in Akpabuyo (37.78%) and least (10.49%) in Biase. However, other insect pest did not show any significant difference ($P<0.05$) in their occurrence.Flower powder preparation (FPP) was found to be the most effective against okra pests as it recorded overall least pest infestation (27.00%). Results also revealed significant reduction in the level of insect infestation in the plots treated with leaf powder preparation (LPP) 28.05%, bark powder preparation (BPP) 37.52%, combine powder preparation (CPP) 37.75%. Root powder preparation was not effective in reducing pest population. FPP recorded the highest repellence (5.21 cm), highest adult mortality (20.24%) and highest inhibition rate (58.82%) which was observed to be significantly different ($P<0.05$) from other plant powder preparations. M. oleifera powders especially the flower powder preparation is therefore suggested for management of insect pest of okra both in the field and during storage as they are easily sourced for and economical. Thus if mass produced, could be accessible to rural farmers and serve as suitable alternatives to synthetic insecticides in insect pest control and management of stored grains.

Keywords: Insecticidal effects, pest, okra, *Moringa oleifera* powders and hazardous

Evaluation of Artisanal Fishers Livelihood Sustainability Status along Shiroro and Kainji Dams, Nigeria

Alhassan Y. John [1], Muhammad A. Muhammad[2], Ayeni M. Durojaye[3] and Elisha Ikpe[4]

1. Department of Agricultural Economics and Extension, Federal University Wukari, Taraba State, Nigeria
2. Department of Agricultural Economics and Extension, Federal University of Agriculture Zuru, Kebbi State, Nigeria.
3. Department of Agricultural Economics and Extension, Land Mark University, Umu-aran, Kwara State, Nigeria
4. Department of Geography education, Federal College of Education Odugbo, Benue State, Nigeria

ABSTRACT

The study evaluated artisanal fishers' livelihood sustainability status along Shiroro and Kainji Dams, Nigeria. Multi -stage sampl ing technique was used to select 402 respondents for the study. Semi - structured interview schedule was employed for data collection. Data were analysed using percentages, mean, standard deviation, sustainability index and Herfindel livelihood index. Most respondents (88.6%) were engaged in non -fishing livelihood activities especially crop farming and livestock rearing. The study found that respondents' access to fishing ground ($\bar{x}$ =4.66, SD= 0.61) and agricultural land ($\bar{x}$ =3.61, SD= 0.89) was sustainable. Soc ial assets among the respondents indicated good entry point for policy advocacy and intervention. The sustainability index (0.57) of the respondents indicated that the livelihoods of the respondents are unsustainable. The Herfindel livelihood diversificati on index (LDI_H = 0.43) revealed a high level of diversification among the respondents. The study concludes that livelihoods around Shiroro and Kainji Dams are unsustainable to the fishers' household. It is recommended that government should enhance fisheri es activities by making available adequate mitigating strategies for increased and sustainable fish yield.

Keywords: Evaluation, Artisanal Fishers, Livelihood Sustainability Status, Fisheries Livelihood activities, Shiroro and Kainji Dams.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

The scope of Conservation therefore is

1. To ensure perpetual supply of raw materials renewable or non-renewable for society
2. To promote ecosystem equilibrium through optimal development of its component parts of flora and fauna.
3. To ensure a stable and high quality environment essential to man's survival on earth.
4. To preserve portions of the natural systems for scientific study.

PROBLEMS IN RESOURCE CONSERVATION

In carrying out conservation of natural Resources, the manager is confronted with a number of problems.

1. Poverty. For a population that is poor with low standard of living, conservation is of limited importance. In such a country, emphasis is on consumption. The tendency will be to exploit the resource at a fast rate to improve the present standard of living. In such societies, time discounting by consumers is a high level. This means that the people will be willing to conserve.
2. Some natural resources assume the character of common property.
3. In Such cases, the resource will be tended to be depleted. This means that if there is a forest with no particular person in control, anybody can go there and exploit it. The resource is said to have a common property right. This is different from communal property.. In this case, there is tendency to deplete rather than conserve the resource.
4. Market Imperfection. There are various sources of market imperfection inmany developing countries. Thus, the tendency is towards depletion of resources. Ciriancy Wanthrup (1952) pointed out the imperfection in pricing of Natural Resouces. If the price that a timber user has to pay is very low, he will exploit heavily ton avoid paying a higher price in future. Thre could also be uncertainty in terms of existing contracts due to change of governments. The users tend to overexploit at the present.Lack of schools, motorable roads electricity and other infrastructure in the rural areas all may lead to overexploitation of natural resources.
5. Ignorance. Consumers may be generally ignorant of the adverse effect of their resource use. The average shifting cultivator is not aware of the dangers of exploiting the forest but is concerned with cultivating his food crops. Thus, ignorance sometimes reinforced by consumers and traditions constitute a serious problem in resource depletion.

Devrlopment. Promotion of general goal of development sometimes brings about resource depletion. It is ofeten asked: Ïs resource depletion and development compatible". According to Ciriancy-Wanthrup and Bishop(1975), the objectives of conservation is to prevent depletion of

The scope of Conservation therefore is

1. To ensure perpetual supply of raw materials renewable or non-renewable for society
2. To promote ecosystem equilibrium through optimal development of its component parts of flora and fauna.
3. To ensure a stable and high quality environment essential to man's survival on earth.
4. To preserve portions of the natural systems for scientific study.

PROBLEMS IN RESOURCE CONSERVATION

In carrying out conservation of natural Resources, the manager is confronted with a number of problems.

1. Poverty. For a population that is poor with low standard of living, conservation is of limited importance. In such a country, emphasis is on consumption. The tendency will be to exploit the resource at a fast rate to improve the present standard of living. In such societies, time discounting by consumers is a high level. This means that the people will be willing to conserve.
2. Some natural resources assume the character of common property.
3. In Such cases, the resource will be tended to be depleted. This means that if there is a forest with no particular person in control, anybody can go there and exploit it. The resource is said to have a common property right. This is different from communal property.. In this case, there is tendency to deplete rather than conserve the resource.
4. Market Imperfection. There are various sources of market imperfection inmany developing countries. Thus, the tendency is towards depletion of resources. Ciriancy Wanthrup (1952) pointed out the imperfection in pricing of Natural Resouces. If the price that a timber user has to pay is very low, he will exploit heavily ton avoid paying a higher price in future. Thre could also be uncertainty in terms of existing contracts due to change of governments. The users tend to overexploit at the present.Lack of schools, motorable roads electricity and other infrastructure in the rural areas all may lead to overexploitation of natural resources.
5. Ignorance. Consumers may be generally ignorant of the adverse effect of their resource use. The average shifting cultivator is not aware of the dangers of exploiting the forest but is concerned with cultivating his food crops. Thus, ignorance sometimes reinforced by consumers and traditions constitute a serious problem in resource depletion.
6. Devrlopment. Promotion of general goal of development sometimes brings about resource depletion. It is ofeten asked: Ïs resource depletion and development compatible". According to Ciriancy-Wanthrup and Bishop(1975), the objectives of conservation is to prevent depletion of natural resources beyond the crirical zone of irreversibility. Conservation is not necesarrily anti-development. It aims for orderly development in the frame of stable environment.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Sustainable Management of Waste with Zero Discharge and Resource Recovery

Naveen Dwivedi and Shubha Dwivedi
Department of Biotechnology, IIMT University, Meerut, India; naveen.dwivedi@gmail.com

ABSTRACT

Sustainable waste management states to the collection, transportation, valorization, and disposal of the different types of waste, in a way that does not loom the human health, environment or future generations. Zero liquid discharge (ZLD) provides a sustainable approach for conservation of water resources by the process of reuse and recycle of wastewater. The principle of "zero discharge" is recycling of all industrial wastewater. This means that wastewater will be treated and used again in the process. The industrial production of ethanol by fermentation results in the discharge of enormousamount of highstrength liquid wastes. The aqueous distillery effluent stream known as spent washis one of the most polluted waste products to dispose because of the low pH, dark brown colour, high temperature, high ash content and high percentage of dissolved inorganic and organic matter with high COD and BOD values. Due to highly colored nature of spent wash; it can block out sunlight, thus reducing oxygenation of the water by photosynthesis and hence becomes harmful to aquatic life. Spent washhas a high pollution load which would result in eutrophication of polluted water sources. Distillery waste water without any treatment can result in depletion of dissolved oxygen in the receiving water streams and poses serious threat to the aquatic flora and fauna. Zero Liquid Discharge (ZLD) is the most demanding target since the cost and challenges of recovery increase as the wastewater gets more concentrated. This review paper presents a detailed study of biological treatment process of waste and wastewater and role of various microorganisms and their enzymes in the wastewater treatment and resource recovery.

Key words: Sustainable waste management, biological treatment, valorization, spent wash, ZLD

Storage Losses Intensity of Paddy Rice in Benue State, Nigeria: Estimate, Determinants, and Policy Implications

A. M. Okeke[1] Z.T. Nyiatagher[1]
[1]Department of Agribusiness, Joseph Sarwuan Tarka University, Makurdi, Benue State, Nigeria
Email: anayomichaelokeke@gmail.com

ABSTRACT

The study investigated the intensity of storage losses of paddy rice in Benue State, Nigeria. Data for the study were collected from 246 rice farmers selected from 12 communities and six Local Government Areas using multistage sampling technique. The collected data were analysed using descriptive statistics and multiple regression model. The result on the intensity of storage losses of paddy rice showed that on average, 11.34% of paddy rice produced in the study area were lost during storage. The multiple regression analysis showed that age (β = -0.71), level of education (β=0.61), farming experience (β=0.63), annual income (β=0.51), and involvement in off-farm business (β=0.31) influenced intensity of post-harvest storage losses of paddy rice in the study area. The study recommended that policies and programmes aimed at minimizing storage losses of paddy rice should take into consideration the socio-economic characteristics of the rice farmers especially their age, educational level, farming experience, annual income, and off-farm activities involvement, in their design and implementation; and the State ministry of agriculture should annually organize workshops targeted at training of rice farmers on post-harvest handling and storage of paddy rice with the objectives of acquiring skills in timing of harvest, grain drying, moisture management, and safe storage.

Key words: Intensity, Storage, Losses, Paddy Rice, Benue State, Nigeria

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

REFERENCES

Aydinalp, C. and Cresser M. S. (2008).Effect bof Global Climate Change on Agriculture. American Urassin Journal of Agric and Env. Science 3(5)672-676.

Ciriancy-Wanthrup S. V and BishopR.C.(!952). Common Property as a concept in Natural Resource Policy. Natural Resources Journal 15.

Ecosystem (2012). https://www.Canada Ca Retrieved 30th September 2023.

Ekpoh I. J. (2009). Climate, Society and Environment. Calabar. St. Paul Publishing Company.

Federal Environmental Protection Agency Act 1990. Federal Ministry of Environment.153 pages.

IPCC (Intergovernmental Panel on Climate Change). Climate Change 2001: The Scientific Basis; Cambridge University Press: Cambridge, UK, 2001.

IPCC (Intergovernmental Panel on Climate Change). Climate Change 2001: The Scientific Basis; Cambridge University Press: Cambridge, UK, 2001.

Lal ((2018). Soil Carbon Sequestration to mitigate Climate Change and Advance Food Security. Soil Science 172(12) 943-956

Nigrian Meteorlogical gency (NIMET) 2008) Annul Report.

TECHNICAL SESSION FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

S/N	TOPIC/AUTHOR(S)	REMARKS
KNS/01	Climate Change, Floods, Food Security, Policy Framework And Biodiversity Prof. Ani Nkang Former. Vice-Chancellor, Arthur Jarvis University, Akpabuyo, Cross River State.	KEYNOTE SPEAKER
LS/002	Effect Of Climate Change On Food Security And Environmental Resources.Prof. Stephen N. Ochang	LEAD SPEAKER
LS/003	Impact of Climate Change and Pollution on Forestry, Wildlife and Biodiversity Resources. Prof. A. Ogogo	LEAD SPEAKER
SC/004	Sustainable management of waste with zero discharge and resource recovery Naveen Dwivedi and Shubha Dwivedi	SAEREM/UNICROSS/TS2023/TS/001
SC/005	Socioeconomic Analysis of Cereal Crop Farmers Uptake of Improved Storage Systems for Enhance Livelihood in Niger State, Nigeria; Tsado, J. H[1]., Ajayi, O. J[1]., Mohammed, Y[1]., Jibrin, S[1]., Mamman, E[2]. And Balgees S[1].	SAEREM/UNICROSS/TS2023/TS/002
SC/006	Farm Resources Affecting Yam Production In Obudu Local Government Area Of Cross River State, Nigeria.:*Oniah. M.O., Edem T. O., Osim, O. O. And Ovat K. E.*	SAEREM/UNICROSST2023/TS/003
SC/007	Determinants of Fish Catch Among Fishing Villages Along Shiroro Dam Niger State, Nigeria: Alhassan, Y.J[1] Sanchi, I.D , Manga, T. A and Sabo, A. Y	SAEREM/UNIROSST2023/TS/004
SC/008	Performance of Broiler Fed Diets Containing Sweet Potato as A Substitute to Maize I. S. Harande[1] , Ewuola K.M[2]., and Dabai S.A[1]	SAEREM/UNICROSST2023/TS/005
SC/009	Growth and economic performance of finisher broilers served pineapple (Ananas comosus L.) peel extract as a supplementary sources of vitamin and mineral [1]Dabai, S.A., [2]Bello, S. [2]Umar, Y., [1]I. S Harande and [3]I.S Bamalli[11]	SAEREM/UNICROSST2023/TS/006
SC/010	Perceived effect of Climate Change on Cassava Farmers in South-South Nigeria Nyong, E. E[1] , Ngozi Vera and Ibrahim Zuru	SAEREM/UNICROSST2023/TS/007
SC/011	Carcass and organs weight characteristics of broiler birds fed diets containing varying inclusion levels of dried watermelon peel meal [1]Dabai, S.A. [2]Bello, S., [2]Ribah, M.I., and [2]Senchi, M.H., [1]I.S. Harande and [3]I.S Bamalli	SAEREM/UNICROSST2023/TS/008
SC/012	Effect of Artisanal Fisheries Activities on Food Security Status of Fishing Communities along Kainji Dam, Nigeria Alhassan, Y. J [1], Sanchi, I. D[2]. Sabo, A.Y[2], and Manga, T. A [2]	SAEREM/UNICROSST2023/TS/009

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Storage Losses Intensity of Paddy Rice in Benue State, Nigeria: Estimate, Determinants, and Policy Implications

A. M. Okeke[1] Z.T. Nyiatagher[1]
[1]Department of Agribusiness, Joseph Sarwuan Tarka University, Makurdi, Benue State, Nigeria
Email: anayomichaelokeke@gmail.com

ABSTRACT

The study investigated the intensity of storage losses of paddy rice in Benue State, Nigeria. Data for the study were collected from 246 rice farmers selected from 12 communities and six Local Government Areas using multistage sampling technique. The collected data were analysed using descriptive statistics and multiple regression model. The result on the intensity of storage losses of paddy rice showed that on average, 11.34% of paddy rice produced in the study area were lost during storage. The multiple regression analysis showed that age (β = -0.71), level of education (β=0.61), farming experience (β=0.63), annual income (β=0.51), and involvement in off-farm business (β=0.31) influenced intensity of post-harvest storage losses of paddy rice in the study area. The study recommended that policies and programmes aimed at minimizing storage losses of paddy rice should take into consideration the socio-economic characteristics of the rice farmers especially their age, educational level, farming experience, annual income, and off-farm activities involvement, in their design and implementation; and the State ministry of agriculture should annually organize workshops targeted at training of rice farmers on post-harvest handling and storage of paddy rice with the objectives of acquiring skills in timing of harvest, grain drying, moisture management, and safe storage.

Key words: Intensity, Storage, Losses, Paddy Rice, Benue State, Nigeria

RHIZOSPHERE AND RHIZOPLANE FLORA OF *Calopogonium mucunoides* IN THE UNIVERSITY OF CALABAR, CALABAR, NIGERIA

[1]*Bassey Etta Agbo, [1]Okezie Onyemaechi, [3]Daniel Offiong Etim [1]Augustine A. Unimke, [3]Rosemary Anietie Bassey, [2]Alfred Young Ita, [1]Akan A. Brooks And [1]Glory Shadrach Ihezue

[1]Microbiology Department, Faculty of Biological Sciences, University of Calabar, Calabar

[2]Microbiology Department, Faculty of Science, University of Uyo, Uyo

[3]Botany Department, Faculty of Biological Sciences, University of Calabar, Calabar

E-mail: beagbo@unical.edu.ng

ABSTRACT

Rhizosphere and rhizoplane flora of Calopogonium mucunoides in the University of Calabar community was evaluated using standard microbiological and biochemical techniques. This was in the bid to isolate/enumerate microorganisms present in the plant root environment of Calopogonium mucunoides and to examine the biodiversity of rhizosphere/rhizoplane flora in different soil samples of the legume. The results showed that the total heterotrophic bacterial load (THBL) at the root of Calopogonium muconoides plant sampled from the University of Calabar Botanical garden, the University of Calabar Staff Quarters and Faculty of Biological Science Garden were: $80.00\pm0.82x10^4 cfug^{-1}$, $55.67\pm1.25\ x10^4 cfug^{-1}$ and $90.33\pm1.25\ x10^4 cfug^{-1}$ respectively. Analysis of variance showed that there was significant differences ($p < 0.05$) in the total heterotrophic bacterial load (THBL) at the rhizosphere of the Calopogonium mucunoides plant. While the total rhizosphere fungal loads was $24.00\pm1.63x10^3 cfug^{-1}$, $24.00\pm2.16x10^3 cfug^{-1}$ and $18.00\pm2.88x10^3 cfug^{-1}$ for Calopogonium mucunoides plant sampled from University of Calabar Botanical garden, University of Calabar staff Quarters and the Faculty of Biological Science garden respectively. There was significant difference ($p < 0.05$) in the total rhizosphere fungal counts in Calopogonium muconoides plants sampled from the University of Calabar. The bacterial group at the rhizosphere of the Calopogonium mucunoides plant were: Bacillus spp. Streptococcus spp., Proteus spp., Klebsiella spp., Escherichia coli, Proteus mirabilis, Pseudomonas spp., Staphylococcus aureus, Acinetobacter spp and Enterobacter spp. while the rhizosphere fungal group were: Saccharomyces cerevisea, Mucor spp., Penicillium spp and Rhizopus spp. The microorganisms seen at the rhizosphere of the plant could be used for both microbiological and biotechnological researches in the University.

Keywords: Rhizosphere, *Calopogonium mucunoides*, rhizoplane flora, biodiversity and plant

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

SC/013	Connection between Indoor Air Quality and Human Health; Ogboru, R. O[1], Joshua D. K[1], Ofordu C. S[2] and Ibrahim, T. I[1]	SAEREM/UNICROSST2023/TS/010
SC/014	Competencies for Improved Employment growth and Agricultural Development; HAMISU, Sa'adu and GARBA, Lawal	SAEREM/UNICROSST2023/TS/011
SC/015	Impact of Moisture Content on Maize (Zea *mays* L.) Germination Parameters as Influenced by Sun Drying; [1]Tolulope Matthew AWOPEGBA* and [1]Magret Ifeoluwa FOLORUNSHO	SAEREM/UNICROSST2023/TS/012
SC/016	IMPACTS OF ECONOMIC VALUE AND TASTE PREFERENCE IN BUSHMEAT HARVESTING IN OBAN HILLS REGION OF CROSS RIVER NATIONAL PARK, NIGERIA; S. O. ADEDOYIN	SAEREM/UNICROSST2023/TS/013
SC/017	A DECADE-LONG OBSERVATION OF WEATHER TRENDS AT ILE-IFE, A TROPICAL RAINFOREST LOCATION IN SOUTHWESTERN NIGERIA ;[1,2]Chris A. Fayose*, [2]Morakinyo A. B. Fakorede, [3]Olugbenga. O. Jegede, [4]Olaniran J. Mathew	SAEREM/UNICROSST2023/TS/014
SC/018	A Comparative Analysis of Household Fresh Fish and Dried Fish Consumption Expenditure in Port Harcourt Metropolis, River State, Nigeria. Mercy Ebere Ndubueze-Ogaraku, Ebisine Patience Feke & *Oyoburuoma N. Ihunwo*	SAEREM/UNICROSST2023/TS/015
SC/019	Storage Losses Intensity of Paddy Rice in Benue State, Nigeria: Estimate, Determinants, and Policy Implications: A. M. Okeke[1]	SAEREM/UNICROSST2023/TS/016
SC/020	Factors Influencing Women's Participation in Household Food Security: A Case Study of Makurdi Metropolis Benue State Nigeria. Omede, U. David	SAEREM/UNICROSST2023/TS/017
SC/021	Willingness to Pay for Pome Modern Treatment Technologies for Environmental Sustainability by Smallholder Oil Palm Farmers in Agbo, Delta State, Nigeria.,Okere, R. A[1], Apeh, C. C [2], Bankole, A. S[1], Garba, I. D[1] and Oghogho, I. A[1]	SAEREM/UNICROSST2023/TS/018
SC/022	Soil and Water Resources Management: Climate Change Mitigation for Food Security Egbebi, I. A.[1]and Egbebi, O. E.[2]	SAEREM/UNICROSST2023/TS/019
SC/023	Assessment of Socio-economic livelihood of Pangannu Village - Zaria Local Government Area, -Kaduna State. Idris, Rakiya kabir	SAEREM/UNICROSST2023/TS/020
SC/024	The Effect of Changes in Crop Production Pattern on Income of Small Holder Farmers in Katsina-Ala Local Government Area of Benue State [1] Oko, Peter E.; [2]korom Terna.; [3]akpan, Boniface E.; [1]odey David U.	SAEREM/UNICROSST2023/TS/021
SC/025	Innovative Farming Practices in Cross River State: Farmers' Perspectives on Sack Farming. Eta[1], H.C, Ayi[2], N.A. Iyamah[1], D. A. and Emmanuel[1], E. J.	SAEREM/UNICROSST2023/TS/022
SC/026	Building Financial Resilience and Socio-Ecological Adaptation to Climate Change and Food Security in Flood-Prone Farming Communities of South-East States, Nigeria. Odili, Okwuchukwu, Agbaeze, Clifford Chilasa & Ezeudu, Ikenna Jude	SAEREM/UNICROSST2023/TS/023

SC/027	Climate Change: An Anthropogenic Consequence *Oyedeji, O.F[1]., Alade, A.A[1]., Adebusuyi, G.A[1]., Sowunmi, L.I[1]. and Obekpa, N.B[2]	SAEREM/UNICROSST2023/TS/024
SC/028	Implication of agricultural land-use and management practices on food insecurity among rural households in south-west states, Nigeria. Ganiyu, Muibat Omolara[1], Ajala, Adedolapo Adekemi [2], Ogunwole-Olapade, Folayimi[3], Ayinla, Rasheed Ayodele [4] and Raufu Mufutau Oyedapo[5]	SAEREM/UNICROSST2023/TS/025
SC/029	Land Suitability Evaluation of Selected Soils for Cassava Production in Akwa Ibom State, Nigeria .*Okon, U. M. and John, U. N.	SAEREM/UNICROSST2023/TS/026
SC/030	The Impact of Sea Robbery on Artisanal Fish Production in Akwa Ibom State, Nigeria.Ibok, Ibanga Bassey & Nyong, Eteyen Edet	SAEREM/UNICROSST2023/TS/027
SC/031	Connection Between Indoor Air Quality and Human Health,Ogboru, R. O[1], Joshua K. D[1], Ofordu C. S[2] and Ibrahim, T. I[1]	SAEREM/UNICROSST2023/TS/028
SC/032	Population Growth And Biodiversity Loss In Tiv Land Of Benue State [1]Dr.Asaasuen, Terngu; [2]Prof. Francis I. Okpiliya; [3]Dr. Peter E. Oko; & [1]Ako, Benjamin Tavershima.	SAEREM/UNIROSST2023/TS/029
SC/033	Adaptation Strategies for Climate Change Effects on Livestock Production in Ogoja Agricultural Zone of Cross River State Iyamah, D. A[1]; Ogar P. O.[2], Eta, H. C.[3], Mbu, M . M.[4], Elemi, G. F.[5], Isa, U. K.[6], Eremi E. O.[7]	SAEREM/UNICROSST2023/TS/030
SC/034	Evaluation of Artisanal Fishers Livelihood Sustainability Status along Shiroro and Kainji Dams, Nigeria. Alhassan Y. John [1], Muhammad A. Muhammad[2], Ayeni M. Durojaye[3] and Elisha Ikpe[4]	SAEREM/UNICROSST2023/TS/031
SC/035	Nanobiotechnology as an Alternative Waste Water Treatment Measure.Hannah Edim Etta PhD	SAEREM/UNICROSST2023/TS/032
SC/036	Prediction of Cumulative Infiltration Rates for Soils of Akoko-Edo Local Government Area, Edo State Using Philip's and Kostiakov's Infiltration Models Agbai, Williams Perekekeme and Chokor, Joseph Utienyi	SAEREM/UNICROSST2023/TS/033
SC/037	Agricultural Biodiversity Conservation Techniques Among Farmers in Ogoja Agricultural Zone of Cross Rivers State. Iyamah, D. A[1]., Mbu M. M.[2], Ogar, P. O.[3], Eta, H. C.[4], Isa, U. K.[5], Elemi, G. F.[6], and Aya, C. F.	SAEREM/UNICROSST2023/TS/034
SC/038	Assessment of Rural Households' Willingness to Pay for Healthcare Insurance in Bauchi State Of Nigeria.Sadiq, Mohammed Sanusi[1] and Ahmad, Muhammad Makarfi [2]	SAEREM/UNICROSST2023/TS/035
SC/039	Economic and Environmental Impact of Gully Erosion on Croppable Land in Calabar Metropolis, Cross River State, Nigeria.*Edet, Eyo O; Effiong, Mfonobong O.; Agbachom, Emmanuel E. and Uwah, Eno D.	SAEREM/UNICROSST2023/TS/036

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

VARIETAL RESPONSE OF COWPEA (*Vigna unguiculata WALP*)TO MORINGA LEAF EXTRACT IN A DERIVED SAVANNA OF CROSS RIVER STATE

Kekong M. A[1] and Eteng E. U[2]

1 Dept. of Agronomy, Cross River University of Technology Calabar

2 Dept. of Soil Science and Land Resources, Michael Okpara University of Agriculture Umudike

ABSTRACT

A field experiment was conducted at the Teaching and Research Farm of the Cross River University of Technology in 2021 and 2022 to evaluate the response of cowpea varieties to moringa leaf extract. The experiment composed four varieties of cowpea: FUAMPEA 1, FUAMPEA 2, SAMPEA 14 and SAMPEA 15 as V_1, V_2, V_3 and V_4, respectively, and two levels of moringa leaf extract M_0(no extract) and M_1(applied extract). This gave a total combination of V_1M_0, V_2M_0, V_2M_0, V_4M_0, V_1M_1, V_2M_1, V_2M_1, V_3M_1 and V_4M_1. The eight treatments were laid out in Randomized complete block (RCBD) and replicated three times. Results obtained indicated that variety, moringa leaf extract and their interaction significantly affected the growth and yield of cowpea. FUAMPEA 1 produced tallest plants (62.3cm) followed by SAMPEA 14 (60.2cm) and least height of 56.4cm from FUAMPEA 2. The number of leaves was highest with FUAMPEA 1 (73.4), followed by SAMPEA 14 (71.2) and least number of leaves was FUAMPEA 2 (68.6). Moringa leaf extract produced taller plants (71.5cm) than no extract (63.4cm) while number of leaves 78.4 in moringa extract plants and 63.5 in no extract plants. SAMPEA 15 reached 50% flowering at 40 days after planting, followed by FUAMPEA 2 with 41 days and SAMPEA 14 with highest number of days of 46 to 50% flowering. SAMPEA 14 produced highest number of pods per plant and highest grain yield (1.62 t ha^{-1}) followed by FUAMPEA 1 with yield (1.23 tha^{-1}) and least yield in SAMPEA 15 (0.80 t ha^{-1}). Moringa extract produced higher yield (1.28 t ha^{-1}) than no extract (0.80 t ha^{-1}). SAMPEA 14 with moringa leaf extract produced best result in the yield of cowpea in the study area.

Key Words: Moringa, extract, cowpea, variety, yield components

Physico-Chemical Parameters of the Lotic System in the Derived Savanna, Cross River State, Nigeria.

Mowang, Dominic Awam*; Udiba, Udiba Ugumanim; Adie, Peter Imbufe

Dominic A. Mowang, University of Calabar, Department of Zoology and Environmental Biology, Calabar, Nigeria, P.M.B 1115, Etta Agbo Street.

*Corresponding author: dominicmowang@yahoo.com

ABSTRACT

The study was carried out to determine the Physico-Chemical parameters in the lotic system of the Derived Savanna, Cross River State, Nigeria. The study areas were Ogoja, Yala, Bekwara, Obudu and Obanliku Local Government Areas with each divided into four sampling points totaling twenty (20). Data of Physico-Chemical parameters of the lotic system were collected during the dry and rainy seasons of the year 2022. Temperature, pH and conductivity were measured using multipurpose thermos-scientific orion meter. Dissolved oxygen was measured with dissolved oxygen meter. Salinity was measured using hand held refractometer. Turbidity was measured using turbidimeter. The data were analyzed using descriptive statistics and ANOVA. The result of physico-chemical parameters showed that temperature ranged (27.1±0.67 - 28.0±0.46°C), this was highest in Akorshie River in Obanliku with mean values 28.0 ±0.46°C and lowest in Kigbe Stream in Obudu with mean values 27.1 ±0.67°C. The pH ranged (8.28±0.36 - 8.87±0.29), highest in Abebe Stream in Obudu with mean values 8.87±0.29 and lowest in Ranch Stream in Obanliku with mean values 8.28±0.36. The turbidity ranged (18.2±0.25 - 18.7±0.35 NTU) highest in Nwol River in Ogoja with mean values 18.7±0.35 NTU and lowest in Buabia Stream in Obudu with mean values 18.2 ± 0.25NTU.Salinity ranged (-66.5±0.81‰ - -68.3±1.53 ‰) highest in Kigbe Stream in Obudu with mean values -68.3±1.53 ‰ and lowest in Basun River in Obudu with mean values -66.5±0.81‰. Dissolved Oxygen (5.13±0.47 - 6.19±0.45mg/l) highest in Okpoku River in Yala with mean values 6.19±0.45mg/l and lowest in Ibil River in Ogoja with mean values 5.13±0.47 mg/l. Conductivity (64.35 ±1.02 - 73.2±0.99 µs/cm) was highest in Bansara River in Ogoja with mean values 73.2±0.99 µs/cm and lowest in Onyinne Stream in Bekwara with mean values 64.35 ±1.02 µs/cm. The ranged of values were within WHO acceptable limits for unpolluted tropical freshwater bodies.

Keywords: Physico-chemical,Temperature,pH,Conductivity,Dissolved oxygen, salinity, turbidity.

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

TECHNICAL SESSION FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Comparison of three Different Mulches Effects on the Performances and Yield of Maize (Zea mays) On Coastal Plain Sand in Southern Nigeria.

1.Gbarabe Roland, 2. Daye Barango Owuna

1. **Elechi Amadi Polytechnic, Rumuola, Port Harcourt, River State**

ABSTRACT

The presence of residue mulches in farm has been known to effectively save the soil surface, prevent soil erosion on slopes, help reduce soil moisture loss through evapotranspiration and insulates soil, protect roots from extreme temperature, improve soil biology, aeration, aggregation of soil particles and reduce drainage over-time, improve soil fertility as certain mulch type decompose, inhibit plant diseases, give planting beds a uniform and provide favourable preservation of ecological stability. This experiment was conducted in Teaching and research farm of Akwa ibom State University, ObioAkpa Campus to assess the effect of sawdust, calopogonium leaves, and siam weed on microbial, physicochemical properties and performance of White Maize(Zea mays) on a coastal plain sand of Obio Akpa in Southern Nigeria. Results showed that soil mulches with calopogoniummucunoides recorded highest in the following parameters measured; ECEC 10.35%, Cmol and AV.P323mg/kg^{-1},% base saturation (91.11),100% seed emergence and less leaf area, the highest moisture(35%) was obtain in the soil mulched with saw dust. The highest moisture content in Zea mays ,(5.63%) crude fibre (3.91), lipid (4.71), Total Ash(4.42) and carbohydrates (61.98%) were obtained in the soil mulched calopogoniummucunoides while the highest bacterialcount37x10^{5}cfu/g-1 and fungi counts(5.1x10^{3}cfu/g^{-1} which gives rise to typicpaludult characteristics of soil derived from coastal plain sand. key words; Mulches, Microbial, Zea mays

BOOK OF CONFERENCE PROCEEDINGS FOR THE 6TH INTERNATIONAL SAEREM/UNICROSS2023 CONFERENCE

Bridging the Gap: Assessing Agricultural Extension Officers' Awareness and Constraints in Climate Information Dissemination.

Eta[1], H.C, Ayi[2], N.A. Ginini[1], E. F., Iyamah[1], D.A. and Etim[1], A. C.

[1]Department of Agricultural Extension and Rural Sociology, University of Calabar, Nigeria

[2]Department of Agricultural Economics and Extension, University of Cross River State, Nigeria

Corresponding author: nsa.ayi@gmail.com;

ABSTRACT

This study delved into the awareness, competencies, and constraints faced by agricultural extension officers in climate information dissemination in Akpabuyo Local Government Area, Cross River State, Nigeria. Major findings reveal that a substantial proportion of extension agents were aware of climate change causes, with deforestation ranking as the most recognized factor. However, knowledge gaps persisted for certain causes. Social media and television were the primary sources of climate information for extension agents, followed by radio and magazines/newspapers, indicating room for collaboration with research institutions to access credible information. Extension agents played pivotal roles in climate information dissemination, such as organizing awareness events, disseminating adaptation practices, and capacity building for farmers. However, some areas, like emergency management units and weather forecasts, necessitates additional training. While extension agents possess competencies for climate information dissemination, areas like producing radio/TV programs and building partnerships required improvement. Constraints included funding shortages, poor cooperation, poverty, translation difficulties, inadequate technical capacity, complexity in methods, and traditional farming practices. Recommendations encompass specialized training, increased funding, enhanced collaboration, simplified information, and promotion of climate-smart practices to ensure resilience and food security in the face of climate change.

Keywords: Climate information dissemination, Agricultural extension officers, Competencies