UNIVERSITY OF PORT HARCOURT

IN COLLABORATION WITH THE

ASSOCIATION OF DEANS OF AGRICULTURE IN NIGERIA UNIVERSITIES (ADAN) WITH SUPPORT FROM REGIONAL UNIVERSITIES FORUM FOR CAPACITY BUILDING IN AGRICULTURE (RUFORUM)

IN PARTNERSHIP WITH MASTERCARD FOUNDATION

Present

20TH-24TH JULY 2026

69th AGM & 10th International Conference of ADAN

THEME:

INCLUSIVE EDUCATION, SOCIETY AND DEVELOPMENT: PATHWAYS FOR BUILDING RESILIENT FOOD SYSTEMS



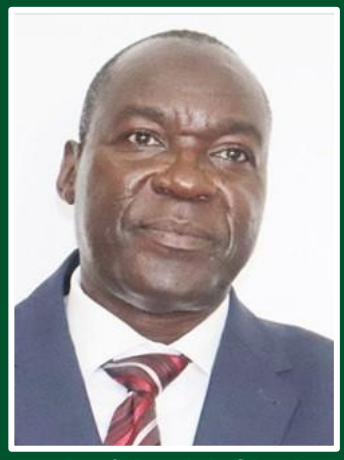
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Chief Host



Prof. Nene A.Jamabo
Dean, Faculty of Agriculture, Uniport
Host



Prof. Olumuyiwa J. Jayeoba
President (ADAN)



Prof. Patrick Okori
Executive Secretory
Regional Universities Forum for Capaciy Building in Agriculture (REFORUM)
Keynote Speaker

CBN Centre of Excellence Main Auditorium, University of Port Harcourt, Rivers State, Nigeria

TAGDev 2.0
Transforming African Agricultural Universities to meaningfully contribute to Africa's Growth and Development

RUFORUM
Capacity Building in Agriculture

mastercard foundation

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National Anthem Lyrics
Stanza 1

Nigeria, we hail thee,
Our own dear native land,
Though tribe and tongue may differ,
In brotherhood, we stand,
Nigerians all, and proud to serve
Our sovereign Motherland.

National Pledge

I pledge to Nigeria my Country
To be faithful, loyal and honest
To serve Nigeria with all my strength
To defend her unity
And uphold her honour and glory
So help me God.



THE UNIVERSITY ANTHEM

On the green lowlands and swampy planes
Of the new Calabar Rivers stand
The University of Port Harcourt
A citadel of learning and excellent education
A home of academic enthusiasts,
Searching, searching for knowledge and wisdom.

Enlightenment and self-reliance, our mission,
Our hope in the future is rooted in God alone;
The vision of our father shining in the stars,
Opportunities, unlimited and equal,
Our progenies citizens of the universe
From far and near, the pride of Uniport echoes.

Refrain:
Unique, Unique, Unique Uniport
Unique, Unique, Unique Uniport



His Excellency

Bola Ahmed Tinubu, GCFR

President and Commander-in-Chief of the Armed Forces

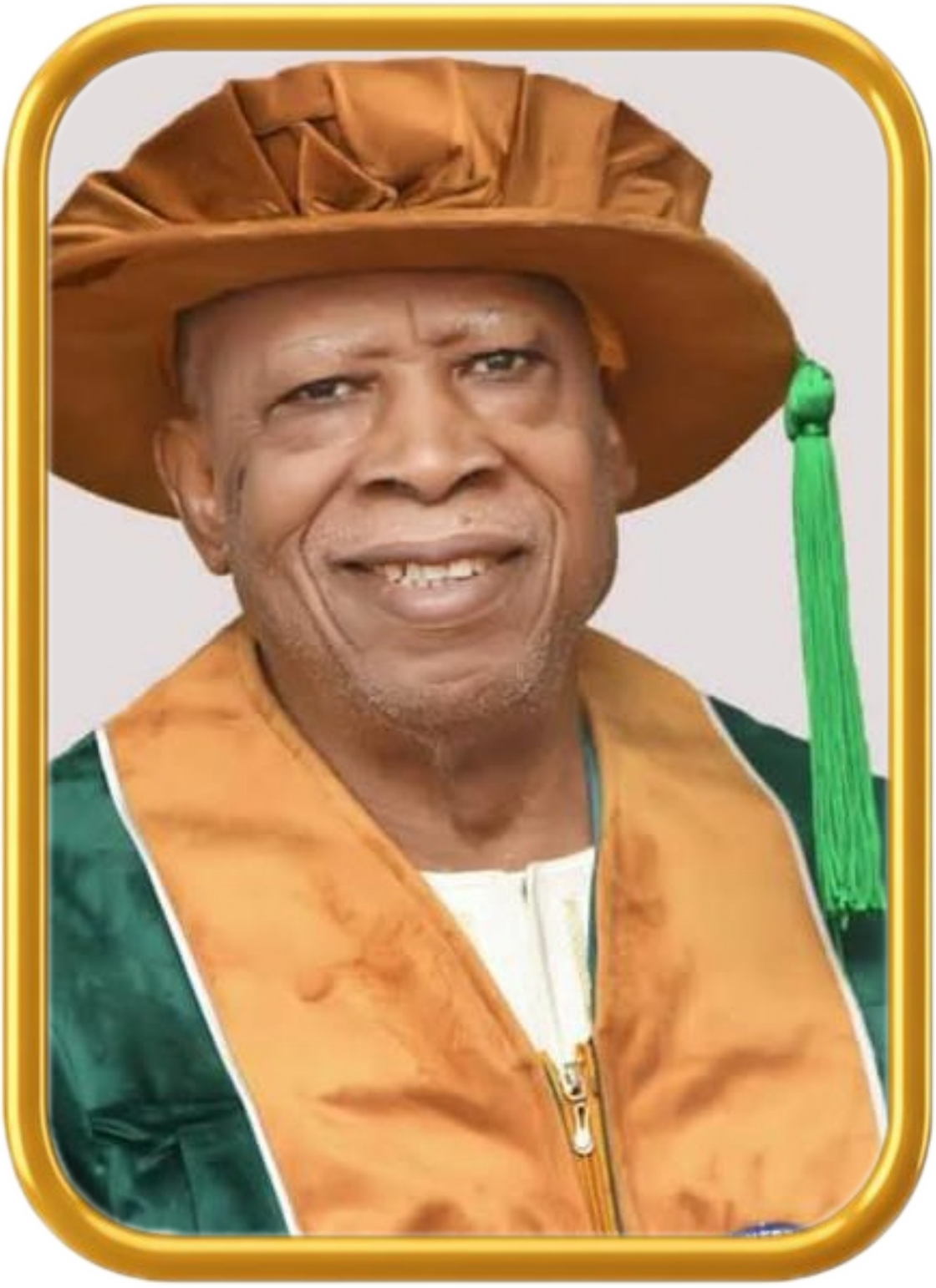
Federal Republic of Nigeria



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Honourable Minister of Agriculture and Food Security
Federal Republic of Nigeria



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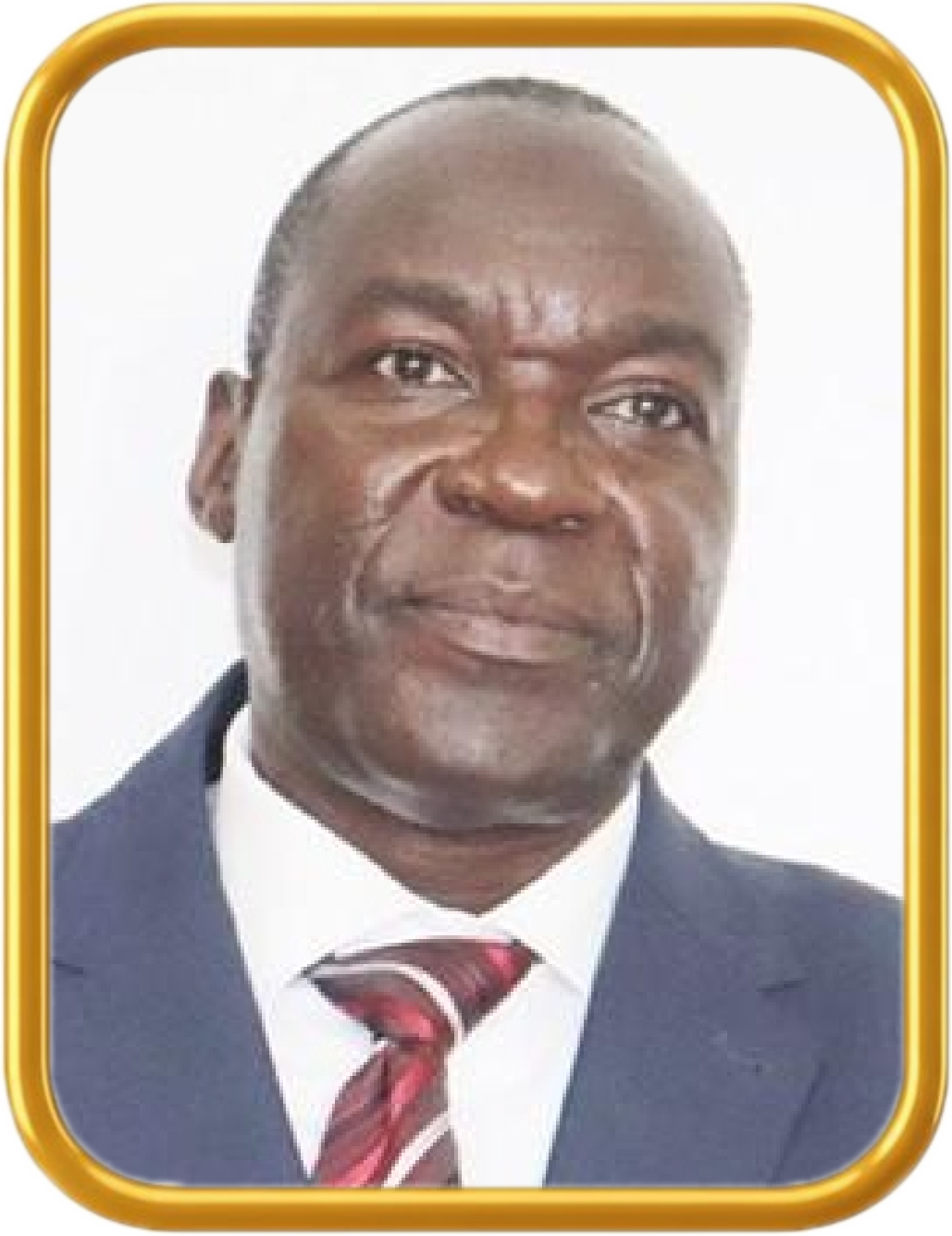
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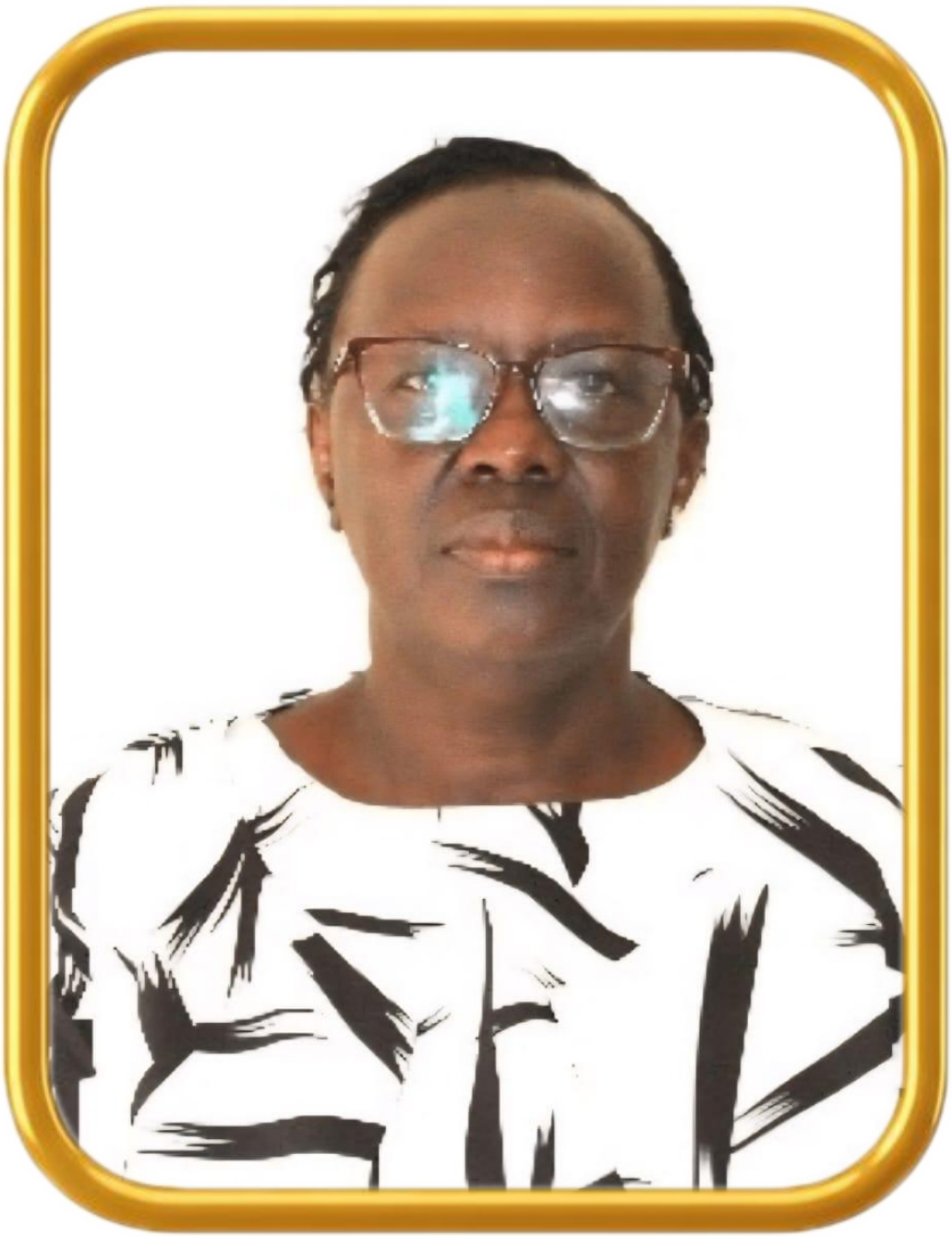
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Keynote Speaker



Sheriff Balogun
National President
Nigeria-American Chanber of Commerce (NACC)
Guest Lecturer 1



Prof. Betty Agnes Akullu Ezati
Vice Chancellor
Uganda National Institute of Teacher Education (UNITE)
Guest Lecturer 2



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Prof. Nene A. Jamabo
Dean, Faculty of Agriculture, University of Port Harcourt
Host



Prof. A.A. Aiyeloja
Chairman, Local Organising Committee, ADAN 2026

Programme of Events

69th Annual General Meeting and 10th Annual Conference of Association of Deans of Agriculture in Nigeria Universities (ADAN)

Monday, July 20, 2026

8.30 am - 06.00 pm: Arrivals and Registration

11.00 am - 12.00 pm: Visit to Vice Chancellor

12.00 pm - 05.00 pm: Setting the Agenda

Tuesday, July 21, 2026

08.30 am - 09.00 am: Registration

09.00 am - 09.15 am: Introduction and Recognitions

09.15 am - 09.30 am: National and UniPort Anthems

09.30 am - 09.40 am: Opening Remarks / Declare Ceremony Open by Professor Chike Princewill Chike, Vice Chancellor, University of Port Harcourt (UniPort)

09.40 am - 09.45 am: Welcome Address by Professor Nene A. Jamabo, Dean, Faculty of Agriculture, UniPort,

09.45 am - 09.50 am: Speech by Professor M.F. David-Abraham, Chairperson, Board of Trustees, ADAN

09.50 am - 09.55 am: Address by Professor Olumuyiwa J. Jayeoba, President, ADAN

09.55 am - 10.00 am: Goodwill Messages by NUC Representative, FMAFS

10.00 am - 10.20 am: Keynote Address by Professor Patrick Okori, Executive Secretary, Regional

	Universities Forum for Capacity Building in Agriculture (RUFORUM)
10.20 am - 10.40 am:	Guest Lecture by Sheriff Balogun, President, America - Nigeria Chamber of Commerce
10.40 am - 10.50 am:	Command Performance by UniPort Theatre
10.50 am - 11.10 pm:	Guest Lecture 2 by Professor Betty Agnes Akullu Ezati, First Female Vice Chancellor, Uganda National Institute of Teachers Education (UNITE)
11.10 am - 11.20 am:	Presentation of Awards **1) Award for Leadership** a) Professor Owunari Abraham Georgewill b) Professor (Mrs) Ngozi Ifeoma Odiaka c) Professor Jonathan Jeremiah Atungwu d) Professor Mufutau Olaoye Atayese e) Professor Olaniyi Jacob Babayemi **2) Award for Academic Excellence** a) Best Male Student: Anudu, Uzoma Stanley - Fisheries b) Best Female Student
11.20 am - 11.30 am:	Lauching of ADAN Journal
11.30 am - 11.45 pm:	Tea / Coffee Break
11.45 pm - 1.45 pm:	Higher Education Reforms: Towards Competence-Based Education and Training (CBET) for Competitiveness - Policy Landscape for Reform
1.45 pm - 1.50 pm:	Vote of Thanks by LOC Chairman, Prof. A.A. Aiyeloja
01.50 pm - 02.50 pm:	Group Photograph and Lunch
02.50 pm - 03.50 pm:	Institutional readiness self-assessment; Breakout Groups / Reflection / Synthesis

Wednesday, July 22, 2026

Day 2 — Leading Competence-Based Curriculum Transformation

Time	Session / Topic	Mode / Lead
08:30 – 08:45	Recap of Day 1 and agenda for Day 2	Plenary – Participant representative
08:45 – 10:00	Principles of Competence-Based Education and Training (CBET): from inputs to outcomes	Presentation + guided practice – Resource person
10:00 – 10:15	Tea break	
10.15 - 12.00	Scientifc Presentations	Section Facilitators
10:15 – 12:00	Quadruple-Helix partnerships: engaging industry, government and civil society in curriculum co-design	Panel + discussion – Industry and NUC representatives
12:00 – 13:00	Digital transformation and AI integration in teaching, learning, assessment and micro-credentials	Presentation – Resource person
13:00 – 14:30	Lunch	
14:30 – 15:00	Day 2 reflection and synthesis	Plenary – Facilitation team
15:00 – 18:00	ADAN Annual General Meeting (AGM)	ADAN BoT and EXCO

Thursday, July 23, 2026

Day 3 — Governance, Assessment, Quality Assurance and Financing

Time	Session / Topic	Mode / Lead
08:30 – 08:45	Recap of Day 2 and agenda for Day 3	Plenary – Participant representative
08:45 – 10:15	University governance and leadership selection for reform-ready institutions	Plenary – Resource person
10:15 – 10:30	Tea break	
10:30 – 11:30	Competence-based assessment, accreditation and quality assurance under CCMAS	Presentation + breakout – NUC / NBTE / NCCE resource persons
11:30 – 12:30	Sustainable financing for reform: leveraging TETFund, NELFUND and internally generated revenue	Presentation + Q&A – TETFund / NELFUND resource persons
12:30 – 13:30	Lunch	
13:30 – 14:30	Academic integrity in the age of AI: policy and institutional practice	Plenary – Resource person

14:30 – 15:00	Vice-Chancellors' dialogue: leading institutional change management	Panel – Sitting Vice-Chancellors
15.00 – 16:00	Developing institutional CBET transition roadmaps and action plans	Breakout groups – Institutional teams
16.00 - 16.30	Closing ceremony, certification and way forward	Plenary – Convening Secretariat / NUC / TETFund

Friday, July 24, 2026

DEPATURE

SCHEDULE OF PRESENTATION AT THE 69TH AGM & 10TH INTERNATIONAL CONFERENCE OF ADAN
Theme: Inclusive Education, Society and Development: Pathways for Building Resilient Food Systems
Venue: CBN Centre of Excellence, University of Port Harcourt, Rivers State, Nigeria

Please find below the official schedule of paper presentations scheduled for **Wednesday, 22nd July 2026**, commencing promptly at **10:15 AM**. To ensure a seamless scientific exchange, all presenters are required to upload their slides at their designated venues 30 minutes before their session starts.

Each presenter is allotted a total of **15 minutes** (10 minutes for presentation and 5 minutes for questions and answers).

Parallel Technical Sessions Schedule
Venue 1: (Crop Production, Agronomy & Sustainable Soils)
Session Chair: To be announced
Rapporteur: To be announced

Time	Article ID	Paper Title & Authors
10:00 AM – 10:15 AM	Article 1	**Effects of Different Fertilization Strategies on Water Use Efficiency (Wue), Nutrient Use Efficiency (Nue) and Soil Fertility in Cucumber (*Cucumis sativus* L.) Cultivation** *Ademiju, T.A., Ali, G. A., Omotosho, O. A. & Salawu, F. O.*
10:15 AM – 10:30 AM	Article 8	**Effect of Sowing Dates and Varieties on Growth and Yield of Sweet Corn (*Zea mays saccharata*) in Uyo, Nigeria** *Udofia, A. C., Udom, G. N., Udo, E. I. and Bruno, S. A.*
10:30 AM – 10:45 AM	Article 14	**Efficacy of Chilli Pepper (*Capsicum* spp.) Extract as a Botanical Insecticide for Pest Management and Yield Enhancement in Two Cowpea (*Vigna unguiculata* L. Walp) Varieties in the Sudan Savanna of Nigeria** *Shamsu Ado Zakari & Amira Musa Saad*
10:45 AM – 11:00 AM	Article 20	**Influence of Biochar on the Growth of Maize Cultivated in Mycorrhizal-Inoculated Soil** *Anozie H. I. and Adesope O. M.*
11:00 AM – 11:15 AM	Article 19	**Utilizing Nigerian Bread Bakeries as Agricultural Processing Industries for Value-Added Snack Production: Opportunities for Sustainable Agro-Industrial Development**

Time	Article ID	Paper Title & Authors
		Wilson T. Orunaboka & Sarah T. Precious-Georgewill
11:15 AM – 11:30 AM	*N/A*	**Interactive Q & A / Panel Wrap-up**

Venue 2: Seminar Hall A (Animal Science, Precision Nutrition & Climate-Smart Livestock)
Session Chair: To be announced
Rapporteur: To be announced

Time	Article ID	Paper Title & Authors
10:00 AM – 10:15 AM	Article 7	**Effect of Different Levels of Enzyme and Palm Press Meal on Performance and Bone Characteristics of Broiler Birds** *Akinola, L.A.F., Wozi, E. E., Chukwu, C.P*
10:15 AM – 10:30 AM	Article 10	**Haematological Profile of Weaner Pigs Fed Diets Containing Concentrate Feed Ingredients, Discarded Fish Feed and Crop By-Products** *Israel, C., Gad, G. and Kalio, G.A*
10:30 AM – 10:45 AM	Article 11	**Precision Nutrition in Livestock Production: A Digital Approach to Enhancing Feed Efficiency and Reducing Environmental Impact** *Dick, T.S., Francis, I.W.*
10:45 AM – 11:00 AM	Article 12	**Growth Performance and Haematological Response of Broiler Chickens Administered Aqueous Extract of *Triumfetta cordifolia* Leaf** *Edna, U. ABEL., Nodu, M. BARIARABEL., Godgift I. Odeke., Judith, AMOLO*
11:00 AM – 11:15 AM	Article 13	**Digital and Climate-Smart Approaches To Genomic Sequencing and Gene Expression in Poultry and Dairy Cattle** *Francis I. W., Dick T. S., Ajayi, F.O.*
11:15 AM – 11:30 AM	Article 15	**Growth Performance and Haematological Indices of Broiler Chickens Fed Diets Containing Graded Levels of *Nephrolepis cordifolia* Leaf Meal**

Time	Article ID	Paper Title & Authors
		Judith, AMOLO., Nodu, M. BARIARABEL, Godgift I. Odeke, Edna, U. ABEL
11:30 AM – 11:45 AM	*N/A*	**Interactive Q & A / Panel Wrap-up**

Venue 3: Seminar Hall B (Agricultural Economics, Agribusiness & Digital Innovations)
Session Chair: To be announced
Rapporteur: To be announced

Time	Article ID	Paper Title & Authors
10:00 AM – 10:15 AM	Article 4	**Digital Financial Services and Agricultural Market Access in Africa: A PRISMA-Based Systematic Review of Evidence from Nigeria, Kenya and South Africa** *Aroyehun, A. R., Ozuruoke, S.N., and Edaba, M. I. E.*
10:15 AM – 10:30 AM	Article 17	**Profitability Analysis of Marketing of Plantain in Enugu Urban, Enugu State, Nigeria** *Emeka Nzeh, Eugene Umeyor, Mgbada, Justina, Jonathan Okolie, Uloma Egwuagu et al.*
10:30 AM – 10:45 AM	Article 18	**Strengthening Resilient Food Systems through Inclusive Agribusiness Support among Grain Crop Farmers in Niger State, Nigeria** *Tsado, J.H., Abdulahi, A., Yakubu M. and Shuaibu, U.*
10:45 AM – 11:00 AM	Article 9 / 21	**Effect of Agricultural Cooperative Societies on Agricultural Production in Awka South Local Government Area, Anambra State, Nigeria** *Anyanwu, J. A., Agwu, A. L., and Okonkwo, C. V.*
11:00 AM – 11:15 AM	*N/A*	**Interactive Q & A / Panel Wrap-up**

Venue 4: Conference Room C (Agricultural Extension, Gender Dynamics & Rural Education)
Session Chair: To be announced
Rapporteur: To be announced

Time	Article ID	Paper Title & Authors
10:00 AM – 10:15 AM	Article 2	**Factors Influencing Youth Participation in Rice Production in Ebonyi State, Nigeria** *Odoemenam, E. F., Adesope, O. M., Onoh, P. A. and James, A. G.*
10:15 AM – 10:30 AM	Article 3	**Contribution of Youth Organizations to Community Development in Imo State, Nigeria** *Joseph-Osio, O. C., Odoemenam, E .F., and Chukwumezie, I. A.*
10:30 AM – 10:45 AM	Article 5	**Implementation of Core Curriculum Minimum Academic Standard in Nigerian Universities: An opportunity for agricultural entrepreneurship through practical education** *Ogunlade Israel, Omotesho Kemi Funmilayo and Olabanji Oluwafemi Peter*
10:45 AM – 11:00 AM	Article 6	**Impact of Agricultural Intervention on Income of Women Processors in Kwara State, Nigeria** *Kareem, O.W, Adefalu, L.L., Adebiyi, F.E, Akorede, A.A, and Muhammed, M.J.*
11:00 AM – 11:15 AM	Article 16	**Use of Mobile Applications for Agricultural Extension Service Delivery among Smallholder Farmers in Imo State, Nigeria** *Okoronkwo, Ifeanyi Ernest, Uko, Aniefiok Godwin, and Ogbonna, Magdaleen Chigozie*
11:15 AM – 11:30 AM	Article 22	**Health Vulnerabilities and Greenhouse Gas Emissions Impacts on Rural Women Farmers in Rivers State, Nigeria** *Amadi, Cynthia Chinedu; Uchendu, Lucky Nnebuchi*
11:30 AM – 11:45 AM	*N/A*	**Interactive Q & A / Panel Wrap-up**

UNIVERSITY OF PORT HARCOURT

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IN PARTNERSHIP WITH THE MASTERCARD FOUNDATION

BOOK OF ABSTRACTS

69TH AGM & 10TH INTERNATIONAL CONFERENCE OF ADAN

CONFERENCE THEME:

INCLUSIVE EDUCATION, SOCIETY AND DEVELOPMENT: PATHWAYS FOR BUILDING RESILIENT FOOD SYSTEMS

WORKSHOP THEME:

HIGHER EDUCATION REFORM: TOWARDS COMPETENCE-BASED EDUCATION AND TRAINING FOR COMPETITIVENESS

DATE: 20TH – 24TH JULY 2026

VENUE: CBN CENTRE OF EXCELLENCE MAIN AUDITORIUM, UNIVERSITY OF PORT HARCOURT, RIVERS STATE, NIGERIA

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- Article 8: Effect of Sowing Dates and Varieties on Growth and Yield of Sweet Corn (*Zea mays saccharata*) in Uyo, Nigeria
- Article 14: Efficacy of Chilli Pepper (*Capsicum* spp.) Extract as a Botanical Insecticide for Pest Management and Yield Enhancement in Two Cowpea (*Vigna unguiculata* L. Walp) Varieties in the Sudan Savanna of Nigeria
- Article 20: Influence of Biochar on the Growth of Maize Cultivated in Mycorrhizal-Inoculated Soil

Section 2: Animal Science & Livestock Production

- Article 7: Effect of Different Levels of Enzyme and Palm Press Meal on Performance and Bone Characteristics of Broiler Birds
- Article 10: Haematological Profile of Weaner Pigs Fed Diets Containing Concentrate Feed Ingredients, Discarded Fish Feed and Crop By-Products
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Section 3: Agricultural Economics, Agribusiness & Digital Innovations

- Article 4: Digital Financial Services and Agricultural Market Access in Africa: A PRISMA-Based Systematic Review of Evidence from Nigeria, Kenya and South Africa
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- Article 18: Strengthening Resilient Food Systems through Inclusive Agribusiness Support among Grain Crop Farmers in Niger State, Nigeria
- Article 21: Effect of Agricultural Cooperative Societies on Agricultural Production in Awka South Local Government Area, Anambra State, Nigeria.

Section 4: Agricultural Extension, Rural Development & Education

- Article 2: Factors Influencing Youth Participation in Rice Production in Ebonyi State, Nigeria
- Article 3: Contribution of Youth Organizations to Community Development in Imo State, Nigeria
- Article 5: Implementation of Core Curriculum Minimum Academic Standard in Nigerian Universities: An opportunity for agricultural entrepreneurship through practical education
- Article 6: Impact of Agricultural Intervention on Income of Women Processors in Kwara State, Nigeria
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Article 1

Effects of Different Fertilization Strategies on Water Use Efficiency (Wue), Nutrient Use Efficiency (Nue) and Soil Fertility in Cucumber (*Cucumis sativus L.*) Cultivation

*ADEMIJU, T.A.[1], ALI, G. A.[2], OMOTOSHO, O. A.[3] & SALAWU, F. O.[4]

[1,4]Department of Agricultural Education, Federal College of Education, Iwo, Osun State, Nigeria

[2]Department of Agricultural & Bio-Environmental Engineering, Federal Polytechnic, Ede, Osun State, Nigeria

[3] Land and Water Resources Management Programme, Institute of Agricultural Research & Training, Obafemi Awolowo University, Moor Plantation, Ibadan, Oyo State, Nigeria

*Corresponding email: tessy6u@gmail.com

Abstract

Efficient resource management is essential for sustainable agricultural production, particularly in regions facing growing water scarcity and declining soil fertility. This study evaluated the effects of integrated deficit irrigation and nutrient management strategies on water and nutrient use efficiencies in cucumber (*Cucumis sativus L.*) cultivation. The experiment was conducted at the Demonstration Farm of the Federal College of Education (Technical), Asaba, Delta State, using a Randomised Complete Block Design (RCBD) in a 3 × 5 factorial arrangement with three replicates. Treatments comprised three irrigation levels: I_{100} (100% of crop water requirement), I_{75} (75% of crop water requirement), and I_{50} (50% of crop water requirement), combined with five nutrient management regimes: N0M0 (control), N_6M_6 (120 kg ha^{-1} NPK + 6 t ha^{-1} poultry manure), N_6M_3 (120 kg ha^{-1} NPK + 3 t ha^{-1} poultry manure), N_3M_6 (60 kg ha^{-1} NPK + 6 t ha^{-1} poultry manure), and N_3M_3 (60 kg ha^{-1} NPK + 3 t ha^{-1} poultry manure). Pre-planting soil analysis revealed a sandy loam texture with moderate fertility, while the poultry manure had a pH of 8.3, an organic matter content of 51.08%, and a balanced nutrient composition. Results showed that the highest Nutrient Use Efficiency (NUE) of 26.00 kg yield kg^{-1} N was achieved under the $I_{100}N_3M_6$ treatment. The greatest Irrigation Water Use Efficiency (IWUE) and Water Use Efficiency (WUE), at 19.49 and 16.73 kg m^{-3}, respectively, were recorded under $I_{50}N_6M_6$. Notably, the N_3M_6 treatment produced a fruit yield of 4.44 t ha^{-1} while using 50% less inorganic nitrogen fertilizer, resulting in a 54.2% increase in yield and a 57.2% improvement in NUE compared with the control treatment. Post-harvest soil analysis further indicated significant improvements in soil chemical properties under manure-amended treatments, with soil organic matter increasing from 4.22% to 6.98%. The study demonstrated that integrating deficit irrigation with combined organic and inorganic nutrient management can substantially enhance cucumber productivity, improve water and nutrient use efficiencies,

and promote sustainable soil fertility. The application of 60 kg ha^{-1} NPK combined with 6 t ha^{-1} poultry manure emerged as an effective strategy for achieving high yields while reducing fertilizer inputs and conserving water resources.

Article 2

Factors Influencing Youth Participation in Rice Production in Ebonyi State, Nigeria

Odoemenam, E. F.[1], Adesope, O. M.[2], Onoh, P. A.[1] and James, A. G.[1]
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[2]Department of Agricultural Extension and Development Studies, University of Port-Harcourt
Correspondence - Email: emeka.odoemenam@futo.edu.ng ; Phone: 08133980612

Abstract

Youth engagement is crucial for food security, employment generation and sustainable agricultural development in Nigeria. The study examined the factors influencing youth participation in rice production in Ebonyi State, Nigeria. It utilised both purposive and simple random sampling techniques to select 72 youths from three main rice producing LGAs. Primary data were collected using structured questionnaires and analysed using frequencies, percentages, mean scores and standard deviations. The findings revealed that there was generally a low extent of participation in government intervention initiatives with the Abakaliki Rice Project having the highest level of participation. The favourable factors, amongst others, that influenced participation were years of rice farming experience ($\bar{x}$ = 3.53), involvement in government programmes ($\bar{x}$ = 3.40), access to credit facilities ($\bar{x}$ = 3.36) and availability of farm inputs ($\bar{x}$ = 3.36). The major challenges identified, as perceived by the respondents were low access to farmlands (94.4%), inadequate institutional support (86.1%) and poor access to rice production information (84.7%). The study therefore recommends that youth engagement in rice production and agricultural transformation can be enhanced through the establishment of youth-friendly loan programmes, greater access to farmlands, subsidised farm inputs, and strengthened extension services.

Keywords: Youth participation, rice farming, government intervention programs, agricultural development, food security.

Article 3

Contribution of Youth Organizations to Community Development in Imo State, Nigeria

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Corresponding author's E-mail: onomejosephosio@gmail.com 07033536677
2&3 Department of Agricultural Extension, Federal University of Technology, Owerri, Imo State, Nigeria

Abstract

Youth organizations are critical agents of community development, particularly in developing countries where young people constitute a significant proportion of the population. This study examined the contributions of youth organizations to community development in Imo State, Nigeria. Specifically, the study described the socioeconomic characteristics of youths, assessed their participation in community development programmes, identified their contributions, and determined factors limiting their effective participation. A structured questionnaire was administered to 100 selected respondents, out of which 86 valid responses were retrieved and analyzed using descriptive statistics such as frequency counts, percentages, and mean scores. Findings revealed that the average age of respondents was 27.8 years, with majority (59.3%) possessing tertiary education and belonging to youth organizations. The study showed that Youths contributed significantly to environmental sanitation, education and literacy programs, skill development initiatives, leadership activities, and advocacy campaigns. However, limited time due to academic and work commitments, lack of skills, financial constraints, and inadequate recognition were identified as major barriers to effective participation. The study concludes that youth organizations play a vital role in promoting community development in Imo State and recommends increased financial support, capacity-building programs, and youth-inclusive policies to enhance their effectiveness.
Keywords: Youth organizations, Community development, Youth participation, Imo State, Nigeria.

Article 4

Digital Financial Services and Agricultural Market Access in Africa: A PRISMA-Based Systematic Review of Evidence from Nigeria, Kenya and South Africa

[1]Aroyehun, A. R., [2] Ozuruoke, S.N., and [3]Edaba, M. I. E.

[1]Lagos State University of Science and Technology, Department of Agric. Econs and Farm Mgt.

[2] Ignatius Ajuru University of Education, Department of Agricultural Economics and Extension

[3]University of Africa, Toru-Orua, Department of Agricultural Economics and Extension

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Abstract

Digital financial services (DFS) are increasingly recognized as key drivers of agricultural transformation because they connect farmers to finance, payments, markets, savings, insurance, and digital value-chain platforms. However, evidence on their impact on agricultural market access remains fragmented across countries, service types, and methodologies. This systematic review synthesizes empirical studies on DFS and agricultural market access in Nigeria, Kenya, and South Africa. Following PRISMA 2020 guidelines, studies published between January 2015 and June 2026 were retrieved from major databases and institutional sources. After screening and quality appraisal, 58 studies were included for thematic synthesis. Findings

show that DFS, especially mobile money, digital credit, electronic payments, digital savings, agency banking, and agricultural insurance which enhances agricultural market access by reducing transaction costs, improving payment speed and security, expanding access to production finance, strengthening buyer–farmer linkages, and improving financial records for creditworthiness. Kenya shows the most advanced mobile money ecosystem, South Africa strong digital banking systems, and Nigeria rapid growth in agency banking and AgriTech financing. There has been progress but digital exclusion remains high among smallholder farmers, women and rural populations. The review concludes that when backed by inclusive infrastructure, financial literacy, secure digital systems and farmer-centric policies, DFS can dramatically improve agricultural commercialisation and food system resilience.
Keywords: Digital, Financial Services. Agriculture, Market Access, Africa.

Article 5

Implementation of Core Curriculum Minimum Academic Standard in Nigerian Universities: An opportunity for agricultural entrepreneurship through practical education

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Abstract

The introduction of the Core Curriculum and Minimum Academic Standards (CCMAS) in Nigerian universities presents a strategic opportunity to reposition higher education toward innovation, employability, and sustainable national development. This position paper argues that the effective implementation of the CCMAS framework, particularly in agricultural disciplines, can transform agricultural education from a predominantly theoretical enterprise to a competency-based system that equips graduates with entrepreneurial and practical skills. In repositioning agricultural education, the successful realisation of the CCMAS objectives depends largely on strengthening the practical components of agricultural training, particularly the Farm Practical Training (FPT) programme. While the revised curriculum emphasises learner-centred and outcome-based education, its impact will remain limited if students continue to receive predominantly classroom-based instruction with inadequate exposure to real-life agricultural production systems. The paper contends that FPT should be projected as the cornerstone of agricultural entrepreneurship education because it enables students to acquire technical competence, managerial skills, entrepreneurial mindset, problem-solving abilities, and practical experience across crop, livestock, agribusiness, and value-addition enterprises. Furthermore, FPT provides a platform for integrating modern agricultural technologies, climate-smart practices, digital agriculture, and agribusiness management into undergraduate training, thereby enhancing graduate employability and self-reliance. The paper concludes that projecting Farm

Practical Training as the flagship component of the CCMAS will bridge the gap between theory and practice, cultivate entrepreneurial graduates capable of establishing profitable agricultural enterprises, reduce graduate unemployment, and support Nigeria's broader goals of food security, youth empowerment, and sustainable agricultural transformation. To maximise its impact, the paper advocates increased investment in university Teaching and Research Farms as commercial learning enterprises, strengthened collaboration with private agribusinesses, adoption of experiential and competency-based learning approaches, and the establishment of functional agribusiness incubation centres within universities. It also recommends adequate funding, continuous staff capacity development, and systematic monitoring of practical learning outcomes.
Keywords: Agricultural Entrepreneurship, Core Curriculum Minimum Academic Standard, Nigerian Universities, Practical Education

Article 6

Impact of Agricultural Intervention on Income of Women Processors in Kwara State, Nigeria

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ABSTRACT

Women play a vital role in cassava processing in Nigeria, yet their productivity and income are constrained by limited access to improved technologies, extension services, and productive resources. This study assessed the impact of the Women-in-Agriculture (WIA) Programme on women cassava processors in Kwara State, Nigeria. A multi-stage sampling procedure was used to select 200 respondents comprising programme beneficiaries and non-beneficiaries. Data were analysed using descriptive statistics, the Chow test, and regression analysis. The findings showed that beneficiaries were predominantly within the economically active age group and accessed programme information mainly through extension agents, processors' associations, social media, and television. Technologies transferred included abrasive peelers, vibrating sieves, frying pans, and motorised graters, which improved processing efficiency and reduced labour. The Chow test revealed that beneficiaries earned significantly higher incomes than non-beneficiaries ($p < 0.05$). Regression analysis indicated that age, marital status, educational level, and household size significantly influenced programme impact. Major constraints included inadequate capital, limited access to land, and labour-intensive processing methods. The study concludes that the WIA Programme significantly improved the livelihoods of women cassava processors and recommends its expansion and sustained implementation to enhance rural women's economic empowerment and agricultural development.

Keywords: “Technology transfer”, “Empowerment”, “Income”, “Rural development”, Livelihoods, “Beneficiaries”

Article 7

Effect of Different Levels of Enzyme and Palm Press Meal on Performance and Bone Characteristics of Broiler Birds

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Abstract
The aim of this research was to evaluate the influence of different levels of enzyme and palm press meal on performance and bone quality of broiler birds. One hundred and forty-seven (147) day old chicks (Ross 308) were used for the study. They were assigned to seven (7) treatments with three replicates of twenty-one (21) birds per treatment and seven (7) per replicate in a 2x3 factorial completely randomized design (CRD). The palm kernel cake in the control was replaced with 25%, 50% and 75% palm press meal with 2 levels of enzymes respectively. Thus, T_1 was the control (without palm press and enzyme), T_2-T_4 had 25%, 50%, and 75% palm press meal with 0.02% enzyme respectively and T_5-T_7 had 25%,50% and 75% palm press meal with 0.04% enzyme. This study was carried out for a period of eight (8) weeks. From the result obtained, the initial weight, final weight, weight gain, feed intake, feed conversion ratio, feed cost and mortality were not significantly ($P>0.05$) different across the treatment groups. There was no significant difference ($P>0.05$) recorded for bone thickness, bone load, bone stress, dry weight, bone length and wet weight of the broiler birds at 0.02% and 0.04% enzyme levels. In conclusion, the interactive effect of palm press meal and enzyme on performance and bone of the broiler birds showed that supplementation at 0.02% to 0.04% levels can be included in broiler diets to improve growth performance, feed efficiency and bone quality of broiler birds.
Keywords: Broiler birds, Enzyme, Palm press meal, palm kernel cake, Bone quality.

Article 8

Effect of Sowing Dates and Varieties on Growth and Yield of Sweet Corn (*Zea mays saccharata*) in Uyo, Nigeria

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Abstract
Sweet corn is one of the major cereal crops in the world. Its production is faced with many challenges, amongst which include appropriate variety and

optimum sowing date. Therefore, this study was conducted in 2025 at Use Offot in Uyo Local Government Area to assess the effect of sowing dates and variety on the growth, yield and economic returns to management of sweet corn. The 3 x 4 factorial experiment was laid out in a randomized complete block design and replicate three times. Factor A treatments were three varieties (Ayo, Hybrid 56 and Oba) while Factor B were four sowing dates (7th April, 14th April, 21st April and 28th April). Data collected on growth and yield parameters were subjected to analysis of variance and means were compared using least significant difference at 5% probability level. The result revealed that Ayo sweet corn varieties significantly (p≤0.05) influenced growth and yield of sweet corn, giving higher total fresh weight of grain yield (12.29 t/ha) than Hybrid 56 and Oba 46 varieties. Sweet corn sown on 7th April performed better than other sowing date with (9.28 t/ha) grain yield while 14th, 21st and 28th April sowings had (9.22 t/ha, 8.41 t/ha and 7.93 t/ha) grain yields, respectively. Significant varieties and sowing dates interaction indicated that sowing on 7th April with Ayo variety had the highest total fresh weight of grain yield. Ayo sweet corn variety sown in first week of April could be recommended for higher grain yield.
Keywords: Sweetcorn, varieties, sowing dates, interaction.

Article 9

Effect of Agricultural Cooperative Societies on Agricultural Production in Awka South Local Government Area, Anambra State, Nigeria

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Abstract

Agricultural cooperative societies play a vital role in improving agricultural productivity. This study examined the effect of agricultural cooperative societies on agricultural production in Awka South Local Government Area of Anambra State, Nigeria. The study specifically looked at the roles of cooperative societies in facilitating access to agricultural inputs, determined their effects on agricultural production, and identified the challenges affecting their performance. A multistage sampling procedure was employed to select 119 respondents from 23 agricultural cooperative societies. Structured questionnaires were used to collect the primary data and analyzed using frequencies, percentages, and mean scores. The findings revealed that cooperative societies contribute significantly in providing agricultural credit (mean = 3.53), improving farmers' welfare (mean = 3.09), and facilitating market access (mean = 2.79). Access to shared equipment (mean = 3.65), subsidized inputs (mean = 3.48), and agricultural credit (mean = 3.36) had positive effects on agricultural production. However, limited access to finance (mean = 1.63), poor government support (mean = 1.53), and weak management structures (mean = 1.34) constrained cooperative performance.

The study concludes that addressing the challenges facing cooperative societies is crucial for improving the effectiveness of cooperative institutions, improve agricultural productivity and better livelihoods for farmers.

Keywords: Agricultural cooperative societies, agricultural production, Awka South, Anambra State, Nigeria.

Article 10

Haematological Profile of Weaner Pigs Fed Diets Containing Concentrate Feed Ingredients, Discarded Fish Feed and Crop By-Products

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Abstract

The study investigated the effect of the combination of the feed materials (concentrate feed ingredients, discarded fish feed and crop by-products) on the haematological responses of weaner pigs. The four feed treatments utilized were: T_1 – 60%WO + 20%PKC + 20%DFF (control); T_2 - 15%WO + 15%PKC + 15%DFF + 55%CP; T_3 -15%WO + 15%PKC + 15%DFF + 55%YP and T_4 - 15%WO + 15%PKC + 15%DFF + 55%PP in a completely randomized design (CRD) by the pigs. On the last day the feeding and growth trial, a set of 2 ml blood samples were taken from 3 pigs per treatment into plastic tubes containing the anti-coagulant ethylene diamine tetraacetic acid (EDTA) for the determination of haematological parameters: Packed Cell Volume (PCV), Haemoglobin (Hb), Red Blood Cell (RBC) and White Blood Cell (WBC). The Mean Corpuscular Haemoglobin (MCHC), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Volume (MCV) were also determined. Results on the blood parameters of wearner pigs served the various feed treatments revealed normal range of blood values for PCV (38.76 – 47.56%), Hb (12.67 – 14.08 g/100ml) RBC (1.86 – 2.76 $x10^6/mm^3$) and WBC (19.88 – 26.66 $x10^3/mm^3$). Therefore, the combination of the feed materials (concentrate feed ingredients, discarded fish feed and crop by-products) used in the experiment for all the treatment groups could be a ready source of feed materials for utilization by pig farmers since they do not have any negative effects on the blood parameters and subsequently will promote good health of the pigs.

Key words: Haematology, Weaner pigs, Concentrate feed ingredients, discarded fish feed, Crop by-products

Article 11

Precision Nutrition in Livestock Production: A Digital Approach to Enhancing Feed Efficiency and Reducing Environmental Impact

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Abstract

Livestock production systems have undergone significant transformation due to increasing global demand for meat, milk and other animal products. This rising demand has created the need for innovative strategies that improve productivity, efficiency and sustainability. However, intensification of livestock production has increased concerns relating to environmental pollution, greenhouse gas emissions, nutrient wastage and animal welfare.

Digital precision nutrition has emerged as an important approach for addressing these challenges by enabling accurate nutrient delivery based on the actual requirements of animals. Precision nutrition integrates sensors, automated feeding systems, artificial intelligence, machine learning and data-driven decision-making to monitor individual animals and optimize feeding strategies. This approach improves feed conversion efficiency, reduces nutrient losses, minimizes environmental impacts and enhances animal health and welfare. Despite its benefits, adoption remains limited due to high investment costs, inadequate digital infrastructure, poor technical skills, unreliable power supply and concerns relating to data ownership. Therefore, effective implementation requires affordable technologies, farmer training and supportive policies.

Keywords: Precision nutrition; digital livestock farming; feed efficiency; sustainability; animal welfare

Article 12

Growth Performance and Haematological Response of Broiler Chickens Administered Aqueous Extract of *Triumfetta cordifolia* Leaf

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Abstract

This study evaluated the effects of graded levels of aqueous Triumfetta cordifolia leaf extract on the growth performance and haematological profile of broiler chickens. A total of 105 day-old Arbor Acres chicks were allotted to five treatments (T1–T5: 0, 5, 10, 15, 20% extract in drinking water) in a

completely randomized design, three replicates of seven birds each, over eight weeks. Growth indices (weight gain, feed intake, feed conversion ratio, feed efficiency ratio) and haematological parameters (packed cell volume, haemoglobin, red and white blood cell counts, platelets, erythrocyte indices) were measured. Extract inclusion had no significant effect ($P > 0.05$) on any growth parameter, though 10% extract gave numerically the best weight gain and feed conversion. Packed cell volume, haemoglobin, red blood cell count, and mean corpuscular haemoglobin differed significantly among treatments ($P < 0.05$), generally rising with extract level, while white blood cell count, platelets, mean corpuscular haemoglobin concentration, and mean corpuscular volume were unaffected. All values remained within normal reference ranges for broilers. The results indicate that aqueous Triumfetta cordifolia leaf extract is well tolerated by broiler chickens and may support red blood cell formation without compromising growth or blood safety, with 10% inclusion appearing most favourable.
Keywords: *Triumfetta cordifolia*, broiler chickens, growth performance, haematology, phytogenic feed additive

Article 13

Digital and Climate-Smart Approaches To Genomic Sequencing and Gene Expression in Poultry and Dairy Cattle

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Abstract
The impact of climate change on livestock production includes reduced efficiency of reproduction, increased disease prevalence, heat stress, and reduced feed availability. Conventional livestock breeding programmes lacks the adaptability to cope with climate change concerns. Some Digital and Climate-smart breeding genomics tools, including Whole Genome Sequencing (WGS), RNA Sequencing (RNA-Seq), and Precision Livestock Farming (PLF), have the potential to identify resilience traits. Dairy cattle and poultry are particularly at risk of the impact of these challenges as a result of their high metabolic rates. The application of these technologies into breeding programmes in the Tropics will result in the development of climate-smart, resilient Dairy and Poultry breeds to sustain production in a changing climate. This paper provides a review on the application of digital and climate-smart technologies in genomics, from climate change and resilience to RNA sequencing, gene expression, and precision livestock farming in dairy and poultry, including the identification of resilient genes, heat tolerance and disease resistance, the ability to perform and sustain optimal productivity. The paper discusses the application of various technologies, including Next Generation Sequencing, Transcriptomics, Marker-Assisted Selection, Genomic Selection, and Precision Livestock Farming. The paper concludes that breeding programmes incorporating these technologies will enhance

resilient dairy and poultry populations, protect biodiversity, and improve food security even in climate variabilities.

Keywords: Climate change, resilience, sustainability, transcriptomics, gene expression.

Article 14

Efficacy of Chilli Pepper (Capsicum spp.) Extract as a Botanical Insecticide for Pest Management and Yield Enhancement in Two Cowpea (Vigna unguiculata L. Walp) Varieties in the Sudan Savanna of Nigeria

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Abstract

Cowpea (*Vigna unguiculata* L. Walp) is a principal source of dietary protein in sub-Saharan Africa, yet its production is severely constrained by insect pests, and the reliance on synthetic pesticides raises concerns over environmental contamination, pest resistance, and human health. Botanical alternatives such as chilli pepper (*Capsicum spp*.) extract, whose active ingredient capsaicin has documented insecticidal and repellent properties, offer a promising, low-cost option for smallholder farmers. This study evaluated the influence of chilli spray frequency on the vegetative growth, yield components and grain yield of two cowpea varieties (277-2 and 357-2-1) during the 2021 rainy season at the Teaching and Research Farm of Kano University of Science and Technology, Wudil, Nigeria. Two varieties were factorially combined with four spray regimes: 1-4 applications of chilli extract, in a randomised complete block design with three replications. The results revealed that spray frequency significantly ($P < 0.05$) influenced plant height, leaf and branch numbers, pod number, pod weight, 100-seed weight and grain yield, with effects becoming pronounced from five weeks after sowing. The four-spray regime combined with variety 357-2-1 produced the highest grain yield (1957 kg ha^{-1}), representing a 53.6% increase over the single-spray control, while the same regime combined with variety 277-2 yielded 1888 kg ha^{-1} (41.0% increase). Grain yield correlated strongly with pod number ($r = 0.971$), 100-seed weight ($r = 0.953$) and pod weight ($r = 0.936$), and increased linearly with spray frequency ($Y = 191.05X + 1133$, $R^2 = 0.939$). However, spray efficiency (yield gained per spray) declined with increasing frequency, indicating diminishing marginal returns. These findings support chilli pepper extract as a viable, environmentally friendly component of integrated pest management for cowpea in the Sudan Savanna, while highlighting the need for economic and direct pest-incidence data to optimise spray scheduling.

Keywords: Cowpea varieties; Botanical pesticide; Chilli pepper extract; Sustainable agriculture

Article 15

Growth Performance and Haematological Indices of Broiler Chickens Fed Diets Containing Graded Levels of *Nephrolepis cordifolia* Leaf Meal

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Abstract

This study evaluated the proximate composition of *Nephrolepis cordifolia* leaf meal (NCLM) and its effects on growth performance and haematological indices of broiler chickens. One hundred and five day-old Arbor Acres chicks were assigned to five treatments (T1–T5) containing 0, 2, 3, 4, and 5% NCLM in a Completely Randomised Design (three replicates of seven birds each) for eight weeks. NCLM contained 24.78% crude protein, 11.66% ash, 1.06% crude fat, 35.91% crude fibre, 10.97% moisture, and 15.61% nitrogen-free extract. Inclusion level significantly ($P<0.05$) affected final weight, weight gain, daily weight gain, feed intake, feed conversion ratio, and feed efficiency ratio, but not initial weight ($P>0.05$). Birds on 3% NCLM performed best, recording the highest final weight (3.437 kg), weight gain (3.104 kg), daily gain (0.063 kg), and feed efficiency ratio (44.16%), alongside the lowest feed conversion ratio (2.300); performance declined at higher inclusion levels. Haematology revealed no significant effect ($P>0.05$) on packed cell volume, haemoglobin, platelets, erythrocyte indices, or differential leucocytes, though red and white blood cell counts increased significantly ($P<0.05$), peaking at 5% inclusion, with all values within normal physiological ranges. NCLM can be included up to 5% without adverse haematological effects, with 3% optimal for growth, while elevated erythrocyte and leucocyte counts suggest a beneficial immunostimulatory effect of its phytochemicals.

Keywords: *Nephrolepis cordifolia*, leaf meal, broiler chickens, proximate composition, growth performance, haematology

Article 16

Use of Mobile Applications for Agricultural Extension Service Delivery among Smallholder Farmers in Imo State, Nigeria

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Abstract

The increasing integration of digital technologies into agricultural systems has created new opportunities for improved delivery and accessibility of extension services among farmers. However, the extent to which smallholder

farmers utilise mobile applications for agricultural extension services in Imo State remains poorly understood. This study examined the awareness, level of use, and challenges to the use of mobile applications for agricultural extension service delivery among smallholder farmers in Imo State, Nigeria. A multistage sampling procedure was used to select 126 farmers. Data were collected through questionnaires, and were analysed using percentages, means, and standard deviations. Findings reveal that awareness of general-purpose mobile applications such as WhatsApp (74.2%), Facebook (74.2%), and YouTube (72.5%) was relatively high among the farmers, while awareness of agriculture-specific applications like e-Wallet was low (35.0%). Similarly, the farmers' overall level of use of mobile applications was low (61.7%) in the area, with poor internet connectivity ($\bar{x}$ = 2.97) and high data costs ($\bar{x}$ = 2.97) the major constraints limiting their use. Government, in partnership with relevant stakeholders, should improve rural digital infrastructure and subsidise data services for rural farmers to enhance effective use of mobile applications for agricultural extension delivery.
Keywords: Mobile applications, Agricultural extension service delivery, Smallholder farmers

Article 17

Profitability Analysis of Marketing of Plantain in Enugu Urban, Enugu State, Nigeria

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Abstract
The study examined the economics of plantain marketing in Enugu urban of Enugu state, Nigeria and specifically determines the profitability of plantain marketing in the study area. Purposive and multi-stage random sampling techniques were employed in selecting 120 respondents; as data were collected from primary sources. Findings from the study revealed that a total revenue of N120,000.00 was earned from sales of ten (10) whole plantain sold to retailers by the wholesaler per trip of tricycle keke while the total variable costs incurred was N80,000.00, given a gross margin of N40,000.00per trip of tricycle keke. The study recommended among others that loans at single digit interest rate should be made available to the small-scale plantain marketers, also that plantain marketers should form cooperative societies and finally, the study recommends frequent use of workshops, advocacy and seminars through agricultural extension officers to educate the rural and urban plantain marketers and farmers more on the economic benefits of plantain marketing which is a major source of income and employment to both urban and rural dwellers.
Keywords: Plantain, Profit, Marketers

Article 18

Strengthening Resilient Food Systems through Inclusive Agribusiness Support among Grain Crop Farmers in Niger State, Nigeria

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Abstract

This study assessed how inclusive agribusiness support influences household income and livelihood resilience among grain crop farmers in Bosso and Chanchaga Local Government Areas of Niger State, Nigeria. A multistage sampling procedure was used to select 121 grain crop farmers, while primary data were collected using structured questionnaires administered through the Kobo Collect mobile application. Descriptive statistics were employed to summarize farmers' socioeconomic characteristics, grain production patterns, livelihood outcomes, and production constraints, while Ordinary Least Squares (OLS) regression analysis identified factors influencing household income. The findings revealed that respondents were economically active, with a mean age of 45 years, an average farming experience of 23 years, and an average farm size of 2.4 hectares, indicating the dominance of smallholder production systems. Maize was the most widely cultivated grain crop, followed by rice and guinea corn. The preferred OLS model showed that farming experience, fertilizer utilization, access to agricultural credit, and pesticide expenditure significantly enhanced household income, whereas inadequate extension services, persistent weed infestation, limited access to improved production inputs, and the high cost of fertilizer remained major constraints to productivity. Farmers also reported that grain production contributed substantially to employment creation, improved household welfare, increased savings, enhanced children's education, and livelihood resilience. The study concludes that strengthening inclusive agribusiness support through improved access to extension services, affordable agricultural finance, quality farm inputs, and efficient market linkages is fundamental to building resilient food systems and improving rural livelihoods. It therefore recommends stronger public-private partnerships, increased access to agricultural credit, and targeted investments in input delivery systems to promote sustainable grain production in Nigeria.

Keywords: Inclusive agribusiness, livelihood resilience, grain crop production, market access, rural households, resilient food systems.

Article 19

Utilizing Nigerian Bread Bakeries as Agricultural Processing Industries for Value-Added Snack Production: Opportunities for Sustainable Agro-Industrial Development

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Abstract

This paper examines the potential of Nigerian bread bakeries to function as agricultural processing industries for the production of value-added snack products. Nigeria possesses a large network of small and medium-scale bakeries that currently focus primarily on bread production, yet substantial opportunities exist to diversify into snack manufacturing using locally sourced agricultural commodities such as cassava, rice, maize, soybean, plantain, and sweet potato. The study synthesizes evidence from bakery economics, food processing, and agricultural value-chain literature to propose an integrated model in which bakeries serve as decentralized agro-processing hubs. The paper discusses technological requirements, product opportunities, economic benefits, food security implications, and sustainability considerations. Illustrative process diagrams and a conceptual value-chain framework are presented to guide implementation. The analysis suggests that bakery-based snack diversification can reduce postharvest losses, increase demand for local crops, improve bakery profitability, create rural and urban employment, and contribute to import substitution in the Nigerian food sector.

Keywords: ***bakery industry, agricultural processing, value addition, snacks, Nigeria, composite flour, agro-industrialization***

Article 20

Influence of Biochar on the Growth of Maize Cultivated in Mycorrhizal-Inoculated Soil

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Abstract

This study evaluated the effects of biochar and arbuscular mycorrhizal fungi (AMF) on the growth of maize (*Zea mays* L.) and selected soil properties under screen-house conditions. A factorial experiment in a Completely Randomized Design with three replications was conducted using three AMF species (*Glomus deserticola*, *Gigaspora gigantea*, and *Glomus mosseae*) and five biochar rates (0, 5, 10, 15, and 20 g). Plant growth parameters and soil physicochemical properties were assessed using standard methods. The combined application of biochar and AMF significantly improved maize growth and soil fertility compared with the control. *Glomus mosseae* with 20 g biochar produced the highest plant height (261 cm) and leaf area (215 cm^2), while *Glomus deserticola* showed the best overall growth performance. Biochar increased soil pH (5.6 – 7.1), organic carbon, total nitrogen, and available phosphorus, indicating enhanced nutrient availability. The study concludes that integrating biochar with AMF is an effective and sustainable strategy for improving maize productivity and soil fertility, with *Glomus deserticola* and moderate biochar application (5 – 15 g) showing the most consistent benefits.

Keywords: Biochar, arbuscular mycorrhizal fungi, maize, soil fertility, sustainable agriculture.

Article 21

Effect of Agricultural Cooperative Societies on Agricultural Production in Awka South Local Government Area, Anambra State, Nigeria.

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Abstract

Agricultural cooperative societies play a vital role in improving agricultural productivity. This study examined the effect of agricultural cooperative societies on agricultural production in Awka South Local Government Area of Anambra State, Nigeria. The study specifically looked at the roles of cooperative societies in facilitating access to agricultural inputs, determined their effects on agricultural production, and identified the challenges affecting

their performance. A multistage sampling procedure was employed to select 119 respondents from 23 agricultural cooperative societies. Structured questionnaires were used to collect the primary data and analyzed using frequencies, percentages, and mean scores. The findings revealed that cooperative societies contribute significantly in providing agricultural credit (mean = 3.53), improving farmers' welfare (mean = 3.09), and facilitating market access (mean = 2.79). Access to shared equipment (mean = 3.65), subsidized inputs (mean = 3.48), and agricultural credit (mean = 3.36) had positive effects on agricultural production. However, limited access to finance (mean = 1.63), poor government support (mean = 1.53), and weak management structures (mean = 1.34) constrained cooperative performance. The study concludes that addressing the challenges facing cooperative societies is crucial for improving the effectiveness of cooperative institutions, improve agricultural productivity and better livelihoods for farmers.
Keywords: Agricultural cooperative societies, agricultural production, Awka South, Anambra State, Nigeria.

Article 22

Health Vulnerabilities and Greenhouse Gas Emissions Impacts on Rural Women Farmers in Rivers State, Nigeria

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Sub-theme: Gender, Youth, and Disability in Research and Extension

Abstract

This study examined the health vulnerabilities and impacts of greenhouse gas emissions among rural women farmers in Rivers State. It specifically identified the health challenges faced by rural women farmers in Rivers State as a result of GHG emissions. The study determined the relationship between emissions-induced health vulnerabilities and the overall health of rural women farmers using a null (H_0) hypothesis. Data for the study were collected from 407 rural women farmers using a set of semi structured questionnaire and checklist, while data analysis involved both descriptive and inferential statistical tools. Results from the analysis showed that rural women farmers in Rivers State suffer from a diverse array of health vulnerabilities, including red ($\dot{x}$ = 4.6437), difficulty in breathing ($\dot{x}$ = 4.3538), and excessive sneezing/nasal congestion ($\dot{x}$ = 4.2801) The null hypothesis (H_0) was rejected since adjusted R^2 value is .907 with e=0.24964. particularly rural women farmers who support global food systems need to stay healthy to be able to effectively and sustainably engage in farming to support families and communities with sufficient and nutritious food. Recommendations include increasing advocacy on oil production best practices and community resilience education.

Keywords: Greenhouse gas emissions, Climate Change, Health vulnerabilities, Rural women, Farming,

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