



**Contact us:**

Network of Organic Agriculture Researchers in Africa (NOARA) Continental Secretariat  
c/o Olugbenga O. Adeoluwa,  
Department of Soil Resources Management,  
Faculty of Agriculture, University of Ibadan, Nigeria.  
Tel./WhatsApp: +2348035709365, +2348077794143  
Website: [www.noara.bio](http://www.noara.bio); <https://publications.noara.bio/>  
Email: [noaraafrica@gmail.com](mailto:noaraafrica@gmail.com); [info@noara.bio](mailto:info@noara.bio)

**Contactez-nous**

Secrétariat continental du Réseau des chercheurs en agriculture biologique en Afrique (NOARA)  
c/o Olugbenga O. Adeoluwa,  
Département de gestion des ressources en sols,  
Faculté d'Agriculture  
Université d'Ibadan, Nigéria.  
Tél./WhatsApp : +2348035709365, +2348077794143  
Site Internet : [www.noara.bio](http://www.noara.bio) ; <https://publications.noara.bio/>  
Courriel : [noaraafrica@gmail.com](mailto:noaraafrica@gmail.com) ; [info@noara.bio](mailto:info@noara.bio)



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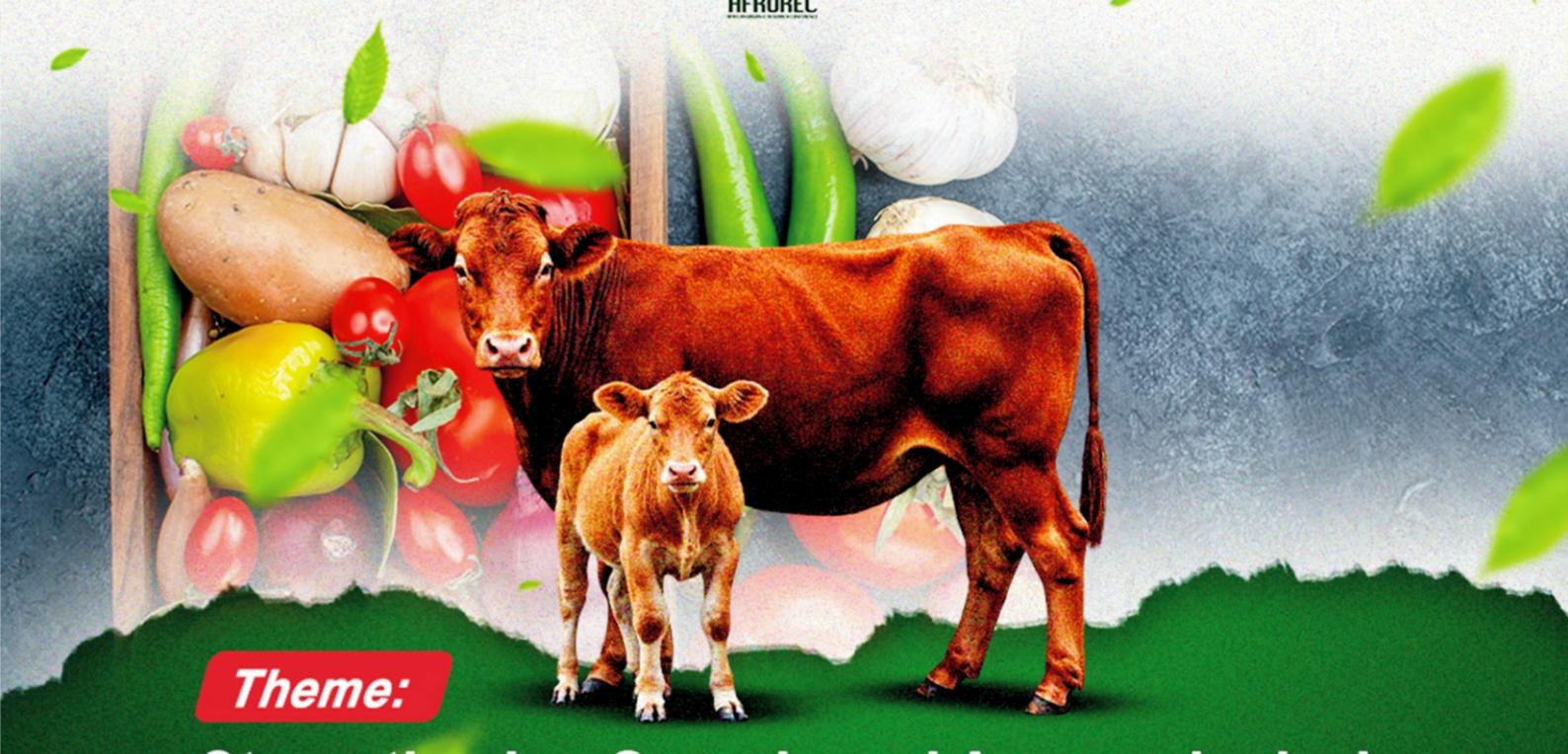
[info@noara.bio](mailto:info@noara.bio)

[noaraafrica@gmail.com](mailto:noaraafrica@gmail.com)

# BOOK OF ABSTRACTS

OF THE

## 2ND AFRICAN ORGANIC RESEARCH CONFERENCE (AFROREC)



**Theme:**

**Strengthening Organic and Agroecological  
Farming in Africa through Innovative  
Research**

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[www.noara.bio](http://www.noara.bio)

[info@noara.bio](mailto:info@noara.bio)

[naoraafica@gmail.com](mailto:naoraafica@gmail.com)

S/N	MANUSCRIPTS TITLES	AUTHORS
AF001	Germination and Seedling Vigour of Maize as Influenced by Priming and Time of Seed Bio-Priming	<p>Olawale S. Musibau<sup>1</sup>, Sunday Ojo Adigbo<sup>1,2*</sup> and Patience U. Odueme<sup>2</sup></p> <p><sup>1,2</sup>Plant Physiology and Crop Production, Federal University of Agriculture, Abeokuta, Nigeria</p> <p><sup>2</sup>Institute of Food Security, Environmental Resources and Agricultural Research (IFSERAR), Federal university of Agriculture, Abeokuta, NIGERIA correspondence author: email <a href="mailto:adigboso@funaab.edu.ng">adigboso@funaab.edu.ng</a></p>
AF002	Performance, serum biochemistry and intestinal microbiome ecology of Ross 308 broilers fed graded levels of <i>Cichorium intybus</i> root powder	<p>Chawarika M, Muronzi F, Duri T, Tigere A, Nyahangare ET, Bonyongwe T</p> <p>Grasslands Research Institute, P.O. Box 3701, Marondera, Zimbabwe</p> <p>Department of Livestock Science, Faculty of Agriculture Environment and Food System, University of Zimbabwe P.O. Box MP167 Mt Pleasant, Harare, Zimbabwe</p> <p>Corresponding email: <a href="mailto:marlonchavarika@gmail.com">marlonchavarika@gmail.com</a> +263785733505</p>
AF003	The Regulation (EU) 2018/848 and the organic certification in Africa, a case of Uganda	<p>Junior Nuwandinda*</p> <p>Kushamiri Agro Consults Ltd, Kampala, Uganda; <a href="mailto:njunr2012@gmail.com">njunr2012@gmail.com</a></p>
AF004	Poly- and perfluoroalkylated substances (PFASs) in water, sediment, and fish muscle	Ahrens, Habiba Gashaw, Margareta Sjöholm, Solomon Gebreyohannis Gebrehiwot, Abebe Getahun, Ermias Derbe, Kevin Bishop, Staffan Åkerblom
AF006	Biochar based native microbial consortium for crop quantity and quality improvement in Cameroon	<p>Sontsa-D. A. -M.*<sup>a</sup>, Madou C. <sup>a</sup>, TinakE.D.C. <sup>a</sup>, MahotH.C. <sup>a</sup>, Ntsama P. <sup>a</sup>, Boyomo B. <sup>a,b</sup>, Nana N.J.J., MongoueF.A. <sup>a</sup>, ChatueC.G. <sup>a</sup>, NzeketO.A. <sup>a</sup>, Linou N.A.S., HawouaO. <sup>a</sup>, Messi A.L.M. <sup>a</sup>, BegoudeB.A.D<sup>a</sup></p> <p><sup>a</sup>Laboratory of Regional Biological Control and Applied Microbiology, Institute of Agricultural Research for Development (IRAD), P. O. Box 2123, Yaounde, Cameroon.</p> <p><sup>b</sup>Biotechnology and Environment Laboratory/Plant Pathology and Protection Unit, Faculty of Sciences, University of Yaounde I, P.O. Box 812, Yaounde, Cameroon.</p> <p>*<a href="mailto:martialdonhoung@yahoo.fr">martialdonhoung@yahoo.fr</a></p>
AF007	Empowering agroecological transitions through renewable energy integration for climate adaptation in Uganda	<p>Charles L. Tumuhe, Denis Katusiime, David Ssekamatte</p> <p>Uganda Martyrs University, Kampala, Uganda Corresponding author: <a href="mailto:tumchaz34@gmail.com">tumchaz34@gmail.com</a></p>
AF008	Conjugating organic agricultural production and green agri-food marketing	<p>Martin Hilm</p> <p>Aston Postgraduate Research Society (APRS)</p> <p>Aston Business School (ABS), Aston University</p> <p>Birmingham, United Kingdom</p> <p>E-mail: <a href="mailto:hilmim@aston.ac.uk">hilmim@aston.ac.uk</a></p>

AF009	Back to Basics: Mitigating the Harmful Effects of Droughts for Efficient Livestock Productivity in the Grasslands of The	T.E Mokhesengoane <sup>1#</sup> , H.C van der Westhuizen <sup>2</sup> , & J.A Van Niekerk <sup>3</sup>
AF010	Comment Impliquer Femmes et Jeunes En Agroécologie? L'expérience de L'association Nourrir Sans Detruire (AnsD) du Burkina Faso	<p>1 Agricultural Extension, Free State Department of Agriculture and Rural ASSOCIATION NOURRIR SANS DETRUIRE -ANSD</p> <p>Adresse : <a href="mailto:ali.dianou@ansdbf.org">ali.dianou@ansdbf.org</a></p> <p>Tel : 00226 70 34 66 99</p>
AF011	Smallholder Farmers' Contribution to National Food Security in Nigeria	<p>Adebola Adedugbe.</p> <p>No Hunger Food Bank Initiative</p> <p>Email: <a href="mailto:bolaadedugbe@gmail.com">bolaadedugbe@gmail.com</a></p>
AF012	Renforcement de L'agriculture Biologique et Agroécologique dans Les Afrique A Traversets De L'enquête« L'innovateur »	<p>JOSÉ MORA NSUMNE</p> <p>Spécialiste en communication rurale et d'élaboration des projets</p> <p>Président de l'Association Nationale de la Chaîne de Valeur du Riz, Racines et Tubercules de Guinée-Bissau (ANCVART-GB)</p> <p>E-mail: <a href="mailto:nsumnejosmora@yahoo.com.br">nsumnejosmora@yahoo.com.br</a></p> <p>Tél. ou WhatsApp : +24595544666 / 965617146. Bissau, Guinée-Bissau</p>
AF013	<i>Dillenia indica</i> L.: A Nutritional and Medicinal Approach for Agroecology in Africa	<p>Hanaa Salah Ebrahim<sup>a*</sup>, Seham Salah Eldin El-Hawary<sup>b</sup>, Gihan Fouad Ahmed<sup>a</sup>, Essam Mostafa Abd El-Kader<sup>c</sup>, Marwa Yousry Issa<sup>b</sup></p> <p><sup>a</sup> National Nutrition Institute, General Organization for Teaching Hospitals and Institutes, Egypt</p> <p><sup>b</sup> Faculty of Pharmacy, Cairo University, Egypt</p> <p><sup>c</sup> Agriculture Research Center, Egypt</p>
AF014	Multiple aflatoxins co-occurrence in groundnut grown in three districts of Mtwara region, Tanzania	<p>Juma R. Mfaume<sup>1#</sup>, John J. Tenga<sup>1</sup> and Ernest R. Mbega<sup>2</sup>.</p> <p><sup>1</sup>Tanzania Agricultural Research Institute (TARI), Cereals and Legumes Research Program, Naliendele Centre, P.O. Box 509, Mtwara, Tanzania;</p> <p><sup>2</sup>The Nelson Mandela African Institution of Science and Technology (NM-AIST), the School of Life Sciences and Bioengineering (LiSBE), P.O. Box 447, Arusha, Tanzania.</p> <p>*Corresponding author email: <a href="mailto:jumamfaume2@gmail.com">jumamfaume2@gmail.com</a></p>
AF015	Rooting resilience: Urban agroecology for livelihood innovation in Uganda	<p>Charles L. Tumuhe, Dennis Katusiime, David Ssekamatte</p> <p>Uganda Martyrs University, Kampala, Uganda; Corresponding author: <a href="mailto:tumchaz34@gmail.com">tumchaz34@gmail.com</a></p>
AF016	Renforcement des capacités pour l'agriculturebiologique et agro-écologique à tous les niveaux	<p>Abdoul SY Nouakchott Mauritanie</p> <p>Movement for the Equalization of Conditions</p> <p>Field : Education / Entrepreneurship</p> <p>Promoting the Local Dimension in Resource Management</p> <p>Tel: +222 46 82 34 55</p>

AF017	The Relevance of Agricultural Extension Services in the Adoption of Organic Agriculture	<p>Adeokun.A.A.,<sup>2</sup>Olawunmi.A.T.,<sup>1</sup>Opeifa.D.A.,<sup>1</sup>Akinsulu.A.A.,<sup>3</sup>Adesina.M.W.,<sup>1</sup>Abiala.A.A.,<sup>4</sup>Mebude. A.M</p> <p><sup>1</sup>Department of Agricultural Economics and Extension, College of Agriculture and Hospitality Management, Tai Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.</p> <p><sup>2</sup>Department of Ecotourism and Hospitality Management, College of Agriculture and Hospitality Management, Tai Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.</p> <p><sup>3</sup>Department of Animal Science, College of Agriculture and Hospitality Management, Tai Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.</p> <p><sup>4</sup>Department of Aquaculture and fisheries Management, College of Agriculture and Hospitality Management, Tai Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.</p>	AF023	Modalités d'accès à l'information sur des techniques de production des légumesbiologiques au Sud-Bénin	<p>Justin A. Houeto<sup>1*</sup>, Florent Okry<sup>1</sup>.</p> <p><sup>1</sup>Laboratoire d'EconomieRurale et de Sciences Sociales pour le Développement Durable (LERSSoDD), Université Nationale d'Agriculture du Bénin.</p> <p>*Correspondance :<a href="mailto:justinhoueto@yahoo.fr">justinhoueto@yahoo.fr</a></p>
AF024			AF024	Stratégies de mise en marché des légumes biologiques au Sud du Bénin	<p>Justin A. Houeto<sup>1*</sup>, Florent Okry<sup>1</sup>.</p> <p><sup>1</sup>Laboratoire d'EconomieRurale et de Sciences Sociales pour le Développement Durable (LERSSoDD), Université Nationale d'Agriculture du Bénin.</p> <p>*Correspondance :<a href="mailto:justinhoueto@yahoo.fr">justinhoueto@yahoo.fr</a></p>
AF025			AF025	Evaluation of simple but effective methods to reduce pesticide residues in/on fresh vegetables, Nairobi, Kenya.	<p>Nduhiu Gitahi<sup>1*</sup>, Eustace Kiarii<sup>2</sup>, Wycliffe Nyamao<sup>2</sup>, Joseph Nderitu<sup>1</sup>, Harun Warui<sup>3</sup>.</p> <ol style="list-style-type: none"> <li>1. University of Nairobi, Department of Public Health Pharmacology &amp; Toxicology</li> <li>2. Kenya Organic Agriculture Network</li> <li>3. Heinrich Böll Foundation</li> </ol> <p>*Corresponding author email: <a href="mailto:nduhiugitahi@gmail.com">nduhiugitahi@gmail.com</a></p>
AF026	Restoring resilience using holistic management in semi-arid communal farming lands: Case study of Dembe Stream Catchment in Zimbabwe	<p>Never Mujere<sup>11</sup>, Astrid Huelin<sup>2</sup>, Mupenyo N.G. Mberi<sup>3</sup>, Charity Kwenzani<sup>4</sup>, Cosmas Chipenzi<sup>5</sup>, Vimba Mlambo<sup>6</sup>, Farirai Jemwa<sup>7</sup>, Rodney Zhombwe<sup>8</sup>, Shingirai Majaji<sup>9</sup>, Sam Tavengwa<sup>10</sup>, OnalennaGwate<sup>11</sup>, Josphine Mundava<sup>12</sup>, Precious Moyo<sup>13</sup> and Theophilus Mudzindiko<sup>14</sup></p>	AF026	Impact of Agricultural Technologies in Strengthening Organic Farming Among Youth Farmers in Southwestern Nigeria	<p>Abiala, Abiala Alatise<sup>1*</sup>, Akinyode Timothy Olawumi<sup>2</sup>, Sikiru Oluwole Banjo<sup>2</sup>, Adewale Ibrahim Abass<sup>1</sup>, John Olalere Jolayemi<sup>3</sup> and Sanni Micheal Anuoluwapo<sup>4</sup></p> <p>*Corresponding Author Email: <a href="mailto:abialaaa@tasued.edu.ng">abialaaa@tasued.edu.ng</a></p>
AF027	Modelisation Spatiale et Strategie de Conservation Des Formations Boisees aDaniellia Oliveri (Rolle) Hutch. & Dalz. (Fabaceae) des Zones Ecologiques II et III du Togo	<p>Panla Koffi<sup>*</sup>, Amevivi Kossi, Atakpama Wouyo, Folega Fousséni, Dourma Marra, Batawila Komlan, Akpagana Koffi</p> <p>Université de Lomé – Faculté des Sciences (FDS) – Département de Botanique – Laboratoire de Botanique et Écologie Végétale (LBEV), 01 BP 1515, Togo.</p> <p>* Auteur correspondant : PANLA Koffi, E -mail: <a href="mailto:koffipanla@gmail.com">koffipanla@gmail.com</a>/Tél : (+228) 91969950</p>	AF027	Sterilization of farms tools contaminated by banana and potato wilt using plants extracts: a strategy for ecological disease control and for improving food security in the EAC countries	<p>Franchement Mukeshambala<sup>12*</sup>, Angele Ibanda<sup>34</sup>, Enoch Wembabazi<sup>5</sup>, Gakuru Semacumu<sup>1</sup>, Dhed'a Djailo<sup>6</sup>, Valentine Nakato<sup>7</sup>, Guy Blomme<sup>8</sup>, Godefroid Monde<sup>9</sup> Department of Crop Science, University of Goma, P.O. Box 204, Goma, Goma, North Kivu Province, Democratic Republic of Congo;</p> <p>Corresponding author :MukeshambalaFranchement :<a href="mailto:franckmukeir@gmail.com">franckmukeir@gmail.com</a></p>
AF028	Effect of Tithonia Compost on Soil Chemical Properties, Growth and Yield of Radish	<p>Olowoake A. A<sup>1</sup>; Abioye, T.A<sup>1</sup>; Yusuf, A.A.<sup>1</sup> Ojo, J.A.<sup>1</sup> and Ojo, A. O<sup>2</sup></p> <p><sup>1</sup>Department of Crop Production, Kwara State University, P.M.B. 1530, Ilorin, Kwara State, Nigeria. <sup>2</sup>National Centre for Genetic Resources and Biotechnology, Moor plantation, Apata, Ibadan, Nigeria.</p> <p>Corresponding author E-mail: <a href="mailto:aolowoake@yahoo.com">aolowoake@yahoo.com</a>, Phone- +2348034370246</p>	AF028	Analysis of knowledge, attitudes and practices of breeders and consumers for the establishment of a certification system for agroecological poultry farming in Benin	<p>ASSOGBA S. Claude-Gervais 1 , AGNADOMI Ulrich 1 1 Research Laboratory on Innovation for Rural Development, Faculty of Agronomy, University of Parakou, Benin Corresponding author: Email: <a href="mailto:a_claude2003@yahoo.fr">a_claude2003@yahoo.fr</a>   Tel: +229 01611 04886</p>
AF029			AF029	Influence of Moisture pit Sowing on the development and production of upland taro: An approach for Agroecological farming	<p>Macharia, Joseph Kinyoro.<sup>1*</sup>, Akuja, T. E. <sup>2</sup> &amp; Mushimiyima, D. M. <sup>3</sup></p> <p><sup>1</sup>Department of Agriculture and Natural Resources, School of Science and Technology, Kenya Methodist University.</p>
AF030			AF030	Front Yard Vegetable Garden: A Great Starter for Organic Farming	<p>Ryoichi Komiya (Ph.D.) <a href="mailto:komiyaryoichi@gmail.com">komiyaryoichi@gmail.com</a> Organic Shizukuishi IFOAM Recognized PGS Initiative, Japan</p>
AF031			AF031	Typologie des pratiques agroécologiques en zone cotonnière au Nord Bénin	<p>Abdou Ganiou ABOU CHABI<sup>1</sup> <i>Laboratoire d'Analyses et de Recherches sur les Dynamismes Economiques et Sociales (LARDES), Ecole Doctorale Sciences Agronomiques et de l'Eau, Université de Parakou,</i> Université de Parakou, BP : 123, Parakou, Bénin, Email : <a href="mailto:acaganiou@gmail.com">acaganiou@gmail.com</a></p>
AF032			AF032	A Biostimulant as a lever for agroecological intensification: assessing impacts on maize ( <i>Zea mays L.</i> ) in Benin	<p>HOUEDJOFONON M. Elysée<sup>1</sup>, Dr. AGUEGUE Ricardo M.<sup>1</sup>, Dr. BLALOGOE C. Parfait<sup>2</sup>, Dr. CODJO Victor<sup>3</sup>, Prof. BABAMOUSSA Lamine Said<sup>4</sup> Affiliation(s): <sup>1</sup>University of Abomey-Calavi (UAC), <sup>3</sup>National Institute of Agricultural Research of Benin (INRAB), <sup>2</sup>CREDEL NGO.</p> <p>Corresponding author: <a href="mailto:e.houedjofonon@gmail.com">e.houedjofonon@gmail.com</a></p>

AF033	Awareness Campaigns and Capacity Building as Drivers of Organic Agriculture Adoption in Delta State, Nigeria	<sup>1</sup> Atoma, C.N., <sup>1</sup> Akpogheneoyibo-Owigho, O., <sup>2</sup> Onwumere-Idolor, O.S. <sup>1</sup> Ewododhe, A.A.C., <sup>1</sup> Adaigho D.N., and <sup>3</sup> Atoma O.E. Corresponding Authors Email: <a href="mailto:nwacharity1211@gmail.com">nwacharity1211@gmail.com</a>	AF042	Effects of Natural Biostimulants as an Innovative Approach in the Propagation of Flame of the Wood ( <i>Ixora coccinea L.</i> )	<sup>1</sup> Ilem, D. O., <sup>1</sup> Olosunde, O. M., <sup>2</sup> Yisau, O. P. and <sup>1</sup> Adedokun, T. A <sup>1</sup> Department of Horticulture <i>College of Plant Science and Crop Production, Federal University of Agriculture, Abeokuta P.M.B 2240. Abeokuta, Ogun state Nigeria.</i> <sup>2</sup> Department of Horticulture and Landscape Management <i>Lagos State University of Science and Technology, Lagos State, Nigeria.</i> <sup>3</sup> Department of Science Laboratory Technology, <i>Abraham Adesanya Polytechnic, sIjabu Igbo, Ogun State.</i> Corresponding Author Email <a href="mailto:ilemdo@funaab.edu.ng">ilemdo@funaab.edu.ng</a> Phone number +2348033871733
AF034	Modeling the Impact of Fertilizers on Maize and Rice Productivity in Tanzania: Pathways to Agricultural Transformation	Ibrahim L. Kadigi  Department of Business Management, College of Humanities and Business Studies, Mbeya University of Science and Technology, Mbeya P.O. Box 131, Tanzania. Correspondence: <a href="mailto:ibrahim.kadigi@ sua.ac.tz">ibrahim.kadigi@ sua.ac.tz</a> / <a href="mailto:kideannito@gmail.com">kideannito@gmail.com</a>			
AF035	Farmers' Knowledge of Organic Agriculture for Climate Change Mitigation In Kwara State, Nigeria	Felicia Motunrayo Olooto  Department of Agricultural Economics and Extension Services, Faculty of Agriculture, Kwara State University, Malete Nigeria. <a href="mailto:feliciamoloto@gmail.com">feliciamoloto@gmail.com</a> <a href="mailto:felicia.oloto@kwasu.edu.ng">felicia.oloto@kwasu.edu.ng</a> +2347030918979			
AF036	Green manure contributes to achieving regenerative organic farming	Kazuma Katahira spnw9my9@outlook.jp 2-1894-8 Ono-machi, Ichikawa, Chiba, Japan	AF043	Water quality and presence of intestinal parasitic forms, responsible for neglected tropical diseases in Dimako (East-Camereroon	MBASSI MBIDA Marcelle-Blanche <sup>1,2</sup> , MESSOE William <sup>1</sup> , ZEBAZE TOGOUET Serge Hubert <sup>1</sup> . <sup>1</sup> Laboratory of Hydrobiology and Environment, Department of Animal Biology and Physiology, Faculty of Science, University of Yaoundé I, P.O BOX 812 Yaoundé, Cameroon. <sup>2</sup> Laboratory of Parasitology, Centre for Research on Health and Priority Pathologies, Institute of Medical Research and Medicinal Plants Studies, P.O BOX 13033 Yaoundé, Cameroon; E-mail: <a href="mailto:mbassiblanche2@gmail.com">mbassiblanche2@gmail.com</a>
AF037	Contribution de l'agroécologie à la régulation naturelle des ravageurs et à la pollinisation en cultures maraîchères à Yamoussoukro (Côte d'Ivoire)	Marie-France N'Da KOUADIO <sup>1</sup> , GomhanSannCédic OULAI <sup>1</sup> , Antoine AlbanKacouM'BO <sup>1,2</sup> , San-WhoulyMauricetteOUALI N'GORAN <sup>1</sup> <sup>1</sup> FelixHouphouëtBoigny University, Abidjan, Côte d'Ivoire; E-mail: <a href="mailto:kouadiomariefrance283@yahoo.fr">kouadiomariefrance283@yahoo.fr</a> , <a href="mailto:ngoransw@yahoo.fr">ngoransw@yahoo.fr</a> , <a href="mailto:sannoula@gmail.com">sannoula@gmail.com</a> <sup>2</sup> Centre d'Excellence Africain sur le Changement Climatique, la Biodiversité et l'Agriculture Durable (CEA -CCBAD/WASCAL), Abidjan, Côte d'Ivoire; E-mail: <a href="mailto:kacoumbo@yahoo">kacoumbo@yahoo</a> *Corresponding author: Email : <a href="mailto:kouadiomariefrance283@yahoo.fr">kouadiomariefrance283@yahoo.fr</a>	AF044	Potentials of arbuscular mycorrhizal fungi combine with biochar on the growth in <i>Senna obtusifolia</i> and evaluation of its effects on the expressions of some molecules of interest	Djeuani Astride Carole <sup>1,2*</sup> , ADEBE BADEM Fulbertine <sup>3</sup> , and ESSONO Damien Marie <sup>3</sup> 1. Laboratory of Plant Physiology and Biochemistry, Department of Biological Sciences, Higher Teachers' Training College, University of Yaoundé 1, Yaoundé, Cameroon 2. Department of Plant Biology, Faculty of Science, University of Yaoundé 1, Yaoundé, Cameroon 3. Department of Plant Microbiology, Faculty of Science, University of Yaoundé 1, Yaoundé, Cameroon Email: <a href="mailto:astride-carole.djeuani@facsciences-uy1.cm">astride-carole.djeuani@facsciences-uy1.cm</a>
AF038	Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises (Sparc) Research Initiative. Afriscout Impact Evaluation	Miguel Uribe, Sophie Turnbull, and Javier Madrazo (Causal Design) Ethiopia/ Kenya	AF045	Inside the PIF method: a new technique to produce seed plants in <i>Xanthosoma sagittifolium</i> L. Schott plants under the influence of some fertilizers	Djeuani Astride Carole <sup>1,2*</sup> Tiki Antoine Marie Kevin <sup>1,2</sup> Mbouobda Hermann Désiré <sup>1,3</sup> Gwan Mofor Elvis <sup>1,4</sup> PanguepkoFendju Christophe <sup>1,3</sup> MoutamalDjem Rose Theophine Derricka <sup>1,2</sup> Nyimiebolo Bengono Audrey Maguy <sup>1,2</sup> Manuela Diobe Motassy <sup>1,2</sup> Theresa Akinimbom Moma <sup>1,3</sup> and Niemenak Niolas <sup>1</sup> 1. Laboratory of Plant Physiology, Department of Biological Sciences, Higher Teacher Trai ning College HTTC), University of Yaoundé I, Yaoundé - Cameroon; 2. Department of Plant Biology, Faculty of Sciences, University of Yaoundé I, Yaoundé-Cameroun; 3. Department of Biology, Higher Teacher Training College, Bambili (HTTC), the University of Bamenda, Bamenda-Cameroun; 4. Department of Plant Science, Faculty of Science, University of Buea, Buea, Cameroon Corresponding author: <a href="mailto:astride-carole.djeuani@facsciences-uy1.cm">astride-carole.djeuani@facsciences-uy1.cm</a>
AF039	Value Addition Strategies: Achieving Zero Postharvest Loss In Organic Potato in Ekiti State, Nigeria	Adewale Ibrahim Abass <sup>1*</sup> , AbialaAlatise Abiala <sup>1</sup> , Akinyode Timothy Olawumi <sup>2</sup> , SikiruOluwole Banjo <sup>2</sup> and John Olalere Jolayemi <sup>3</sup> <sup>1</sup> Department of Agricultural Economics and Extension, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria; <a href="mailto:abass.adewale020@gmail.com">abass.adewale020@gmail.com</a> , <a href="mailto:abialaaa@tasued.edu.ng">abialaaa@tasued.edu.ng</a> <sup>2</sup> Department of Tourism and Hospitality Management, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria; <a href="mailto:aremutim@gmail.com">aremutim@gmail.com</a> , <a href="mailto:banjoos@tasued.edu.ng">banjoos@tasued.edu.ng</a> <sup>3</sup> Department of Agricultural Science Education, Kwara State College of Education, Oro, Kwara State, Nigeria; <a href="mailto:johnlere9@gmail.com">johnlere9@gmail.com</a>			
AF040	Vermicompost: a tool for plant growth and disease suppression	Ali Motaz <sup>1</sup> , Fares Khaled <sup>1</sup> , Mohamed F. Salem  Department of Environmental Biotechnology, Genetic Engineering and Biotechnology Research Institute, GEBRI, Sadat City, P.O. Box:79, University of Sadat City, Egypt; <a href="mailto:mohamed.salem@gebri.usc.edu.eg">mohamed.salem@gebri.usc.edu.eg</a> (M.F.S); <a href="mailto:alimotaz257@gmail.com">alimotaz257@gmail.com</a> (A.M); <a href="mailto:www.fareshalim@gmail.com">www.fareshalim@gmail.com</a> (F.K)			
AF041	Effet des huilesessentielles sur les phytophages de la culture du pois cajan ( <i>Cajanus cajan L.</i> ) au champ à Loudima (Bouenza)	MBOUSSY TSOUNGOULD Feldane Gladrich <sup>1</sup> , MPIKA Joseph <sup>1</sup> et NTSOUKA Fridolin <sup>2</sup> <sup>1</sup> : Laboratoire Biotechnologie et Production Végétales, Faculté des Sciences et Techniques de l'Université Marien NGOUABI. BP: 69 Brazzaville. <sup>2</sup> :Institut National Recherche Agronomique (IRA), Station de Loudima (Bouenza). Gmail correspondance : <a href="mailto:gladeriche.feld@gmmail.com">gladeriche.feld@gmmail.com</a>			

AF046	Study of the interaction between nematodes and PIF plants of <i>Xanthomasagittifolium</i> L. Schot	Djeuani Astride Carole <sup>1,2*</sup> , Fossong Nengi Abigaelle <sup>1,2</sup> , Niemenak Nicolas <sup>1</sup> and Mbouobda Hermann Désirée <sup>1,3</sup>  1. Laboratory of Plant Physiology and Biochemistry, Department of Biological Sciences Higher Teachers' Training College, University of Yaoundé 1, Yaoundé, Cameroon 2. Department of Plant Biology, Faculty of Science, University of Yaoundé 1, Yaoundé, Cameroon 3. Department of Biology, Higher Teachers' Training College Bamili, University of Bamenda, Bamenda, Cameroon Email: <a href="mailto:astride-carole.djeuani@facsciences-uv1.com">astride-carole.djeuani@facsciences-uv1.com</a>	AF052	Influence of Ibadan Brewery Waste Based Compost on the Growth and Yield of Cabbage	Oyewole, O.M., Adeoluwa, O.O.  Department of Soil Resources Management, University of Ibadan, Ibadan, Nigeria Correspondence: <a href="mailto:matildaoyewole@gmail.com">matildaoyewole@gmail.com</a>
AF047	Influence of Nitrogen Fertilizer Levels on Yield of King of Bitters ( <i>Andrographis Paniculata</i> )	Samuel Dotun Oyekunle <sup>1</sup> , Prof. O. O Adeoluwa <sup>2</sup> , Adewumi Fiyinfooluwa Odeniran <sup>2</sup>  Department of Tropical Crop Management & Ecology, Czech University of Life Sciences, Prague, Czech Republic.  Department of Soil Resource Management, University of Ibadan, Ibadan, Nigeria.  Department of Agronomy, Purdue University, United States of America  Corresponding Author's Email and Phone No  Xoyes001@studenti.czu.cz (+420776638362)	AF053	Application rates of poultry manure and seed size effects on the growth and yield of fluted pumpkin ( <i>Telfairia occidentalis</i> Hook F.)	Effa, E. B. <sup>1</sup> , Uko, A. E. <sup>1</sup> , and Ofem, U. E. <sup>2</sup>  <sup>1</sup> Department of Crop Science, University of Calabar, Nigeria <sup>2</sup> Department of Extension and Rural Sociology, University of Calabar, Nigeria Corresponding author: emmaeffa@unical.edu.ng
AF048	Evaluation of Biofertiliser as a Sustainable Fertiliser in Crop Production	<sup>1</sup> Olufemi Ebenezer Taiwo, <sup>1</sup> Jumoke Omowumi Omoniyi, <sup>2</sup> Adefoyeke O. Aduramigba-Modupe, <sup>1</sup> Oluseyi Olugbenga Adeoluwa  <sup>1</sup> Department of Soil Resources Management, University of Ibadan, Ibadan, <sup>2</sup> Department of Crop Protection and Environmental Biology, University of Ibadan, Ibadan  Corresponding author: <a href="mailto:olufemitaikoeb@gmail.com">olufemitaikoeb@gmail.com</a> , +234-7064862476	AF054	The Role of Biochar in Agricultural Production; Soil Fertility And Water Quality Improvement: An Overview	<sup>1</sup> Abel Ojewummi <sup>2</sup> Olugbenga Adeoluwa <sup>3</sup> Olushola Ibiyemi <sup>4</sup> Siyanbola Omitoyin <sup>5</sup> Tannaz Pak <sup>6</sup> Tariq Ahmed <sup>7</sup> Vida Zohoori <sup>8</sup> Vahid Ghorbani  <sup>1</sup> Department of Soil Resources Management, University of Ibadan, Ibadan, Nigeria <sup>2</sup> Department of Soil Resources Management, University of Ibadan, Ibadan, Nigeria <sup>3</sup> Department of Periodontology and Community Dentistry, University of Ibadan, Ibadan, Nigeria <sup>4</sup> Department of Aquaculture and Fisheries Management, University of Ibadan, Ibadan, Nigeria <sup>5</sup> Department of Energy and Environmental Engineering, Teesside University, Middlesbrough, England, United Kingdom <sup>6</sup> Department of Energy and Environmental Engineering, Teesside University, Middlesbrough, England, United Kingdom <sup>7</sup> Department of Public Health and Nutrition, Teesside University, Middlesbrough, England, United Kingdom
AF049	Bio-Vermigot (Vermicompost and Kasgot) Fertilizer Production and Isolation of Potential Biocontrol Agents from Spent Mushroom Substrates	Adedeji Kafilat <sup>1*</sup> , Aduramigba Modupe A. O. <sup>1</sup>  <sup>1</sup> Department of Crop Protection and Environmental Biology, University of Ibadan, Nigeria  Corresponding author: <a href="mailto:kafilatadeedeji@gmail.com">kafilatadeedeji@gmail.com</a> , +234-7011226808	AF055	The Microbiome Revolution: Unravelling Microbial Dynamics in Sustainable Agriculture	Elizabeth Temitope Alori <sup>1,2,3,4*</sup> , Ayibanoa Lekoo Ibaba <sup>3</sup> , Abidemi Olubusayo Onaolapo <sup>1,2,3</sup> Olubukola Oluranti Babalola <sup>4,5</sup> , Adewumi Fiyinfooluwa Odeniran <sup>6,7</sup>  <sup>1</sup> Crop and Soil Science Department, Landmark University, Omu-Aran, Kwara State Nigeria; <sup>2</sup> SDG 15 (Life on Land Research Group, Landmark University, Omu-Aran Kwara State, Nigeria <sup>3</sup> Crop and Soil Sciences Department, Landmark University, Omu-Aran, Kwara State, Nigeria <sup>4</sup> Food Security and Safety Focus Area, Faculty of Natural and Agricultural Sciences, North-West University, Mmabatho 2735, South Africa <sup>5</sup> Department of Life Sciences, Imperial College London, Silwood Park Campus Buckhurst Road, Ascot, Berkshire, SL57PY, UK <sup>6</sup> Department of Agronomy, Purdue University, 915 Mitch Daniels Blvd, West Lafayette, IN 47907 <sup>7</sup> Network of Organic Agricultural Researchers in Africa, Continental Office, University of Ibadan Correspondence: <a href="mailto:adewumi.olayioye@gmail.com">adewumi.olayioye@gmail.com</a> ; <a href="mailto:aloritope@yahoo.com">aloritope@yahoo.com</a> ; Tel.: (+234) 08063485837
AF050	An Evaluation of the Impact of Post-Harvest Management Practices on the Nutritional Quality and Health Benefits of Horticultural Crops	Mukhtar, A. A <sup>1a</sup> , Ibrahim, S.M <sup>2</sup> , Mukhtar, A.I <sup>3</sup> and Mukhtar, F. I <sup>4</sup> .  <sup>a</sup> Corresponding Author <sup>1</sup> Department of Agronomy, Faculty of Agriculture, ABU Zaria. <a href="mailto:mukhtaraishaprof@gmail.com">mukhtaraishaprof@gmail.com</a> <sup>2</sup> Biotechnology Research Programme, National Animal Production and Research Institute (NAPRI). <a href="mailto:sadiqahmukhtar@gmail.com">sadiqahmukhtar@gmail.com</a> <sup>3</sup> Department of Pediatrics, Ahmadu Bello University/Teaching Hospital, Zaria. <a href="mailto:ayshamukhie001@gmail.com">ayshamukhie001@gmail.com</a> <sup>4</sup> Department of Nursing Science, Faculty of Allied Health Sciences, ABU Zaria. <a href="mailto:phatymukhtar@gmail.com">phatymukhtar@gmail.com</a>	AF056	Response of Common Beans ( <i>Phaseolus Vulgaris</i> L.) to Organic Fertilizers in Farmers' Fields of Western Kenya	George O. K'Otuto <sup>1*</sup> , Harun O. Ogindo <sup>1</sup> , Collins Okoko <sup>1</sup> , Ferdinand W. Wafula <sup>2</sup> , Charles Tumuhe <sup>3</sup>  <sup>1</sup> Department of Crops and Soil Sciences Maseno University, Kenya <sup>2</sup> Bio Gardening Innovations, (BIOGI) Kenya <sup>3</sup> The Alliance for Food Sovereignty in Africa
AF051	Yield and yield attributes of sunflower ( <i>Helianthus annuus</i> L.) grown after a 5-year organic diversified crop rotation in the tropics	<sup>1</sup> Adebeso Z. O., <sup>2</sup> Olowe V. I. O, <sup>2</sup> Fabunmi T. O and <sup>3</sup> Azeez J. O.  Crop and Pasture Production and Sustainable Environment Programme, Centre for Excellence in Agricultural Development and Sustainable Environment, Federal University of Agriculture, Abeokuta (FUNAAB)  1. Department of Plant Physiology and Crop Production, FUNAAB 2. Department of Soil Science and Land Management, FUNAAB * corresponding author – <a href="mailto:olowevio@funaab.edu.ng">olowevio@funaab.edu.ng</a>			

## GERMINATION AND SEEDLING VIGOUR OF MAIZE AS INFLUENCED BY PRIMING AND TIME OF SEED BIO-PRIMING

Olawale S. Musibau<sup>1</sup>, Sunday Ojo Adigbo<sup>12\*</sup> and Patience U. Odueme<sup>2</sup>

<sup>1</sup>2Plant Physiology and Crop Production, Federal University of Agriculture, Abeokuta, Nigeria

<sup>2</sup>Institute of Food Security, Environmental Resources and Agricultural Research (IFSERAR), Federal university of Agriculture, Abeokuta, NIGERIA

correspondence author: email adigboso@funaab.edu.ng

### Abstract

Seed priming with bio-fertilizer is known to enhance germination and seedling vigour; however, priming time is crucial for germination and seedling vigour. Thus, two studies were carried out at the Federal University of Agriculture in 2020 to investigate the effective time of bio-priming to promote seed germination and seedling vigour of maize plant. The germination and vigour trials had 2 factors each in common: A comprises two levels (hydro- and bio-priming) while factor B consisted of twelve priming times (2, 4, 6, ..., 22 and 24 hours). In germination experiment, twenty seeds obtained from each of the soaked seeds for each prescribed time interval were sown per petri-dish and replicated three times. The first 2 germinated seeds were picked up and transplanted into their corresponding 72 perforated pots which contained well-watered topsoil as the second trial. Results showed that bio-priming significantly reduced germination percentage. Hydro- and bio-primed seeds had 90.6 and 40.6% germination, respectively. Based on the significant interaction of priming and time of priming on seed germination, bio-priming should be limited to 4 hours for effective germination. Seedlings vigour obtained from bio-primed seeds significantly reduce leaf greenness, number of leaves and plant height at the earlier stage compared to their counterpart in hydro-primed but normalize as growth advances. Conclusively, bio-priming significantly reduced germination percentage. Time of bio-priming seed should be limited to four hours. The performance of seedlings obtained from bio-primed seeds were initially lower but leveled up as growth advances compared to those of hydro-primed.

**Keywords:** seed treatment, maize, microbes, priming, germination

## PERFORMANCE, SERUM BIOCHEMISTRY AND INTESTINAL MICROBIOME ECOLOGY OF ROSS 308 BROILERS FED GRADED LEVELS OF CICHORIUM INTYBUS ROOT POWDER

Chawarika M, Muronzi F, Duri T, Tigere A, Nyahangare ET, Bonyongwe T

Grasslands Research Institute, P.O. Box 3701, Marondera, Zimbabwe

Department of Livestock Science, Faculty of Agriculture Environment and Food System, University of Zimbabwe  
P.O. Box MP167 Mt Pleasant, Harare, Zimbabwe

Corresponding email: marlonchavarika@gmail.com +263785733505

### Abstract

This study was conducted to assess the performance of 250 Ross 308 broilers fed graded levels of chicory root powder (CRP) over a thirty-five-day period. Digestibility, intestinal histomorphometry, serum biochemistry, gut microbes and carcass quality were also assessed for different treatments at the end of the feeding trial. The feeding diet included control, chicory root powder 0.25%, chicory root powder 0.5%, chicory root powder 1% and chicory root powder 2%. The broilers were managed under same rearing conditions with the CRP concentration being the varying factor. The results showed that there was significant ( $P < 0.05$ ) difference among treatments with greater performance at CRP2% which also had lower FCR compared to other treatment diets. Other parameters also favoured positively inclusion of CRP meaning the prebiotic had effect on all factors which were under consideration. The control diet had higher cholesterol levels in the blood serum than treatments with CRP0.25%, CRP0.5%, CRP1% and CRP2% which shows the effect of CRP inulin. The intestinal microbiology on broilers under CRP diets showed that there were higher counts of *E. coli* in birds under control diets and the counts significantly reduced as the concentration of CRP increased. Therefore, it was concluded

that inclusion of chicory root powder in diets can affect broiler performance and other parameters.

**Keywords:** chicory root powder, poultry production, inclusion levels

## THE REGULATION (EU) 2018/848 AND THE ORGANIC CERTIFICATION IN AFRICA, A CASE OF UGANDA

Junior Nuwandinda

Kushamiri Agro Consults Ltd, Kampala, Uganda; njunr2012@gmail.com

### Abstract

Uganda has 404,246 organic producers. It ranks number two in the world on the number of organic producers after India which has 2,358,267 producers according to The World of Organic Agriculture Statistics & Emerging Trends 2025 by FiBL and IFOAM - ORGANICS INTERNATIONAL. The same report shows that six of the top 10 countries with the highest number of organic producers, come from Africa and overall, African organic producers are 22.4% of the world distribution. Uganda is generally an organic producing country with most of the products able to grow naturally without using synthetic chemicals and pesticides. This is one of the reasons why it has been easy for farmers to transform to be organic certified. However, this is going to change with Regulation (EU) 2018/848 which has come with a lot of requirements and controls which include limiting to the number of smallholder farmers certified in a "group of operators" to only 2000, farmers not to exceed certain size and turnover thresholds, and the legal and organisational structures. These extreme changes will significantly lead to an increase in the certification costs which could be up to 5 times more expensive (FiBL, 2025). As a result, many producers might abandon the certification which will lead to a decrease in the supply of organic certified products, and the prices will increase significantly.

In conclusion, Importers of organic products in the EU need to provide assistance to their suppliers in terms of financial, technical and legal to enable them to navigate through these times as they build their capacity to stand firm in the long-term certification cycle.

**Keywords:** organic, certification, producers

## POLY- AND PERFLUOROALKYLATED SUBSTANCES (PFAS) IN WATER, SEDIMENT, AND FISH MUSCLE TISSUE FROM LAKE TANA, ETHIOPIA, AND IMPLICATIONS FOR HUMAN EXPOSURE

Ahrens, Habiba Gashaw, Margareta Sjöholm, Solomon Gebreyohannis Gebrehiwot, Abebe Getahun, Ermias Derbe, Kevin Bishop, Staffan Åkerblom

### Abstract

Lake Tana is Ethiopia's largest lake and there are plans to increase the harvest of fish from the lake. The objective of this study was to assess the levels of poly- and perfluoroalkyl substances (PFASs) in different compartments of the lake (water, sediment, and fish muscle tissue), and its effects for human exposure. The results showed higher PFAS concentrations in piscivorous fish species *Labeobarbusmegastoma* and *Labeobarbusorguari* than non-piscivorous species *Labeobarbus intermedius*, *Oreochromis niloticus* and *Clarias gariepinus* and spatial distribution similarities. The PFAS concentrations ranged from 0.073 to 5.6 ng L<sup>-1</sup> (on average, 2.9 ng L<sup>-1</sup>) in surface water, 0.22-0.55 ng g<sup>-1</sup> dry weight (dw) (on average, 0.30 ng g<sup>-1</sup> dw) in surface sediment, and non-detected to 5.8 ng g<sup>-1</sup> wet weight (ww) (on average, 1.2 ng g<sup>-1</sup> ww) in all fish species. The relative risk (RR) indicates that the consumption of fish contaminated with perfluorooctane sulfonate (PFOS) will likely not cause any harmful effects for the Ethiopian fish-eating population. However, mixture toxicity of the sum of PFASs, individual fish consumption patterns and increasing fish consumption are important factors to consider in future risk assessments.

**Keywords:** Bioconcentration; Perfluorooctane sulfonate; Sediment; Water.

## ABATTOIR OPERATIONS AND THEIR ECOLOGICAL FOOTPRINT: IMPLICATIONS FOR CLIMATE RESILIENCE AND JUSTICE IN GWAGWALADA, ABUJA, NIGERIA

Michael Oke

Plot 232 Kaida, Along Old Kuntunku Gwagwalada P.O. Box 11611, Garki Federal Capital Territory, Abuja, Nigeria  
Phone: +234 802 714 2077, +234 805 271 9697 Email: maof2020@gmail.com

### Abstract

Abattoirs in Gwagwalada, Abuja, serve as critical hubs for regional meat supply, yet their operational practices pose significant environmental and public health risks. These practices directly impact food safety and climate resilience, raising critical climate justice concerns within the local food system. This study assessed the ecological footprint of Gwagwalada abattoir operations and analyzed their implications for climate resilience, food safety, and justice. We employed observational techniques, visual aids, and conducted interviews with approximately fifty meat buyers and five producers/workers to document operational activities, infrastructure, and value chain dynamics. Current practices reveal inadequate water supply, unsanitary slaughtering (e.g., tire-based skinning), and poor waste management (e.g., unmanaged processing effluents), leading to environmental contamination and inefficient resource use. Rudimentary transportation and storage exacerbate food safety risks. These deficiencies compromise ecological integrity, undermine meat supply chain resilience, and disproportionately expose vulnerable workers and communities to environmental degradation and health hazards, highlighting significant climate justice issues. Existing abattoir operations in Gwagwalada are unsustainable and detrimental to public health and environmental well-being. Urgent interventions are needed, including developing standardized, climate-resilient abattoir infrastructure with advanced waste and water management systems. We advocate for modern meat preservation technologies and fostering value chain development prioritizing ecological sustainability and equitable access to safe practices. Implementing such biotechnological and systemic improvements is crucial for enhancing food security, public health, and climate justice in the region.

**Keywords:** Abattoir, Ecological Footprint, Climate Resilience, Food Safety, Climate Justice, Gwagwalada, Nigeria.

## BIOCHAR-BASED NATIVE MICRO BIALCONSORTIUM FOR CROP QUANTITY AND QUALITY IMPROVEMENT IN CAMEROON

Sontsa-D. A.-M.a\*, Madou C.a, TinakE.D.C.a, MahotH.C.a, Ntsama P.a, Boyomo B.a,b, Nana N.J.J., MongoueF.A.a, ChatueC.G.a, , NzeketO.A.a, Linou N.A.S, HawouaO.a, MessiA.L.M.a, BegoudeB.A.Da

aLaboratory of Regional Biological Control and Applied Microbiology, Institute of Agricultural Research for Development (IRAD), P. O. Box 2123, Yaounde, Cameroon.

bBiotechnology and Environment Laboratory/Plant Pathology and Protection Unit, Faculty of Sciences, University of Yaounde I, P.O. Box 812, Yaounde, Cameroon.

\*martialdonhoung@yahoo.fr

### Abstract

It is increasingly recognized that modern, high-productive farming methods are not sustainable and that the world, particularly Africa, needs innovative solutions to provide safe and secure food for future generations. This study aimed to evaluate the collaborative effects of biochar and bacterial endophytes to improve the growth, yield, and nutrient uptake (N,P,K) of maize (*Zea Mays L.*). Biochar used in this study was produced by slow co-pyrolysis of coconut fiber and cow dung (30:70), and consortium consisted of two bacterial strains *Bacillus velezensis* and *Glutamicibacter nictianae*. The experiment followed a fully randomized block design with five treatments: uninoculated control (C); chemical treatment (NPK); biochar; endophytes (Endo) and a combined biochar-endophytes (Bio). Growth, yield and grain nutrient uptake were evaluated. The results showed that all the treatments improved maize growth and yield compared to the control. The NPK treatment achieved the highest plant

height (149,29cm) and yield (9.6t/ha), whereas the Bio treatment obtained slightly weaker results (6,94 t/ha), representing 125% increase over the control. Fortunately, the Bio treatment significantly improved nutrient, increasing N, P, and K uptake in grain by 78%, 90%, and 115%, respectively, relative to the control. Principal Component Analysis (PCA) indicated that improving yield does not ensure better nutritional content of the grains. These results highlight that the biofertilizer-based on endophytes and biochar can contribute to the improvement of the quantity and quality of maize and thereby reduce the use of chemical fertilizers.

**Keywords:** biochar; consortium; amendment; quantity; quality; crops.

## EMPOWERING AGROECOLOGICAL TRANSITIONS THROUGH RENEWABLE ENERGY INTEGRATION FOR CLIMATE ADAPTATION IN UGANDA

Charles L. Tumuhe, Denis Katusiime, David Ssekamatte

Uganda Martyrs University, Kampala, Uganda Corresponding author: tumchaz34@gmail.com

### Abstract

Rural communities in Uganda face compounded environmental and social vulnerabilities due to their dependence on biomass energy sources, which exacerbate deforestation and climate risks. This study investigates how renewable energy technologies are integrated into agroecological initiatives to foster climate adaptation and resilience. Using a qualitative, phenomenological case study design, data were collected across 17 districts through 26 focus group discussions, 8 in-depth interviews, and 6 small group interviews with women, youth, farmers, and organizational staff affiliated with the PELUM Uganda network. Thematic analysis, supported by NVivo, was employed. Findings reveal that PELUM member organizations are advancing the use of solar dryers, biogas, energy-saving cookstoves, and charcoal briquettes, particularly empowering women and youth as renewable energy champions. These solutions are not implemented as isolated technical fixes but are embedded within agroecological systems that promote gender inclusion, local knowledge, environmental stewardship, and food sovereignty. While these innovations have ecological and socio-economic benefits, barriers remain. Key constraints include limited policy support, financing, and institutional recognition. The study concludes that scaling renewable energy within agroecological transitions requires participatory governance, community-led innovation, and strategic policy alignment. To strengthen agroecology's role in climate adaptation, governments and development partners must support decentralized, community-controlled energy systems that reinforce ecological integrity, justice, and rural transformation.

**Keywords:** agroecology, renewable energy, climate adaptation, energy justice.

## CONJUGATING ORGANIC AGRICULTURAL PRODUCTION AND GREEN AGRI-FOOD MARKETING

Martin Hilmi

Aston Postgraduate Research Society (APRS)

Aston Business School (ABS), Aston University

Birmingham, United Kingdom

E-mail: hilmi@aston.ac.uk

### Abstract

Organic and climate smart agricultural production provides agricultural products that have been produced taking as a priority the natural environment and climate. However, the care for the natural environment and climate should also continue in marketing of organic agri-food products. Indeed, not considering the natural environment and climate in marketing would create a natural environment and climate 'bottle neck' for example. In fact, not accounting for the natural environment and climate in

agri-food marketing activities and practices would seem to counteract all the care that has gone into organic and climate smart agricultural production of food. Within this background, the research's main aim is to consider how marketing activities and practices for organic and climate smart agri-food products can be greened, i.e. green agri-food marketing. However, the objective is to take a 'bottom up' perspective in green agri-food marketing: learning from local contexts in Africa and applying such learning to green agri-food marketing activities and practices. In particular, the focus is on learning from green innovations, for example, in bottom-of-the-pyramid subsistence market (BOP-SM) local contexts in Africa. This approach considers that green innovations in the BOP-SM are not just about technologies, but are also related to activities, processes, systems, knowledge, know-how and behaviour. Such innovations have been identified, for example, in such countries as The Gambia, Tunisia, Tanzania, and Zambia. Thus, such would set green agri-food marketing activities and practices in local political, social, economic, cultural, natural environmental and climate contexts, that could hence have far more potential uptake and thus be far more implementable and viable in green agri-food marketing in such realities.

#### BACK TO BASICS: MITIGATING THE HARMFUL EFFECTS OF DROUGHTS FOR EFFICIENT LIVESTOCK PRODUCTIVITY IN THE GRASSLANDS OF THE CENTRAL FREE STATE IN SOUTH AFRICA

T.E Mokhesengoane<sup>1</sup>, H.C van der Westhuizen<sup>2</sup>, & J.A Van Niekerk<sup>3</sup>

1 Agricultural Extension, Free State Department of Agriculture and Rural Development, Bloemfontein, South Africa.

2 Research, Free State Department of Agriculture and Rural Development, Glen, South Africa.

3 Sustainable Food Systems and Development, University of the Free State, Bloemfontein, South Africa.  
Corresponding author: T.E. Mokhesengoane. Email: mokhesengoane@gmail.com

##### Abstract

Rangelands health is dependent on rangelands productivity and effective livestock management practices and is directly linked to proper animal stocking rates in extensive livestock farming systems. Thus, these two parameters are essential for healthy rangelands ecosystems. However, imprudent rangelands management exacerbates catastrophic drought impacts, leading to fodder shortages for ruminant animals in extensive livestock farming systems. The latter subsequently increase the vulnerability of livestock to diseases, and thus, implicates low reproductive performance and high livestock mortalities in extensive farming systems. This result in exorbitant financial losses incurred by livestock farmers. Abysmal rangelands conditions inevitably lead to rangelands degradation and consequently minimize the ability of rangelands ecosystems to sequester more carbon. This tremendously decrease the inherent ability of these ecosystems to function optimally to withstand environmental shocks and mitigate the harmful impacts of climate change. This study compares the findings of three trials with identical theoretical framework namely, 1. Stocking rates on land-reform farms during drought, 2. Rangeland management and reproduction performance of beef cattle and 3. Rangeland condition and soil chemical properties data collected from nine extensive livestock land-reform farms, in a recent research trial. Post research trials comparison and scientific data analyses, the following was found: Imprudent rangelands management practices decrease the ability of rangelands to support livestock with fodder during drought, Execution of science informed sustainable grazing system increase livestock productivity during drought, Improper animal stocking rates leads to financial losses during drought, whereas proper animal stocking rates can increase income even during drought and Lastly, a significant difference between rangeland condition and soil carbon, demonstrating the essential role of good rangeland management in carbon sequestration was identified. It is thus, concluded that knowledge regarding stocking rates and prudent rangeland management practices (condition and carbon sequestration) is paramount for sustainable livestock farming during climate change.

**Keywords:** Mitigating Droughts, Livestock Productivity, Grasslands

#### COMMENT IMPLIQUER FEMMES ET JEUNES EN AGREOCOLOGIE? L'EXPERIENCE DE L'ASSOCIATION NOURRIR SANS DETRUIRE (ANSO) DU BURKINA FASO

ASSOCIATION NOURRIR SANS DETRUIRE -ANSO

Adresse : ali.dianou@ansdbf.org, Tel : 00226 70 34 66 99

##### Resume

*L'implication des femmes et des jeunes en agroécologie est cruciale pour la durabilité et la résilience des systèmes agricoles. Les femmes, représentant 60-70% de la main-d'œuvre agricole, jouent un rôle important dans la production alimentaire, mais leur travail reste souvent invisible. L'ANSO s'engage à valoriser leur contribution à travers diverses actions.*

*La stratégie adoptée comprend le renforcement de l'accès aux ressources, le leadership féminin, l'autonomisation des femmes, l'éducation environnementale pour les jeunes et la prise en compte des ménages vulnérables. Pour sensibiliser et éduquer, des ateliers d'informations sont organisés, ainsi que des programmes de formation sur des compétences pratiques comme le jardinage et l'élevage durable. Le renforcement des capacités passe par la mise en place de formations adaptées aux besoins des femmes et des jeunes, ainsi que leur participation active dans des programmes de recherche. La création de groupes d'épargne permet aux femmes d'accéder à des fonds pour investir dans des pratiques agroécologiques et d'échanger des connaissances.*

*L'accès à la terre et aux intrants reste un défi majeur, avec seulement 8% des terres agricoles détenues par des femmes. L'ANSO aide à surmonter ces obstacles en facilitant l'accès à la terre et aux ressources nécessaires. De plus, il est essentiel d'inclure les femmes et les jeunes dans les comités de gestion et de promouvoir des politiques favorisant l'égalité des sexes.*

*En somme, l'engagement des femmes et des jeunes en agroécologie est fondamental pour un développement rural inclusif et durable. Une approche holistique, combinant sensibilisation, formation, accès aux ressources et participation à la prise de décision, est nécessaire pour renforcer leur rôle et assurer un avenir résilient pour les communautés rurales.*

#### SMALLHOLDER FARMERS' CONTRIBUTION TO NATIONAL FOOD SECURITY IN NIGERIA

Adebola Adedugbe

No Hunger Food Bank Initiative Email :bolaadedugbe@gmail.com

##### Abstract

Smallholder farmers in Nigeria play a crucial role in food production and make up the majority of the agricultural workforce. They produce most of the food and form the backbone of Nigeria's food supply. In Nigeria, there is an increasing call for sustainable food production to meet the growing demands as the country is faced with high cost of food, hunger, poverty and malnutrition. The adoption of organic farming as a pathway to food security, environmental sustainability, improved livelihoods and sustainable agricultural practices by smallholder farmers in Nigeria has boosted the national food security. Organic farming represents a deliberate attempt to make the best use of local natural resources that is environmentally friendly. This model of farming offers benefits such as higher market prices, reduced costs and environmental sustainability. It is considered one of the promising sustainable agricultural practices that promotes green economy. This study adopted a random sampling method by selecting twenty smallholder farmers in each of the six regions in Nigeria. Closed-ended and structured questionnaires were used for primary data collection from farmers. The findings revealed that majority of the smallholders were male (78.2 percent) with an average age of 35 years, small farm size and primary school education. The results further shows that organic farming is a viable alternative in boosting food security. This paper recommends that women and youth should be encouraged to be actively involved when providing training on organic farming in future study area. There should be conscious effort to train, educate and create awareness of organic farming among the smallholders. This study offers useful approaches to assess the contribution of local organic farmers to the food supply of Nigeria's

growing population and provides suggestions for the government, stakeholders, and the international community willing to collaborate and invest in the agricultural sector.

**Keywords:** Adoption, National Food Security, Nigeria, Organic Farming, Smallholder Farmers

## REINFORCEMENT DE L'AGRICULTURE BIOLOGIQUE ET AGROECOLOGIQUE DANS LES AFRIQUE À TRAVERSETS DE L'ENQUÊTE "L'INNOVATEUR"

JOSÉ MORA NSUMNE

Spécialiste en communication rurale et d'élaboration des projets

Président de l'Association Nationale de la Chaîne de Valeur du Riz, Racines et Tubercules de Guinée-Bissau (ANCVART-GB)

E-mail: nsumnejosmora@yahoo.com.br

Tél. ou WhatsApp : +245955544666 / 965617146. Bissau. Guinée-Bissau

### Résumé

L'agriculture biologique, aussi appelée agriculture biologique, est un système de production agricole qui vise à minimiser l'impact environnemental et à promouvoir la durabilité. Au lieu de recourir à des produits chimiques, des engrains et des pesticides de synthèse, l'agriculture biologique utilise des méthodes naturelles telles que la rotation des cultures, la lutte biologique contre les ravageurs et la fertilisation organique.

Son importance est qu'il joue L'agriculture biologique joue un rôle crucial dans la protection de la santé humaine, en favorisant la production d'aliments plus nutritifs et plus sûrs, et en contribuant à la préservation de l'environnement. En adoptant des pratiques durables, elle minimise l'utilisation de produits chimiques de synthèse, réduisant ainsi la contamination des sols, de l'eau et des aliments, et par conséquent les risques sanitaires.

Pour avoir un impact significatif sur l'agriculture biologique dans les communautés rurales, il est crucial de mettre l'accent sur l'éducation, l'assistance technique et le soutien à la production et à la commercialisation des produits biologiques. De plus, la promotion de pratiques durables, telles que la rotation des cultures et la lutte biologique contre les ravageurs, est essentielle pour garantir la santé des sols et la biodiversité.

Pour promouvoir l'agriculture biologique dans les exploitations familiales, il est essentiel de mettre en œuvre des stratégies combinant soutien technique, financier et commercial, en mettant l'accent sur la durabilité et la valorisation des produits biologiques. Cela comprend l'accès à des crédits subventionnés pour la conversion, une assistance technique spécialisée, la promotion des marchés locaux et des programmes d'éducation et de sensibilisation.

Compte tenu de la Stratégies de développement rural et alternatives technologiques pour une agriculture familiale durable. Le retour à l'agriculture biologique nécessite des technologies adaptées, des actions de vulgarisation rurale, une assistance technique et un crédit rural. L'importante capacité d'absorption des avancées technologiques de l'agriculture familiale a permis de concilier la production de céréales et d'aliments à bas prix avec l'amélioration des conditions de vie des agriculteurs, en abandonnant les engrains chimiques et en favorisant un retour à une agriculture d'origine humaine.

## DILLENNIA INDICA L.: A NUTRITIONAL AND MEDICINAL APPROACH FOR AGROECOLOGY IN AFRICA

Hanaa Salah Ebrahima\*, Seham Salah Eldin El-Hawaryb, Gihan Fouad Ahmeda, Essam Mostafa Abd El-Kadderc, Marwa Yousry Issab

a National Nutrition Institute, General Organization for Teaching Hospitals and Institutes, Egypt

b Faculty of Pharmacy, Cairo University, Egypt

c Agriculture Research Center, Egypt  
\*Corresponding author: hanaa.salah2009@gmail.com

### Abstract

This study investigates *Dillenia indica* L. elephant apple, a medicinal plant of significant agroecological value in Egypt, for its nutritional, phytochemical, and biological properties. The research explores the potential of this plant in enhancing the nutritional and health profiles of local farming systems, with relevance to organic and agroecological farming in Africa. This research investigates the potential of *D. indica* L.'s phytochemical content and biological activities to offer solutions for improving agricultural resilience and promoting human well-being, specifically in environments affected by climate change. Methodology, methanolic extracts of leaves and fruits of *D. indica* L. were analyzed for their phytochemical content. Techniques such as HPLC fingerprinting, gas chromatography, UPLC-QTOF-MS/MS, and molecular networking were employed. Tissue culture and in vitro propagation techniques were utilized to investigate the impact of growth regulators on plant quality and bioactive compound production. The plant is rich in flavonoids, phenolics, and fatty acids (notably lupeol and betulin). Key nutrients identified include potassium, vitamin A, and essential amino acids such as glycine. The fruit exhibits strong antioxidant, anti-inflammatory, anti-acetylcholinesterase, and antidiabetic properties. Tissue culture studies showed promising results for nutraceutical applications. The authors can conclude this research that *D. indica* L. offers valuable nutritional and medicinal benefits, making it a promising candidate for organic and agroecological farming. Climate conditions significantly affect fruit quality, suggesting the need for optimized farming practices. Further research on *invivo* applications and bioactive mechanisms is recommended.

**Keywords:** *Dillenia indica*, phytochemicals, tissue culture, biological activity

## MULTIPLE AFLATOXINS CO-OCCURRENCE IN GROUNDNUT GROWN IN THREE DISTRICTS OF MTWARA REGION, TANZANIA

Juma R. Mfaume 1\*, John J. Tenga 1 and Ernest R. Mbega 2

1 Tanzania Agricultural Research Institute (TARI), Cereals and Legumes Research Program, Naliendele Centre, P.O. Box 509, Mtwara, Tanzania;

2 The Nelson Mandela African Institution of Science and Technology (NM-AIST), the School of Life Sciences and Bioengineering (LiSBE), P.O. Box 447, Arusha, Tanzania.

\*Corresponding author email: jumamfaume2@gmail.com

### Abstract

Aflatoxin contamination is among causes of healthy problems, and has not been adequately addressed in groundnuts production in Tanzania. Aflatoxins are natural toxins that contaminate food crops leading to health risk in both humans and animals. This study conducted to know aflatoxin levels in 45 randomly collected groundnut samples from farmers in three sites; namely Mwanje, Mpeta and Naliendele of Southern, Tanzania. Samples were analyzed using High Performance Liquid Chromatography (HPLC). Results indicated occurrence of Aflatoxin G1 in 25 samples (55.6%). The highest (9.5  $\mu\text{g}\cdot\text{kg}^{-1}$ ) incidence of contamination was detected at Naliendele site and the lowest at Mpeta site (5.8  $\mu\text{g}\cdot\text{kg}^{-1}$ ). There was a significant difference in total levels of aflatoxins between sites ( $P < 0.05$ ). High levels of total aflatoxins were observed (12.3 - 16.7  $\mu\text{g}\cdot\text{kg}^{-1}$ ), way above the permissible aflatoxin level (10  $\mu\text{g}\cdot\text{kg}^{-1}$ ) set by Tanzania Food and Drugs Authority. Analyzed samples showed an alarming rate of aflatoxins contamination.

**Keywords:** Contamination, *Arachis hypogaea*, *Aspergillus* spp, HPLC, Tanzania.

## ROOTING RESILIENCE: URBAN AGROECOLOGY FOR LIVELIHOOD INNOVATION IN UGANDA

Charles L. Tumuhe, Dennis Katusiime, David Ssekamatte  
Uganda Martyrs University, Kampala, Uganda; Corresponding author:tumchaz34@gmail.com

### Abstract

Amidst growing urbanization, food insecurity, and climate stress, urban agroecology offers promising pathways for sustainable food systems and ecological resilience in African cities. This study explores how two Ugandan initiatives adapt agroecological principles within space-constrained urban environments. The research investigates how these two institutions promote innovation, build resilience to climate change, engage communities, and confront systemic barriers. The study employed a qualitative case study design involving two focus group discussions, two in-depth interviews, two 2-hour site visits, and analysis of 10 documents. These methods enabled a nuanced understanding of practices, motivations, and challenges from diverse stakeholders, including youth, women, farmers, and organizational leaders. Findings reveal that JERO Farm and AFIRD are advancing context-specific innovations, such as rooftop gardening, aquaponics, mobile gardens, organic pest control, and value-added herbal products. Both institutions leverage recycled materials and local knowledge to build climate-resilient systems, particularly through composting, water harvesting, and waste reuse. They actively engage youth and women, offering skills training, mentorship, and school outreach programs to foster community-wide participation in agroecology. Despite their impact, both face persistent challenges including insecure land tenure, limited water infrastructure, fragmented institutional support, and weak policy integration. These constraints limit scalability and long-term sustainability. The study recommends incorporating agroecology into municipal planning frameworks, providing secure land and water access, and investing in grassroots innovation hubs. Policy incentives, educational integration, and support for local agroecological markets are also essential to unlock the full potential of urban agroecology. The research concludes that urban agroecology, when community-led and institutionally supported, can catalyze inclusive, climate-adaptive urban transformations. The experiences of JERO Farm and AFIRD offer scalable models for integrating food, ecology, and social justice into Africa's urban development planning.

**Keywords:** Urban agroecology, climate resilience, food systems, community engagement, Uganda, sustainability.

## REFORCEMENT DES CAPACITÉS POUR L'AGRICULTURE BIOLOGIQUE ET AGRO-ÉCOLOGIQUE À TOUS LES NIVEAUX

Abdoul SY Nouakchott Mauritanie  
Movement for the Equalization of ConditionsPromoting the Local Dimension inResource Management  
Tel: +222 46 82 34 55

### Résumé

La lutte contre la dénutrition et de la pauvreté compte parmi les défis les plus pressants de notre époque et l'agriculture et plus globalement le système alimentaire, l'environnement alimentaire et l'approvisionnement constituent la clé de voûte.

Au regard de ce qui suit

- " Environ 735 millions de personnes souffrent actuellement de sous-alimentation (FAO al. 2013),
- " La population mondiale devrait atteindre 9,7 milliards de personnes en 2050 et 11,2 milliards en 2100.
- " La transformation des régimes alimentaires mène à une augmentation de la demande pour des denrées alimentaires nécessitant beaucoup d'intrants et de ressources.
- " On estime que la demande mondiale en 2050, le monde devra produire 50 % de plus de nourriture, d'aliments pour animaux et de biocarburants qu'en 2012.

Et toujours dans les estimations, il nous faudrait encore investir 265 milliards de

dollars supplémentaires par an pour atteindre les deux premiers ODD (dont 140 milliards seraient consacrés à l'agriculture et au développement rural).

L'engagement d'institution comme le Comité de la sécurité alimentaire mondiale (CSA /IRA) dans la vulgarisation de l'investissement responsable pour une agriculture biologique et agro-écologique en constitue une cause suffisante pour le renforcement des capacités de l'ensemble des acteurs de la production à la consommation et ne laissera aucun acteur en marge.

Renforcer les capacités de l'ensemble des acteurs permettra :

- D'accroître les rendements agricoles, la production alimentaire, et la disponibilité de nourriture dans le Monde
- D'augmenter l'accès des populations à des cultures plus nutritives,
- De créer des opportunités d'emplois, de revenus, un meilleur accès économique et à la santé.

Et en Mauritanie, les ONGs sont actives et en 2023 le PBF, OIT, FAO et l'ANE ont lancé le projet Emploi décent vert et l'agri-entrepreneur 2.0. Mais le renforcement des capacités à tous les niveaux dépend d'une volonté politique réelle.

## THE RELEVANCE OF AGRICULTURAL EXTENSION SERVICES IN THE ADOPTION OF ORGANIC AGRICULTURE

1 Adeokun.A.A., 2Olawunmi.A.T., 1Opeifa.D.A., 1Akinsulu.A.A, 3Adesina.M.W., 1Abiala.A.A, 4Mebude. A.M  
1 Department of Agricultural Economics and Extension, College of Agriculture and Hospitality Management, Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.  
2 Department of Ecotourism and Hospitality Management, College of Agriculture and Hospitality Management, Tai Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.  
3 Department of Animal Science, College of Agriculture and Hospitality Management, Tai Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.  
4 Department of Aquaculture and fisheries Management, College of Agriculture and Hospitality Management, Tai Solarin Federal University of Education, Ijagun, Ogun State, Nigeria.

### Abstract

The global push for sustainable agriculture has brought organic farming to the forefront as an environmentally sound alternative to conventional practices. However, the adoption of organic agriculture remains limited, especially in developing countries, due to a lack of awareness, technical knowledge, and institutional support. This research study examines the critical role of agricultural extension services in facilitating the transition to organic farming. Drawing on theoretical frameworks such as Rogers' Diffusion of Innovation and supported by recent empirical studies, research study explores how extension services contribute to farmer awareness, skill development, behavioral change, and market integration. Key findings highlight that well-designed extension approaches such as participatory learning, field demonstrations, and ICT-based outreach significantly influence the adoption of organic practices. However, challenges such as underfunded extension systems, lack of specialized training, and weak policy support hinder effectiveness. The research study concludes with strategic recommendations for strengthening extension systems, including capacity building, policy reform, and enhanced farmer engagement, to accelerate the adoption of organic agriculture and promote sustainable rural development.

**Keywords:** Sustainable Agriculture, Diffusion of innovation, extension systems

## RESTORING RESILIENCE USING HOLISTIC MANAGEMENT IN SEMI-ARID COMMUNAL FARMING LANDS: CASE STUDY OF DEMBE STREAM CATCHMENT IN ZIMBABWE

Never Mujere1 , Astrid Huelin2, Mupenya N.G. Mberi 3, Charity Kwenzani4, Cosmas Chipenzi5, Vimba Mlambo6, Farirai Jemwa7, Rodney Zhombwe8, Shingirai Majaji9, Sam Tavengwa10, Onalenna Gwate 11, Josphine

Mundava12, Precious Moyo13 and Theophilus Mudzindiko14

**Abstract**

Degraded rangelands and croplands, declining soil fertility, and reduced biodiversity are common challenges in Zimbabwe's semi-arid communal farming areas. These are primarily driven by unsustainable land and livestock management practices. Holistic land and livestock management (HLLM) of land and livestock is an agroecological approach designed to reverse ecosystem degradation and build community resilience to climate change. However, little empirical research has been conducted to evaluate the contribution of HLLM towards community resilience. This study, therefore, assesses the impact of HLLM on ecological restoration in Ward 10 of Chinyika communal lands in Gutu District of Masvingo Province, Zimbabwe. Since 2019, communities were mobilised by a non-governmental organisation, Participatory Ecological Land Use Management (PELUM) to implement HLLM practices, including the use of mobile night bomas or moving kraals. The aim of adopting HLLM was to improve soil fertility, restore biodiversity, and enhance water retention and availability, particularly in Dembe Stream catchment and surrounding villages. Data were gathered through interviews with community members, direct field observations, and participatory assessments of soil fertility, biodiversity and hydrological changes. Information from community elders highlighted that Dembe Stream stopped flowing during dry seasons from 1996 to August 2023. However, records from Meteorological Services Department of Zimbabwe show no significant increase in precipitation in the area. Results indicate that following the adoption of HLLM in 2019 and its implementation in December 2020, dry season flows resumed in September 2023 thus, restoring the stream's perennial status. HLLM significantly improved soil health, livelihoods, streamflows, social capital, resurgence of biodiversity, ecosystem services and resilience. The study concludes that HLLM can effectively restore degraded ecosystems, enhance catchment water availability, support land productivity, and empower communities to sustainably manage their natural resources. This study contributes to the body of knowledge on the importance of using group or ultra-high density grazing towards environmental protection and, improving livelihoods and, ecosystem functions and services in dry communal farming regions.

**Keywords:** agroecology, bomas, climate change, holistic planned grazing, Chinyika communal lands.

**MODELISATION SPATIALE ET STRATEGIE DE CONSERVATION DES FORMATIONS BOISEES A DANIELLIA OLIVERI (ROLFE) HUTCH. & DALZ. (FABACEAE) DES ZONES ECOLOGIQUES II ET III DU TOGO**

Panla Koffi\*, Amevivi Kossi, Atakpama Wouyo, Folega Fousséni, Dourma Marra, Batawila Komlan, Akpagana Koffi  
Université de Lomé - Faculté des Sciences (FDS) - Département de Botanique - Laboratoire de Botanique et  
Écologie Végétale (LBEV), 01 BP 1515, Togo.

\* Auteur correspondant : PANLA Koffi, E-mail: koffipanla@gmail.com/Tél : (+228) 91969950

**Résumé**

Dans un contexte de changement climatique global, cette étude vise à modéliser la distribution actuelle et future (horizon 2050) de l'espèce ligneuse *Daniellia oliveri*, essentielle tant sur le plan écologique que socioéconomique, dans les zones écologiques II et III du Togo. La recherche s'appuie sur la méthode MaxEnt pour prédire les habitats potentiels de l'espèce à partir de 21 variables (19 bioclimatiques et 2 environnementales), intégrant deux scénarios climatiques contrastés : SSP126 (optimiste) et SSP585 (pessimiste). Les données d'occurrence proviennent d'enquêtes de terrain, de bases de données nationales (IFN) et internationales (GBIF), ainsi que de publications scientifiques. Le modèle affiche une performance élevée (AUC = 0,95) et met en évidence l'importance du sol (jusqu'à 48,9 % dans la contribution) et des variables bioclimatiques telles que Bio19 et Bio12. Les projections indiquent une forte régression des habitats très favorables à l'horizon 2050 : -52,81 % sous SSP126 et -73,73 % sous SSP585. En parallèle, les habitats moyennement, peu ou non favorables augmenteraient, signe d'un recul généralisé des conditions optimales pour l'espèce. Malgré ce recul, certaines localités comme Sotouboua, Tchaoudjo, Bassar et la zone frontalière Togo-Bénin présentent une haute adéquation écologique actuelle et future (15 % de la zone), représentant des

zones prioritaires pour la conservation. À l'inverse, les préfectures de Mô, Haho, Ogou et Moyen-Mono (35 %) devraient devenir défavorable à l'espèce d'ici 2050. Ces résultats soulignent la vulnérabilité de *D. oliveri* face aux changements climatiques et appellent à l'intégration urgente des projections climatiques dans les politiques publiques de gestion forestière et de conservation, afin de préserver cette espèce clé et les services écosystémiques qu'elle rend aux communautés rurales.

**Mots-clés :** Modèle de distribution, changements climatiques, habitat d'espèce, *Daniellia oliveri*, Togo

**EFFECT OF TITHONIA COMPOST ON SOIL CHEMICAL PROPERTIES, GROWTH AND YIELD OF RADISH**

Olowoake A. A1; Abioye, T.A1; Yusuf, A.A.1 Ojo, J.A.1 and Ojo, A. O2

1Department of Crop Production, Kwara State University, P.M.B. 1530, Ilorin, Kwara State, Nigeria. 2National Centre for Genetic Resources and Biotechnology, Moor plantation, Apata, Ibadan, Nigeria.  
Corresponding author E-mail: aolowoake@yahoo.com, Phone- +2348034370246

**Abstract**

The use of compost cannot be over emphasized because of its usefulness in the improvement of physical and biological conditions of soil which in turn improves the crop growing environment and culminates in the better crop production. A pot experiment was conducted in a screen house at Kwara State University, Malete, Ilorin, Nigeria to examine effect of Tithonia compost on soil chemical properties, growth and yield of radish (*Raphanus sativus* L.). The treatments comprised of control, Tithonia compost (70, 80, 90 and 100 kgN/ha) and NPK 15-15-15 were applied at the rate of 100 kg N/ha. The treatments were laid out in a completely randomized design (CRD) with three replicates. Agronomic parameters taken were; plant height, number of leaves, stem girth, root yield weight and leaf weight. Radish plants grew better ( $P < 0.05$ ) with the application of NPK at 100 kgN/ha followed by Tithonia compost at 100 kg N/ha. However, Tithonia compost significantly ( $P < 0.05$ ) improved the yield of Radish by 13% and 59% compared with NPK fertilizer and control respectively. Tithonia compost at 100 kgN/ha had a significant and additive effect on soil nutrients after harvesting of radish when compared with NPK.

Tithonia compost at 100 kgN/ha could serve as alternative to mineral fertilizer for the production of radish with the additional advantage of enhancing better waste management.

**Keywords:** Growth, NPK, radish, tithonia compost, yield

**EMPOWERING WOMEN, YOUTH, AND VULNERABLE GROUPS IN ORGANIC AND AGROECOLOGICAL FARMING: A CASE STUDY FROM BULILIMA MAT NORTH**

Malon Muronzi

hazardmarlonmuronzi@gmail.com>

Zimbabwe

**Abstract**

Bulilima Mat North is a rural district in Zimbabwe, where many communities face challenges such as food insecurity, poverty, and limited access to education and healthcare. Organic and agroecological farming offers an opportunity to address these challenges while promoting environmental sustainability. Engaging marginalized groups such as women, youth, and vulnerable communities is critical for achieving inclusive and equitable development in the region. This study aims to explore the experiences and perspectives of women, youth, and vulnerable groups in organic and agroecological farming practices in Bulilima Mat North. It examines the barriers they face, the strategies they employ to overcome these challenges, and the potential of these farming practices to empower marginalized

communities. The study employs a qualitative approach, using focus group discussions, key informant interviews, and participant observation to gather data from women, youth, and vulnerable groups engaged in organic and agroecological farming in Bulilima Mat North. Thematic analysis is used to identify common themes and patterns in the participants' experiences and perceptions. The study highlights the unique challenges faced by women, youth, and vulnerable groups in adopting organic and agroecological farming practices, including limited access to land, financial resources, and technical knowledge. Participants identified strategies to overcome these barriers, such as forming cooperatives, accessing microfinance, and participating in training programs. Participants reported that organic and agroecological farming has contributed to increased food security, income generation, and improved well-being in their communities. The study also revealed that these practices have the potential to enhance the social status and decision-making power of marginalized groups, particularly women.

The findings emphasize the importance of tailoring organic and agroecological farming interventions to the specific needs and priorities of women, youth, and vulnerable groups. By addressing the barriers, they face and building on their strengths and existing strategies, these farming practices can become powerful tools for empowering marginalized communities and promoting sustainable development in Bulilima Mat North and similar contexts across Africa.

#### DEFENSE MECHANISMS OF SWEET POTATO VARIETIES (IPOMOEA BATATAS L. [LAM]) ENHANCED BY NEEM SEED EXTRACT AGAINST ROOT-KNOT NEMATODES AND FUSARIUM WILT

Behly Bertha NDJA'A TANEKOU, Behly Bertha Tanekou Ndja'a, Sylvere Landry Lontsi Dida2, Patrice Zemko Ngatsi2, William Norbert Tueguem Kuate2, Liliane Tekam Meguekam3, Emmanuel Youmbi1

1 Laboratory of Biotechnology and Environment, Physiology and Plant Improvement Research Unit, Department of Plant Biology, University of Yaounde I, Yaounde, Cameroon  
2 Laboratory of Biotechnology and Environment, Phytopathology and Plant Protection Research Unit, Department of Plant Biology, University of Yaounde I, Yaounde, Cameroon  
3 Department of Biological Sciences, Higher Teacher Training College, University of Yaounde behlyberthandjaa@gmail.com

##### Abstract

Sweet potato production encounter severe threats from root-knot nematodes *Meloidogyne* spp. and *Fusarium* sp. fungi, which cause *Fusarium* wilt. Nematodes induce root and tuber deformities, as well as wilting of stems and leaves, while *Fusarium* wilt causes rot, necrosis, and additional wilting. These pests jointly lead to significant yield losses. Chemical control remains common however, poses environmental and health risks due to overuse chemical and pesticides. This study evaluated the tolerance of four sweet potato varieties treated with aqueous neem seed extract against combined nematode and *Fusarium* infections. A completely randomized block design included four varieties (V1: white from Center region-Togolo; V2: white from Adamawa-Lambadidi; V3: Improved Yellow-IRAD 1112; V4: Yellow from Center-Bété) and four treatments (T0: non-inoculated control; T1: inoculated with nematodes + *Fusarium*; T2: inoculated then treated with neem extract; T3: inoculated then treated with synthetic pesticides) under greenhouse conditions. Agro-morphological, epidemiological, and biochemical resistance parameters were measured. Neem extract (T2) reduced disease severity by 60-80% compared to T0, with T3 showing slightly lower efficacy. Highest yields were observed in T2 and T3 treatments across all varieties. Varieties V2 (Lambadidi) and V3 (IRAD 1112) reached yields up to 7 t/ha under T3. Phenolic compounds, protein content, and peroxidase activity were elevated in plants inoculated with *Fusarium* and treated with neem extract, indicating enhanced resistance. Overall, neem treatment exhibited strong protective potential against fungal diseases and nematodes, suggesting its value as an eco-friendly alternative for integrated sweet potato pest management.

**Keywords:** *Ipomoea batatas*, neem seed extract, root-knot nematodes, *Fusarium* wilt, plant resistance, biocontrol.

#### MODALITÉSD'ACCÈS À L'INFORMATION SUR DES TECHNIQUES DE PRODUCTION DES LÉGUMESBIOLOGIQUESAU SUD-BÉNIN

Justin A. Houeto1\*, Florent Okry1.

1Laboratoire d'EconomieRurale et de Sciences Sociales pour le Développement Durable (LERSSoDD), Université Nationale d'Agriculture du Bénin.

\*Correspondance : justinhoueto@yahoo.fr

##### Resume

Pour nombre de maraîchers, les difficultésd'accès à l'information sur les techniques de production des légumesbiologiques constituent de freins pour continuer la production. Quellessont les modalitésd'accès à l'information sur les techniques de production des légumesbiologiques au Sud- n Bénin ? Et quelle est l'influence de cesmodalités sur le maintien dans la production des légumesbiologiques ? Pour répondre à ces questions, les données ontétécollectées, de Juillet à Août 2023, auprès de quarante un (41) maraîchers qui ontcontinué la production des légumesbiologiques et douze (12) maraîchers qui ontabandonné dans les communes de Cotonou, Seme-Kpodji et Ouidah. Un questionnaire et un guide d'entretienontétéutilisés. Les données collectéesontrelatives aux modes d'accès à l'information sur les techniques de production des légumesbiologiques et les types d'informations techniques partagées. Les données ontétéanalysées à l'aide des logiciels Excel et R. Les résultatsontmontréquel'appartenance à un réseau de promotion des légumesbiologiques, l'appartenance à unecoopérative de production des produitsmaraîchers, l'échange entre pairs, la formation et la recherche sur internet sont des modalitésd'accès à l'information sur les techniques de production des légumesbiologiques. Le maintienou non dans la production des légumesbiologiquesdépendsignificativement du mode d'accès à l'information technique. L'accès à l'information sur les techniques de production à travers l'appartenance à unecoopérative de production des produitsmaraîchers ne favorise pas le maintien dans la production. Par contre, l'accès à l'information sur les techniques de production à travers l'appartenance à un réseau de promotion des légumesbiologiquesfavorise le maintien dans la production. La formation, les visitesd'échanges et la recherche sur internet se sontmontrésnécessaires pour démarrer la production mais ne conditionnent pas le maintien. La structuration et l'organisation des producteursbiologiquesengroupement de promotion de l'agriculturebiologiquesont indispensables pour le développement de l'agriculturebiologique.

**Mots clés:** Accès aux informations techniques, Maraîchagebiologique, Maintien, Abandon, Bénin.

#### STRATÉGIES DE MISE EN MARCHÉ DES LÉGUMES BIOLOGIQUESAU SUD DU BÉNIN

Justin A. Houeto1\*, Florent Okry1.

1Laboratoire d'EconomieRurale et de Sciences Sociales pour le Développement Durable (LERSSoDD), Université Nationale d'Agriculture du Bénin.

\*Correspondance: justinhoueto@yahoo.fr

##### Resume

Les consommateursconsentent à payer les légumesbiologiques au Sud-Bénin avec un prix qui est supérieure à celui des légumes conventionnels. Au même moment, certainsmaraîchersbiologiquesévoquent le problème de marchécomme principal raison pour abandonner la production des légumesbiologiques. Quellessont les stratégies de mise enmarché des légumesbiologiques au Sud-Bénin ? Et quelle est l'influence de cesstratégies sur le maintien dans la production des légumesbiologiques ? Pour répondre à ces questions, les données ontétécollectées, de Juillet à Août 2023, auprès de quarante un (41) maraîchers qui ontcontinué la production des légumesbiologiques et douze (12) maraîchers qui ontabandonné dans les communes de Cotonou, n Seme-Kpodji et Ouidah. Un questionnaire et un guide d'entretien ont été utilisés. Les données collectées sont relatives aux modalités de communication sur l'offre et la demande des légumes biologiques, les stratégies de vente des légumes biologiques et les caractéristiques des stratégies de vente. Les données

ont été analysées à l'aide des logiciels Excel et R. Les résultats ont montré que la vente à la ferme, la vente à travers la création d'un point de vente et la vente en ligne sont les stratégies les plus courantes de mise en marché des légumes biologiques. Les circuits de distribution ultra-court, court et long caractérisent la vente à la ferme ; le circuit court caractérise la vente via la création d'un point de vente et le circuit ultra-court caractérise la vente en ligne. Le circuit long de distribution ne favorise pas le maintien dans la production des légumes biologiques. Par contre les circuits ultra-court et court favorisent le maintien. Mais, le circuit ultra-court favorise plus de maintien que le circuit court. La formation des producteurs à la vente en ligne des légumes biologiques est indispensable pour l'adoption de l'agriculture biologique.

**Mots clés :** Stratégie de mise en marché, circuit de distribution, légumes bio, Bénin.

#### EVALUATION OF SIMPLE BUT EFFECTIVE METHODS TO REDUCE PESTICIDE RESIDUES IN/ON FRESH VEGETABLES, NAIROBI, KENYA

Nduhiu Gitahi1\*, Eustace Kiarii2, Wycliffe Nyamao2, Joseph Nderitu1, Harun Warui3.

1University of Nairobi, Department of Public Health Pharmacology & Toxicology

2Kenya Organic Agriculture Network

3Heinrich Böll Foundation

\*Corresponding author email: nduhiugitahi@gmail.com

##### Abstract

Access to safe and nutritious food is a fundamental human right. Yet, the growing reliance on chemical pesticides in food production has significant public health and environmental risks. This study's objectives were, (1) to investigate the pesticide residues levels in commonly consumed vegetables - tomatoes, kales, spinach and onions from different regions in the Country and (2) to evaluate the effectiveness of simple household methods in reducing pesticide residues to acceptable levels. A cross-sectional study design was used for baseline sampling that later informed the experimental study on pesticide residue reduction. Traders from 4 major markets in the country, with any of the four foodswere randomly selected and samples randomly obtained. Samples were processed using the QuEChERS method and tested for over 500 pesticide residues using GC/MS/MS and LC/MS/MS. Pesticide reduction was carried out by first exposing the foods to selected pesticides, testing for residues then re-tested after being subject to eight treatment methods. In this study, 40% of the samples had pesticide residues with 16 pesticide-active ingredient, where three were classified as unlikely to present acute hazard and one as class III (slightly hazardous), eleven were class II (moderate hazardous) by WHO, while one was category 1b (carcinogen) by Globally harmonized system. Notably, eight active ingredients in 33.5% of the samples exceeded the recommended EU-MRLs, Washing peeled onions in running water and blanching had the overall best pesticide residue reduction at an average of 99.7%. Tomatoes had a 69% average reduction after soaking in 2% baking soda, washing in running water plus cooking. Spinach had 65.5% average reduction, after soaking in salty water, washing in running water, and cooking. Soaking in 20% vinegar, washing in running water, and cooking achieved an average of 62.3% reduction in kales. In conclusion, these findings demonstrate that simple, low cost household practices can significantly reduce pesticide residues in/on vegetables to acceptable MRLs offering a practical approach to improving food safety at the consumer level.

**Key words:** Pesticide active ingredients, residue reduction, households

#### IMPACT OF AGRICULTURAL TECHNOLOGIES IN STRENGTHENING ORGANIC FARMING AMONG YOUTH FARMERS IN SOUTHWESTERN NIGERIA

Abiala, Abiala Alatise1\*, Akinyode Timothy Olawumi2, Sikiru Oluwole Banjo2, Adewale Ibrahim Abass1, John Olalere Jolayemi3 and Sanni Micheal Anuoluwapo4

\*Corresponding Author Email: abialaaa@tasued.edu.ng

##### Abstract

Among the factors for boosting organic food production in Nigeria are appropriate agricultural technologies, trainings and credit facilities. This study therefore examined the impact of agricultural technologies in strengthening organic farming among youth farmers in southwestern Nigeria. The study employed a descriptive survey design. A multi-stage sampling technique was employed to select 1,440 youth farmers who leveraged on agricultural technologies from Ogun, Oyo, Ondo and Ekiti States were purposively selected based on their predominance in organic food production. Data were collected using a well-structured questionnaire. Data were analyzed using descriptive statistics, t-test and Probit regression. The results showed that majority of the youth farmers were male (75.8%), married (83.5%), had education (70.6%), access to extension services (62.4%), technology usage (67.9%) and cooperative membership (85.4%). T-test result showed that there is a significant difference in the output and income of the youth farmers before and after the usage of agricultural technologies. Probit regression results revealed that technology usage ( $? = 0.891, p < 0.01$ ), education ( $? = 1.410, p < 0.01$ ), access to training ( $? = 0.989, p < 0.01$ ) and farm size ( $? = 1.724, p < 0.01$ ) significantly impacted their organic food production in the study area. Conversely, high cost of technology ( $? = -1.621, p < 0.01$ ) and poor access to credit ( $? = -1.392, p < 0.01$ ) remained barriers to adoption and usage of agricultural technologies. It is concluded that youth farmers with education, trainings, credit facilities experienced higher output and income in study area. The study, therefore, recommended that usage of tractor coupled implements, solar pumping machines, drip irrigation kits and access to credit facilities with supportive government policies put in place may encourage massive youth participation in organic farming in southwestern Nigeria.

**Keywords:** agricultural technologies, organic farming, youth farmers, adoption and usage

Word count: 299

#### STERILIZATION OF FARMS TOOLS CONTAMINATED BY BANANA AND POTATO WILT USING PLANTS EXTRACTS: A STRATEGY FOR ECOLOGICAL DISEASE CONTROL AND FOR IMPROVING FOOD SECURITY IN THE EAC COUNTRIES

Franchement Mukeshambala12\*, Angele Ibanda34, Enoch Wembabazi 5, Gakuru Semacumu1, Dhed'a Djailo6, Valentine Nakato7, Guy Blomme8, Godefroid Monde9 Department of Crop Science, University of Goma,P.O. Box 204, Goma, Goma, North Kivu Province, Democratic Republic of Congo;

Corresponding author :MukeshambalaFranchement :franckmukeir@gmail.com

##### Abstract

In the East African region banana is consumed until 600 Kg per person per year, while for potato (*Solanum tuberosum*) is noted a consummation until 250 Kg per person per year. Unfortunately, banana and potato production are facing to bacterial wilts, caused by *Xanthomonas vasicola* pv. *Musacearum*(Xvm) for banana and *Ralstonia solanacearum* phylotype IIB (RsIIB) for potato. These diseases are mostly spread by farmer tools (more than 51%). Thus, the objective of this work was to identify plant extract which are efficient in disinfecting (sterilizing) contaminated tools in vitro. Xvm were collected from infected banana plants and isolated on Yeast Extract Peptone Agar (YPGA), however RsIIB was isolated from potato wilted plant and seeded on MacConkey Agar. Identification of Xvm and RsIIB was accomplished via Polymerase Chain Reaction (PCR) and greenhouse inoculation trials. The crude plant extracts were prepared by diluting 25 g dry plant powder in 125 ml of methanol and macerated, filtered and evaporated. The collected extract was diluted in a proportion of 40mg of extract, 10µl of DMSO and 50µl of sterile distilled water. Sterile scalpels were used as alternative to farmer tool, and these were contaminated with bacteria (2 min), and then disinfected in various plant extracts solutions (3 minutes). The experimental design was completely randomized with 14 treatments (12 plants extracts, 1 negative control and 1 positive control, sodium hypochlorite :jik) repeated 3 times. Data collection included: the number of colonies after 48 hours on Mueller Hinton Agar. After experiment, the extract of *E. globulus* was efficient to disinfect the contaminated scalpel (0 colonies grow) for both pathogens. The efficacy of *E. globulus* was similar to that of positive controls (0 colonies grow). In vivo tests will be required to direct the use of this extract in the field.

**Key Word :** *Ralstonia solanacearum*, *Xanthomonas vasicola* pv. *musacearum*, *Solanum tuberosum*, *Musa* sp.

## ANALYSIS OF KNOWLEDGE, ATTITUDES AND PRACTICES OF BREEDERS AND CONSUMERS FOR THE ESTABLISHMENT OF A CERTIFICATION SYSTEM FOR AGROECOLOGICAL POULTRY FARMING IN BENIN

ASSOGBA S. Claudde-Gervais 1\*, AGNADOMI Ulrich 1

1 Research Laboratory on Innovation for Rural Development, Faculty of Agronomy, University of Parakou, Benin

\* Corresponding author: Email: a\_claude2003@yahoo.fr | Tel: +229 01611 04886

### Abstract

The agroecological transition involves the adoption of sustainable and resilient practices that break with conventional methods, requiring a shift in values towards environmentally friendly agriculture that promotes biodiversity. This study aims to define the criteria for organic certification that meets the needs of breeders and consumers of poultry products in southern Benin, in a context where certification systems remain insufficiently developed to support this transition. Key barriers include institutional challenges such as the absence of locally adapted certification standards that reflect smallholder farming realities, weak regulatory frameworks, high certification costs, inadequate training programs for farmers, a shortage of qualified local inspectors and certification bodies, and low awareness among producers and consumers about the benefits and requirements of agroecological certification. The study was conducted among 78 breeders sampled using a reasoned method on the one hand, and 100 consumers selected using a stratified and simple random method in six communes of Benin: Glazoué, Agbangnizou, Abomey, Abomey-Calavi, Ouidah and Tori Bossito. Data collected via questionnaire on Kobotoolbox were analyzed using descriptive statistics, chi-square test and analysis of variance. Knowledge, Attitude, Practice (KAP) analysis reveals complex dynamics. Producers possess basic certification knowledge (score 3.11) and positive attitude (2.05), but implementation remains null (score 0), primarily due to economic and technical constraints. Indeed, consumer interest in certified products is increasing; however, a gap persists between purchase intention and actual behaviour, attributed to high prices, limited availability, and lack of information. These findings highlight that the effectiveness of an agroecological certification system requires adapting standards to local realities, training producers in agroecological practices, and implementing supportive public policies to overcome economic and technical barriers.

**Keywords:** agroecological certification, poultry farming, sustainable transition.

## INFLUENCE OF MOISTURE PIT SOWING ON THE DEVELOPMENT AND PRODUCTION OF UPLAND TARO: AN APPROACH FOR AGROECOLOGICAL FARMING

Macharia, Joseph Kinyoro.1\*, Akuja, T. E. 2 & Mushimiyyimana, D. M. 3

1 Department of Agriculture and Natural Resources, School of Science and Technology, Kenya Methodist University.

2 Department of Agricultural Sciences, School of Agriculture, Environment, Water and Natural Resources Management, South Eastern Kenya University

3 Department of Agriculture and Natural Resources, School of Science and Technology, Kenya Methodist University

\* Corresponding author's email: jkmacharia@egerton.ac.ke/josephkinyoro@gmail.com

### Abstract

Climate variability and unpredictable rainfall patterns pose significant challenges to sustainable agriculture, underscoring the need for agroecological farming and innovative technologies that enhance productivity and environmental resilience. Taro [*Colocasia esculenta* (L.)] is a high-value starch tuber; however, its production in Kenya remains scarce due to limited farmland, rudimentary cultural practices, and a severe shortage of propagation materials. Traditionally taro has been grown in wetland ecosystems, hindering its extension into upland cropping systems. This study investigates the moisture pit sowing technique as a climate-adaptive strategy aimed at enhancing upland taro production through improved water harvesting and conservation methods. Field experiments were conducted over two seasons at the Egerton University teaching and research farm to assess the impact of different sowing depths on taro tuber yield and its associated components. A randomized complete block design with four replications was employed, utilizing 30 cm wide moisture pits with depths of 20, 30, 45, and 60 cm. The data collected focused on shoot parameters, corm yield, and other yield components. Results indicated that sowing depths significantly influenced corm

weight per plant, with weights of 2.67 kg for 60 cm, 2.02 kg for 45 cm, 1.24 kg for 30 cm, and 0.35 kg for 20 cm. Corm yields also differed significantly: 44.63 t ha<sup>-1</sup> at 60 cm, 38.43 t ha<sup>-1</sup> at 45 cm, 29.58 t ha<sup>-1</sup> at 30 cm, and 7.54 t ha<sup>-1</sup> at 20 cm. The study revealed that the depth of moisture pits significantly influences the yield of upland taro, with deeper pits yielding better results. It is recommended that farmers employ moisture pits that are 30 cm wide and between 30 and 60 cm deep to maximize yields. Additionally, further research is encouraged on the impact of early sucker removal on the growth and productivity of the crop.

**Keywords:** Upland-taro; Wetland-taro; Sucker; moisture pit

## FRONTYARD VEGETABLE GARDEN: A GREAT STARTER FOR ORGANIC FARMING

Ryoichi Komiya (Ph.D.)

komiaryoichi@gmail.com

Organic Shizukuishi IFOAM Recognized PGS Initiative, Japan

### Abstract

We have insisted too much on increasing organic farms as well as organic stakeholders in Shizukuishi town, Japan since 2018 when getting IFOAM Recognized PGS Initiative. However, our PGS activities have failed to expand organic mindset among people in the town. This is due to the low organic awareness of consumers as well as local government people, so that nothing has changed. Therefore, it requires a lifelong education/instruction to consumers and local government people.

In Japan, the exclusively residential dwelling, it is popular they have grown flowers and vegetables in the yards. This is a good place to start organic farming. Because the place is proper for us to grow vegetables. They can start it economically and grow safe and secure produce.

A conservative estimate of the potential organic areas of front yard vegetable garden (FYVG) in Japan is:

[1] Minimum Garden space is ten m<sup>2</sup>/household.

[2] 25,070,100 (Exclusively residential dwellings) x 10m<sup>2</sup> = 25,070ha.

Present JAS certified organic land area in Japan is 11,992 ha in 2022.

Therefore, people are sure theoretically that a 2.0 times larger organic land share could attain by the introduction of FYVG, provided each household has started organic. Growing my produce in FYVG is an effective way to learn about organic farming (See Figs.)

The produce from the FYVG is for our eating so we never use chemicals in our soil, and we gradually know about healthy soil, healthy plants, and healthy bodies. The paper discusses its design, the house dirt conversion into fertile soil to create the FYVG and besides PGS introduction to the residential community in the future. This would contribute to community development with people in the areas with even healthy seniors and increasing lifespans. The same idea could be applicable in African nations to extend organics.

## TYPOLOGIE DES PRATIQUES AGROÉCOLOGIQUES EN ZONE COTONNIÈRE AU NORD BÉNIN

Abdou Ganiou ABOU CHABI

Laboratoire d'Analyses et de Recherches sur les Dynamismes Economiques et Sociales (LARDES), Ecole Doctorale Sciences Agronomiques et de l'Eau, Université de Parakou, Université de Parakou, BP : 123, Parakou, Bénin, Email : acaganiou@gmail.com  
Tél : +229 0197969473 ou 0195393831

### Résumé

L'intensification de l'utilisation des engrains et produits phytosanitaires de synthèse dans les exploitations cotonnières pose d'énormes problèmes pour une production saine et durable. Les conséquences négatives de ces pratiques sur les agroécosystèmes et la santé des exploitants sont lésions. Un nouveau raisonnement, de nouvelles pratiques en termes de pratiques agricoles commencent par s'imposer : notamment une agriculture plus durable et respectueuse de l'écosystème. La présente recherche fait une typologie des pratiques agroécologiques dans la zone cotonnière au Nord Bénin. Les données ont été collectées auprès de 240 producteurs avec un échantillonnage aléatoire simple.

Elles sont projetées sur Excel 2013 et analysées dans le logiciel R 4.6.2, afin de produire la statistique descriptive caractérisant chaque pratique agroécologique et de faire la classification hiérarchique suivant les données sociodémographiques et professionnelles des producteurs. Les mesures de gestion intégrée de la fertilité des sols (GIFS) suivi respectivement des mesures de conservation des eaux et des sols (CES), des mesures d'adaptation au changement climatique (MACC), des mesures d'intégration agriculture-elevage (MIAE), d'agriculture de conservation (AC) et de mesure de promotion forstière (MPF)..

**Mots clés:** Typologie, agroécologie, agriculture durable, Zone cotonnière.

#### A BIOSTIMULANT AS A LEVER FOR AGROECOLOGICAL INTENSIFICATION: ASSESSING IMPACTS ON MAIZE (*ZEAMAYS L.*) IN BENIN

HOUEDJOFONON M. Elysée<sup>1</sup>, AGUEGUE Ricardo M.<sup>1</sup>, BLALOGOE C. Parfait<sup>2</sup>, CODJO Victor<sup>3</sup>, BABAMOUSSA Lamine Said<sup>1</sup>

Affiliation(s): 1 University of Abomey-Calavi (UAC), 3National Institute of Agricultural Research of Benin (INRAB), 2CREDEL NGO.

Corresponding author: e.houedjofonon@gmail.com

##### Abstract

In Benin, maize *Zea mays L.* cultivation, a food security pillar for 70% of the agricultural population, is threatened by soil degradation and dependency on chemical fertilizers. Biostimulants based on indigenous arbuscular mycorrhizal fungi (CMA) represent a promising agroecological alternative. A research and development study was conducted with 200 farmers, including 45% women, across four municipalities in Southern Benin. The methodology compared a biostimulant integrated management system with local practices through agronomic monitoring and socio economic surveys. Evaluated parameters included yield, profitability, social acceptability, and soil health. A baseline study revealed stagnant yields (1.29 t/ha) and low gross margins (XOF 66,440/ha) despite high synthetic input use (92.5%). In stark contrast, on-farm trials demonstrated unanimous adoption and high satisfaction among beneficiaries. Maize grain yields on treated plots more than doubled, reaching 6.2 t/ha, which led to a nearly nine-fold increase in farmer gross margin (to approx. XOF 587,000/ha). Furthermore, a measurable reduction in chemical fertilizer use was validated by agricultural extension agents, reinforcing the technology's environmental co-benefits. The study provides robust on-farm evidence that indigenous AMF biostimulants are a technically effective, economically viable, and socially accepted technology. They simultaneously improve maize productivity, smallholder income, and soil health, offering a clear pathway for sustainable intensification. These findings provide a strong basis for guiding agricultural policies and scaling strategies to support agroecological innovations in Africa.

**Keywords:** Agroecology, ArbuscularMycorrhizal Fungi (AMF), Biostimulant, On-FarmResearch, Zeamays L

#### AWARENESS CAMPAIGNS AND CAPACITY BUILDING AS DRIVERS OF ORGANIC AGRICULTURE ADOPTION IN DELTA STATE, NIGERIA

1 Atoma, C.N., 1Akpgoheneoyibo-Owigho, O., 2Onwumere-Idolor, O.S,1Ewododhe, A.A.C., 1Adaigho D.N., and 3Atoma O.E.

Corresponding Authors Email: nwacharity1211@gmail.com

##### Abstract

This study investigates the awareness and knowledge of agricultural professionals on organic agriculture in Delta State, Nigeria, with a focus on strengthening adoption through innovative research, awareness campaigns, and training programs. Agricultural professionals, including lecturers and extension agents, play a pivotal role in promoting sustainable farming practices. Using structured

questionnaires administered to 230 respondents, data were analyzed through descriptive and inferential statistics. Results indicate moderate to high awareness of practices such as crop rotation, composting, and soil conservation, but limited understanding of areas like organic weed control. Knowledge levels were significantly influenced by age, education, experience, and income, while no major differences were observed between professional groups.

Key barriers to adoption identified include weak government support, high input costs, and insufficient training opportunities. To overcome these challenges, the study underscores the importance of targeted awareness campaigns and farmer-oriented training programs to build local capacity and bridge knowledge gaps. Stronger policy backing and institutional partnerships are also recommended to accelerate the spread of organic and agroecological farming in Delta State. By equipping professionals as champions of awareness and training, Delta State can serve as a model for advancing organic agriculture in Nigeria and contribute to Africa's broader transition to agroecological systems through innovative research.

**Keywords:** Organic agriculture, Agroecology, Awareness campaigns, Training programs, Delta State

#### MODELING THE IMPACT OF FERTILIZERS ON MAIZE AND RICE PRODUCTIVITY IN TANZANIA: PATHWAYS TO AGRICULTURAL TRANSFORMATION

Ibrahim L. Kadigi\*

Department of Business Management, College of Humanities and Business Studies, Mbeya University of Science and Technology, Mbeya P.O. Box 131, Tanzania.

\* Correspondence: ibrahim.kadigi@sua.ac.tz / kideannito@gmail.com

##### Abstract

Agriculture is a central component of Tanzania's economy, supporting the livelihoods of more than 60% of the population. Among staple crops, maize (*Zea mays L.*) and rice (*Oryza sativa*) are vital for food security, household incomes, and national stability. However, yields remain below potential due to low fertilizer use, soil nutrient depletion, and climate variability. This study addresses the question: To what extent does fertilizer application improve maize and rice productivity in Zanzibar, Mainland Tanzania, and at the national level? The study employed a Stochastic Simulation Approach (SSA), based on non-parametric Monte Carlo protocols, using nationally representative data from the 2019/20 National Sample Census of Agriculture (NSCA). Yield probabilities were modeled under different fertilizer-use scenarios to estimate the likelihood of exceeding productivity thresholds and the risk of low yields. Fertilizer use significantly improved mean yields, enhanced yield stability, and reduced downside risk. For maize, the probability of exceeding 4.0 t/ha rose from 1% among non-fertilizer users to 6% among inorganic fertilizer users. For rice, the probability of surpassing 4.0 t/ha increased from 10% for non-users to 17% with the use of inorganic fertilizer at the national level. Fertilizer application also reduced the proportion of farmers producing below the national average, reflecting more stable production outcomes. Differences between Zanzibar and Mainland Tanzania further revealed that agroecological and management conditions influence the effectiveness of fertilizers. Fertilizer is a key driver for closing maize and rice yield gaps, but its effectiveness is maximized when integrated with improved seed varieties, irrigation, and extension services. Strengthening fertilizer access through targeted subsidies, efficient distribution, and farmer training can boost productivity, stabilize rural incomes, and advance food security. The study offers robust empirical evidence to inform agricultural policy, guide subsidy programs, and contribute to the achievement of SDGs 1, 2, 8, and 13 in Tanzania.

## FARMERS' KNOWLEDGE OF ORGANIC AGRICULTURE FOR CLIMATE CHANGE MITIGATION IN KWARA STATE, NIGERIA

Felicia Motunrayo Olooto

Department of Agricultural Economics and Extension Services, Faculty of Agriculture, Kwara State University, Malete Nigeria.  
feliciamoloto@gmail.com, felicia.oloto@kwasu.edu.ng, +2347030918979

### Abstract

Organic agriculture presents a sustainable approach to farming that can significantly contribute to climate change mitigation. This study explored the knowledge, practices, and challenges of farmers in Kwara State, Nigeria, concerning organic agriculture and its potential to reduce greenhouse gas emissions. Three stage sampling technique was employed to select 150 respondents for the study. Structured interview schedule was used to elicit information from farmers on their socioeconomic characteristics, their extent of organic farming knowledge and its relevance in climate change mitigation in Kwara State. The findings indicated a growing awareness of organic methods such as Agroforestry (78.0%), Mulching (70.0%) and Cover cropping (52.7%). Adoption and use however remains limited due to constraints such as Social influence (Mean score=2.99), Water availability (Mean score=2.80), Yield expectations (Mean score=2.78) and access to organic inputs/fertilizers (Mean score=2.76). The study also identified the positive environmental impacts of organic practices already in use, such as improved soil health, increased biodiversity, and reduced chemical usage. The study concluded that empowering farmers with knowledge and resources for organic agriculture is crucial for promoting sustainable farming practices that contribute to climate resilience in Kwara State. The need for enhanced farmer education, policy support, and investment in organic farming to harness its full potential for climate change mitigation was thus recommended.

**Keywords:** organic agriculture, climate change, greenhouse gas emission, mitigation

## GREEN MANURE CONTRIBUTES TO ACHIEVING REGENERATIVE ORGANIC FARMING

Kazuma Katahira

spnw9my9@outlook.jp  
2-1894-8 Ono-machi, Ichikawa, Chiba, Japan

### Abstract

The highest priority in organic farming should be addressing the perspectives of environmental restoration maintaining biodiversity, including biodiversity. The symbiotic relationship between plant roots and soil micro-organisms supports plant growth. These are systems composed of air circulation and utilisation created by plant roots and soil micro-organisms since the birth of earth. Seeds have acquired the ability to use air as a source of nutrients by inheriting environmental information and have made a system of production, and humans have produced food by selecting, improving, protecting and growing these seeds. Plants use carbon dioxide to produce carbohydrates through assimilation, and the nitrogen assimilated by soil micro-organisms and made available for absorption produces amino acids and proteins, which form the structure of the plant body. Efficient use of light is maintained by a balance between supply and demand depending on climatic conditions, soil quality and assimilation speed. Climatic conditions, soil quality, shared relationships between soil micro-organisms and the behaviour of small animals that assist in pollination and assimilation, all contribute to genetic information, as the plant grows steadily, makes amino acids from sugars, stores energy to produce offspring and puts all its energy in the seed-making process. The environment of a seed is once in a lifetime and no matter how recombination, human science cannot create a seed. It is an agricultural heritage that must not be lost just as the information and years that have passed under local climatic conditions cannot be restored. Current Organic farming does not contribute to reducing CO<sub>2</sub> emissions, and criteria for environmentally regenerative agriculture which does not re-emit carbon dioxide fixed in the ground, should be clearly defined. The use of green manure, which is suitable for environmentally regenerative

agriculture, is the best low-cost technology for fixing the large amounts of CO<sub>2</sub>, increasing soil micro-organisms and increasing fertility.

## CONTRIBUTION DE L'AGROÉCOLOGIE À LA RÉGULATION NATURELLE DES RAVAGEURS ET À LA POLLINISATION EN CULTURES MARAÎCHÈRES À YAMOUSSOUKRO (CÔTE D'IVOIRE)

Marie-France N'Da KOUADIO<sup>1,\*</sup>, Gomhan Sann Cédic OULAÏ<sup>1</sup>, Antoine Alban Kacou M'BON<sup>1,2</sup>, San-Whouly Mauricette OUALI N'GORAN<sup>1</sup>

<sup>1</sup>Félix Houphouët-Boigny University, Abidjan, Côte d'Ivoire;

<sup>2</sup>Centre d'Excellence Africain sur le Changement Climatique, la Biodiversité et l'Agriculture Durable (CEA-CCBAD/WASCAL), Abidjan, Côte d'Ivoire; Corresponding author: kouadiomariefrance283@yahoo.fr

### Résumé

Face aux risques environnementaux et sanitaires liés à l'usage intensif de pesticides de synthèse, de plus en plus de maraîchers en Afrique de l'Ouest s'orientent vers la transition agroécologique. Cette étude a comparé l'impact de deux systèmes de protection phytosanitaire agroécologique et conventionnel sur l'entomofaune de la tomate (*Solanum lycopersicum*), de l'aubergine africaine (*Solanum aethiopicum*) et du concombre (*Cucumis sativus*) dans la région de Yamoussoukro. Des observations hebdomadaires ont été réalisées pendant 12 mois en couvrant deux saisons contrastées (saison des pluies et saison sèche) sur trois parcelles en transition agroécologique (utilisant des extraits de plantes) et sur trois parcelles conventionnelles. Les résultats révèlent une plus grande diversité d'insectes sur les parcelles en transition agroécologique par rapport aux parcelles conventionnelles, pour chacune des espèces. Les insectes utiles sont majoritairement collectés sur les parcelles en transition agroécologique. Sur tomate, le prédateur *Nesidiocoris* tenuis a été le plus abondant, avec une moyenne de 6,33 individus par plant en transition agroécologique contre 0,26 en conventionnel. Sur concombre, le pollinisateur *Apis mellifera* a été dominant, avec 4,53 individus par plant en transition agroécologique contre 2,60 en conventionnel. En revanche, les densités des principaux ravageurs (*Bemisia tabaci*, *Jacobiella* sp., *Aphis gossypii*) n'ont pas varié de manière significative entre les deux systèmes. Les producteurs rapportent une qualité de la protection et la production des légumes satisfaisante dans les deux cas. Ces résultats suggèrent que la substitution des pesticides de synthèse par des extraits de plantes, combinée à la lutte par conservation, favorise la biodiversité fonctionnelle et contribue à la régulation naturelle des ravageurs, sans compromettre les rendements. L'adoption de ces pratiques pourrait renforcer la durabilité et la résilience des systèmes maraîchers en Afrique de l'Ouest.

**Mots clés:** agroécologie, biodiversité fonctionnelle, insectes utiles, régulation naturelle, maraîchage

## SUPPORTING PASTORALISM AND AGRICULTURE IN RECURRENT AND PROTRACTED CRISES (SPARC) RESEARCH INITIATIVE. AFRI-SCOUT IMPACT EVALUATION

Miguel Uribe, Sophie Turnbull, and Javier Madrazo (Causal Design)  
Ethiopia/Kenya

### Abstract

Pastoralism, a critical livelihood, and economic activity in East Africa, is increasingly vulnerable as pastoralists confront climate change-induced protracted droughts and floods, livestock diseases, armed conflicts, and an increasing population. Global Communities, a non-profit organization, has supported pastoralist communities in Eastern Africa to organically improve herd condition, land health and overall resiliency through their AfriScout (AS) program. AfriScout combines remote sensing and indigenous knowledge to improve decision-making through two distinct approaches. AfriScout Regen, implemented in Ethiopia, provides intensive community-level grazing support organized around adaptive multi-paddock (AMP) grazing; while AfriScout Steward, implemented in Kenya, provides

pastoralists with near real-time information on rangeland conditions through a mobile app co-created with pastoralists to inform grazing and migration decisions. By providing timely information (AS Steward) or targeted advice (AS Regen), pastoralists' decision-making improves, leading to positive outcomes for rangelands, herd conditions, and overall well-being. A two-year, mixed-methods impact evaluation of these approaches compared outcomes between treatment and control groups. The AS Regen intervention showed large and statistically significant impacts on all primary indicators related to rangeland management capacities and behavioral changes, rangeland conditions, and herd conditions. Treatment households were eighty-three percentage points more likely to be satisfied with the quality of pasture they were able to access for their livestock and reported a 57% higher monetary value of herds compared to control households. Significant improvements were also seen in household well-being; human-human conflict; human-wildlife conflict; migration and risks and costs of scouting. The results indicate that AS Regen intervention has a high potential to improve pastoralism as a way of living.

While the quantitative data for AS Steward was less clear due to information spillover, qualitative data reported strong financial benefits, positive effects on conflict and collaboration between pastoralists, food security, human-wildlife conflict, and confidence in the viability of pastoralism as a livelihood.

#### VALUE ADDITION STRATEGIES: ACHIEVING ZERO POSTHARVEST LOSS IN ORGANIC POTATO IN EKITI STATE, NIGERIA

Adewale Ibrahim Abass<sup>1\*</sup>, Abiala Alatise Abiala<sup>1</sup>, Akinyode Timothy Olawumi<sup>2</sup>, Sikiru Oluwole Banjo<sup>2</sup> and John Olalere Jolayemi<sup>3</sup>

1 Department of Agricultural Economics and Extension, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria; abass.adewale020@gmail.com, abialaaa@tasued.edu.ng  
2 Department of Tourism and Hospitality Management, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria; aremutim@gmail.com, banjoos@tasued.edu.ng  
3 Department of Agricultural Science Education, Kwara State College of Education, Oro, Kwara State, Nigeria; jjohnlere9@gmail.com

##### Abstract

This study investigates role of value addition strategies in achieving zero postharvest loss in case organic potato in Ekiti State, Nigeria. The study employed a descriptive survey design. A multi-stage sampling technique was used to select 460 respondents. Data were collected using a well-structured questionnaire with a Cronbach alpha reliability coefficient of 0.80. Data were analyzed using descriptive, inferential statistics and Probit regression model. The results showed that most of the respondents were male (67.2%), married (85.0%), had education (67.2%), extension services (57.2%), access to training (87.9%), access to credit facilities (42.6%), storage and processing technologies (45.2%), cooperative membership (79.4%). Postharvest technologies commonly used in the area included grating machines, roasters, slicers, solar dryers and fryers. Value addition strategies used were processing potato tubers into powder (86.2%), flour (71.6%), chips (70.3%), bread (71.4%), flakes (81.5%), peels into manure (72.8%), salad cream (86.9%) and chin-chin (61.1%). A significant and positive correlation existed between value addition strategies and income of the respondents ( $r = 1.95$ ,  $p < 0.05$ ). Probit regression results revealed that gender ( $\beta = 0.723$ ,  $p < 0.05$ ), married status ( $\beta = 0.514$ ,  $p < 0.05$ ), education ( $\beta = 0.612$ ,  $p < 0.01$ ), training on value addition ( $\beta = 1.012$ ,  $p < 0.05$ ) and income ( $\beta = 1.653$ ,  $p < 0.05$ ) positively influenced value addition strategies for achieving zero postharvest losses in organic potato harvest. High cost of technologies and interest rates on loans were identified as major constraints to value addition strategies. It is concluded that zero postharvest losses are achievable with increase in education, training, access to credit, storage and processing technologies. The study, therefore, recommended that free trainings on value addition strategies, awareness on technologies, accessible credits and favourable government policies should be in place in Ekiti State, Nigeria.

**Keywords:** Value addition, postharvest losses, organic potato, technologies

#### VERMICOMPOST: A TOOL FOR PLANT GROWTH AND DISEASE SUPPRESSION

Ali Motaz<sup>1</sup>, Fares Khaled<sup>1</sup>, Mohamed F. Salem

Department of Environmental Biotechnology, Genetic Engineering and Biotechnology Research Institute, GEBRI, Sadat City, P.O. Box:79, University of Sadat City, Egypt; mohamed.salem@gebri.usc.edu.eg (M.F.S); alimotaz257@gmail.com (A.M); www.fareshalim@gmail.com (F.K)

##### Abstract

Vermicompost is a promising organic waste management system that improves soil health and promotes plant growth. Chemical analysis from current literature suggests that vermicompost is richer in organic matter and nutrients compared to regular compost. While vermicompost is traditionally used as an organic fertilizer, it can also be used to suppress agricultural pathogens, while promoting beneficial microorganisms. Vermicompost has the capability to create a disease-suppressive environment that favors plant growth promoting microorganisms. Moreover, the microbiome associated with vermicompost is significantly different from that present in soil or compost. This review aims to understand the mechanisms that enable vermicompost to work as both a fertilizer and as a disease inhibitor. The process is briefly explained, but the emphasis is on the unique properties vermicompost provides when applied in soil, especially on the microbiome. Finally, lab and field experiments shed light on using vermicompost as a biocontrol alternative to chemical pesticides, which is desperately needed to encourage sustainable development.

**Keywords:** Vermicompost, organic fertilizer, biological control, sustainability, organic waste management

#### EFFET DES HUILES ESSENTIELLES SUR LES PHYTOPHAGES DE LA CULTURE DU POIS CAJAN (CAJANUS CAJAN L.) AU CHAMP À LOUDIMA (BOUENZA)

MBOUSSY TSOUNGOULD Feldane Gladrich<sup>1</sup>, MPIKA Joseph<sup>1</sup> et NTSOUKA Fridolin<sup>2</sup>

1: Laboratoire Biotechnologie et Production Végétales, Faculté des Sciences et Techniques de l'Université Marien NGOUABI, BP : 69 Brazzaville.

2 : Institut National Recherche Agronomique (IRA), Station de Loudima (Bouenza).

Correspondance: gladeriche.feld@gmail.com

##### Résumé

Le pois cajan est l'une des légumineuses à graines cultivées et consommées par la population congolaise. Cependant, son faible rendement est dû en particulier par les phytophages. L'usage des huiles essentielles au champ contre les phytophages est une alternative à l'emploi des insecticides synthétiques qui présente un danger pour les agriculteurs et l'environnement. L'étude a pour but de tester le potentiel insecticide de cinq huiles essentielles de *Chenopodium ambrosioides*, *Cymbopogon citratus*, *Lippia multiflora*, *Ocimum gratissimum* et *Zingiber officinale* sur les principaux phytophages en milieu réel. Les huiles essentielles ont été extraites par hydrodistillation à partir des feuilles ou rhizomes de ces plantes. Après formulation, une dose de 0,5 ml d'huile essentielle/l ont été préconisées. Quatre applications foliaires ont été effectuées en raison d'une pulvérisation par semaine afin de mettre en évidence leur potentiel insecticide. Le comptage des insectes a été effectué sur l'ensemble de branches échantillonnes par plants. Les principaux phytophages ont été les adultes *Bemisia tabaci* et larves de *Clavigralla sp.* au champ et lors de la récolte des bruches. Ces huiles essentielles ont montré un effet très significatif sur le nombre de larve de *Clavigralla sp.* et d'imagos de *Bemisia tabaci* sur la branche du pois cajan en milieu réel. En revanche, l'huile essentielle de *L. multiflora* a agi plus sur la perturbation de la fécondité sur les bruches du pois cajan. Les huiles essentielles de *C. ambrosioides*, *C. citratus*, *L. multiflora*, *O. gratissimum*, *Z. officinale* ont traduit un effet répulsif dont l'huile essentielle du *L. multiflora* est plus efficace sur les phytophages par rapport au témoin absolu. L'isolement de leurs principes actifs conduira à la réalisation des tests toxicologiques en vue de leurs homologations comme biocides.

**Mots clés :** Bioformulation, huiles essentielles, *Cajanus cajan L.*, phytophages, répulsion.

## EFFECTS OF NATURAL BIOSTIMULANTS AS AN INNOVATIVE APPROACH IN THE PROPAGATION OF FLAME OF THE WOOD (*Ixora coccinea* L)

1Ilem, D. O., 1Olosunde, O. M, 2Yisau, O. P, and 'Adedokun, T.A

1 Department of Horticulture  
College of Plant Science and Crop Production, Federal University of Agriculture, Abeokuta P.M.B 2240. Abeokuta, Ogun state Nigeria.  
2 Department of Horticulture and Landscape Management  
Lagos State University of Science and Technology, Lagos State, Nigeria.  
3 Department of Science Laboratory Technology,  
Abraham Adesanya Polytechnic, sIjabu Igbo, Ogun State.  
Corresponding Author Email ilemdo@funaab.edu.ng  
Phone number +2348033871733

### Abstract

This study assessed the effects of two natural biostimulants (Aloe vera and coconut water extracts) propagation of *Ixoracoccinea* using stem cuttings. *Ixoracoccinea*, an evergreen ornamental shrub valued for its vibrant flowers and traditional medicinal applications, often presents propagation challenges due to poor rooting efficiency and low survival rates when grown from cuttings. Conventional use of synthetic rooting hormones like indole-3-butyric acid (IBA) and naphthaleneacetic acid (NAA), although effective, but associated with environmental concerns, cost, and limited accessibility, this research therefore evaluated efficacy of Aloe vera gel and coconut water as a sustainable alternative. The experiment was conducted in 2023 at the Federal University of Agriculture, Abeokuta (FUNAAB), Nigeria using a Completely Randomized Design (CRD) with Seven treatment combinations applied at three concentrations levels: Aloe vera (15 g/L, 25 g/L, 50 g/L), coconut water (25%, 50%, 100%), distilled water used as a check. Stem cuttings were immersed in each treatment solution for 15 minutes before planting in a sandy loam medium under nursery conditions. Data were collected over an 18-week period on rooting, growth and survival percentage. Results showed that the biostimulants significantly improved propagation success in *Ixora* compared to the distilled water (control). Highest number of roots (18.13) and highest root fresh weight (3.5 g) was recorded in 100% coconut water treated plan, while the 50 g/L Aloe vera treatment produced longest roots (30.2 cm) and competitive shoot height (20 cm). Highest survival percentage (60%) was recorded with 25 g/L at the end of the study; control group had the least 6.67%. Conclusively, application of natural biostimulants (Aloe vera and coconut water) were effective, eco-friendly, and cost-efficient as alternatives to synthetic rooting hormones in the propagation of *Ixoracoccinea*. Future study is recommended to explore potential synergistic effects of combined treatments and develop standardized protocols for broader horticultural use.

**Key Words:** *Ixora*, Propagation, Natural biostimulant

## WATER QUALITY AND PRESENCE OF INTESTINAL PARASITIC FORMS, RESPONSIBLE FOR NEGLECTED TROPICAL DISEASES IN DIMAKO (EAST-CAMEROON)

MBASSI MBIDA Marcelle-Blanche1,2, MESSOE William1, ZEBAZE TOGOUET Serge Hubert1.

1Laboratory of Hydrobiology and Environment,

Department of Animal Biology and Physiology,

Faculty of Science, University of Yaoundé I,

P.O BOX 812 Yaoundé, Cameroon.

2Laboratory of Parasitology,

Centre for Research on Health and Priority Pathologies,

Institute of Medical Research and Medicinal Plants Studies,

P.O BOX 13033 Yaoundé, Cameroon;

Corresponding E-mail: mbassiblanche2@gmail.com

### Abstract

The presence of viable infective forms of helminths and protozoa in surface water systems in Dimako owing to the lack of sanitation leading to the transmission of vector-borne diseases such as cholera, diarrhea, hepatitis A and typhoid fever. Water samples for physicochemical and biological analyses were collected once per season at twenty stations each from Dimako watercourse, from Mai 2022 to April 2023. Physicochemical parameters were measured both in the laboratory and out in the field following standard methods. The sedimentation and the Faust technics were used to identify and count the resistance forms of intestinal parasites. Biological analyses revealed the presence of 13 parasite infective forms belonging to two main groups : protozoans (*Entamoeba coli*, *Balantidium coli*, *Cryptosporidium*spp, *Giardia intestinalis* and *Isospora belli*) and helminths (*Ascaris lumbricoides*, *Ancylostomes*, *Strongyloides*tercoralis, *Trichostrongylus*spp., *Toxocaracanis*, *Toxocara leonina*, *Diphyllobothrium* sp., *Fasciola* sp.). Physicochemical analyses indicated that the waters are slightly acidic ( $6.7 \pm 0.57$ ), rich in organic matter ( $19 \pm 7.9$  mg/L) with an average temperature of  $25 \pm 1.3^{\circ}\text{C}$ . The occurrence of intestinal parasitic forms suggests faecal contamination of the waters. The proximity to pollution sources and fragile sanitary conditions may be accountable for the low water quality. This study was conducted to provide baseline data to allow public authorities as well as stakeholders involved in environmental management to establish sustainable measures aimed at effectively protecting the aquatic ecosystems of Dimako.

**Keywords:** water quality, intestinal parasitic forms, Dimako.

## POTENTIALS OF ARBUSCULAR MYCORRHIZAL FUNGI COMBINE WITH BIOCHAR ON THE GROWTH IN SENNA OBTUSIFOLIA AND EVALUATION OF ITS EFFECTS ON THE EXPRESSIONS OF SOME MOLECULES OF INTEREST

ADEBE BADEM Fulbertine3, and ESSONO Damien Marie3

1 Laboratory of Plant Physiology and Biochemistry, Department of Biological Sciences, Higher Teachers' Training College, University of Yaoundé 1, Yaoundé, Cameroon  
2 Department of Plant Biology, Faculty of Science, University of Yaoundé 1, Yaoundé, Cameroon  
3 Department of Plant Microbiology, Faculty of Science, University of Yaoundé 1, Yaoundé, Cameroon  
Email: astride-carole.djeuani@facsciences-uy1.cm

### Abstract

This work was aimed at assessing the effect of the combination of AMF and biochar on the agronomic performance of *Senna obtusifolia* under unsterilized and sterilized soil conditions by highlighting the effects on some secondary metabolites and the diversity of AMF in the rhizosphere of *S. obtusifolia* plants. The experimental device used was a completely randomized block design with treatments: control, biochar obtained from *Tithonia diversifolia* (TDB) and *Zea mays* (ZMB), and two strains of arbuscular mycorrhizal fungi (AMF1 and AMF2). These treatments lead to the collection of agronomic parameters, biochemical analysis of some metabolites, and the mycorrhizal state of the plant's rhizosphere. As a result, the highest germination rate of seeds was registered at a new seed place under the condition of bleaching 5% with 94.28%. The physicochemical parameters of the soil used were analyzed as being acidic with a pH of 3.9 and a texture, clay-sand. The highest plant height was  $48.58 \pm 03.68$  cm at month 3 for the treatment TDB +AMF2 for unsterilized soil. Meanwhile, for sterilized soil,  $32.79 \pm 04.60$  was registered as the highest plant height at month 3 for the treatment AMF2+ZMB+TDB. The maximum chlorophyll content was registered at  $3.294 \pm 0.936$  mg.g<sup>-1</sup> and  $3.165 \pm 0.021$  mg.g<sup>-1</sup> for both unsterilized and sterilized soil, respectively, at month 1 for treatments AMF2+TDB and AMF2+ZMB. The maximum protein content was registered as  $213.362 \pm 40.545$  mg/g for unsterilized soil at month 2 with treatment AMF1+TDB, while  $95.906 \pm 14.735$  mg.g<sup>-1</sup> for sterilized soil at month 3 for treatment AMF1+TDB+ZMB. The maximum sugar content analyzed was  $660.757 \pm 203.175$  mg.g<sup>-1</sup> for unsterilized soil at month 2 for treatment TDB+ZMB, while  $446.456 \pm 204.299$  mg.g<sup>-1</sup> for sterilized soil at month 1 for the treatment AMF1+TDB+ZMB. Structures such as hyphae, vesicles, arbuscules, and spores were observed to determine the mycorrhizal status of *S. obtusifolia* roots.

**Keywords:** *Senna obtusifolia*, biochar, Arbuscular mycorrhizal fungi, growth, metabolites

## INSIDE THE PIF METHOD: A NEW TECHNIQUE TO PRODUCE SEED PLANTS IN XANTHOSOMA SAGITTIFOLIUM L. SCHOTT PLANTS UNDER THE INFLUENCE OF SOME FERTILIZERS

Djeuani Astride Carole<sup>1,2\*</sup>Tiki Antoine Marie Kevin<sup>1,2</sup>Mbouobda Hermann Désiré<sup>1,3</sup> Gwan Mofor Elvis<sup>1,4</sup> PanguepkoFendju Christophe<sup>1,3</sup> MoutamalDjem Rose Theophine Derricka<sup>1,2</sup>Nyimiebolo Bengono Audrey Maguy<sup>1,2</sup> Manuela Diobe Motassy<sup>1,2</sup>Theresa Akinimbom Moma<sup>1,3</sup> and Niemenak Niolas<sup>1</sup>  
1Laboratory of Plant Physiology, Department of Biological Sciences, Higher Teacher Training College HTTC), University of Yaoundé I, Yaoundé-Cameroon;  
2Department of Plant Biology, Faculty of Sciences, University of Yaoundé I, Yaoundé-Cameroon;  
3Department of Biology, Higher Teacher Training College, Bambili (HTTC), the University of Bamenda, Bamenda-Cameroun;  
4Department of Plant Science, Faculty of Science, University of Buea, Buea, Cameroon  
Corresponding author: \*astride-carole.djeuani@facsciences-uy1.cm

### Abstract

The production of seeds from *Xanthosoma sagittifolium* L. Schott, by the PIF method, is a contributed solution that this study proposed in response to the unavailability of seeds for the farmer during the growing seasons observed in Cameroon. Combining the PIF method with adequate fertilizers would help to further improve the performance of the technique. This study aims to evaluate the effect of fertilization on the mass production of PIF seed plants of *X. sagittifolium* while highlighting their influence on the richness of essential mineral elements in the leaves. Rhizome fragments of the white and red cultivars, with a mass equal to 500g, were germinated in propagators. The growing substrate consisting of wood chips and sawdust (1:2) was fertilized. Eight treatments were applied. For each treatment, 30 rhizome fragments were used. Every 1 month for 3 months, the evaluation of the agronomic growth parameters and the weaning of the PIF plants produced were carried out. The content of some metabolites and mineral elements in the leaves was determined following the treatments applied. The results show that from 480 fragments used, 2576 PIF plants were produced. 1333 in the white and 1243 in the red cultivars. The agronomic parameters varied according to the treatments. In leaves, the content of total soluble sugars correlated significantly with the content of total chlorophyll. The sugar maxima were  $9.97 \pm 0.69$  and  $9.46 \pm 0.37$  mg.g<sup>-1</sup> of PMF, in plants of the white and red cultivars fertilized respectively with AMF+OS and AMF. The total soluble protein content did not vary significantly following the treatments applied. The abundant synthesis of phenolic compounds was the majority in the red cultivar's plants compared to the white cultivars. The control plants of the red cultivars presented the highest flavonoid content ( $1.81 \pm 0.05$  mg.g<sup>-1</sup> of WFM). The richness of mineral elements in the leaves was influenced depending on the treatments applied.

**Keywords:** PIF method, fertilization, PIF plants of *Xanthosoma sagittifolium*, metabolites, and mineral elements.

## STUDY OF THE INTERACTION BETWEEN NEMATODES AND PIF PLANTS OF XANTHOSOMA SAGITTIFOLIUM L. SCHOT

Djeuani Astride Carole<sup>1,2\*</sup>,FossongNengi Abigaelle<sup>1,2</sup>, Niemenak Nicolas<sup>1</sup> and Mbouobda Hermann Désiré<sup>1,3</sup>  
1Laboratory of Plant Physiology and Biochemistry, Department of Biological Sciences Higher Teachers' Training College, University of Yaoundé 1, Yaoundé, Cameroon  
2Department of Plant Biology, Faculty of Science, University of Yaoundé 1, Yaoundé, Cameroon  
3Department of Biology, Higher Teachers' Training College Bambili, University of Bamenda, Bamenda, Cameroon  
Email: astride-carole.djeuani@facsciences-uy1.cm

### Abstract

This work aimed to identify Nematode species present in the rhizosphere of *Xanthosoma sagittifolium* and test their intercropping effect with *Lactuca sativa* and *Abelmoschus esculentus*. Five harvesting sites in the central region of Cameroon (Akonolinga, Mbankomo, Bafia, Ndji, Mbalmayo) were

selected. Agronomic growth parameters were assessed on randomly selected plants in different age groups (6-9 and 9-12 months). At each harvesting site, soil from the rhizosphere of *X. sagittifolium* was sampled. The physicochemical characteristics of the soil were analyzed. The nematode status of *X. sagittifolium* plants and their morphological characterization were carried out. A biochemical analysis was carried out after interaction to assess the content of chlorophyll, sugars, proteins, and phenolic compounds. The results showed the presence of *Radopholus* sp., *Ditylenchus* sp., and *Xiphinema* sp. in the rhizosphere of *X. sagittifolium*. The genus *Radopholus* sp. was the most abundant. According to the Newman and Keuls test, when the plant interacted with *Radopholus* sp., the analysis showed that the agronomic growth parameters were significant, with height values of  $134.80 \pm 33.76$  cm for the white cultivar and  $144.76 \pm 17.29$  cm for the red cultivar. Soil pH ranged from 4.9 to 5.5 at all sites. Biochemical analysis revealed that when infected with *Radopholus* sp., the highest chlorophyll content was  $1.30 \pm 0.00$  mg.g<sup>-1</sup> in the red cultivar of *X. sagittifolium*, and the total sugar content was  $633.69 \pm 85.44$  mg.g<sup>-1</sup> in the white cultivar of *X. sagittifolium* at month 1 at Mbalmayo. *Radopholus* sp. collected in the rhizosphere of cocoyam caused damage to plants of *Lactuca sativa* and *Abelmoschus esculentus*. This study provides essential information for crop management and food security by highlighting the impact of nematodes in the rhizospheres of *X. sagittifolium* and their effect on neighboring crops.

**Keywords:** *Xanthosoma sagittifolium* L. Schott, rhizosphere, harvest site, nematodes, *Abelmoschus esculentus*, *Lactuca sativa*

## INFLUENCE OF NITROGEN FERTILIZER LEVELS ON YIELD of KING OF BITTERS (*Andrographis paniculata*)

Samuel Dotun Oyekunle,<sup>1</sup>Olugbenga O. Adeoluwa<sup>2</sup>,Adewumi Fiyinfoluwa Odeniran<sup>3</sup>  
1Department of Tropical Crop Management & Ecology, Czech University of Life Sciences, Prague, Czech Republic.  
2Department of Soil Resource Management, University of Ibadan, Ibadan, Nigeria.  
3Department of Agronomy, Purdue University, United States of America  
Corresponding Author's Email and Phone No: Xoyes001@studenti.cz (420776638362)

### Abstract

The global demand for medicinal plants as alternatives to conventional medicine has increased, with King of Bitters (*Andrographis paniculata*) gaining recognition for its health benefits. To meet this demand and promote sustainable production, fertilizer application is vital. However, information on the optimal use of fertilisers for King of bitters remains limited. This study aimed to fill this knowledge gap by examining the effects of different nitrogen levels on the yield of King of bitters under controlled conditions.

Conducted over two planting seasons at the University of Ibadan, Nigeria, the study employed a randomised complete block design, testing NPK rates (0, 20, 40, 60, 80 kg N ha<sup>-1</sup>). Data on plant growth, yield, biomass, and phytochemical content were collected. Results showed that 20 kg N/ha yielded the highest fresh (3.63g/plant) and dry (0.87g/plant) weights of King of Bitters in 8 weeks after planting. A strong positive correlation was observed between leaf number for both fresh and dry weight. Excessive fertiliser application at 40, 60, and 80kg/ha resulted in reduced yield, highlighting the importance of balanced and sustainable nutrient management in medicinal plant cultivation. These results provide evidence to guide nitrogen input strategies for maximizing medicinal crop productivity in organic and agroecological farming systems. Based on the findings, it is recommended that commercial King of bitters cultivators apply 20 kg N/ha of NPK 15-15-15 to enhance plant yield and quality, ensuring optimal economic outcomes.

**Keywords:** King of bitters (*Andrographis paniculata*), Yield, Quality, NPK 15-15-15 Fertilizer, Medicinal Plants.

#### EVALUATION OF BIOFERTILISER AS A SUSTAINABLE FERTILISER IN CROP PRODUCTION

1 Olufemi Ebenezer Taiwo, 1Jumoke Omowumi Omoniyi, 2Adefoyeke O. Aduramigba-Modupe, 1OlugbengaOluseyiAdeoluwa

1 Department of Soil Resources Management, University of Ibadan, Ibadan,

2Department of Crop Protection and Environmental Biology, University of Ibadan, Ibadan

Corresponding author: olufemitaiwoeb@gmail.com, +234-7064862476

##### Abstract

Recent decades have witnessed increased crop production to match the global demand for food, feed and pharm by the increased human population. Conventional agricultural practices are heavily reliant on artificial fertilisers that have numerous human and environmental health effects. In-view of this, sustainability/Agroecologist researchers and environmentalists have increased their focus on sustainable crop fertilization mechanisms. Biofertilisers are microbial formulations constituted of indigenous plant growth-promoting microbes (PGPM) that directly or indirectly promote plant growth through the fixation, solubilization and mobilization of soil nutrients, and the production of plant growth-stimulating hormones and iron sequestering metabolites called siderophores. Biofertilisers have continually been studied, recommended, and even successfully adopted for the production of many crops in the world. These microbial products hold massive potential as sustainable crop production tools, especially in the wake of climate change that is partly fueled by artificial fertilisers. Despite the growing interest in the technology, its full potential has not yet been achieved and utilization still seems to be in infancy. There is a need to shed light on the past, current, and future prospects of biofertilisers to increase their understanding and utility. This review evaluates the history of PGPR biofertilisers, assesses their present utilization, and critically advocates their future in sustainable crop production and the global biofertiliser market. It, therefore, updates our understanding of the evolution of PGPR biofertilisers in crop production. Such information can facilitate the evaluation of their potential and ultimately pave the way for increased exploitation

Keyword: Evaluation, Biofertiliser, Sustainable fertiliser, Crop production

#### BIO-VERMIGOT (VERMICOMPOST AND KASGOT) FERTILIZER PRODUCTION AND ISOLATION OF POTENTIAL BIOCONTROL AGENTS FROM SPENT MUSHROOM SUBSTRATES

Adedeji Kafilat 1\*, Aduramigba Modupe A. O. 1

1 Department of Crop Protection and Environmental Biology, University of Ibadan, Nigeria

\*Corresponding author: kafilatadedeji@gmail.com, +234-7011226808

##### Abstract

The rapid expansion of mushroom cultivation and Black Soldier Fly (BSF) larvae farming in Nigeria has led to the accumulation of two nutrient-rich but underutilized waste streams: spent mushroom substrate (SMS) and BSF larvae frass. If not properly managed, these organic residues contribute to environmental pollution and greenhouse gas emissions. This study aimed to develop a novel Bio- vermigot fertilizer with potential biocontrol agents by co-decomposing SMS and BSF frass using two biological decomposers: earthworms (*Eisenia fetida*) and BSF larvae (*Hermetia illucens*) and isolating the inherent potential biocontrol agents. A factorial randomized block design was employed with two treatment factors: decomposer type (control, 100% earthworms, 100% BSF larvae, 50:50 mix) and substrate type (SMS only, BSF frass only, and a 50:50 mixture). A total of 12 treatment combinations were tested in replicates over six weeks. Weekly watering was done to stimulate decomposition, and preliminary and final physicochemical analyses were performed to assess compost maturity and nutrient content. Samples with high Nitrogen content and with the highest Phosphorus and Potassium with neutral pH were selected and used for the isolation of potential biocontrol agents (BCAs). Results showed that SMS alone processed with both decomposers achieved the lowest C:N ratio (18.0), the second highest nitrogen content (2.7%), above the national standard for organic fertilizer and the most stable neutral pH (6.7). This treatment also has the highest total fungal count (0.65) with the presence of *Trichoderma* spp., a potential biocontrol agent. The combined SMS and BSF frass (50:50) decomposed with both agents (50:50) produced compost with a C:N ratio of 20.0, which is the most ideal according to the national standards. SMS without decomposers had the highest bacterial count (10.3), with potential biocontrol agents (*Bacillus* spp. and *Micrococcus* spp.). In all treatments, moisture content

exceeded national standards, while total phosphorus and potassium levels were below required standards. The study demonstrates the potential of using BSF larvae and earthworms in composting and highlights the value of blending carbon-rich SMS with nutrient-dense BSF frass. This approach offers a sustainable solution for managing agro-industrial waste in Nigeria while producing a high-quality biofertilizer with potential biocontrol agents suitable for organic farming. Adoption of this technique can reduce reliance on chemical fertilizers, chemical pesticides, improve soil health, and contribute to circular agriculture and climate-smart waste management strategies in sub-Saharan Africa.

**Keywords:** Mushroom, spent mushroom substrate, black soldier fly larvae, earthworms, biocontrol agents, bio-vermigot fertilizer, compost.

#### AN EVALUATION OF THE IMPACT OF POST-HARVEST MANAGEMENT PRACTICES ON THE NUTRITIONAL QUALITY AND HEALTH BENEFITS OF HORTICULTURAL CROPS

Mukhtar, A. A1a., Ibrahim, S.M2., Mukhtar, A.I3. and Mukhtar, F. I4.

a Corresponding Author

1Department of Agronomy, Faculty of Agriculture, ABU Zaria.mukhtaraishaprof@gmail.com

2Biotechnology Research Programme, National Animal Production and Research Institute (NAPRI).sadiqahmukhtar@gmail.com

3Department of Pediatrics, Ahmadu Bello University/Teaching Hospital, Zaria.ayshamukhie001@gmail.com

4Department of Nursing Science, Faculty of Allied Health Sciences, ABU Zaria.phatymukhtar@gmail.com

##### Abstract

This research paper evaluates the impact of post-harvest management practices on the nutritional quality and health benefits of horticultural crops, specifically fruits and vegetables, in Zaria metropolitan area. The study identifies key post-harvest practices, assesses their effectiveness, and provides recommendations for improving the nutritional quality and health benefits of horticultural produce. Key post-harvest practices include proper harvesting techniques, temperature management, humidity control, and sanitation. These practices are crucial for maintaining the nutritional quality and extending the shelf life of horticultural crops. The effectiveness of these practices is highlighted through proper storage conditions, suitable packaging, and efficient transportation methods. The study recommends providing training for farmers on best post-harvest practices, investing in better storage facilities and transportation infrastructure, and continuous research and development to develop new technologies and methods for post-harvest management. These recommendations aim to enhance the nutritional quality and health benefits of horticultural crops in Zaria metropolitan area.

Yield and yield attributes of sunflower (*Helianthus annuus* L.) grown after a 5-year organic diversified crop rotation in the tropics

1Adebayo Z. O., 2\*Olowe V. I. O, 2Fabunmi T. O and 3Azeez J. O.

Crop and Pasture Production and Sustainable Environment Programme, Centre for Excellence in Agricultural Development and Sustainable Environment, Federal University of Agriculture, Abeokuta (FUNAAB)

3. Department of Plant Physiology and Crop Production, FUNAAB

4. Department of Soil Science and Land Management, FUNAAB  
corresponding author - olowevio@funaab.edu.ng

##### Abstract

Long-term crop rotation is known to improve soil fertility, disrupt pest and disease cycles, and enhance crop yields; however, its impact on sunflower productivity in tropical regions is not well documented. This study evaluated the yield and yield attributes of sunflower (*Helianthus annuus* L.) following a 5-year diversified crop rotation involving sesame (*Sesamum indicum* L.), soybean (*Glycine max* (L.)

*Merrill*), cotton (*Gossypium hirsutum L.*), and sunflower under five cropping systems: continuous cropping without fertilizer (CS1), continuous cropping with organic fertilizer (CS2), crop rotation with organic fertilizer (CS3), crop rotation without organic fertilizer (CS4), and conventional cropping with synthetic inputs (CS5). Field trials were conducted during the late cropping seasons of 2023 and 2024 at the Organic Research Farm of the Federal University of Agriculture, Abeokuta, Nigeria, using a randomized complete block design with three replicates. Data were collected on head diameter, head weight, seed weight per head, 100-seed weight, number of seeds per head, grain yield, and threshing percentage. Cropping system significantly ( $P < 0.05$ ) influenced all yield traits in both years. CS2 consistently produced superior yield components, with grain yields of  $1,376.0 \text{ kg ha}^{-1}$  in 2024 compared to  $564.0 \text{ kg ha}^{-1}$  in the unfertilized control (CS1). The highest yield in 2023 was recorded under CS5 ( $573.6 \text{ kg ha}^{-1}$ ). Yield advantages under CS2 and CS3 were attributed to improved nutrient supply, particularly from organic fertilizer and nitrogen-fixing soybean in rotation. These findings demonstrate that organic sunflower production under CS2 and CS3 can achieve competitive yields in the tropics, offering a sustainable pathway for sunflower production.

**Keywords:** *Helianthus annuus L.*, diversified crop rotation, yield components, organic fertilizer, tropical agriculture

#### INFLUENCE OF IBADAN BREWERY WASTE-BASED COMPOST ON THE GROWTH AND YIELD OF CABBAGE

Oyewole, O.M., Adeoluwa, O.O.

Department of Soil Resources Management, University of Ibadan, Ibadan, Nigeria

Correspondence: matildaoyewole@gmail.com

##### Abstract

In Nigeria, waste management and disposal have become a significant cost factor and an important aspect in the running of a brewery operation. Composting of brewery waste could be a major way of disposing the waste and it could be a good source of organic fertilizers for crop production. The aim of this study was to assess the influence of Ibadan Brewery Waste Based Compost (IBWBC) on the yield of cabbage and on the chemical properties of soil.

The experiment was conducted at the Organic Vegetable Garden Teaching and Research Farm, University of Ibadan, Ibadan. The field study was laid out in Randomized Complete Block Design with four treatments and four replicates. A nursery operation which lasted for 4 weeks began the field trial, this was later transplanted. There were sixteen beds measuring  $1.8 \text{ m} \times 2.4 \text{ m}$  for each and were spaced  $50 \text{ cm}$  apart. The IBWBC was obtained from an on-going experiment on the farm and application was done two weeks before transplanting. Harvesting was done after 13 weeks of transplanting. Growth and yield parameters as well as soil properties of the experimental site before and after planting were determined.

The yield of cabbage planted with IBWBC were ( $14.81 \text{ t/ha}$ ) and it was significantly higher than control ( $4.93 \text{ t/ha}$ ) where no fertiliser was used. The fertilizer application increased the organic matter of the soil and also influenced other chemical properties of the soil after planting. The pH of the soil was in the neutral zone.

In conclusion, Ibadan brewery waste based composts can serve as a good organic fertilizer in crop production can be used to improve the fertility status of the soil over time.

**Keywords:** Brewery waste, Compost, Ibadan brewery waste based composts, cabbage and soil fertility.

#### APPLICATION RATES OF POULTRY MANURE AND SEED SIZE EFFECTS ON THE GROWTH AND YIELD OF FLUTED PUMPKIN (*TELFARIA OCCIDENTALIS* HOOK F.)

\*Effa, E. B. 1, Uko, A. E. 1, and Ofem, U. E. 2

1Department of Crop Science, University of Calabar, Nigeria

2Department of Extension and Rural Sociology, University of Calabar, Nigeria

\*Corresponding author: emmaeffa@unical.edu.ng

##### Abstract

Fluted pumpkin (*Telfaria occidentalis* Hook F.) is economically important and a nutritionally dense leafy green vegetable in West Africa, valued for its protein-rich seeds and edible leaves. Productivity in farmers' fields however remains low as a result of poor soil fertility, inadequate knowledge and application of agronomic practices as well as limited access to fertilizers. This study therefore evaluated the effects of rates of poultry manure (PM) application and size of seed on the growth and yield of *T. occidentalis* under humid tropical conditions. The study was conducted at the University of Uyo Teaching and Research Farm during the 2011 early cropping season, using a  $3 \times 4$  factorial experiment arranged in a Randomized Complete Block Design (RCBD) disposition. Treatments comprised three seed sizes from small ( $<14 \text{ g}$ ), medium ( $14-20 \text{ g}$ ), to large ( $>20 \text{ g}$ ); and four rates of PM ( $0, 5, 10, \text{ and } 15 \text{ t ha}^{-1}$ ), replicated thrice. From the results, PM significantly ( $P < 0.05$ ) improved vine length, number of leaves, tendrils, and foliar yield, with PM at  $5 \text{ t ha}^{-1}$  producing the highest values. Similarly, pod number, girth, and total foliar yield increased with increasing PM rates, attaining a maximum of  $13.15 \text{ t ha}^{-1}$  at  $15 \text{ t ha}^{-1}$  PM. Seed size significantly influenced early vegetative growth, as large seeds produced more vigorous seedlings and higher leaf biomass, but had no significant effect on pod yield. The interactive effect between manure application rate and seed size was not significant, showing independent treatment effects. Overall, the application of  $15 \text{ t ha}^{-1}$  poultry manure is recommended to enhance soil fertility, growth, and yield of *T. occidentalis* under sandy loam conditions. Adoption of this practice offers a sustainable, low-cost pathway to boost productivity among smallholder farmers.

**Keywords:** seed technology, yield, fluted pumpkin, leafy greens

#### THE ROLE OF BIOCHAR IN AGRICULTURAL PRODUCTION; SOIL FERTILITY AND WATER QUALITY IMPROVEMENT: AN OVERVIEW

1 Abel Ojewunmi 2 Olugbenga Adeoluwa 3 Olushola Ibiyemi 4 Siyanbola Omitoyin 5 Tannaz Pak 6 Tariq Ahmed 7 Vida Zohoori 8 Vahid Ghorbani

1 Department of Soil Resources Management, University of Ibadan, Ibadan, Nigeria

2 Department of Soil Resources Management, University of Ibadan, Ibadan, Nigeria

3 Department of Periodontology and Community Dentistry, University of Ibadan, Ibadan, Nigeria

4 Department of Aquaculture and Fisheries Management, University of Ibadan, Ibadan, Nigeria

5 Department of Energy and Environmental Engineering, Teesside University, Middlesbrough, England, United Kingdom

6 Department of Energy and Environmental Engineering, Teesside University, Middlesbrough, England, United Kingdom

7 Department of Public Health and Nutrition, Teesside University, Middlesbrough, England, United Kingdom

##### Abstract

A review of the roles of biochar in agricultural production highlight its relevance in combining water treatment and soil enhancement which ultimately leads to higher crop yield and carbon sequestration over time, the demand of biochar as a soil amendment, its efficacy in improving water quality for sustainable agriculture, addressing the negative effects of climate changes cannot be undermined. Biochar is a porous, largely carbon-based material produced through pyrolysis, a thermochemical

process that occurs in the absence or low oxygen. The biomass used for biochar could be obtained from plant and animal residue or waste, biochar performance is dependent on the type of the feedstock and the pyrolysis conditions employed during its production.

The global demand for biochar is rising for various uses, including fertilizer materials as it's ameliorated nutrient deficiency in nutrient depleted soil as a result of continuous cropping, excessive synthetic fertilizer application and other human activities. Biochar, an environmentally friendly soil conditioners, is suggested for large-scale field application due to its numerous benefits, which are adsorbent for removal of contaminant/inorganic pollutants from water, purifying water, carbon sequestration, soil fertility improvement, nutrient release and uptake, soil water retention, crop yield improvement, and enhances fertilizer use efficiency thereby reducing greenhouse gas emissions as a result of its unique characteristics like high surface area and pore volume.

This review focuses on the potential of biochar as an agricultural amendments that enhance water quality, soil fertility, crop productivity, in addition it serves as growth medium and composting material. Composting of biochar produced from various organic sources can ensure the stability of the soil, restoration of marginalized soil, and reduce carbon emissions associated with agriculture.

In conclusion, it was found that biochar can also serve as media for growing vegetables in a screen house, which enhances the growth of high-value food crops, especially fruits and vegetables, to meet the increasing global demand for food by humans.

**Keywords:** Biochar; Soil Fertility, Water Quality, Crop Productivity, Carbon Sequestration

## THE MICROBIOME REVOLUTION: UNRAVELLING MICROBIAL DYNAMICS IN SUSTAINABLE AGRICULTURE

Elizabeth Temitope Alorit<sup>1, 2, 3, 4\*</sup>, Ayibanoa Lekoo Ibaba<sup>3</sup>, Abidemi Olubusayo Onaolapo<sup>1,2, 3</sup> Olubukola Oluranti Babalola<sup>4,5</sup>, Adewumi Fiyinfooluwa Odeniran<sup>6,7</sup>

1 Crop and Soil Science Department, Landmark University, Omu-Aran, Kwara State Nigeria;  
2 SDG 15 (Life on Land Research Group, Landmark University, Omu-Aran Kwara State, Nigeria  
3 Crop and Soil Sciences Department, Landmark University, Omu-Aran, Kwara State, Nigeria  
4 Food Security and Safety Focus Area, Faculty of Natural and Agricultural Sciences, North-West University, Mmabatho 2735, South Africa  
5. Department of Life Sciences, Imperial College London, Silwood Park Campus Buckhurst Road, Ascot, Berkshire, SL57PY, UK  
6 Department of Agronomy, Purdue University, 915 Mitch Daniels Blvd, West Lafayette, IN 47907  
7 Network of Organic Agricultural Researchers in Africa, Continental Office, University of Ibadan

\*Correspondence: Adewumi.olayoye@gmail.com; aloritope@yahoo.com; Tel.: (+234) 08063485837

### Abstract

Microbial dynamics are increasingly recognized as key components in sustainable agriculture due to their profound impact on plant health, nutrient cycling, and soil fertility. This review synthesizes current methodologies, including DNA sequencing and metagenomics, for studying microbial communities and their interactions within agricultural systems. We evaluate the role of beneficial microbes in disease suppression, nutrient mobilization, and their application through biofertilizers, biopesticides, and microbial inoculants. Additionally, we assess management strategies such as crop rotation, organic amendments, and precision agriculture for optimizing microbial dynamics to enhance crop productivity and resilience. Future directions are outlined with a focus on microbiome engineering and addressing challenges in understanding microbial interactions within complex agroecosystems.

**Keywords:** Microbiome, Soil Fertility, Biopesticides, Inoculants, Agriculture, Biotechnology, Microbiome, Metagenomics, Soil Fertility.

## RESPONSE OF COMMON BEANS (*Phaseolus vulgaris* L.) TO ORGANIC FERTILIZERS IN FARMERS' FIELDS OF WESTERN KENYA

George O. K'Otuto<sup>1\*</sup>, Harun O. Ogindo<sup>1</sup> Collins Okoko<sup>1</sup>, Ferdinand W. Wafula<sup>2</sup>, Charles Tumuhe<sup>3</sup>

1 Department of Crops and Soil Sciences Maseno University, Kenya  
2 Bio Gardening Innovations, (BIOGI) Kenya  
3 The Alliance for Food Sovereignty in Africa

### Abstract

Soil degradation resulting in unhealthy soils is negatively affecting food production and crop yields in Western Kenya. Agroecologically based crop production practices, such as using organic fertilizers, provide a means for enhancing the soil fertility and improving crop yields of such degraded soils. A study, codesigned and managed by farmers, was conducted in the farmers' fields to evaluate the response of intercropped common beans (*Phaseolus vulgaris* L.) to organic fertilizers. The experiments were set up in four farmers' fields in different locations in Vihiga and Kakamega Counties using a local beans variety intercropped with maize (*Zea mays* L.). Four treatments, three organic fertilizers, namely, bokashi, biostimulant, and compost, and a control (zero) where no fertilizer was added, were replicated three times and arranged in a randomized complete block design. Crop growth (plant height, number of leaves, and leaf area) and yield of pods were determined. Location and organic fertilizers affected the growth and yield of pods both individually and in interaction. The better performance of the organic fertilizers mostly became apparent from the fourth week after planting, underscoring a rather slow response to organic fertilizers. Whereas the organic fertilizers generally resulted into better growth and yield of beans, their effects were modified by the location. In particular, the effects of organic fertilizers were generally not significant in one location with a longer history of using organic fertilizers in addition to other agroecological practices. We conclude that biofertilization buffers soil fertility such that even without their addition in the current season, the bean crop can sufficiently grow and produce a good yield.

**Keywords:** Organic fertilizers; Beans (*Phaseolus vulgaris* L); Western Kenya; Farmers' fields