Nurturing regenerative food systems in a changing climate

Agri4D 2025 Conference

23-25 September 2025

Agri4D siani Swedish International Agricultural Network Initiative SLU Sida

Book of abstracts

Peter Adams/GettyImages

Version 1, 250911

Contents

Oral presentations of keynote speakers

2025-09-24
9:15 - 10:00
Keynote

Agroecology and resilience to climate change: will agriculture resist what is coming?

Miguel A Altieri

Abstract: Industrial agriculture and livestock farming occupy about 80% of the global agricultural and livestock surface drives global ecological change by emitting no less than 30% of greenhouse gases. This agriculture is increasingly expanding, at the expense of wild ecosystems, displacing peasants and indigenous peoples, and in turn leaving an immense ecological footprint associated with the massive use of machinery, agrochemicals, transgenic varieties and the homogenization of agricultural landscapes.

The tragedy is that large-scale monocultures dangerously reduces species and genetic diversity present in agricultural landscapes and due to their ecological homogeneity, makes them particularly vulnerable to climate change and insect pests and diseases. This vulnerable ecological state of industrial agriculture represents a major threat to humanity's food security, as historical cases demonstrate that the drastic reduction of agrobiodiversity threatens food production worldwide. The negative impacts of climate change are not only evident in the low productivity of crops and livestock, but also in the damage to food processing, storage, transportation, and retail infrastructure, threatening food availability and prices, and exacerbating food insecurity and malnutrition.

Climate change poses a significant threat to more than 475 million smallholder farmers, and threatens to undermine poverty alleviation, food security, and agrobiodiversity conservation. The most climatically vulnerable smallholder farmers are those who depend on rainfed agriculture, farm marginal areas, and lack technical or financial support. This is significant as these farmers who control 20-30% of the agricultural land, produce between 50-70% of the world's food crops.

Existing models that predict severe climate change impacts on many small-scale and subsistence farmers, provide at best a superficial approximation of the negative effects of climate change, since they ignore the enormous variability in terms of the multiple adaptation strategies developed by farmers and underestimationg resilience factors, such as family labor, patterns of agricultural diversification, and the possession of a wealth of indigenous knowledge. In fact, in rural communities where traditional agriculture is predominant, a large proportion of farmers appear to successfully cope with climatic variations, and even prepare to face climatic variability by using drought-tolerant local varieties, rainwater harvesting, soil conservation, polycultures, agroforestry, timely weeding, wild plant collection, and a range of other practices.

Even today, in the second decade of the 21st century, there are millions of traditional and/or indigenous smallholder farmers in the world practicing ecological agriculture that provides remarkable resilience to ongoing economic and environmental changes. In addition, they contribute substantially to food security at the local, regional, and national levels. In view of this, there is an urgent need to reevaluate indigenous/peasant technology as a key source of information on adaptive capacity, which, if mobilized, would be very useful for thousands of farmers in need of strategies to cope with climate change.

The challenge now is how to quickly mobilize this agroecological knowledge so that it can be applied to the restoration of agrolandscapes already affected by droughts and/or hurricanes or to prepare those rural areas that are likely to be impacted by climate change. For this horizontal transfer

to occur quickly, emphasis must be placed on directly involving farmers in the extension of innovations through farmer-to-farmer networks. This requires a strong social organization of producers, supported by researchers, extension workers, and consumers, so that collectively, agroecology projects are implemented to increase agricultural resilience to climate change and, at the same time, food sovereignty.

Although the overwhelming majority of studies demonstrate that agroecological designs and practices such as those used by small farmers are associated with greater farm-level resilience against climatic extremes, it is important to recognize the limits of resilience. The ability of agroecosystems to adapt to climate change has limits delineated by capacity thresholds, after which climate damages begin to overwhelm the adaptation response, therefore it is crucial to determine the adaptation limits of agroecological strategies adopted by farmers. A strong hurricane or prolonged drought could lead to farming system degeneration and failure depending on the agroecological features such as levels of crop diversity, genetic diversity, landscape matrix, soil organic matter and biological activity, as well as farmers responsive capacity. Many adaptation measures have been suggested to reduce the vulnerability of farmers to prolonged droughts, but the extent to which those can be efficiently extend and/or postpone threshold limits under severe and prolonged climatic stress is not known.

The resilience of farms to climatic disturbances is also diminished by rural conflicts unrelated to ecology, such as the expansion of monocultures and mining, which dry up streams and aquifers, displacing farmers. Addressing these broader agricultural issues suggests that promoting resilience in agriculture is not only about disseminating agroecological practices but also about confronting the social inequalities and injustices that affect rural areas and transforming extractive agro-export economic systems into local and resilient food systems. To build resilience and prevent the next intense hurricane or drought from becoming another catastrophe, it is necessary to scale up agroecologically-based production models, while simultaneously addressing the issues of access to land, water, and seeds, as well as the lack of markets and conducive policies that marginalize farmers. Additionally, it's essential to challenge corporate power that controls food systems.

In this regard caution must be placed on the false solutions (reversative agriculture and climate smart agriculture) which constitute corporate strategies of greenwashing, using what could be considered agroecological practices in part of their industrial operations, leaving the monocultural structure of their systems untouched, thus offsetting any potential benefits. The emphasis on soil carbon capture deviates from real solutions, stimulating the most polluting farmers to adopt "regenerative" practices and enter into C markets to compensate for their huge ecological footprint. C markets are yet another source of North-South inequity, expecting that the South through their biodiverse farms capture most of the northern emissions, when the south has historically contributed with less than 10% of the global emissions. With the USA, a major historical emitter, leaving the climate agreements, with the emergence of AI megacenters that emit enormous amounts of GHGs (as well as being water and energy thirsty), with ongoing wars and other policy changes, it will be impossible to reduce emissions by 40% by 2030 to meet the 1,5 degree target. Up to 50% of crop production may be threatened as heatwaves, droughts, floods and water scarcity intensify and risks of passing tipping points increase. Which model of agriculture will be able to resist? Herein it will be argued that agroecology in its scientific and political dimensions is the only path available to humankind.

2025-09-24
13:30 - 14:15
Keynote

Gender, climate and food justice: exploring the links

Nitya Rao[1]
[1] East Anglia University

Abstract: Global hunger and obesity are increasing. One in 11 people worldwide go to bed hungry every night. Over one third of people can't afford a nutritious, healthy diet. This is a result of myriad overlapping challenges from the climate crisis to large-scale conflicts, market disruptions and rising inequalities. The burden of hunger, malnutrition and climate change, however, are not equally distributed, with rural women and children, those belonging to the lower castes or tribes, the worst affected. In this lecture, I explore how gender plays out through all aspects of the food we produce, access, buy and eat and shapes nearly every moment of everyday life. A gender justice approach, based on a foundation of human rights, is key to solving and unlocking both the climate crisis, and the challenges of increasing obesity and malnutrition. Such an approach starts with people on the ground, especially women - recognizes differential needs and priorities, supports a redistribution of resources and opportunities, and ensures the meaningful participation of diverse voices in decision-making processes.

2025-09-25
09:00 - 10:00
Keynote speakers

A New Player Supporting Agri-Food Transformation and Development in the Global South: The Novo Nordisk Foundation

Erik Alexandersson[1]
[1] Senior Scientific Manager, Agri-Food, Novo Nordisk Foundation, Copenhagen, Denmark

Abstract: The Novo Nordisk Foundation (NNF) is a Danish enterprise foundation with a rich legacy dating 100 years. NNF is dedicated to driving global improvements in health, science, and sustainability. NNF's vision is to promote sustainable practices, foster scientific excellence, and support innovative solutions that address pressing global challenges. NNF advocates the principles of open science and harness data-driven insights to drive impactful research and innovation in the agri-food sector, ensuring transparency, collaboration, and accessibility. NNF is committed to create lasting, positive change in the world.

While NNF continue to advance medical research, particularly in diabetes and chronic disease management, NNF has during the last years placed a stronger emphasis on environmental sustainability and responsible resource utilisation. By providing substantial grants and forging strategic partnerships, we empower researchers, professionals, and organisations to contribute to a healthier, more sustainable future for all.

NNF's recently adapted internationalisation priorities includes a focus for agricultural research and development in the global south to improve health and sustainability. It also emphasises research in the Nordic countries and Europe. The increased focus on especially East Africa and India is reflected in our two new offices in Delhi, India, and Nairobi, Kenya.

At NNF we are supporting agricultural and food research along the farm-to-fork continuum through a variety of initiatives aimed at promoting sustainable farming practices, enhancing food security and preserving biodiversity. For example, NNF funds research projects that focus on improving crop resilience, reducing the environmental impact of agricultural activities, and developing innovative technologies for efficient resource utilisation. By collaborating with academic institutions, industry, and farmers, NNF seeks to advance knowledge in agricultural science and implement solutions that can withstand climate change challenges and reduce land-use. Our grants also support education programmes and capacity-building necessary for sustainable agriculture.

As an example of a mission-driven project, NNF last year awarded CIMMYT USD 21 million to lead the initiative CropSustaiN, which aims at mitigating the environmental impact of agriculture, by developing new wheat varieties that are capable of reducing agriculture's nitrogen footprint. In May, NNF co-funded the World Food Programme with over USD 30 million together with the Danish Ministry of Foreign Affairs and Grundfos Foundation for homegrown school meals in Kenya, Rwanda and Uganda. This project promotes demand for healthy, locally sourced foods across climate-smart value chains. In total, 40,000 smallholders – responsible to produce the food eaten by students - will be trained and supported to grow new foods. Over 200 schools will be provided with cleaner cooking technologies.

2025-09-25
13:30 - 14:15
Keynote speaker

Transformative higher education for resilient and rewarding food system transitions

Patrick Okori[1]
[1] Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), 151/155 Garden Hill Makerere University, P. O Box 16811 Wandegeya, Kampala.

Abstract: Africa possesses 60% of the world's remaining arable land necessary for enhancing agricultural production. However, its rapid urbanisation, with approximately 40% of the population currently residing in urban and semi-urban areas and projected to reach 60% by 2050, presents significant socioeconomic challenges. The mission of RUFORUM is to train scientists and practitioners who improve the productivity, resilience, and regenerative capacities of African agrifood systems. Our approach enhances resilience of agricultural and related community livelihoods against climate change, applies circular economy principles and creates opportunities for employment, wealth, food and nutrition security. In 51 African Universities, across 19 countries, transformative teaching and learning approaches that teach students entrepreneurial skills, involve ecosystems of actors in training, are supported by science, technology, and innovation, and involve local to national policy reforms are being adopted. The programme currently in its 8th year, produces graduates who are productive, climate sensitive, entrepreneurial, think longer term of development and think beyond sustainability but inbuild renewability in their actions. Participating universities are implementing institutional and education reforms as well as digital inclusion, providing a scaffold for 21st century education. The programme will benefit 1,200,000 youth, enhance technological efficiency of farming to boost incomes, increase food and nutrition security, empower 4,000 entrepreneurs, and offer innovative training in climate finance, the digital economy, and artificial intelligence.

Key word: Agrifood-systems, circular economy, digital-economy, entrepreneurship, Transformative-education

Oral presentations onsite

Session 1 - Comparative agroecology: enhancing agroecological knowledge, research and practice across geographies and socio-economic contexts

2025-09-24
10:30 - 12:00
Session 1 - Comparative agroecology: enhancing agroecological knowledge, research and practice across geographies and socio-economic contexts

S1.1 - Comparative agroecology: enhancing agroecological knowledge, research and practice across geographies and socio-economic contexts

Cristian Alarcon[1]
Johanna Bergman Lodin[1], Margarita Cuadra[1]
[1] Swedish University of Agricultural Sciences

Concept note: The proposed session will bring together researchers and practitioners to discuss and define what a 'comparative agroecology' approach is or could be.

This session consists of a roundtable and a workshop. The roundtable will engage a group of invited panelists, including researchers and actors, in a discussion with the following aims:

- To develop theoretical and methodological perspectives for the integration of national and local knowledge into a comparative framework to enhance agroecological knowledge, research and practice across geographies and socio-economic contexts, and,
- To shareknowledge and evidence for agroecology centred policy making at national and international levels.

The session will be organized in connection to the FoodAct research project at SLU, and the outcomes of the previous conference on comparative agroecology organized at SLU in February 2025 (https://www.slu.se/en/ew-calendar/2025/2/agroecology-conference/).

A main conclusion from the previous conference on comparative agroecology at SLU is that developing a robust comparative agroecology research agenda can contribute to better:

- Understand how social actors interact, or not, in relation to policies to foster agroecology.
- Understanding new approaches to integration between policies that can contribute to agroecological transitions.
- Understand the contextual factors that can be barriers or opportunities to agroecology.

S1.2 - Futures of agriculture - contrasting knowledge bases, world views, and values shape scientific approaches

Riccardo Bommarco[1]
Klara Fischer[2], Giulia Vico[3], Helena Röcklinsberg[4], Hans Liljenström[5]
[1] Swedish university of agricultural sciences, Department of Ecology, Box 7044, 750 07 Uppsala, Sweden
[2] Swedish University of Agricultural Sciences, Department of Urban and Rural Development, Box 7012, 750 07 Uppsala, Sweden
[3] Swedish University of Agricultural Sciences, Department of Crop Production Ecology, Box 7062, 750 07 Uppsala, Sweden, Current address: Department of Ecology, 750 07 Uppsala, Sweden
[4] Swedish University of Agricultural Sciences, Department of Applied Animal Science and Welfare, Box 7024, 750 07 Uppsala, Sweden
[5] Swedish University of Agricultural Sciences, Department of Energy and Technology, Box 7032, 750 07 Uppsala, Sweden

Abstract: The climate destabilisation and biodiversity crisis open imminent and fundamental questions about human-nature relations. The close entanglement of human and nature in agriculture makes this a particularly suitable arena for studying human-nature relations. Agriculture is at the same time essential for human survival, and a major cause of and vulnerable to biodiversity loss, climate change and antimicrobial resistance. We are five researchers in natural, social and human sciences who examine positions in academia on the future of agriculture. We explore the scientific evidence and wider social and cultural contexts that shape the rationale and premises underpinning dominant and contrasting academic discourses on the futures of agriculture, such as “agroecology”, “closing the yield gap” and “climate smart agriculture”. In doing so, we identify the respective ontologies, epistemologies and value judgements across sciences. Our aim is an understanding and appreciation of the contributions of social, human and natural scientific disciplines with evidence and perspectives in the much needed interdisciplinary dialogue on agriculture and its future.

Session 2 -Science and policy and agrifood system transformation

2025-09-24
10:30 - 12:00
Session 2 -Science and policy and agrifood system transformation

S2 - SCIENCE and POLICY for AGRIFOOD SYSTEM TRANSFORMATION

Konstantinos Karantininis[1]
Gabriela Albuquerque[2], Jessica Clement[3], Tristan Le Cotty[3], Rodomiro Ortiz[1], Myriam Perez[2], James Tefft[4], Isabelle Vagneron[3]
[1] SLU
[2] ISA
[3] CIRAD
[4] FAO

Concept note: Food systems (FS) encompass all the actors and institutions involved to organise, produce, process, distribute, consume and dispose food, and are integral part of the economic, social, political, ecological and cultural fabric of our societies. FSs have been remarkably successful in feeding a rapidly increasing global population, decreasing many forms of malnutrition, reducing poverty and increasing life expectancy. Today's FSs need to transform to tackle all three pillars of sustainability: economic, environmental and social. Particularly FSs are expected to improve food security, reduce loss of biodiversity, create jobs and improve livelihoods for farmers and the rural poor. Food system transformations require coordinated efforts by all food system components: stakeholders, farmers, industry, policy makers, investors, and science and evidence-based policies.

In this proposed session we bring together FS actors and researchers to discuss methods for developing and effectively promoting science-policy interfaces for food system transformation. Based on scientific and field research in Africa, Asia and Latin America, we present and discuss applied methodology providing comprehensive and multidimensional comparison of a range of policy and strategy options based on their expected impacts on the three dimensions of sustainability and the corresponding SDGs over time. Utilizing a set of tools to measure expected impacts, identifying key trade-offs between sustainability pillars, among food system actors and institutions, across time horizons.

This food system approach with science-policy interfaces is developed by researchers of the SASi-SPi (Sustainable Agri-Food System Intelligence – Science-Policy Interface) an EU-funded program in collaboration with FAO under AGRiNATURA leadership. Researchers of SASi-SPi have analysed several topics like the fertilizer use in Africa, agroecological intensification, aquatic-food systems in Sub-Saharan Africa, and agropastoralism in the Sahel. Work on three specific countries, Siera Leone, Colombia and Bhutan, uses participatory approaches and science-policy framework to analyse and assist food system transformations regionally and nationally. Both short and long term impacts and trade-offs between varied policy options are laid out.

Already In its third year, the SASi-SPi food system methodology will be presented and discussed. Applications on key global food thematic issues, country-level analyses and policy alternatives will be presented

Session 3 - From Tech to Policy: Enabling Climate-Smart Agriculture

2025-09-24
10:30 - 12:00
Session 3 - From Tech to Policy: Enabling Climate-Smart Agriculture

S3.1 - Back to the Future: Ethiopian barley landraces for tomorrow's challenges

Therese Bengtsson[1]
Miguel Sanchez-Garcia[2], Wondimu Fekadu[3], Anna Backhaus[2], Michael Baum[2], Girma Degife[3], Ahmed Jahoor[4], Dina Najjar[2], Rodomiro Ortiz[1], Andrea Visioni[2], Ronja Wonneberger[1]
[1] Swedish University of Agricultural Sciences (SLU), PO Box 190, 23422 Lomma, Sweden
[2] International Center for Agricultural Research in the Dry Areas (ICARDA), Rabat, Morocco
[3] Ethiopian Institute of Agricultural Research (EIAR), Holetta, Addis Ababa, Ethiopia
[4] Nordic Seed A/S, Kornmarken 1, 8464 Galten, Denmark

Abstract: Barley is a foundational crop in Ethiopia's highlands, sustaining smallholder food systems through its nutritional value and straw for livestock feed. Despite sustained breeding efforts, traditional landraces remain widely grown, highlighting a gap between farmers' priorities and modern breeding outcomes. This project harnesses the genetic potential of Ethiopian landraces by crossing them with elite germplasm to develop high-yielding, heat- and drought-resilient cultivars. A panel of 300 genotypes developed from landrace × elite crosses is being evaluated in Morocco and Ethiopia for yield, tolerance to heat and drought stress and resistance to net form of net blotch (*Pyrenophora teres f. sp. teres),* spot form of net blotch (*Pyrenophora teres* f. sp. *maculata*) and scald (*Rhynchosporium secalis* (Oudem.) J.J. Davis f. sp. *hordei*). The lines are also assessed for malting quality to meet industry standards.

To improve adoption, participatory selection with women and men farmers is integrated throughout the evaluation cycle. Trait preferences from farmers, processors, traders, and consumers are systematically collected. Traits not visible during field selection, like processing and straw quality, are also prioritised. Marginalised and landless groups, particularly women who rely on barley for food processing and income, are actively engaged to ensure breeding outcomes reflect their needs.

Genome-wide association studies and genomic selection are being used to identify quantitative trait loci linked to stress resilience, with gender-disaggregated trait priorities informing selection strategies. This transdisciplinary effort combines local knowledge with advanced tools to co-develop cultivars for greater adoption.

Keywords: Barley breeding, abiotic stress, biotic stress, genomic selection, transdisciplinary research

S3.2 - Agri-Tech Startups in India: Knowledge Recombination under Resource Constraints

Rashid Parvez Khan[1]
Regina Birner[1], Saurabh Gupta[2], Dhirendra Mani Shukla[3]
[1] Hans-Ruthenberg-Institute of AgriculturalScience in the Tropics, University ofHohenheim, Stuttgart, Germany
[2] Centre for Development Policy andManagement (CDPM), Indian Institute ofManagement, Udaipur, India
[3] Indian Institute of Management, Lucknow, India

Abstract: This study examines how urban educated entrepreneurs without prior agricultural knowledge innovate and succeed in India's agriculture sector under resource constraints. Drawing upon in-depth case studies of two startups, one in hydroponic vegetable cultivation and the other in electrochemical soil testing, we analyze how non-traditional entrepreneurs leverage the accumulated stock of agricultural knowledge, build institutional collaborations, and repurpose multidisciplinary technologies. Grounded in Julian Alston' Stock of knowledge framework, this paper argues that non-traditional entrepreneurs succeed by repurposing publicly available agriculture knowledge, leveraging academic collaborations and integrating multidisciplinary technologies to overcome resource constraint. Both the startups integrate technologies such as AI and IoT to develop scalable, sustainability-focused solutions. Our findings extend to the theories of resource mobilization and knowledge recombination by highlighting how intellectual, rather than financial, capital underpins entrepreneurial success in emerging economies. Our study contributes to the literature on agri-entrepreneurship and sustainable innovation by revealing mechanisms through which new entrants drive transformation into traditionally stagnant sectors.

S3.3 - Institutional Policy Support Towards Climate Action: Implications for Adaptations and Productivity of Maize-Based Farming Households in Nigeria

Adetomiwa Kolapo[1]
Stefan Sieber[2, 3]
[1] Obafemi Awolowo University
[2] Sustainable Land Use in Developing Countries, Leibniz Centre for Agricultural Landscape Research, Eberswalder Müncheberg, Germany
[3] Department of Agricultural Economics, Faculty of Life Sciences, Humboldt Universität zu Berlin, Berlin, Germany

Abstract: This study examines how institutional policy support influences climate adaptation and maize productivity among smallholder farmers in Southwest Nigeria, a key maize-producing yet climate-vulnerable region. Data were collected from 450 maize-based households across six states using surveys and interviews, supported by secondary climate and policy data. A multivariate probit (MVP) model with instrumental variable correction addressed endogeneity in institutional variables, while Bayesian linear regression assessed the impact of institutional support on maize yield, using weakly informative priors and Markov Chain Monte Carlo (MCMC) sampling. Key drivers of adaptation strategy adoption included institutional support, credit, irrigation, market access, and road infrastructure, moderated by gender, farming experience, and farm size. Bayesian regression revealed significant yield improvements linked to road access (54.77 kg/ha), market support (44.09 kg/ha), and irrigation (41.96 kg/ha), with strong model fit ($R^2 = 0.75$, WAIC = -1071.4) and high posterior probabilities ($P(\beta > 0) \geq 0.9980$). Subgroup analysis showed larger farms gained more from institutional support, though gender impacts were neutral. Despite these benefits, limitations persist in irrigation access, climate information delivery, and support targeting for smallholders. Overall, institutional support enhances both adaptation and productivity but requires more inclusive and context-specific implementation. The study recommends improving rural infrastructure, expanding financial incentives, and designing tailored policies to strengthen climate resilience and food security, supporting Nigeria's climate commitments and Sustainable Development Goals 2 and 13.

S3.4 - Climate-Smart Agriculture as a Pathway to Resilience against Climate Change Vulnerability

Adetomiwa Kolapo[1]
Stefan Sieber[2, 3]
[1] Obafemi Awolowo University
[2] Sustainable Land Use in Developing Countries, Leibniz Centre for Agricultural Landscape Research, Eberswalder Müncheberg, Germany
[3] Department of Agricultural Economics, Faculty of Life Sciences, Humboldt Universität zu Berlin, Berlin, Germany

Abstract: Climate change poses significant threats to agricultural productivity and food security in Nigeria, particularly among smallholder maize farmers in Southwest Nigeria, where erratic rainfall, droughts, and floods exacerbate vulnerability. Climate-Smart Agriculture (CSA) is increasingly adopted to enhance resilience, yet its mediating effects on productivity and food security remain underexplored. This study investigates how CSA practices mitigate climate change vulnerability among Nigerian maize farming households, focusing on their impact on maize yield and household food security, and identifying factors influencing their implementation. Conducted in Southwest Nigeria, the research sampled 480 maize farmers using a multi-stage stratified random sampling technique. Data on CSA adoption, productivity, and food security (HDDS, HFIAS, HFIAP) were collected via structured questionnaires and analyzed using descriptive statistics, Multinomial Endogenous Switching Regression (MESRM), Tobit regression, and Propensity Score Matching (PSM). Vulnerability was assessed with a Household Vulnerability Index (HVI). CSA adoption varied, with drought-tolerant maize varieties at 76%, soil conservation at 44%, and organic fertilizer at 39%. MESRM showed significant yield increases (80.859 kg/ha with combined practices). HDDS improved with CSA, but HFIAS scores rose unexpectedly for some practices, indicating trade-offs. Adoption was driven by age, gender, and extension access, with barriers including household size and labor constraints. Vulnerability analysis highlighted regional climate risks, with CSA reducing exposure and sensitivity. CSA enhances resilience and productivity but requires tailored strategies to address adoption barriers and food security complexities. Integrated approaches and policy support are critical for maximizing benefits in climate-vulnerable maize systems.

S3.5 - Innovating Fodder, Navigating Gender: Insights from the Adoption of Hydroponics Fodder Technology in Rural Eastern Rwanda

Patrick Mugiraneza[1]
Alfred Bizoza[2], Linley Chiwona-Karltun[1]
[1] Department of Urban and Rural Development, Swedish University of Agricultural Sciences
[2] Department of Rural Development, University of Rwanda

Abstract: There is a growing interest in hydroponics fodder technology as an innovative solution to address land, food, and fodder scarcity in Rwanda. While economic benefits such as increased milk production and supplemental income from fodder sales have been documented from previous studies, little attention has been paid to empirical research that addresses gendered barriers to adoption and use of this innovative technology. Drawing on Rodgers' adoption of innovation theory and feminist technology studies' perspectives, this study explores adoption processes of hydroponics fodder technology and the gendered issues related to its adoption. Our analysis relies on eight in-depth interviews with men and women smallholder dairy farmers, early adopters of the technology, and 12 key informant interviews with animal resources officers, technology promoters, and extension agents. We also conducted participant observations during a period of 14 weeks. Our findings revealed that men and women farmers reported benefits of the technology, such as increased milk production, reduced costs of animal feeds, and all year-round fodder availability. However, women indicated major constraints related to water scarcity, non-inclusive placement of solar panels, and limited access to technical support. The technology's introduction through donor-led projects also raised concerns about long-term sustainability and equitable ownership, particularly for women with less bargaining power. The findings of this study underscore the importance of integrating gender considerations in donor-driven development projects. To achieve sustainable and inclusive food system transformation, policies and technologies must be co-created with the users and their context.

Keywords: Gender, Innovation, Technology, Hydroponic Fodder, Rwanda

Session 4 - Forging transformative pathways for food security. Challenges and opportunities in a changing development cooperation landscape

2025-09-24
10:30 - 12:00
Session 4 - Forging transformative pathways for food security. Challenges and opportunities in a changing development cooperation landscape

S4 - Forging transformative pathways for food security. Challenges and opportunities in a changing development cooperation landscape

CECILIA MORAA ONYANGO[1]
Robert Musindire[2], **Judith Nagasha**[3]
[1] University of Nairobi
[2] Chinhoyi University of Technology
[3] Kyambogo University

Concept note: Cecilia M. Onyango[1*], Robert Musundire[2] and Judith Nagasha[3]
[1]University of Nairobi, Kenya[2]Chinhoyi University of Technology, Zimbambwe[3]Kyambogo University, Uganda

Global food security faces unprecedented challenges, demanding transformative approaches to build sustainable and resilient food systems. This abstract examines the critical role of innovation and its implementation within evolving development cooperation frameworks. Achieving SDG 2 necessitates integrated, context-specific interventions and policies, where scientists play a pivotal role in empowering smallholder farmers. Drawing on the experience of the Agriculture for Food Security 2030 (AgriFoSe2030) program, funded by Sida, this session reflects on fostering collaboration between Swedish and Sub-Saharan African scientists to translate knowledge into impactful policy and practice; AgriFoSe2030's theory of change methodology that emphasized multi-stakeholder engagement, problem co-identification, and knowledge contextualization. Leaders from three regional AgriFoSe2030 hubs will share lessons learned in facilitating cross- and transdisciplinary collaborations that have yielded tangible change. They will also reflect on the preconditions for future collaborations in light of shifting funding landscapes and evolving development models.

Session 5 - Cultivating agency – Farmers’ organizations and youth empowerment for sustainable and just food systems

2025-09-24
10:30 - 12:00
Session 5 - Cultivating agency – Farmers’ organizations and youth empowerment for sustainable and just food systems

S5.1 - Empowering Youth in Agrifood Systems Initiatives

Ebba Engstrom[1, 2]
Margaret Hegwood[3], Gideon Iheme[4, 5], Celia Burgaz[6], Isnawati Hidayah[7, 8, 9], Ayaz Mukarram Shaikh[10], Cherie Russell[11]
[1] Centre for Environmental Policy, Imperial College London - 16-18 Prince's Gardens, London SW7 1NE, United Kingdom
[2] Science and Solutions for a Changing Planet DTP, Grantham Institute, Exhibition Road, South Kensington, London SW7 2AZ, United Kingdom
[3] Department of Environmental Studies, University of Colorado Boulder, Boulder, CO, USA
[4] Department of Food Studies, Nutrition and Dietetics, Uppsala University, 753 10 Uppsala, Sweden
[5] Department of Human Nutrition and Dietetics, Michael Okpara University of Agriculture, Umudike Nigeria
[6] Department of Epidemiology and Public Health, Sciensano, Rue Juliette Wytsman 14, 1050 Brussels, Belgium
[7] Department of Economics Development, ROTASI Institute (Institute for Rural Development and Sustainability), Kab. Blitar, Indonesia, 66155
[8] Department of Economics and Law, Sapienza University of Rome, Rome, Italy
[9] Department of Public Health and Primary Care, Leiden University Medical Center, Leiden, Netherlands
[10] Faculty of Agriculture, Food Science, and Environmental Management, Institute of Food Science, University of Debrecen, Böszörményi út 138, 4032 Debrecen, Hungary
[11] Deakin University, Geelong, Australia, Institute for Health Transformation, Global Centre for Preventive Health and Nutrition, School of Medicine, Faculty of Health. 1 Epworth Place, Geelong, VIC, Australia, 3216

Abstract: *Youth* have been encouraged to engage in decision-making and activities to support agrifood systems to become more environmentally sustainable, healthy, and equitable. To promote this engagement there have been calls for youth empowerment through youth-oriented agrifood systems initiatives. However, in the context of youth-oriented initiatives, what youth empowerment entails and how it can be facilitated, is poorly understood. As a diverse group of youths, we present our perspectives and lived experiences on how youth-oriented agrifood systems initiatives can positively and negatively impact youth empowerment. The examination of our experiences and recommendations toward youth-oriented initiatives are guided by two youth empowerment frameworks – encompassing factors pertaining to the *external e*nvironment and *internal* individual capabilities and characteristics. We find that best practices facilitating youth empowerment include: i) the creation of safe and supportive spaces for youth to discuss and develop ideas; ii) appointing youth to leadership positions; iii) involving youth in decision-making processes; iv) training and educating youth; v) providing opportunities for youth to network, collaborate, and attend high-level meetings; and vi) supporting youth to participate in impactful projects and socio-political processes. To limit the disregard of youth ideas and efforts, tokenistic youth participation (i.e. 'youth washing'), and the creation of unsupportive environments for youth, initiatives can benefit from: i) having strategies in place for youth involvement and empowerment; ii) clarifying mutual expectations with youth; iii) discussing youth's positionality and promoting youth identity; iv) implementing processes to assess impacts of youth engagement and on youth empowerment; and v) fostering inclusive teamwork among youth.


Initiative actions for youth empowerment
Creating safe and accessible spaces for discussions and idea development
Meaningfully involving youth in decision-making and respecting youth's ideas
Appointing youth to leadership positions
Providing youth with opportunities to collaborate, network, and attend high-level meetings
Involving youth in socio-political processes and impactful opportunities
Strategies for supporting youth, and engaging youth for impact
Clarifying mutual expectations between youth and initiatives
Facilitating reflections on youth empowerment and positionality, and intergenerational respect
Enhance teamwork capacities for different youth
Implementing monitoring and evaluation processes for impacts and empowerment
Training, educating, and upskilling youth

S5.2 - Small-scale farmer organizations as transformative change agents: Insights from Ghana, Uganda and Zimbabwe

Ellinor Isgren[1, 2]
Chad Boda[3], Ronald Byaruhanga[1], Bernard Ekumah[1], Michaelin Sibanda[1], Anne Jerneck[1]
[1] Lund University
[2] University of Gothenburg
[3] Malmö University

Abstract: Farmer organizations are widely regarded as important for agricultural development, for numerous reasons. One important, yet relatively overlooked, role is to organize and mobilize farmers' meaningful participation in political discussions and decision-making processes, especially small-scale farmers. Here we present insights from a four-year project that has aimed to produce comparative analysis of small-scale farmer organizations and polititical mobilizaton in three sub-Saharan African countries: Ghana, Uganda and Zimbabwe. Drawing on diverse theories from studies of social movements, civil society and organizational development, we identify promising practices, common challenges and key strategic issues for small-scale farmer organizations that aspire to build grassroots collective action and even support counter-hegemonic movements for sustainable and equitable food systems. Finally we reflect on the value, as well as challenges and limitations, of the collaborative approach employed in this research project.

S5.3 - From Promises to Capabilities: Rethinking Agricultural Policy for Just and Resilient Smallholder Farming in Ghana

Bernard Ekumah[1]
[1] Lund University Centre for Sustainability Studies

Abstract: Agricultural policy in Ghana continues to prioritise input-based interventions such as subsidies, extension services, and irrigation infrastructure as pathways to increased productivity and food security. However, such interventions rarely translate into real freedoms or sustained improvements in the wellbeing of smallholder farmers. Drawing on qualitative interviews and focus group discussions with farmer organisations across three agroecological zones, this study applies the Capability Approach to examine how agricultural policies shape, enable, or constrain farmers' substantive opportunities to pursue secure, autonomous, and resilient livelihoods. Findings reveal that while political structures for participation exist in name, through farmer organisations and local assemblies, actual decision-making remains centralised and unresponsive. Economic access to land, credit, and markets remains precarious, and is especially limited for women due to entrenched gender-based barriers. Subsidy programmes are inconsistently implemented, undermined by leakages, weak monitoring, and opaque intermediaries. The conversion of policy resources into real capabilities is deeply uneven, constrained further by mistrust in extension services, poor information flow, and lack of safety nets. Despite these systemic failures, farmers actively build resilience through farmer organisations, savings schemes, shared labour, and agroecological knowledge. These grassroots responses reflect a latent potential for more just and locally rooted food systems. Yet the political and advocacy role of farmer organisations remains largely unrealised due to limited institutional support and partisan politicisation. I argue for a fundamental reorientation of agricultural policy—from narrow input delivery models to approaches that expand farmers' capabilities to choose, adapt, collaborate, and thrive in the face of climate and economic shocks.

S5.4 - AfricanYouth4Forests – From science to youth action for sustainable forests

Anders Roos[1]
Daphine Gitonga[2], Labode Popoola[2], Doris Mutta[2], Moussa Massaoudou[2], Chemuku Wekesa[3], Cecilia Mark-Herbert[1], Marie Louise Avana-Tientcheu[2], Farhan Moshood[4], Catherine Patrick[4], Takudzwa Ashley Mlambo[4], Nancy Barisoa[4], Tabe Brandon[4]
[1] Swedish University of Agricultural Sciences
[2] African Forest Forum
[3] Kenya Forest Research Institute
[4] Youth Advisory Council

Abstract: AfricanYouth4Forests (AY4F) is a dynamic initiative at the intersection of Africa's rich forest ecosystems and its vibrant youth. Rooted in the belief that the continent's future is intrinsically tied to the sustainable management of its forests, this communication project (2024–2026), led by the Swedish University of Agricultural Sciences (SLU) and the African Forest Forum with support from Formas, seeks to empower young Africans to turn their environmental aspirations into concrete action through science-based communication. While the project focuses on Kenya and Cameroon, it also engages youth across the continent through digital media, networks, and strategic collaborations. A range of activities—including workshops, social media outreach, online discussion forums, and participation in international conferences—has been designed to maximize impact. At the heart of the initiative is the creation of meaningful dialogue between young people and the research community. These conversations explore the value of forests, the threats they face, and the opportunities they offer, with the goal of fostering youth commitment to sustainable forest management. Recognizing the pivotal role of youth in driving sustainable development in Africa—and the importance of forests in this process—this presentation will highlight the key concerns and aspirations expressed by youth during the project. It will also showcase youth-led initiatives across the continent focused on forest conservation and sustainable use. The presentation concludes with the presenting of a Youth Declaration, articulating young people's demands and proposals for strengthening their role and agency for Africa's forests.

S5.5 - The agency of farmers' organisations and farmers in scaling agroecology in Burkina Faso

Aboubakar Iyabano[1]
[1] Wageningen University and Research; Knowledge, Technology, and Innovation Group

Abstract: Understanding the potential role of agroecology as a promising solution to the current agriculture development challenges (such as low productivity and rapid depletion of natural resources) is crucial for many sub-Saharan countries, including Burkina Faso. As highlighted in many studies, agroecology has always been essential in restoring highly degraded lands in the Sahelian regions. In the context of Burkina Faso, the promotion of agroecology is mainly conducted through collaboration between international NGOs and farmers' organizations, as they serve as bridges between farmers and rural development institutions. Thus, this study aims to unravel the agency of farmers' organizations and farmers in scaling agroecology. Agency is defined in this study as the ability of individuals and groups to take action in the course of events. The study shows the involvement of farmers' organizations in multiple relations with the broader innovation actors to get the necessary resources for the provision of learning facilities, credits and inputs, and marketing facilities to their farmers. The actions of farmers' organizations are shaping farmers' motivation by acting on at least two of the three drivers of their decisions: instrumentality, valence, and expectancy. This study contributes to the debates on actors' agency in the development of agroecology by showing the existence of "interdependencies". One of the main implications of this study is the call for national policy actors to pay more attention to agroecology by providing some support to the farmers' organizations involved in this dynamic.

Session 6 - An Art-Based Immersion into the Journey of Seed

2025-09-24
10:30 - 12:00
Session 6 - An Art-Based Immersion into the Journey of Seed

S6 - The Journey of Seed

Kushal Poudel[1]
[1] Independent Researcher

Concept note: Heirloom and local seed varieties are crucial for a resilient food system, yet they are rapidly disappearing. Over 75% of crop varieties have already been lost, and the global seed market is dominated by large agribusiness corporations. This workshop aims to highlight the importance of local seeds through an immersive, art-based approach, emphasizing their role in biodiversity and building a resilient food system. By immersing participants as seeds themselves, this workshop uses an art-based method to explore the journey of seeds from ancient times to the present, paving the path for the future. Participants will be divided into groups focusing on different seed types—Indigenous, Hybrid, GMO, and others—based on participant numbers. They will trace their ideas and thoughts on how they perceive seeds. The workshop encourages creative expression by using seeds as a medium to craft unique artworks that symbolize agricultural cycles and seed heritage. Through self-reflection and group discussions, participants will gain insights into the current state of our seed system in the world. The workshop will conclude with a seed-sharing session to promote community-driven seed conservation initiatives.

Session 7 - Transforming Aquatic Food Production for Global Food Security

2025-09-24
15:00 - 16:30
Session 7 - Transforming Aquatic Food Production for Global Food Security

S7 - Transforming Aquatic Food Production for Global Food Security

Parisa Norouzitallab[1]
Stephanie De Vos[1], Patience Chungu[1], Arnold Ebuka Irabor[1], Alin Kadfak[2], **Kartik Baruah**[1]
[1] Department of Applied Animal Science and Welfare, Faculty of Veterinary Medicine and Animal Sciences, SLU.
[2] Department of Urban and Rural Development, Swedish University of Agricultural Sciences, SLU

Concept note: Climate change poses a significant threat to global food systems, including aquatic food production. Land and water resources are becoming increasingly scarce, while global food demand continues to rise, putting more pressure on farmers and researchers worldwide to adopt novel methods for maximizing quality food production and reducing/recycling waste. To achieve the goals of Agenda 2030, particularly the target of zero hunger, it is crucial to improve aquaculture through an integrated, sustainable approach. The proposed workshop will bring together experts, researchers, policymakers, and industry leaders to explore innovative approaches and strategies for adapting and transforming aquatic food systems in response to the global challenges. The workshop will focus on (emerging) topics related to blue biotechnology, such as the integration of agroecology in aquaculture, nutraceutical ingredients, novel feed, microbial management, circular bioeconomy, the role of technology and innovation in enhancing aquatic food production systems, the potential for artificial intelligence and digitalization to drive efficiencies and resilience in aquatic food production, among others. It will also delve into policy and governance frameworks that support sustainable practices and the financing mechanisms necessary to scale these innovations. Through presentations, panel discussions, and collaborative sessions, the workshop will encourage the exchange of ideas and best practices to foster climate-resilient, sustainable, and equitable aquatic food systems. We invite contributions from all scientific fields to advance sustainable aquatic food production research and develop innovative solutions that will support food security in the face of global change.

Session 8 - Inclusivity, fairness and the transition to fossil-free energy in agri-food systems: The AgroDrive center in Sweden

2025-09-24
15:00 - 16:30
Session 8 - Inclusivity, fairness and the transition to fossil-free energy in agri-food systems: The AgroDrive center in Sweden

S8 - Inclusivity, fairness and the transition to fossil-free energy in agri-food systems: The AgroDrive center in Sweden

Johanna Bergman Lodin[1]
Cristian Alarcon[1]
[1] Swedish University of Agricultural Sciences

Concept note: Food and energy systems are inextricably linked. In Sweden, food production remains heavily dependent on fossil fuels. Despite advances in electrification and renewable energy uptake in heating and drying, core elements of the agri-food system, not least field operations and transports, continue to invariably rely on fossil fuel imports. This situation creates vulnerabilities for climate mitigation and national food security, particularly under geopolitical uncertainty (SOU, 2021).

"*AgroDrive – the transition to fossil-free energy in Sweden's agricultural and food systems, for improved competitiveness, higher resilience, and better climate*", is a new Swedish center funded by the Swedish Research Council Formas 2024–2028. As such, it represents a unique and much-needed effort to catalyze this transition by 2050, with critical impact goals set for 2030 in line with the climate commitments of the sector itself.

The center employs a transdisciplinary, quadruple helix approach, bringing together a broad group of stakeholders to reduce fossil fuel dependency throughout the food value chain. By phasing out fossil energy, the climate impact is reduced, and preparedness is increased. AgroDrive will be at the forefront of innovative and effective green solutions, research and policy.

AgroDrive will offer a platform to coordinate the systemic transition of Sweden's agri-food sector towards fossil-free energy solutions, targeting technological substitution, policy coherence, and equitable change. It will work as an arena for fostering partnerships, collaborations and conversations among stakeholders to share knowledge, best practices and resources as well as co-create solutions related to cost distribution and transition processes, aiming for inclusivity and fairness across the system.

In this session, AgroDrive researchers and stakeholders, and other researchers and relevant actors invited to the session, will engage in discussions around AgroDrive goals, namely:

- implement Sweden's fossil-free food production roadmaps,
- build stakeholder capacity,
- ensure inclusive transition processes,
- support profitability and competitiveness,
- reduce climate impacts, and
- increase emergency preparedness across the food system, all by 2030.

Session 9 - Farming forward: Crop science and climate-ready agriculture

2025-09-24
15:00 - 16:30
Session 9 - Farming forward: Crop science and climate-ready agriculture

S9.1 - How push-pull cropping, soil fertility, and landscape context shape biodiversity, pest control, and crop yield in East Africa.

Grace Mercy Amboka[1]
Benjamin Feit[1], Sigrun Dahlin[1], Mattias Jonsson[1]
[1] Swedish University of Agricultural Sciences

Abstract: Ecological intensification offers a promising pathway to enhance crop yield while supporting biodiversity and ecosystem services. The push-pull cropping system developed to protect maize against stem borers in East Africa is a well-established example. Since its development, this cropping system has been found to reduce fall armyworm and *Striga* weeds while improving soil health and crop yields. Despite its widespread adoption, the environmental context in which push-pull is most effective remains poorly understood, limiting targeted implementation and scaling. We investigated how soil fertility and landscape composition determine the efficacy of push-pull systems in enhancing invertebrate predator diversity, reducing pest and weed pressure, and enhancing crop yield. Data was collected in Ethiopia, Kenya, Rwanda, and Uganda. In each country, fifteen to sixteen pairs of push-pull and non-push-pull maize or sorghum fields were selected along gradients of landscape-level grassland cover and soil types. In each field, we measured invertebrate predator diversity, pest pressure, pest leaf damage, *Striga* infestation, maize or sorghum yield, and multiple soil fertility indicators. We found that the interactions between push-pull cropping systems and soil fertility are context-dependent, shaped by regional variations in soil conditions and management practices. In contrast, preliminary results from Rwanda and Uganda suggest that the effectiveness of push-pull systems in reducing weeds and pests is relatively independent of soil fertility and landscape structure. Further analyses will determine if these patterns are consistent across all countries.

S9.2 - Mainstreaming Biofortified Cereal Cultivars through Sensory Evaluation: A Strategy for Climate-Resilient and Culturally Accepted Food Systems in Sudan

Manhal Gobara Hamid[1]
Khitma A. Sir Elkhatim[1], Faraz Muneer[2], Mahbubjon Rahmatov[2], Mohammed Elsafy[2], Tilal Abdelhalim[1]
[1] Biotechnology and Biosafety Research Center, Agricultural Research Corporation, Shambat, Khartoum, North Sudan
[2] Department of Plant Breeding, Swedish University of Agricultural Sciences (SLU), PO Box 190, 234 22 Alnarp, Sweden

Abstract: Climate-resilient and nutritionally enhanced crops are vital to food security in regions affected by conflict and extreme climates. However, cultural acceptability often hinders the adoption of biofortified cultivars. Our studies demonstrate how integrating rapid sensory evaluation models into breeding programs can bridge this gap by using the biofortified sorghum cultivar “Dahab” and the pearl millet cultivar “Aziz” as case studies in Eastern Sudan. A range of rapid sensory methods, including Check-All-That-Apply (CATA), Rate-All-That-Apply (RATA), rapid descriptive analysis, and Emosensory profiling, were applied to culturally accepted Sudanese indigenous foods: Kisra (leavened flatbread), Aceda (stiff porridge), and Damirga (fermented pearl millet flour). Naïve consumers (105 participants) performed CATA and RATA evaluations, while semi-trained participants assessed stiff porridge products. Results revealed strong preferences for biofortified products (Kisra and Aceda) when blended with familiar, adapted local cultivars, suggesting that sensory strategies can effectively enhance the acceptance of novel traits early in the breeding pipeline. These studies underscore the potential of participatory sensory approaches not only to improve adoption rates, guide market segmentation, and develop gender-responsive breeding strategies. This is particularly urgent in Sudan, where ongoing conflict and displacement have intensified malnutrition, disproportionately affecting women and children. In conclusion, mainstreaming biofortified sorghum and pearl millet through culturally attuned sensory science offers a practical pathway toward regenerative food systems that are nutritionally adequate, socially inclusive, and climate-resilient.

Keywords:
biofortification, sensory evaluation, climate resilience, sorghum, pearl millet, Sudan

S9.3 - Climate-smart durum wheat for North and West Africa

Rodomiro Ortiz[1]
Amadou-Tidiane Sall[2], Hafssa Kabbaj[3], Filippo Bassi[3]
[1] Swedish University of Agricultural Sciences
[2] L'Institut Sénégalais de Recherches Agricoles
[3] International Center for Agricultural Research in the Dry Areas

Abstract: A total of three continuous research projects funded between 2014 and 2024 by VR Development Research allowed to screen a vast set of duurm wheat germplasm and identify heat tolerant types. In 2020, two heat tolerant cultivars were officially released and included in the variety catalogs in Senegal and Mauritania. It is estimated today that some 4,000 ha are cultivated with these cultivars, mostly through the activation of "community-based" seed enterprises run by rural women. In 2024 another cultivar was released in Nigeria stemming from the work done along the Senegal River Basin, and it was planted over 100 ha in 2025 also using the principle of community seeds. Industrial mills and local food units are monitoring closely the progress to purchase these harvests at prices often superior to the international markets. Calculations based on the lowest recorded yield (3 MT per ha) and the FAO measured 200,000 ha of irrigated rice land cultivated in Mali, Mauritania, and Senegal, estimate that up to 0.6 million MT of new food could be generated without affecting the current cropping cycle. Since high quality durum wheat grains are traded on the international market at € 300 to € 400 per MT, approximately 30% higher than top quality bread wheat, and up to 70% higher than low quality ones, this outcome could be converted into a significant new business of over € 180 million per year.

Keywords. association genetics ° genomics ° plant breeding ° seed systems ° sustainable development

S9.4 - Pollination knowledge exchange for food, nutrition, and livelihood security in South and Southeast Asia

Paul Egan[1]
Kedar Devkota[2], Lotta Fabricius Kristiansen[1], SIANI Expert Group team[3]
[1] Swedish University of Agricultural Sciences (SLU)
[2] Agriculture and Forestry University, Nepal
[3] Living Labs in India, Sri Lanka, Nepal, Laos

Abstract: Millions of Asian smallholders depend on production of pollinator-dependant crops and beekeeping as a basis of livelihoods and food and nutrition security. This talk will share key experiences of the **SIANI 'Pollination in Asia' Expert Group** established as a multisectoral partnership between academic, NGO, governmental, and private sector experts to address technical and policy challenges in crop pollination and beekeeping. The Group's work was undertaken from 2023-2025 via expert knowledge exchange, field research, and multisectoral dialogues conducted across a network of six living labs initiated in South and Southeast Asia (India, Sri Lanka, Nepal, and Laos).

Research findings will be presented on the main focal areas, including: 1) efforts to trial a first-ever '*pollination deficit monitoring network*' across the region, as potential input to an emerging Asian Pollinator Initiative; 2) pro-poor value chain analysis of honey and the honey market; and 3) guideline formation on how beekeeping can be used in emergency livelihood interventions – as part of humanitarian response, and for disaster risk reduction under climate change.

The talk will conclude with short live interviews with living lab representatives from India, Sri Lanka, Nepal, and Laos to share unique experiences and lessons learnt from their localities.

Session 10 - Transforming food systems: Smallholders, markets & sustainability

2025-09-24
15:00 - 16:30
Session 10 - Transforming food systems: Smallholders, markets & sustainability

S10.1 - Participatory Guarantee Systems in Kenya: A Scalable Innovation for Regenerative Food Systems

WYCLIFF NYAMAO[1]
EUSTACE KIARII[1], BO LAGER[2]
[1] Kenya Organic Agriculture Network (KOAN)
[2] Swedish Society for Nature Conservation (SSNC)

Abstract: Participatory Guarantee Systems represent a transformative innovation for developing regenerative and inclusive food systems, particularly suited to smallholder farmers. In Kenya, producers engage in organic farming, but third-party certification's high cost and complexity have limited access to certified markets. PGS provides a credible, low-cost, peer-reviewed alternative, fostering transparency, accountability, and trust among producers, consumers, and other stakeholders. Since its early piloting and continued development by the Kenya Organic Agriculture Network under the Ecological Organic Agriculture Initiative, it has become an essential component of Kenya's organic sector strategy.

Kenya Organic Agriculture Network has facilitated the establishment of a National Participatory Guarantee Systems Committee and a formal approval protocol based on structured assessment reports, a scoring system, and tiered compliance criteria. This participatory framework empowers local actors to manage certification while adhering to national organic standards and agroecological principles such as biodiversity, soil health, natural pest control, and circularity using the Kilimohai Mark. The system also encourages market linkage through local organic markets and consumer awareness initiatives.

As Kenya scales Participatory Guarantee Systems nationally, supported by regional chapters and institutional integration, this model presents a replicable approach to democratizing certification and enhancing climate resilience. The Kenyan experience offers valuable lessons for other regions seeking sustainable and context-appropriate alternatives for certifying and promoting organic and regenerative agriculture within the broader transformation of food systems.

Keywords: Agroecology, Food Systems Innovation, Kenya, Organic certification, Participatory Guarantee Systems.

S10.2 - Teetering on the brink of debt and hunger: Empirical examination of the linkages between external debt and food security in Africa

Assem Abu Hatab[1]
Emmanuel Orkoh[1]
[1] The Nordic Africa Institute

Abstract: Debt accumulation and food insecurity are two critical challenges confronting low- and middle-income countries, yet there is limited research on how external debt affects food security, particularly in Africa. This paper analyzes balanced panel data from 32 African countries over a decade (2012–2022) to assess the impact of external debt stock and debt servicing on food security. The results generally support the hypothesis that "the dose makes the poison," showing that higher external debt stock undermines food security, though its effects vary across different dimensions of food security. We also found that higher debt stock increases rates of child stunting, indicating adverse long-term nutritional effects. External debt servicing was found to have a negative impact on overall food security and its individual dimensions. Notably, the effect of debt servicing on various aspects of food security—such as availability, affordability, and food safety and quality—along with child stunting, is significantly greater than the impact of debt stock. Disaggregated analysis reveals that the source of external debt matters: multilateral loans positively influence food security and decrease child stunting, whereas private and bilateral loans have opposite effects. Generally, the adverse effects of external debt on food security persist across income levels and degrees of food-import dependency, although with varying magnitudes. These findings emphasize the need for African countries to carefully balance external borrowing with robust debt management strategies, and direct borrowed funds towards sustainability-enhancing projects and productive investments that enhance food security and reduce malnutrition to mitigate negative effects on vulnerable populations, especially children

S10.3 - Consumption Patterns and Preferences for Food Non-Timber Forest Products in Mombasa, Kenya

Anders Roos[1]
Doris Mutta[2], Chemuku Wekesa[3], Cecilia Mark-Herbert[1], Marie-Louise Avana-Tientcheu[2]
[1] Swedish University of Agricultural Sciences
[2] African Forest Forum
[3] Kenya Forestry Research Institute

Abstract: Non-Timber Forest Products (NTFPs) have long played a vital role in supporting rural livelihoods and meeting local consumption needs. The rapid pace of urbanization across Africa presents a significant opportunity to introduce these products to urban markets. For such growth to be both sustainable and viable, it must be underpinned by responsible resource management and appropriate marketing strategies. This study explores the consumption patterns, consumer preferences, and marketing strategies for NTFPs—specifically tamarind, baobab, and coconut—within the urban setting of Mombasa, Kenya. Using a mixed-methods approach that includes surveys, interviews, and value chain analysis, the research investigates the supply chains, usage trends, and perceptions surrounding these products. The findings highlight the diverse applications of tamarind, baobab, and coconut among urban consumers, revealing growing demand as well as key challenges that threaten the sustainable development of food-based NTFPs. These include declining tree availability, inconsistent product quality, limited marketing capacity, and a lack of product diversification. To unlock the potential of the urban market, the study proposes targeted strategies to strengthen NTFP value chains. Key recommendations include improving production practices, fostering product innovation, enhancing market linkages, and promoting the regeneration of NTFP sources. By addressing these challenges and leveraging urban demand, NTFPs can contribute meaningfully to ecosystem conservation, support sustainable livelihoods, and bolster food security.

S10.4 - Leverage Points For Sustainable Nutrition Transitions in Hanoi's Food Environment

Thi Thu Giang LUU[1]
Simone Kathrin Kriesemer[1], Cory Whitney[1, 2]
[1] Department of Horticultural Sciences, Institute of Crop Science and Resource Conservation, University of Bonn, Auf dem Hügel 6, 53121 Bonn, Germany
[2] Center for Development Research, University of Bonn, Genscherallee 3 53113 Bonn, Germany

Abstract: Urban food environments in emerging economies are rapidly transforming. Understanding these dynamics is crucial for identifying leverage points for sustainable, resilient, and health-promoting change. This study explores shifts in Hanoi's food environment, their drivers, and key intervention points, based on a systematic literature review of both external and personal food environment domains. Using Meadows' leverage points framework, we classified recommended interventions by system characteristics: parameters, feedback, design, and intent.

Since 2008, Hanoi's food environment has undergone significant transitions, expanding from traditional markets to supermarkets, and, more recently, online food platforms. The increasing demand for service and convenience have emerged as dominant trends, alongside a greater diversity of vegetable sources and increasing access to delivery services. However, concerns persist regarding vegetable quality, food waste, and climate-related disruptions to production and logistics. Our findings reveal how globalization, climate change, urbanization, and modern agricultural practices interact with market and consumption patterns to produce mixed outcomes—including reductions in hunger and undernutrition, but also rising health risks (particularly overweight among Hanoi children), food safety concerns, food supply instability, plastic and food waste, and inequitable safe food access.

Identified interventions include promoting short supply chains, increasing consumer awareness, developing behavioral nudges to encourage sustainable consumption (e.g. color-coded stalls to identify sustainable products), and having a dedicated authority focused on monitoring and optimizing multiple system objectives.

The study offers insights for policymakers to foster integrated strategies that address food security, nutrition, public health, resilience, environmental sustainability, and inclusion within Hanoi's food system.

Keywords: sustainable nutrition transitions, urbanization

S10.5 - Smallholder food systems transformation through commercialisation: implications for environmental (un)sustainability and food (in)security in Kenya

Ndungu Nyokabi[1, 2]
Henreitta Moore[2], Lisette Phelan[3]
[1] University of Edinburgh Business School, Edinburgh, United Kingdom
[2] Institute for Global Prosperity (IGP), University College London (UCL), London, United Kingdom
[3] Harper Adams University, Newport Shropshire TF10 8NB, England, United Kingdom

Abstract: Sustainable and just transition of our food systems is the core challenge of our time. Food production and consumption have been the major drivers of environmental degradation and biodiversity loss; and are linked to health-related challenges to the realisation of sustainable development goals. It is crucial to ensure that food systems transformation is embedded in food justice principles, which promote people-centred approaches to avoid exacerbating existing injustices.

This study explores how the agricultural commercialisation of smallholder agricultural production systems to increase productivity and improve farmers' livelihoods has impacted environmental sustainability, household dietary diversity and food (in)security in the seven counties in the Mau-Cherangany complex in Kenya. A team of citizen scientists participating in the Prosperity Co-learning Laboratory (PROCOL-Africa) network collected data through key informant interviews with 85 farmers. Additional data was collected through participatory photography and mapping exercises involving 45 farmers.

Results show a shift towards cash crop production, which is driving land use change, accelerating the loss of native flora and fauna biodiversity. The use of herbicides to control weeds has led to the loss of native plant biodiversity, which reduces access to nutritious indigenous vegetables, leading to a reliance on the consumption of purchased foods from the market and negatively impacting household food security. There is a need for systems thinking and holistic approaches to realising food system transformation to ensure that the commercialisation of smallholder production systems is not pursued at the expense of socioeconomic inclusion, the environment, and the nutritional security of rural households.

Session 11 - Animal-sourced food: Moving towards sustainable production

2025-09-24
15:00 - 16:30
Session 11 - Animal-sourced food: Moving towards sustainable production

S11.1 - A survey of goat farming practices among smallholder farmers in Zambia

Dinah Seligsohn[1, 2]
Bertha Chitambo[2], Musso Munyeme[2], Chisanga Mwamba[3], Erika Chenais[1, 4], Jonas Johansson Wensman[1, 4]
[1] Swedish Veterinary Agency
[2] University of Zambia
[3] Musika
[4] Swedish University of Agriculture

Abstract: Livestock production is fundamental to global food security. Goats harbour a potential to alleviate poverty by contributing financially to smallholder farmers. Their resilience makes them particularly useful in light of the ongoing climate change. The aim of this study was to describe the goat farming practices and assess the knowledge on goat production in smallholder farmers in selected regions in Zambia. The study was carried out in two different agroecological zones (AEZs) in Zambia; Southern Province (AEZI-II) and Central Province (AEZIII). Households were selected through snowball sampling and interviews were conducted in the local language, using a semi-structured questionnaire. A total of 147 households were included. Goats were largely kept for generating income (135/147), mainly through live animal sales (126/147). Only two households used goats for milk production. Mainly, goats were either tethered during the day (55/147 households) or free-ranging (93/147). Practices related to reproduction and disease control differed largely between the study areas as well as perceptions of common diseases and major challenges within goat production. In the Southern province, the majority of households regarded lack of water and feed due to droughts as the main obstacle, whereas in Central province, investments related to grazing system, such as labour and ropes, were frequently cited. The results from this study provide an opportunity to identify and target specific areas in Zambian goat production to sustainably improve animal health and productivity through policy formulations and directed recommendations.

Key words: *Goat production; sustainability; infectious diseases, climate change, questionnaire*

S11.2 - Challenges and needs in Swedish dairy production – does herd size matter?

Lisa Ekman[1, 2]
Nina Lind Ranneberg[3], Ulrika Nordling[1, 4], Nils Fall[1], Gabriela Olmós Antillon[1]
[1] Swedish University of Agricultural Sciences, department of Clinical Sciences
[2] Växa Sverige
[3] Swedish University of Agricultural Sciences, department of Economics
[4] Swedish Veterinary Agency

Abstract: The ongoing structural changes of the dairy sector in Sweden—characterized by a decline in farm numbers and an increase in herd sizes—entails challenges in terms of sustainability and resilience of rural food systems. This study investigated the experiences and perceptions of Swedish dairy farmers in relation to the challenges and needs of their production, with a particular focus on differences related to herd size. Using a mixed methods approach, we conducted a national survey combining quantitative and qualitative data from 326 active dairy farms. The analysis was framed within a systems perspective, integrating farm-level, local, and broader systemic factors. Results reveal that while all farms face economic and political pressures, smaller farms (≤79 cows) more frequently emphasized challenges related to work-life balance, generational succession and the environmental and rural values their farm contributed to, whereas larger farms prioritized labour availability, resource needs and operational efficiency. Thematic analysis of free-text responses highlighted six overarching areas of concern: working environment, farm succession, economy, resource management, politics, and the societal role of dairy farming. Our findings underscore the importance of maintaining a diversity of farm sizes and production systems to enhance the resilience of Swedish dairy production. Policy and advisory efforts must be tailored to the specific needs of different farm types to support a sustainable and regionally inclusive dairy sector.

S11.3 - Challenges in transforming poultry breeding in low- and middle-income countries towards lower use of antibiotics

Sandra Nohrborg[1]
[1] Swedish University of Agricultural Sciences (SLU)

Abstract: Due to overuse of antibiotics, antimicrobial resistance (AMR) has become a serious threat to human and animal health, but also to food security and livelihoods. To curb this development, the livestock sector, which for many decades has been relying on antibiotics not only for disease treatment, but also for disease prevention and growth promotion, is in desperate need of transformation.

This project focuses on AMR in poultry farming in Vietnam, a middle-income country in Southeast Asia. Widespread access to over-the-counter antibiotics, often combined with low access to animal health services, has turned Vietnam into an AMR hotspot.

Even though governmental AMR-mitigating ambitions in Vietnam are high, regulation implementation is lacking. Therefore, regulations often need to be complemented by bottom-up approaches to achieve a change at the farm level. To design such approaches, an understanding of antibiotic use drivers is fundamental. Increasing this understanding was the aim of the research, more specifically by:

- Investigating farm(-er) variables that influence poultry farmers' AMR-related knowledge and practices
- Assessing the extent of AMR in poultry production and its associations with farm(-er) variables
- Exploring veterinary drug shop workers' AMR-related knowledge, and antibiotic sales routines

The results showed high AMR levels in farms, and that multiple variables impacted farmers' knowledge and practices, making intervention tailoring challenging. Veterinary drug shop workers were highly knowledgeable about AMR, but faced several challenges in contributing to better antibiotic practices.

The results obtained will be useful when designing AMR-mitigating interventions and as a resource in Vietnamese policymaking.

Keywords: antimicrobial resistance, poultry, Vietnam

S11.4 - Harnessing the Potentials of Neglected Livestock Species for Building Future Resilient Food Systems

Maria Oguche[1]
Folasade Oke[2], Juliet Kariuki[1], Kerstin Schopp[3], Kristina Roesel[1], Thomas Potthast[3], Mizeck Chagunda[1, 4], Regina Birner[1]
[1] Institute of Agricultural Science in the Tropics (Hans-Ruthenberg-Institute), University of Hohenheim, Germany
[2] Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta, Nigeria
[3] International Centre for Ethics in the Sciences and Humanities (IZEW), Eberhard Karls Universität of Tübingen, Germany
[4] Centre for Tropical Livestock Genetics and Health (CTLGH), University of Edinburgh, United Kingdom

Abstract: Some locally-present livestock species have not received the needed attention and support from policies and research to become viable in sub-Saharan Africa's food systems. Such species have been termed neglected livestock species and are experiencing an increasing production trend in "mainstream" food systems. This study integrated value chain analysis with the One-Health framework to (i) investigate key production processes of some selected neglected species – rabbit, guinea fowl, and grasscutter; and (ii) identify drivers for integrating these species into existing production systems. Mixed methods involving survey, focus group discussions, stakeholder interviews, and matrix scoring in two purposively selected states in the southwest region of Nigeria, were employed. Data were analysed using STATA, and content analysis.
In the study, most respondents (61%) were women. Majority of the actors were restricted to the production end of the value chain, while processing and marketing aspects were largely ignored. The species, guinea fowl (54%) and rabbit (41%) are the most utilised. Further, we noted that most producers were involved in producing these livestock species because they have favourable traits, including adaptiveness, less input requirements, resilience to weather fluctuations, and reusability of their waste.
It is concluded that the current production systems are suboptimal due to the neglect of other aspects of the value chain and lack of policies. Prospectively, we suggest prioritisation of these species through research and policies as a strategy to achieve a resilient food system for the future.

Keywords: value chain, resilience, neglected livestock species, food systems, sub-Saharan Africa

S11.5 - Harnessing Whole Genome Sequencing of Gudali Cattle to Transform Livestock Breeding and Combat Hunger in Cameroon

Youchahou Poutougnigni Matenchi[1]
Andrea Talenti[2], Hegarty Matthew[3], Olivier Hanotte[4, 5, 6], James Prendergast[2]
[1] Department of Animal Biosciences, Swedish University of Agricultural Sciences, 7023, SE-75007, Uppsala, Sweden
[2] The Roslin Institute, University of Edinburgh, Easter Bush, Midlothian, EH25 9RG, UK Centre for Tropical Livestock Genetics and Health, Easter Bush, Midlothian, EH25 9RG, UK
[3] Department of Life Sciences, Aberystwyth University, Penglais Campus, Aberystwyth, Ceredigion, SY23 3FL, UK
[4] International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia
[5] The Centre for Tropical Livestock Genetics and Health (CTLGH), The Roslin Institute, The University of Edinburgh, Midlothian, UK
[6] School of Life Sciences, University of Nottingham, Nottingham, UK

Abstract: The increasing impacts of climate change demand urgent transformations in global food systems, particularly in regions where food security remains vulnerable. In Cameroon, the Gudali cattle breed, integral to local agricultural practices, faces challenges in productivity and adaptability, exacerbated by climate-induced stressors. This study explores the potential of genomic data to enhance the resilience and productivity of Gudali cattle, providing a sustainable pathway for fighting hunger in the region. We present a comprehensive analysis of whole genome sequencing (WGS) data from 70 local Gudali cattle, aimed at identifying genetic traits that contribute to resilience against climate stressors, such as heat tolerance, disease resistance, and feed conversion efficiency. By integrating genomic data with phenotypic observations, we utilize advanced bioinformatics approaches to uncover key genetic variations linked to desirable traits for climate-smart livestock breeding programs. Our findings highlight the genetic diversity within the Gudali population and reveal candidate genes associated with improved adaptation to local environmental conditions. Characterizing this genetic diversity is a critical step toward understanding the genomic basis of productivity and adaptation to the challenging conditions of African farming systems, and serves as a foundation for developing targeted, climate-smart breeding strategies. This innovative approach offers a scalable model for transforming livestock breeding practices in Cameroon and other low-income countries, aligning with the global imperative to foster regenerative food systems. Ultimately, this study underscores the pivotal role of genomic tools in designing food systems that are more resilient, sustainable, and capable of combating hunger in the face of climate change.

Session 12 - Integrating social and technological innovations for sustainable rangeland restoration in East Africa

2025-09-25
10:30 - 12:00
Session 12 - Integrating social and technological innovations for sustainable rangeland restoration in East Africa

S12 - Integrating social and technological innovations for sustainable rangeland restoration in East Africa

Aida Bargués Tobella[1, 2]
Muhammad Ahmad[3], Johanna Bergman Lodin[1], Evans Chimoita[4], Flora Hajdu[1], Malin Lundberg Ingemarsson[5], Denis Mpairwe[6], Dorcas Munyua[7], Stephen Mureithi[4], Jane Mutune[4], Annrose Mwangi[1], Diana Njihia[7], Gert Nyberg[1], Benard Onkware[3], Emily Ouko[7], Nathaniel Robinson[3], Anna Treydte[8], Alice Turinawe[6], Gwendolyn Varley[1], Tor Vågen[3], Karolina Wallin Fernqvist[1], Leigh Winowiecki[3], Ewa Wredle[1], Ingrid Öborn[1]
[1] SLU
[2] AGROTECNIO-CERCA Center
[3] World Agroforestry
[4] University of Nairobi
[5] SIWI
[6] Makerere University
[7] Vi Agroforestry
[8] Stockholm University

Concept note: In East Africa, rangeland ecosystems sustain the livelihoods of millions of pastoralists and agropastoralists and are critical for biodiversity. Yet, many of these rangelands face significant degradation, with negative impacts on livelihoods, biodiversity, and the provision of vital ecosystem services. Restoring degraded rangelands is essential to reverse this trend and to improve ecosystem, livestock, and human health.

While restoration is increasingly seen as a nexus solution to the biodiversity-land degradation-climate crises, key questions remain - particularly when it comes to rangeland ecosystems, which have long been undervalued and overlooked. As we move from restoration commitments to action, we must address critical questions: How can interventions be tailored to local contexts and needs? What works where? How should we prioritize restoration efforts? How can we make rangeland restoration ecologically, socially and economically sustainable? And how can we ensure that restoration is inclusive and equitable over the long term?

In this session, we will explore the role of social and technological innovations in rangeland restoration and how they can be combined to deliver more sustainable restoration outcomes. We will begin by presenting several innovations developed as part of the research projects Drylands Transform, Drylands Restore, Restore4More and Include2Restore to support and guide rangeland restoration in East Africa, with a particular focus on the cross-border area between northern Kenya and Uganda. These include: *Livestock Cafés* - collaborative spaces for knowledge-sharing and co-creation of rangeland restoration and management strategies; restoration techniques tailored to local contexts; a free mobile-based application for assisted citizen science data collection of restoration activities; and data-driven decision-support tools for prioritizing and monitoring restoration efforts.

In a panel discussion, we will dive deeper into the role of social and technological innovations in the context of rangeland restoration. Using the examples presented earlier as a starting point, we will discuss the potential of innovations to support and improve restoration, how social and technological innovations can be integrated to enhance impact, the importance of co-creating innovations with

local communities and other stakeholders, and what kind of enabling environment is needed to foster innovation at different levels, including grassroots innovations.

Session 13 - Energy, land and climate change: Conflicts and opportunities

2025-09-25
10:30 - 12:00
Session 13 - Energy, land and climate change: Conflicts and opportunities

S13.1 - Agrivoltaics and land-use conflict

Jonathan Cooper[1]
[1] Harper Adams University, Newport, Shopshire TF10 8NB, United Kingdom

Abstract: On-farm solar energy installations have become common in many rural areas as part of efforts to meet renewable energy and climate change mitigation targets. However, public acceptability and concern about impacts on food security remain among the key barriers to more widespread adoption of such technology. Agrivoltaics is a set of novel configurations which seeks to achieve multifunctional land use and benefit both energy security and food security at the same time, although yields of both electricity and food are often affected. Agrivoltaic installations are emerging as a potential means of addressing the problem of such land-use conflicts; climate change mitigation and adaptation benefits and the potential for diversified farm income are also important considerations. However, agrivoltaics tend to be more expensive than conventional solar installations so commercial adoption has been slow in some places. This paper explores case studies of on-farm solar energy installations in the United Kingdom and makes recommendations for the development of agrivoltaics. Environmental, social and economic aspects are considered.

Keywords: agrivoltaics, solar energy, solar farms, land use

S13.2 - Household livelihood regimes and development resilience after multiple shocks: Evidence from selected sub-Saharan African countries

Eva Salve Tino Bacud[1]
Kathy Baylis[2], Martin Paul, Jr. Tabe-Ojong[3], Thomas Heckelei[1]
[1] Institute for Food and Resource Economics, University of Bonn, Germany
[2] Department of Geography, University of California Santa Barbara, United States of America
[3] World Bank, Washington D.C., United States of America

Abstract: Climatic, economic, social, political, and health shocks disrupt people's livelihood strategies, threatening food security and poverty reduction. Increased exposure to and negative impacts of these shocks highlight the importance of resilience thinking. To develop effective resilience-building strategies, understanding how agents (women and men) make a living, respond to compounding shocks, and which activities yield the best outcomes and uplift lives, is crucial. This study examines livelihood regimes in selected SSA countries following four main shocks: climate change, COVID-19, conflict, and high living costs (4Cs). We assess how these regimes impact different welfare measures, including income, assets, food security, and development resilience (operationalized on these welfare outcomes).

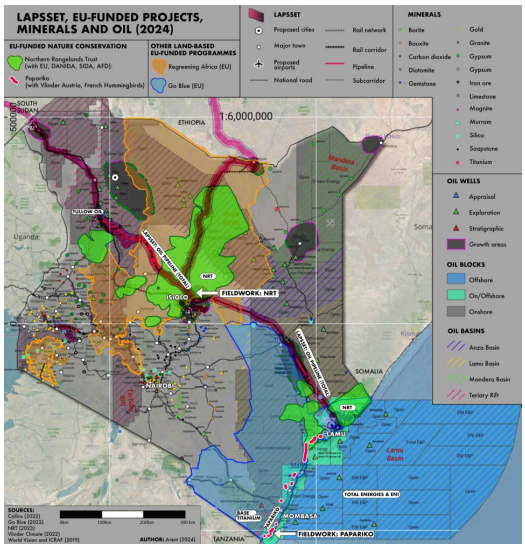
Our study combines household, weather, and market-level price datasets of rural areas in four African countries: Baringo County in Kenya, Zambezi region in Namibia, Morogoro and Iringa regions in Tanzania, and north-eastern Zambia. We analyze data from 2,665 households and 182 areas from comprehensive surveys in 2019 and 2023, and a COVID-19 follow-up phone survey in 2020. We incorporate weather data from the University of California Santa Barbara's Climate Hazards Center and food prices from the FAO and WFP Price Monitor.

Using k-means clustering, fixed-effects, and multinomial endogenous switching regression, we test the hypotheses: (1) Increasing frequency and severity of shocks cause households, mainly men-headed households, to diversify or integrate livelihood activities (e.g., integrated crop-livestock systems, crop-wage labour). (2)More integrated strategies result in higher income, better assets, and improved food security, increasing the probability of development resilience. Forest-based livelihoods show the lowest resilience scores.

S13.3 - Territorialisation for extractive and energy industries through EU-funded nature conservation in Kenya

Aleksandra Arent[1]
[1] SLU Graduate

Abstract: I will address the issue of the EU's territorialisation of Kenya's land, fostered by the current large-scale climate aid programmes under the strategy of 'aid for trade'. First, I will briefly introduce the mechanisms that allow the EU's member states and their corporations to grab immense stretches of land in Kenya. These include the UN's Clean Development Mechanism, Kenya Vision 2030 and the EU's Green Deal, of which implementation often results in displacements of rural communities from their communal land through favouring (foreign) capital, underpinned by colonial ideologies. After that, I will present two case studies based on my fieldwork in Kenya: the Northern Rangelands Trust, which is an EU-funded land management NGO governing over 12% of Kenya's land mass and Papariko, a French-backed carbon credit programme aiming to conserve mangroves on the entire coast of the country. I will argue that these programmes allow for 'accumulation by dispossession', often to the benefit of EU-based extractive and energy corporations, including Total Energies and Vestas. Furthermore, I will also touch upon how these programmes encourage conflicts between local rural communities through restricting access to natural resources essential for the subsistence livelihoods. The resulting clashes motivate the EU-funded militarisation of the previously communal lands. Lastly, I will elaborate on how this limitation of subsistence livelihoods forces the rural communities into participation in the global economy, for example, through replacing the use of mangroves for house-building with Chinese-owned concrete, or instead of using the products of pastoralism, becoming customers of international food corporations.



S13.4 - Power from Waste: the Untapped Potential of Anaerobic Digestion in Amazonian Riverine Communities

Juliana Porsani[1]
[1] Linköping University

Abstract: This presentation explores the potential of anaerobic digestion (AD) as a transformative yet underutilized energy technology in the Brazilian Amazon. Drawing on empirical material from riverine communities in the Mamirauá Sustainable Development Reserve, we examine the feasibility and promise of community-based AD systems. AD can convert locally available organic waste (such as fish residues, manioc peels, and sawdust) into biogas for cooking and boat fuel, as well as nutrient-rich biofertilizer. These outputs help reduce dependence on fossil fuels and associated greenhouse gas emissions, enhance soil fertility (thereby strengthening livelihoods and curbing deforestation), and support adaptation to increasingly extreme climate events. We argue that these benefits are most likely to be realized in contexts with robust community-based management structures. In this case, long-standing fisheries and timber governance systems provide a strong institutional foundation for collective engagement with AD. Our findings highlight the untapped synergies between AD and community-based natural resource management. By foregrounding its socio-environmental and climate mitigation co-benefits, we underscore the overlooked role of AD as a bridging technology for sustainable energy transitions in the Amazon.

S13.5 - BIOCHAR PRODUCTION AND APPLICATION IN KENYAN AGRICULTURE: POTENTIAL CLIMATE MITIGATION

Lisa Zakrisson[1]
Elias Azzi[2], Gunnar Larsson[1], Cecilia Sundberg[1]
[1] Swedish University of Agricultural Sciences (SLU)
[2] Ecoleaf.consulting

Abstract: Biochar is the product from pyrolysis of organic matter; a black, porous material similar to charcoal with high specific surface area. Biochar can be applied to agricultural soils with multiple potential positive effects: higher water holding capacity, nutrient availability, crop yields and, due to the high concentration of stable carbon, carbon sequestration. These positive effects are especially prominent in tropical soils. The aim of this project is to develop scenarios for future biochar production and use in Kenya. Building on previous life cycle assessment studies, we will model biochar production and application in Kenyan local agricultural systems, with different pyrolysis techniques, and multiple available biomasses as feedstock, most of them residues or wastes. Four agroecosystem types will be defined and modelled, capturing differences regarding available biomasses, agricultural practices and crops grown. The future scenarios consider different storylines regarding energy and agriculture; thereby our model will be comprehensive, capturing both the system under study and the surrounding background system. Two energy scenarios that will be modelled are extended electrification and continued local bioenergy systems. For agriculture, aspects and techniques that are considered when creating the scenarios are small-scale/large-scale, intensive/extensive, manure/industrial fertilizer, agroforestry, animals, transport distances, self-sufficiency and urbanization. In a later stage, the scenarios will be used for quantifying the future magnitude of carbon sequestration that can be achieved with biochar production and application, and how this will vary between scenarios. The scenarios in themselves can also serve as basis for policy-making.

Keywords: biochar; agriculture; climate mitigation; carbon sequestration; scenario

Session 14 -The International Research Consortium on Food and Nutrition Security and Sustainable Agriculture (IRC-FNSSA): from consolidation to implementation

2025-09-25
10:30 - 12:00
Session 14 -The International Research Consortium on Food and Nutrition Security and Sustainable Agriculture (IRC-FNSSA): from consolidation to implementation

S14 - The International Research Consortium on Food and Nutrition Security and Sustainable Agriculture (IRC-FNSSA): from consolidation to implementation

Ioannis Dimitriou[1]
Irene Annor Frempong[2], Emelie Zonabend König[1], Antti Autio[3], Jelle Maas[4], Maroun El Moujabber[5], Genna Tesdall[6], Sithembile Mwamakamba[7], Lillian Lihasi[8], Katja Vuori[9], Sylvie Lewicki[10], Thierry Helmer[10], Benjamin Abugri[2], Petronella Chaminuka[11], Prudence Makhura[12], Nombuso Madonda[12], Patrick Okori[13]
[1] Swedish University of Agricultural Sciences - SLU
[2] FARA
[3] University of Helsinki
[4] Wageningen University Research
[5] Centro Internazionale Di Alti studi Agronomici Mediterranei
[6] YPARD - Young Professionals for Agricultural Development
[7] FANPRAN
[8] African Forum for Agriculture Advisory Services (AFAAS)
[9] Agricord
[10] CIRAD
[11] ARC South Africa
[12] NRF S. Africa
[13] RUFORUM

Concept note: The International Research Consortium on Food and Nutrition Security and Sustainable Agriculture (IRC-FNSSA) is a multi-actor collaborative 'Network of Networks', operationalised to serve the various stakeholders in the FNSSA domain in Africa and Europe. The IRC-FNSSA feeds into the Science, Technology and Innovation dialogue between the EU and the AU and provide consortium-led services by actively involving its members in research studies, project co-funding, sharing of knowledge and information, capacity sharing and clustering activities, and contributions with external partners (through e.g. events, website, social media, policy briefs etc.). IRC-FNSSA membership therefore confers benefits like joint articulation of research and innovation priorities above fragmented interests of individual institutions. These institutions, partnerships and networks will be part of a more robust Agricultural Knowledge and Innovation System (AKIS). IRC-FNSSA members will enjoy access to complementary skills, expertise and FNSSA information, joint R&I funding and other resources to implement projects and programmes as well as the opportunity to share ideas wider to promote scaling and the enhanced impact of R&I activities.

IRC-FNSSA membership is open to all public and private legal entities involved in either funding, implementing or applying research and innovation in an AU-EU context and in the context of integrating the FNSSA partnership. Members are expected to support an enhanced and shared coordination of the activities. So far, over 50 institutions have joined the IRC-FNSSA, with about equal African and European representation. Research institutions being the current majority, followed by R&I coordinating bodies. Funders, line ministries and end user organisations are less represented. The Horizon Europe funded Consortium EuropeAfrica on Research and Innovation for Food Systems Transformation (CEA-FIRST) project has been put in place to operationalise the IRC-FNSSA, consolidating work conducted in previous projects (ProIntensAfrica, LEAP4FNSSA, and others), taking into account FNSSA-related strategies in both continents, while considering the needs

of the IRC-FNSSA members.

This sessions will highlight the developments in the IRC-FNSSA from consolidation of previous work towards its implementation and further functions. Issues concerning its governance, provided services, and how to achieve increased stakeholders involvement will be addressed.

10:30-10:35	Introduction to the Session	Ioannis Dimitriou, SLU/Agrinatura
10:35-10:50	The IRC-FNSSA: what it is, where we are, where we wish to go and how.	Irene Annor Frempong, FARA/CEA-FIRST coordinator
10:55-11:05	The IRC-FNSSA Secretariat and its functions: what else should we consider?	Antti Autio, Univ. of Helsinki, WP leader CEA-FIRST
11:10-11:20	IRC-FNSSA Knowledge Management and its functions: what else should we consider?	Emelie Zonabend König, SLU, WP leader CEA-FIRST
11:25-12:00	Roundtable discussion: What are the needs from an IRC-FNSSA and how to achieve increased stakeholders involvement?	Moderator: Ioannis Dimitriou. Panel: Patrick Okori, Executive Secretary RUFORUM; Maroun El Moujabber, CIHEAM Bari / Chair PRIMA SAC; Sylvain Perret, Agrinatura Director; Farmer organisation (?); Funder (SIDA? – not confirmed yet)

Potential questions to the panel:
- What do you consider is the added value that the IRC-FNSSA offers to promote and adopt supportive policies and governance frameworks to accelerate the transition to regenerative food systems?
- What's in it for the different groups of stakeholders in the food system? Is there something you believe is missing from the IRC-FNSSA planning prior to the implementation phase?
- What should the IRC-FNSSA focus upon in the implementation phase?
- How to achieve increased stakeholder involvement?

Session 15 - Seeds, seas, and sovereignty: Reimagining food systems for justice and resilience

2025-09-25
10:30 - 12:00
Session 15 - Seeds, seas, and sovereignty: Reimagining food systems for justice and resilience

S15.1 - Transforming Mediterranean Diets for Health and Empowerment: A Transdisciplinary Approach to Non-Communicable Disease Prevention in the MENA Region

Andrea Visioni[1]
Dina Najjar[1], Dorsaf Oueslati[1], Barbara Laddomada[2], Hamit Koksel[3], Emanuele Blasi[4], Eleonora Sofia Rossi[4], Abderrazek Jilal[5], Rola El Amir[6], Hajer Ben Ghanem[7], Benbelkacem Abdelkaber[8], Samuela Palombieri[4], Francesco Sestili[4]
[1] International Center for Agricultural Research in the Dry Areas, Rabat, Morocco
[2] National Research Council, Institute of sciences of food production, Lecce, Italy
[3] Food Engineering Department, Hacettepe University, Istanbul, Turkey
[4] Tuscia University, Department of Agricultural and Forestry Sciences
[5] National Institute of Agricultural Research, Rabat, Morocco
[6] Lebanese Agricultural Research Institute, Tel Amara, Lebanon
[7] National Institute of Agricultural Research, Tunis, Tunisia
[8] National Institute of Agricultural Research, Alger, Algeria

Abstract: To address the increase of non-communicable diseases due to dietary shifts in favor of ultra processed foods, the **MEDWHEALTH-**project adopted a **transdisciplinary approach**, bringing together experts in nutrition, agriculture, food technology, health sciences, economics, and gender studies, along with farmers, cooperatives, processors, and consumers. This inclusive and collaborative method ensured that innovations were grounded in both scientific evidence and local needs.

The project aimed to enhance the nutritional value of traditional Mediterranean durum and barley-based foods by incorporating innovative materials, high-amylose durum wheat, high β-glucan barley, and high-protein lentil cultivars. These improved food products were evaluated through clinical studies involving individuals with mild to moderate symptoms of metabolic and inflammatory diseases. Health parameters, including inflammation markers, oxidative stress, and endothelial function, were monitored, and the impact on gut microbiota was assessed.

In parallel, MEDWHEALTH explored the potential for women-led businesses linked to the testing, production and dissemination of these novel food products. Data collected from fields, laboratories, and processing cooperatives were used to evaluate production costs and the environmental footprint of the new value chain. This analysis informed an assessment of the advantages and trade-offs associated with reformulating Mediterranean foods.

The primary beneficiaries of the project were women's cooperatives in the MENA region. Special emphasis was placed on strengthening leadership and marketing skills, and facilitating dialogue with key service providers and policy actors. Findings indicated strong consumer acceptance of the newly developed products, with a noted willingness to pay a premium for attributes linked to health benefits and women's empowerment.

S15.2 - Vitamin Sea: Identifying risks in the flow of nutrition from aquatic foods in vulnerable coastal and islands states in the face of a changing climate

Charlotte Berkström[1]
Edward Allison[2], Ulf Bergström[1], Maria Eggertsen[1], Hampus Eriksson[2], Anna Gårdmark[1], Wanjiku Gichohi[2], Aratrika Ray[1], Mathew Silas[3, 4], Michelle Tigchelaar[2]
[1] Dep. of Aquatic Resources, Swedish University of Agricultural Sciences, Uppsala, Sweden
[2] WorldFish, Penang, Malaysia
[3] Tanzanian Fisheries Research Institute, TAFIRI, Dar es Salaam, Tanzania
[4] Deep Sea Fishing Authority, Zanzibar, Tanzania

Abstract: Climate change already affects and will have major impacts on Earth's food systems. Society's capacity to mitigate the effects depends on an early understanding of how different systems are affected. Many communities are heavily reliant on marine resources and have few other options. Furthermore, aquatic food systems have enormous potential as a lever for transformation toward a more sustainable and equitable global food system. A key question is therefore how the distribution and access to important nutrients from aquatic foods will be affected by climate change. Our project aims to investigate this by 1) compiling data on fish, habitats, environmental variables, fishing pressure, nutrient content and food web dynamics for three study areas in regions where fisheries can be an important protein provider, 2) model species distributions and 3) produce maps of current and future distributions of aquatic species and their nutrient content. The end product will be maps illustrating how "nutrient-scapes" may change as a consequence of climate change, from today to 2050. The 3-year project is a collaboration between the Swedish University of Agricultural Sciences, WorldFish, and the Tanzania Fisheries Research Institute and is conducted in Tanzania, Timor-Leste, and the Solomon Islands, states that are highly dependent on access to nutritious aquatic food. The outputs of the project are valuable in mitigating climate change impacts on local coastal communities, and methods are also expected to be useful for identifying risks in other coastal states.

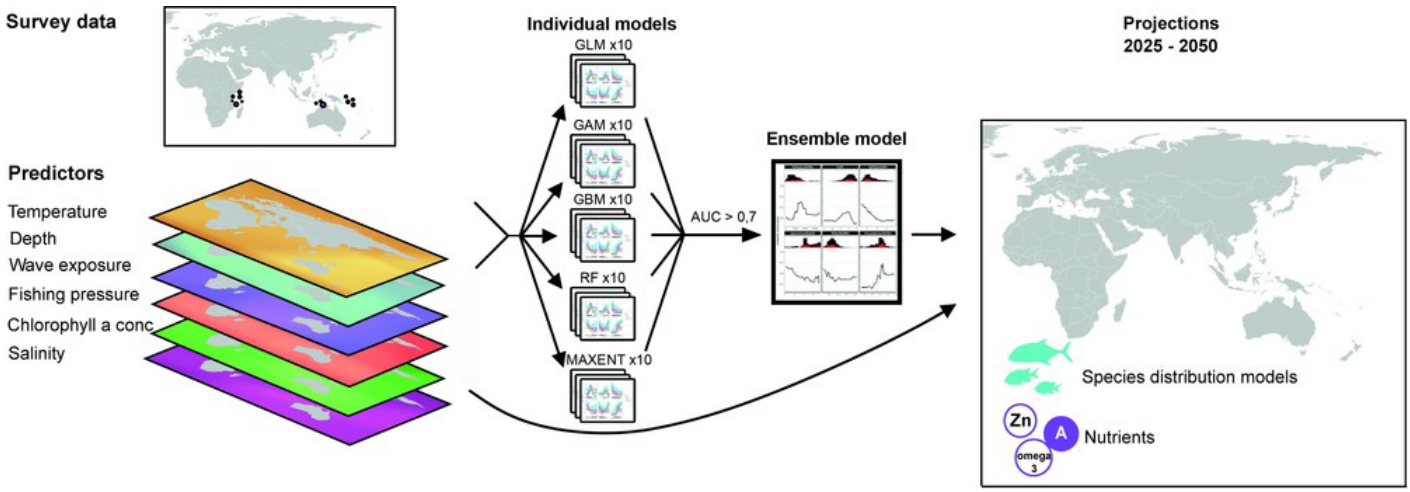


Illustration of modelling to be used to create maps of nutrient-scapes in the study locations Tanzania, Timor-Leste and Solomon Islands.

S15.3 - Towards improved livelihoods, food and nutrition security, and gender equality for small-scale actors in aquatic food systems: A Science-Policy Lab

Birgit Koehler[1]
David Mirera[2], Nicola Francesconi[3], Julie Newton[3], Irene Njogu[4], Myriam Pérez[4], Maria Lee[4], Maria Eggertsen[1], Charlotte Berkström[1], Kartik Baruah[5], Maria J. Darias[6], Patrick Sorgeloos[7], Rodomiro O. Ortiz Rios[8], Konstantinos Karantininis[9]
[1] Institute of Coastal Research, Dep. of Aquatic Resources, Swedish University of Agricultural Sciences, Uppsala, Sweden
[2] Kenya Marine and Fisheries Research Institute, Mombasa, Kenya
[3] KIT Institute, Amsterdam, The Netherlands
[4] International Centre for development-oriented Research in Agriculture (ICRA), Montpellier, France
[5] Dep. of Applied Animal Science and Welfare, Aquaculture, Swedish University of Agricultural Sciences, Uppsala, Sweden
[6] MARBEC, Univ Montpellier, CNRS, Ifremer, IRD, Montpellier, France
[7] Dep. of Animal Sciences and Aquatic Ecology, Ghent University, Belgium
[8] Dep. of Plant Breeding, Swedish University of Agricultural Sciences, Alnarp, Sweden
[9] Dep. of People and Society, Swedish University of Agricultural Sciences, Alnarp, Sweden

Abstract: Small-scale fisheries and small-scale aquaculture are vital to food and nutrition security, livelihoods, and poverty reduction, particularly in many low- and middle-income countries. Despite providing most global fisheries employment and a substantial share of aquaculture production, their contributions are often overlooked in data and policies. Particularly women and marginalized communities often face barriers in accessing resources, engaging in decision-making and benefitting from aquatic foods. To address these challenges, a Science-Policy Lab in Mombasa, Kenya, brought together 48 stakeholders from nine African countries. The Lab ensured diverse representation of women, youth, Indigenous people, and small-scale actors. Preparatory community visits informed the discussions by providing insights into local realities and supporting the subsequent participation of diverse community spokespersons in the Lab. A literature review guided the Lab's focus on the co-development of policy options within three broad areas: (1) improving availability and equitable access to aquatic foods, (2) enhancing their use for nutrition and health, and (3) reducing social and economic inequalities in aquatic food systems. A central insight was the recognition of key trade-offs. For example, increasing aquatic food availability through innovation and small-scale production may not necessarily improve consumption among disadvantaged groups, since economic pressures, social and gender norms often lead small-scale producers to sell rather than consume the aquatic foods. Combining production-focused strategies with efforts to ensure equitable access and promote local dietary use may help to resolve this trade-off. The Lab illustrated how participatory, evidence-informed multi-stakeholder processes can support the analysis of complex food system transformation challenges.

Participatory power-ladder exercise during the multi-stakeholder Science-Policy Lab in Mombasa, Kenya, 2024.

S15.4 - Calorie and macronutrient outputs benefit from functionally diverse rotations

Giulia Vico[1]
Alessio Costa[1], Monique E Smith[1], Timothy Bowles[2], Amélie C.M. Gaudin[3], Christine A Watson[4, 5], Riccardo Bommarco[1]
[1] Swedish University of Agricultural Sciences, Department of Ecology, SE 75007, Uppsala, Sweden
[2] University of California Berkeley, Department of Environmental Science, Policy, and Management, Berkeley, CA, 94720, USA
[3] University of California Davis, Department of Plant Sciences, CA 95616, Davis, USA
[4] Scotland's Rural College, UK AB21 9YA, Aberdeen, United Kingdom
[5] Swedish University of Agricultural Sciences, Department of Crop Production Ecology, SE 75007, Uppsala, Sweden

Abstract: Rotations comprising diverse crops can reduce negative environmental impacts and support climate change adaptation of agriculture. A counterargument to diversifying crop rotations is that it often implies substituting cereals with other crops that are less energy-dense for human consumption. Based on data from 16 long-term (10-55 yr) field experiments across Europe, we quantified calorie and macronutrient (carbohydrate, protein and fat) outputs of cropping systems differing in functional diversity of the rotated crops. With forage crops is used for milk production, rotations including cereals, leys and an additional functional group between broadleaves and legumes rendered the most calories and macronutrient, exceeding those of cereal monocultures and cereal-only rotations. These benefits increased with time. The nutritional outputs of these diverse rotations was better aligned with dietary recommendations compared with cereal-only rotations.

S15.5 - Reclaiming Resilience: Women-Managed Jubraka (Jabareek) Gardens as Pathways to Nutrition Security during Climate Change and Conflict in Sudan

Tilal Abdelhalim[1]
Manhal Gobara Hamid[1, 2], Khitma A. Sir Elkhatim[1, 2], Faraz Muneer[2], Mahbubjon Rahmatov[2], Mohammed Elsafy[2]
[1] Biotechnology and Biosafety Research Center, Agricultural Research Corporation (ARC), Sudan
[2] Department of Plant Breeding, Swedish University of Agricultural Sciences (SLU), PO Box 190, 234 22 Alnarp, Sweden

Abstract: Despite climate disruption and protracted conflict, women-managed backyard gardens, locally known as *Jubraka* or *Jabareek*, are emerging as vital platforms for household food and nutrition security in Sudan. This study draws on data from 271 women-led households across 15 villages in Gadarif State to explore the potential of Jubraka systems in enhancing dietary resilience. Despite agricultural livelihoods, nearly 43% of women exhibited low dietary diversity (WDDS <5), and over half of the households showed inadequate intake of iron and vitamin A. However, households maintaining diverse Jubraka gardens consistently reported higher consumption of vegetables, legumes, and nutrient-dense foods. The findings underscore the structural dietary limitations, even within food-producing households, and highlight the transformative capacity of locally managed food systems. With most caregivers in their prime working age and responsible for medium-to-large families, Jubraka empowers women as central actors in sustaining food access. The scaling up of this model involves integrating iron-biofortified and vitamin A-rich crops, enhancing food processing and preservation practices, and embedding nutrition education for women and youth. Jubraka offers a culturally rooted, climate-adaptive, and low-cost strategy for achieving advanced nutrition equity and household resilience. It bridges gaps left by formal food systems and acts as a regenerative microcosm, supporting biodiversity, community agency, and intergenerational food knowledge. Investing in Jubraka is essential for building just, inclusive, and sustainable food futures in fragile and conflict-affected regions.

Session 16 - Who leads the table?: Certificate, women, labour participation in food value chains

2025-09-25
10:30 - 12:00
Session 16 - Who leads the table?: Certificate, women, labour participation in food value chains

S16.1 - What is the role of leadership in food systems transformation? The case study of the enactment of the Good Food Nation (GFN) (Scotland) Act

Ndungu Nyokabi[1]
[1] University of Edinburgh Business School

Abstract: Leadership is the ability of an individual to influence, motivate, and enable others to contribute to the effectiveness and success of organisations or institutions. Leaders substantially influence collaborative processes and outcomes in food systems. There is a need for effective and authentic leadership to deliver food systems transformation and the desired social, economic, environmental and public health outcomes. There is a paucity of research on the role of leadership in food systems and their transformation. This study explores leadership's role in supporting the implementation of the recently enacted Good Food Nation (GFN) (Scotland) Act.

Leadership of the food system stakeholders played a significant role in the development and enactment of the GFN Act. Although organisations and individuals in the Scottish food system have competing interests, leaders were able to collaborate, forming a coalition of like-minded individuals and organisations to agitate for policy change. It is imperative to improve the competencies of food systems leaders, particularly in strategic thinking and systematic thinking and practice.

Knowledge institutions have a role to play in developing systemic leadership and thinking competency through training and capacity development of individuals and organisations to ensure they can be stewards of change. Strengthening the transformative leadership capacity of individuals and organisations through training and continuous personal development courses can stimulate knowledge production for transformative change. Moreover, policy leadership is important for establishing connections among individuals and organisations to facilitate policy implementation across the civil service.

S16.2 - Harmonising tradition & innovation: Exploring the potential of agrobiologicals in Ethiopia

Anna Maňourová[1]
Ofgaa Djirata[2], Tewodros Mulugeta[3], Mekdes Ourge[4], Tesfu Tujuba[5], Kidist Yohannes[6], Zenebe Mekonen[7], Awoke Guadie[8], Lemessa Kumsa[2], Gwendolyn Varley[9]
[1] Department of Plant Breeding, Swedish University of Agricultural Sciences, Alnarp, Sweden
[2] Department of Applied Biology, Adama Science and Technology University, Adama, Ethiopia
[3] Department of Biology, Kotebe University of Education, Addis Abeba, Ethiopia
[4] Department of Forestry, Arba Minch University, Arba Minch, Ethiopia
[5] Department of Animal Biodiversity Research, Ethiopian Biodiversity Institute, Addis Abeba, Ethiopia
[6] Department of Foreign Language and English, Kotebe University of Education, Addis Abeba, Ethiopia
[7] Department of Plant Science, Arba Minch University, Arba Minch, Ethiopia
[8] Department of Biology, Arba Minch University, Arba Minch, Ethiopia
[9] Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Uppsala, Sweden

Abstract: Agriculture is the cornerstone of Ethiopia's economy, with 95% of farmers being smallholder farmers. These farmers face significant challenges in accessing conventional agricultural inputs, which are often costly, unreliable, and pose environmental and health concerns. As a viable solution, agrobiologicals offer sustainable, locally adapted alternatives based on traditional knowledge and biodiversity. This SLU Global Seed Money-supported project aims to bridge traditional practices and modern science by documenting the use of agrobiologicals in Ethiopia. A pilot study was conducted through semi-structured interviews and focus group discussions with 330 farmers and 18 groups, across three socio-culturally distinct regions: Western Showa zone (Oromia), Gamo Zone (Southern Ethiopia), and Asosa Zone (Benishangul-Gumuz). The survey mapped traditional knowledge on agrobiologicals, identifying commonly used species, preparation methods, and local perceptions of both traditional and conventional inputs. A small conservation plot for agrobiological plant species is being established in the Gamo Zone to support ongoing research and knowledge preservation. Photographic documentation of identified agrobiologicals and collected insights will be incorporated into educational materials for schools and shared through a publicly open minisymposium targeting farmers, researchers, policy makers and other stakeholders in the agricultural sector. The project demonstrates the value of integrating traditional knowledge into research and education to promote sustainable, locally adapted agricultural practices. At the time of submission, data analysis and the development of educational materials are in progress. Upon acceptance, updated results and key findings will be presented at the conference.

Key words: nature-based solutions, traditional knowledge, education, indigenous plant species

S16.3 - Short Value Chains for Vulnerable Urban Consumers: Linking Factory Workers with A Certified Vegetable Cooperative in Vietnam

Sau Nguyen Thi[1]
Thi Thu Giang Luu[2], Thi Tan Loc Nguyen[1], Simone Kathrin Kriesemer[2], Cory Whitney[2]
[1] Fruit and Vegetable Research Institute
[2] Institute of Crop Science and Resource Conservation, University of Bonn

Abstract: The Nutrition Intervention Forecasting and Monitoring (NIFAM) project applies transdisciplinary decision analysis to support sustainable food environments and improve nutrition outcomes in Vietnam. Using structured decision framing, NIFAM identified a mobile safe vegetable point-of-sale on factory campuses as a promising intervention to improve food environments for vulnerable urban communities in Hanoi.

Our decision model demonstrates that direct connections between consumers and producers generate benefits for participating stakeholders, including enhanced awareness, improved health outcomes, strengthened social relationships, and positive environmental impacts. However, realizing these benefits involves both short-term and long-term costs. Various risk factors - such as extreme weather events and transportation delays - along with broader contextual conditions, were identified as influencing its overall effectiveness, both directly and indirectly. Moreover, several unforeseen factors emerged during the intervention's implementation and monitoring phases, affecting its outcomes, such as selling skills and facilitator.

Our results underscore the critical role of multiple stakeholder engagement in the establishment, operation, and sustainability of the intervention. Notably, the active involvement of Labour Union officials within the factory was instrumental in maintaining and expanding the model. The findings also highlight farmers' willingness to adapt to new roles as sellers, beyond their traditional roles as producers. Additionally, communication initiatives led by researchers effectively raised awareness among workers and promoted the consumption of safe vegetables.

The supply chain innovation demonstrated the feasibility of a novel business model that enhances access to safe vegetables for vulnerable urban consumers by creating a short value chain directly linking producers with factory workers in urban settings.

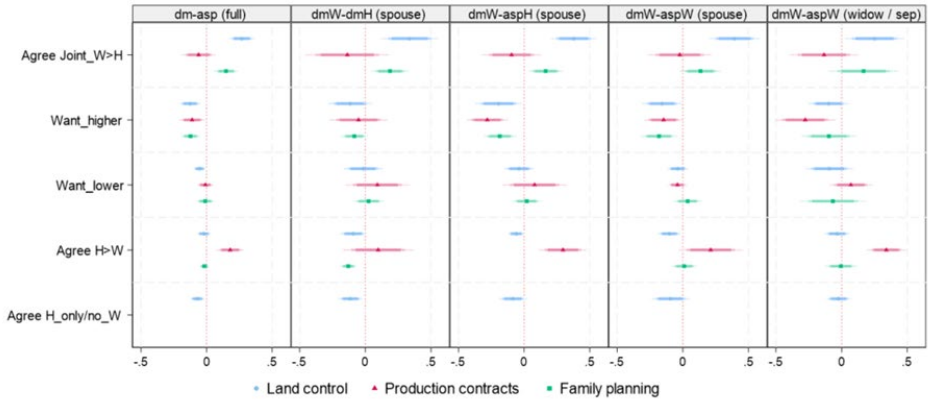
S16.4 - Understanding women's power to decide: Mismatches in acquired and aspired agency and implications for household food security and women's well-being

Eva Salve Tino Bacud[1]
Kathy Baylis[2], Stuart Sweeney[2], Jessica Marter-Kenyon[3]
[1] Institute for Food and Resource Economics, University of Bonn, Germany
[2] Department of Geography, University of California Santa Barbara, United States of America
[3] College of Agricultural and Environmental Sciences, University of Georgia, United States of America

Abstract: The importance of empowering women to achieve sustainable development goals, including zero hunger and no poverty, has spurred various policies and programs for women's empowerment, including the Gender Action Learning System (GALS). However, evidence of its effectiveness remains limited. Moreover, many studies assume that high agency universally manifests bargaining power without considering the decision-making preferences of women and men.

We examine the gap between women's and their husbands' aspired power (desired agency) and their acquired power (actual agency) to know if women's practiced agency is what they desire or what their husbands recognize or perceive as ideal. We then assess whether GALS affect power dynamics and investigate how accordance in acquired and aspired agency influences welfare outcomes.

Using data from 654 random households in Malawi and vignettes methodology to capture intrahousehold decision-making, our findings indicate that most women practice and aspire to joint decision-making regarding land, contract farming, and family planning. However, 15% to 20% prefer that their husbands decide (except for family planning). GALS participation is linked to agreement in women's higher agency, and reduced agreement that husbands mainly or solely decide in land and family planning. GALS does not significantly correlate with women's agency in monetary decisions. Women's land and contract decision-making may improve household food consumption. However, it may result in higher distress and perceived violence when husbands assign women's power and when they seek power in contract farming. When women's agency (land decisions) matches their own aspirations, they report lower depression and perceived violence.



Notes: Controls for % peer joint, % peer women main, trust, gender, marital status, ethnicity, age, education, household size, dependency ratio, number of in-laws and relatives, number of children, husband-wife age gap, household income, and land area. In the spouse sample, the number of in-laws, relatives, and children is dropped to avoid a significant reduction in degrees of freedom and convergence issues due to the small sample. The category consensus that the husband only decides for the production contract and family planning domains is dropped due to the few observations.

Figure 1. Association of GALS training with accord in acquired and aspired agency (standardized coefficients).

S16.5 - Resilient but Restricted: Women's Informal Work in Kenya's NTFP Value Chain

Bruna Jesus Dos Santos[1]
Chemuku Wekesa[2], **Anders Roos**[1], Cecilia Mark-Herbert[1]
[1] Swedish University of Agricultural Sciences (SLU)
[2] Kenya Forestry Research Institute (KEFRI)

Abstract: This study explores gendered labour relations in the Kenya's Non-Timber Forest Product (NTFP) sector, focusing on tamarind and coconut value chains across Kilifi, Makueni, and Mombasa counties. Grounded in Feminist Political Ecology and Feminist Economics, and using qualitative methods, it examines how structural inequalities, socio-cultural norms, and informality shape women's access to land, labour, and markets. Despite their central role in NTFP production, women remain largely confined to low-value activities with limited control over profits and decision-making. Formal recognition of their contributions is scarce, as much of their labour remains invisible within household dynamics and broader value chains. Nevertheless, women exhibit remarkable resilience: they mobilise collective action through cooperatives, table banking, and informal producer groups to mitigate vulnerabilities, diversify income, and increase bargaining power. These grassroots strategies challenge prevailing gender norms and support more equitable labour practices. The study highlights the need for gender-responsive policies that go beyond adaptive strategies and work to transform the socio-economic structures that constrain women's agency. Addressing the informal nature of women's labour in forest-based economies is critical for advancing equity and resilience within regenerative food systems.

S16.6 - Geographical indications and underutilized crops: biodiveristy, agroecology, certification for transformation of food systems

Ivana Radic[1]
Aboubakar Iyabano[2], Aparajita Banerjee,[3]
[1] UMR Innovation CIRAD
[2] Wageningen UR
[3] IDOS German institute of development and sustainability

Abstract: Underutilized crops such as rye, chickpea, and pea hold considerable promise for transforming food systems toward greater equity, resilience, and sustainability. These crops contribute to agrobiodiversity, climate resilience, and cultural food heritage, but their integration into formal value chains and certification schemes remains limited. Geographical indications (GIs), as origin quality certification tools, offer a promising but underexplored pathway to valorize these crops while supporting smallholder inclusion and agroecological practices.

This study will present the findings of an ongoing desk review of GI codes of practice and regulatory frameworks across Europe. By analyzing the role of GIs in all existing codes of practices of rye, chickpea, and pea, we investigate how GI certification is shaping agrifood value chains and contributing to food systems transformation. Particular attention is paid to how GI standards reflect agroecological principles, promote varietal diversity, and protect traditional knowledge systems.

Our hypothesis is that GIs could hold both promising practices and systemic barriers. While some GI systems might successfully reinforce biodiversity and local livelihoods, others risk excluding small-scale producers or perpetuating inequities through rigid or exclusionary standards. The analysis will contribute to broader debates on the role of certification, governance, and policy in enabling just and regenerative food systems.

By focusing on underutilized crops within the European context, this study offers insights relevant to global efforts to diversify production systems, empower rural communities and fight food insecurity, and build sustainable food futures.

Keywords:
Geographical indications, underutilized crops, agroecology, certification, agrobiodiversity

Session 17 - intersectoral; cooperation sub-saharan - Self organise

2025-09-25
14:45 - 16:15
Session 17 - intersectoral; cooperation sub-saharan - Self organise

S17 - Intersectoral cooperation in Sub-Saharan Africa's transition from agrochemicals to agrobiologicals

Paul Egan[1]
Anna Maňourová[1], Ivar Virgin[2], Raphael Mwezi[3], Chaymae Fennine[1], Kristina Karlsson Green[1], Fikira Kimbokota[4], TBC X2[5]
[1] Swedish University of Agricultural Sciences (SLU)
[2] Stockholm Environment Institute (SEI)
[3] Tanzania Plant Health and Pesticide Authority (TPHPA)
[4] Mkwawa University College of Education, University of Dar es Salaam
[5] Community-based living labs representatives from South Africa and Kenya

Concept note: This seminar will explore the critical role of intersectoral cooperation in driving Sub-Saharan Africa's transition from conventional agrochemicals to agrobiologicals (living or naturally-derived products for enhanced crop production and protection). Invited speakers will introduce several on-going Africa-Europe partnerships in the region – covering community-based research, regulatory policy, and industry perspectives – and discuss how cross-sector collaboration can promote sustainable food production in the face of climate change, while safeguarding biodiversity and reducing environmental and health risks.

Speakers and initiatives covered will include:

- The AgBio4SSA and inSALSA projects – advancing uptake and sustainability of agricultural biologicals by smallholder farmers through Living Labs in Sub-Saharan Africa – **Anna Maňourová, SLU & community-based living labs representatives from South Africa and Kenya**
- The SIANI Expert Group on Agrobiologicals – **Ivar Virgin, SEI**
- Regulatory cooperation in East Africa – **Raphael Mwezi, Tanzania Plant Health and Pesticide Authority & Paul Egan, Kristina Karlsson Green, SLU**
- 'One Health' research on sustainable tomato production in Tanzania: A strategy to reduce pesticide impact on human health and the environment – **Chaymae Fennine, SLU & Fikira Kimbokota, Mkwawa University College of Education, University of Dar es Salaam**

A multi-stakeholder panelist discussion will then proceed with representatives from academia, government authorities, and the private sector. The panel will reflect on opportunities and challenges for coordinated action on pressing topics in the region (phasing out highly hazardous pesticides, scaling agrobiological solutions, harmonizing regulatory approaches and efficacy testing, and fostering private sector and locally-grounded innovation).

The session will conclude with an audience Q&A, a short Agrobiologicals Quiz, and review of a Padlet dashboard opened throughout for participant input.

Session 18 - Implementing innovative technologies in sub-Saharan Africa: opportunity and challenges

2025-09-25
14:45 - 16:15
Session 18 - Implementing innovative technologies in sub-Saharan Africa: opportunity and challenges

S18 - Implementing innovative technologies in sub-Saharan Africa: opportunity and challenges

Adjani Isabelle[1, 2]
[1] Adjani Isabelle
[2] Kristina Mastroianni

Concept note: Many innovative technologies could have a large impact on the agricultural sector in sub-Saharan Africa, both in terms of securing yields and enhancing productivity. However, implementing innovation in this region involves significant challenges. One of the most pressing bottlenecks is access to fertiliser. Conventional nitrogen fertilisers are imported, their production reliant on fossil fuels, and constrained by limited inland logistics — leaving many rural farming communities underserved.

This session explores how new technologies can plan for successful deployment in sub-Saharan Africa, offering a deeper understanding of both the barriers they may face and the strategies to overcome them. In particular, the session will spotlight decentralised green fertiliser production through NitroCapt's novel process — a groundbreaking innovation with the potential to transform Africa's food systems.

NitroCapt's technology uses renewable energy to produce nitrogen fertiliser without fossil fuels. This decentralised approach reduces transport costs and emissions, enabling production to occur close to the point of use.

NIRAS has a long practical experience in introducing and scaling up agricultural innovations in Sub-Saharan Africa and offer unique expertise regarding large supply-chain projects in the region.

This session will present key from both NIRAS and NitroCapt's perspective, offering participants a chance to engage with real-world findings and stakeholder assessment.

Participants will explore the feasibility of scaling this innovation, the potential partnerships needed to support deployment, and the role of supportive policy, local infrastructure, and sustainable finance mechanisms.

Session 19 - Agroecological Transitions: Lessons from Global Case Studies

2025-09-25
14:45 - 16:15
Session 19 - Agroecological Transitions: Lessons from Global Case Studies

S19.1 - Agri-environmental policy, agroecology, and the challenges for food security in Sweden, Chile and Italy: Insights from the FoodAct project

Cristian Alarcon[1]
Johanna Bergman Lodin[1], Margarita Cuadra[1], Alessandra Corrado[2], Marcelo Garrido[3]
[1] Swedish University of Agricultural Sciences
[2] Università della Calabria
[3] Universidad Metropolitana de Ciencias de la Educación

Abstract: At the policy level, food security and agroecology are gaining an important role in the envisioning of new agri-environmental policies Europe and South America. This paper is based on empirical insights and results from the FoodAct project, an ongoing research project funded by FORMAS, which aims at exploring agroecology practices in times of uncertainties and crises, through a comparative approach based on a range of research methods, including participatory ones. More specific objectives of FoodAct are to: provide a better understanding of the opportunities that exist for new approaches to sustainable food security based on agroecology by analyzing how current agricultural crises affect food provision; strengthen cooperation and knowledge among practitioners and farmers for agroecological transformations that can contribute to other farmers' re-orientation of their farming systems; provide practical guidance to farmers and policy makers on how to develop agroecology to transform food systems for sustainable food security.

In this paper, the authors will discuss different policy contexts for agroecological transformations unfolding in Sweden, Italy and Chile - the three cases included in FoodAct – and the drivers behind those agroecological transformations. The authors will focus on 1) the analysis of the agroecological practices implemented in each diverse setting, to bring to light the existing institutional barriers and enablers for an agroecology-based food regime transition at the regional level, and 2) the analysis of prospects and barriers of agroecological transitions for regional food security, and food sovereignty.

S19.2 - Agroecological Solutions for Sustainable Farming: Tackling Water, Soil, and Livestock Issues in Vhulaudzi, South Africa

Msc. Cecilia Hagberg[1]
Dr. Jenny Lindblom[2], Dr. Florence M Murungweni[3], Assoc. prof Gerhard Du Preez[4], Assoc. prof Rojanette Coetzee[5]
[1] Dep. Animal Science and Welfare at Swedish University of Agricultural Sciences, Sweden
[2] Dep. Civil, Environmental and Natural Resources Engineering, Luleå University of Technology, Sweden
[3] Dep. Geography and Environmental Sciences, University of Venda, South Africa
[4] Unit for Agricultural Sciences at the North-West University, South Africa
[5] Unit for Industrial Engineering at North-Western University, South Africa

Abstract: This study investigates the root causes of poor water sustainability, declining soil health, and reduced livestock productivity among small-scale farmers in the Village of Vhulaudzi, Vhembe District, South Africa. Agriculture remains a central livelihood in this rural area, yet persistent systemic and environmental challenges undermine long-term sustainability. The project aimed to assess current agricultural water practices and advise on future improvements through the application of agroecological principles. Using a mixed-methods approach, data were collected through field observations and focus group discussions with local farmers. Findings reveal uneven water distribution across the village, negatively affecting certain farmers. Traditional furrow and open-channel irrigation systems, with cracked infrastructure, result in significant water loss through evaporation and seepage, reducing efficiency and degrading soil health. For example, replacing these systems with drip irrigation could increase water efficiency by up to 70% in maize production, the dominant crop in the area. In livestock production, water access is similarly constrained. Many farmers rely on natural water sources of inconsistent quality, which can compromise animal health. Rainwater harvesting from rooftops is highlighted as a practical agroecological solution to support livestock needs. Overall, the study emphasizes that adopting agroecological principles can enhance water use efficiency, improve soil quality, reduce input costs, and increase agricultural yields and market outputs. Enhanced animal health and welfare further contribute to profitability. The findings advocate for targeted interventions and capacity-building efforts to support small-scale farmers in transitioning to more sustainable and resilient farming systems rooted in agroecology.

S19.3 - Beyond the fall armyworm: How smallholder farmers adopt crop diversification practices as agroecological pest management strategies in Eastern Zambia

Kimberly Blaakman[1]
Chloe MacLaren[2, 3]
[1] Department of Urban and Rural Development, SLU
[2] Department of Crop Production Ecology, SLU
[3] Sustainable Agrifood Systems, CIMMYT Zimbabwe

Abstract: The fall armyworm (*Spodoptera frugiperda*) is a crop pest that is increasingly threatening the production of staple crops such as maize (*Zea mays L.*). This study targeted rural smallholder maize farmers in two farming communities in Zambia's Eastern Province, who are affected by this pest. The farmers were participating in a network of on-farm trials that investigated crop diversification as a means to increase food security, nutrition, and income. Effects on fall armyworm can play a key role here: previous studies have shown that fall armyworm damage is often lower in diverse cropping systems. Harnessing crop diversity to suppress fall armyworm can reduce the need for chemical pesticides, helping to protect the health of both farmers and the environment. This study explored farmers' understanding of fall armyworm, current and cultural management methods, how information surrounding pests and alternative farming methods is used and shared, and what barriers hinder the adoption of crop diversification. Data was collected from interviews and focus group discussions. We identified how farming challenges were influenced by pests and other issues - influencing adoption potential - and what motivated or prevented farmers from further implementing the trialled crop diversification technologies. Social factors played a significant role here, as farmers' knowledge, perceived risks, and incentives impacted their attitude and intentions, which shaped the actual observed adoption behaviour. These findings will help to inform how agroecological pest management strategies can be successfully implemented.

Keywords: fall armyworm, crop diversification, farmer adoption, pest management

S19.4 - Breaking free from rice monoculture: Challenges and Agroecological pathways in Northeast India

Raj Chongtham[1]
[1] Department of Biosystems and Technology, Swedish University of Agricultural Sciences

Abstract: Much of the agriculture in the Imphal Valley, located in North-East India, relies on rain-fed systems, with rice as the primary crop. Most farmers focus on rice monoculture and depend heavily on chemical fertilizers, pesticides, and manual weeding. However, growing dependence on this rain-fed rice monoculture system faces increasing challenges due to shifting climatic conditions and rising input costs, including agrochemicals and labor. This situation threatens farmers' livelihoods and jeopardizes both environmental sustainability and food security in the region. This exploratory study aims to understand the constraints hindering diversification and to identify pathways for transitioning toward a more sustainable rice-based cropping system in the Imphal Valley. A multi-stakeholder participatory workshop involving eight participants was conducted, followed by semi-structured interviews with four key informants in January 2024. Findings revealed that limited land access, inadequate irrigation, and poor availability of organic alternatives to chemical fertilizers and pesticides severely constrain farmers' ability to diversify beyond rice monoculture. Another major barrier is the lack of knowledge and training on crop diversification and integrated farming practices. These challenges trap farmers in a low-resilience system, highly vulnerable to climate variability, market shocks, and continued dependence on external inputs. To address these issues, respondents emphasized the importance of forming farmer cooperatives, expanding access to irrigation, and promoting peer learning and targeted training to support a transition toward more diverse and agroecological farming systems.

Keywords: Agroecological approach, Diversification, Livelihood, Resilience, Rice monoculture

S19.5 - Agroecological Approach to Designing Coffee Pulp Composting Intervention, A Case Study of Rusizi District, Rwanda

Kushal Poudel[1]
Ioanna Mouratiadou[2], Tor Arvid Breland[1], Dominique Barjolle[3]
[1] Norwegian University of Life Sciences
[2] ISARA Lyon
[3] ETH Zurich

Abstract: Coffee is an important cash crop contributing to the livelihood of millions of smallholder farmers, particularly in developing countries. It's processing creates a substantial amount of waste, posing a significant environmental threat. Coffee pulp waste holds the immense potential for conversion into cost-effective and easily manageable high-quality compost, which improves soil health and nutrient uptake contributing to improving coffee production. This study aimed to understand behavioral factors affecting coffee pulp compost adoption and develop composting interventions leading to improved livelihoods and empowerment of smallholder coffee farmers. The research uses an agroecological understanding for systemic exploration of the coffee composting practice in the Coffee Agroecosystem of the Rusizi district of Rwanda through 10 field visits, 30 semi-structured interviews, and a participatory workshop.

The study revealed that the major factors supporting the adoption of coffee pulp composting are farmers' willingness to improve coffee farming, availability for free of cost, and the perceived benefits and the preferences regarding sustainable soil management practices. Hindering factors include the know-how of composting, financial capacity, remoteness of the farm and government policies on chemical input subsidies. Designing coffee pulp composting interventions should focus on making it a cost-effective practice using locally available structural materials and providing training and demonstration on composting techniques. Additionally, farmer-to-farmer knowledge sharing is crucial for promoting widespread adoption of these practices. The findings suggest that building capacity to reduce external dependency and improving market access are key to driving the agroecological transition in resource-poor settings for cash-crops.

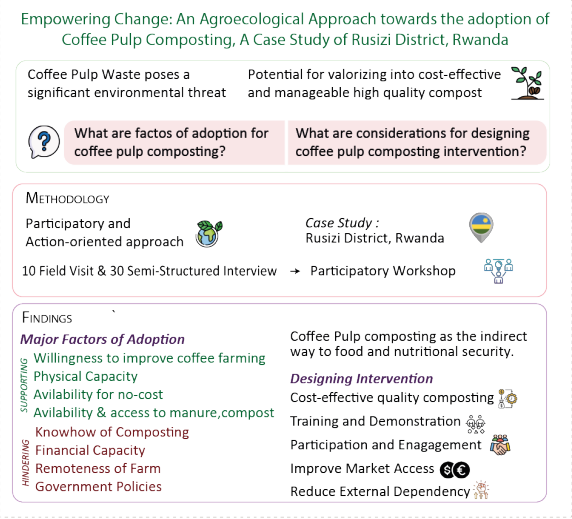


Fig: Graphical Abstract

Session 20 - When tradition meets innovation: Co-producing knowledge for food system resilience

2025-09-25
14:45 - 16:15
Session 20 - When tradition meets innovation: Co-producing knowledge for food system resilience

S20.1 - Harnessing Indigenous Knowledge of Sudanese Women to Overcome Pearl Millet Flour Rancidity: A Regenerative, Inclusive, and Resilient Food System

Khitma A. Sir Elkhatim[1]
Manhal Gobara Hamid[1], Faraz Muneer[2], Mahbubjon Rahmatov[2], Mohammed Elsafy[2], Tilal Abdelhalim[1]
[1] Biotechnology and Biosafety Research Center, Agricultural Research Corporation, Shambat, Khartoum, North Sudan
[2] Department of Plant Breeding, Swedish University of Agricultural Sciences (SLU), PO Box 190, 234 22 Alnarp, Sweden

Abstract: Pearl millet is a climate-resilient staple for millions of Sudanese people, yet its use is constrained by rapid flour rancidity driven by lipolytic enzymes, limiting its shelf life and market potential. Technological solutions to this problem are inaccessible for most rural households. This study explores indigenous strategies used by women in the Eastern and Western Galabat regions (El Gedarif State) to extend flour shelf life and mitigate post-harvest losses. An exploratory survey of 211 women from six villages revealed a range of traditional techniques, including grain decortication, fermentation, and the use of natural preservatives such as black cumin, natron salt, normal salt, and red ginger. Notably, the **Damirga** process, a post-harvest method involving decortication, soaking, fermentation, and rehydration, emerged as a culturally embedded innovation capable of extending the flour shelf life up to nine months without compromising sensory quality. Women also reported **varietal differences in rancidity**, with some local landraces demonstrating higher oxidative stability than others. This observation indicates an untapped genetic potential for breeding rancidity-resistant cultivars. The findings highlight women's critical role in preserving agroecological knowledge and ensuring household food security. These practices offer low-cost, scalable solutions for enhancing pearl millet value chains, especially in conflict-affected regions. Recognizing and integrating indigenous knowledge into post-harvest strategies is essential for promoting food system resilience, reducing waste, and achieving nutrition security through gender-inclusive, locally adapted innovations.

Keywords:
indigenous knowledge, pearl millet, rancidity, women in agriculture, food system resilience

S20.2 - Co-production of strategies to improve food system outcomes in rural Senegal – insights from Living Labs in the Lac de Guiers area

Hanna Sinare[1]
Bakary Doucoure[2], Mor Ngom[3], Ousseynou Diouf[4]
[1] Stockholm Resilience Centre, Stockholm University, Sweden
[2] UFR Lettres & Sciences Humaines, Université Gaston Berger de Saint-Louis, Senegal
[3] Bureau d'Analyses Macroéconomiques, Institut Sénégalais de Recherches Agricoles, Senegal
[4] Laboratoire de Sociologie, Anthropologie et Psychologie, Université Cheikh Anta Diop de Dakar, Senegal

Abstract: The on-going action research project Healthy Territories has initiated two Living Labs with local actors in the Lac the Guiers area, Northern Senegal, co-producing activities with a One Health perspective to support an agroecological transition. Around the Lac the Guiers lake, agro-industries and family farmers produce irrigated vegetables predominantly with mineral fertilizers and pesticides. The lake is a source of fish and drinking water for local residents, the capital Dakar, and livestock herds. Change to agroecological practices at the field and farm level occur in a wider food system. In the food systems thematic group of the project we focus on co-producing strategies to improve key food system interactions, with particular focus on capacities to respond to shocks, to build resilience in the system. Interviews and focus group discussions identified post-harvest losses due to lack of storage facilities and processing as a major issue, limiting income and producers' food self-sufficiency in a context were a survey showed high levels of food-insecurity. There is a mis-match between dominant crops produced, and the skills and equipment of local food processors. Access to organic fertilizers is limiting, and the longer production time of organic vegetables cannot be compensated by a higher price, as the produce is not distinguishable in the market. Current work focus on concretizing actions for strategies identified with actors. We reflect on the challenge of representation and justice, as participation in living lab activities takes time, and the Living Lab is initiated in a context with existing power relations.

S20.3 - Using Decision Analysis to Support Agricultural Land Use Policy in Peri-Urban Hanoi: Integrating Local Knowledge and Validation

Hoa Bui Thi Khanh[1]
Hung Pham Van[1], Thi Thu Giang Luu[2], Cory Whitney[2]
[1] Vietnam National University of Agriculture
[2] Institute of Crop Science and Resource Conservation, University of Bonn

Abstract: Rapid urbanization and demographic shifts in peri-urban Hanoi are driving a decline in farming interest and an aging rural workforce, leading to increasing land abandonment. This study applied decision analysis to examine how farming households navigate among three land use options: (1) continuing cultivation, (2) renting out land, and/or (3) leaving land fallow.

We developed a probabilistic decision analysis model that integrates causal mapping, expert elicitation, and Monte Carlo simulations to estimate the net present value (NPV) of each decision pathway. The initial model was informed by a review of 15 peer-reviewed studies and subsequently refined through focus groups involving 50 farmers from two districts in Hanoi. Participants received training to recognize and mitigate common biases in data estimation, using culturally appropriate examples. Following the training, participants provided data inputs with 90% confidence intervals.

The model was iteratively refined through community feedback and expert consultations. These consultations provided valuable insights into local interpretations of key risks, including market instability, labor constraints, land use conflicts, and ambiguous land use policies. This input informed the selection of proxy indicators, clarified the mathematical representation of variables, and improved the specification of inter-variable relationships. These refinements enhanced the model's credibility, relevance, and legitimacy.

In the next phase, study findings will be shared with farmers and local officials for validation and to explore policy implications, particularly around abandoned land revocation. As a living model, this approach demonstrates the value of participatory tools in evidence-based decision-making within dynamic food systems.

Keywords: peri-urban agriculture, land use

S20.4 - Building resilience: socioeconomic, gender, and ecological dimensions of Moringa cultivation and livelihoods in a changing African climate

George M. Ogendi[1]
Salmina Mokgehle[2], Awoke Guadie[3], Peter Mubanga Cheuka[4], Anna Manourova[5], Erik Alexandersson[5], **Sajeevan Radha Sivarajan**[6]
[1] Department of Environmental Science, Egerton University, P.O. Box 536 – 20115, Egerton, Kenya.
[2] School of Agricultural Sciences, Faculty of Agriculture and Natural Sciences, University of Mpumalanga, Private Bag X11283, Nelspruit, 1200, South Africa.
[3] Department of Biology, Arba Minch University, P.O. Box 21, Arba Minch, Ethiopia.
[4] Department of Pure and Applied Chemistry, The University of Zambia, P.O. BOX 32379, Plot# 64, Great East Road, Lusaka, Zambia.
[5] Department of Plant Breeding, Swedish University of Agricultural Sciences, Lomma, Sweden.
[6] Department of Plant Protection Biology, Swedish University of Agricultural Sciences, Lomma, Sweden.

Abstract: Moringa cultivation is gaining increasing significance across African countries due to its exceptional nutritional, medicinal, and economic value. This study employed a transdisciplinary ethnoecological approach to assess the demographic, socioeconomic, and ecological factors influencing Moringa cultivation in four African countries. Data were collected through semi-structured interviews with 477 household respondents: Ethiopia_(n=160), Kenya_(n=160), South Africa_(n=122), and Zambia_(n=35). The survey captured diverse variables, including household structure, land tenure, education, gender dynamics, cultivation history, crop knowledge, management practices, and perceived livelihood benefits.

Findings revealed country-specific demographic patterns, knowledge gaps, and shared constraints among moringa growers. Middle-aged farmers predominated in Ethiopia and Kenya, while broader age representation, including youth, was observed in South Africa and Zambia. Gender participation varied in cultivation, with the highest female involvement in South Africa (69%) and male dominance (>95%) in Ethiopia. Educational attainment was generally low, with Ethiopia reporting the highest, 28% of farmers without formal education. Ethiopia also exhibited the longest cultivation history, largest farm sizes, highest species diversity, and 96.3% awareness of different Moringa species beyond *M. oleifera*. Notably, Ethiopian and Kenyan respondents reported Moringa's highest consumption and dietary integration, while South African and Zambian farmers highlighted its therapeutic and medicinal uses.

Despite limited ecological knowledge, rainfall and temperature were recognized as key production factors. Addressing systemic barriers, such as market access, technical training, and value addition through inclusive extension services, supportive policy frameworks, and sustainable investment in local value chains, is critical to upscaling Moringa cultivation and transforming rural livelihoods.

Keywords: Moringa_cultivation, Food_systems_transformation, Gender_and_youth_inclusion, Agroecological_knowledge, Value_chain_development

Session 21 - Beyond the drought: Gendered adaptations, youth migration, and agroecological innovation

2025-09-25
14:45 - 16:15
Session 21 - Beyond the drought: Gendered adaptations, youth migration, and agroecological innovation

S21.1 - When water runs dry: How irrigation water scarcity shapes smallholder farmers' mitigation strategies and migration aspiration in developing countries

Assem Abu Hatab[1, 2]
Mohammed Abdel Hameed Ahmed[3], Shilpa Asokan[1], Carl-Johan Lagerkvist[2]
[1] The Nordic Africa Institute, Uppsala, Sweden
[2] Department of Economics, Swedish University of Agricultural Sciences, Uppsala, Sweden
[3] Department of Agricultural Economics, Faculty of Agriculture, Fayoum University, Fayoum, Egypt

Abstract: Increasing water stress, exacerbated by the rising frequency and intensity of droughts, poses a significant threat to smllholder farmers within water-stressed regions. This study employs a combination of clustering approach and binary recursive partitioning method to analyze the perceptions of irrigation water scarcity (IWS) among 501 Egyptian smallholder farmers, their intentions to adopt farm-level mitigation strategies, and their migration aspirations driven by perceived IWS. The findings reveal significant heterogeneity in farmers' perceptions of IWS, emphasizing the need for tailored interventions that address the specific challenges faced by different farmer groups. The recursive partitioning model identifies irrigation technology and village-level water availability as key factors shaping farmers' perceptions of IWS impacts. In addition, the degree of perceived IWS risk and trust in water management institutions significantly influence farmers' intentions to adopt farm-level coping strategies. The results also reveal a spectrum of migration aspirations among farmers, ranging from minimal interest in relocation to a firm commitment to migrate. The analysis of the derteminants of migration aspirations highlight the role of resource availability, institutional credibility, and personal risk assessments in shaping migration decisions. Moreover, the findings highlight that farmers' migration decisions are not solely driven by immediate water scarcity but are profoundly shaped by their anticipated gains or losses from moving. Overall, the results provide critical insights into how farmers perceive and respond to water scarcity, offering valuable implications for water-resource management and the design of targeted policies to address water scarcity challenges and promote sustainable agricultural practices.

S21.2 - A resilient Persian lime / Coffee agroforestry system: best practices for drought protection

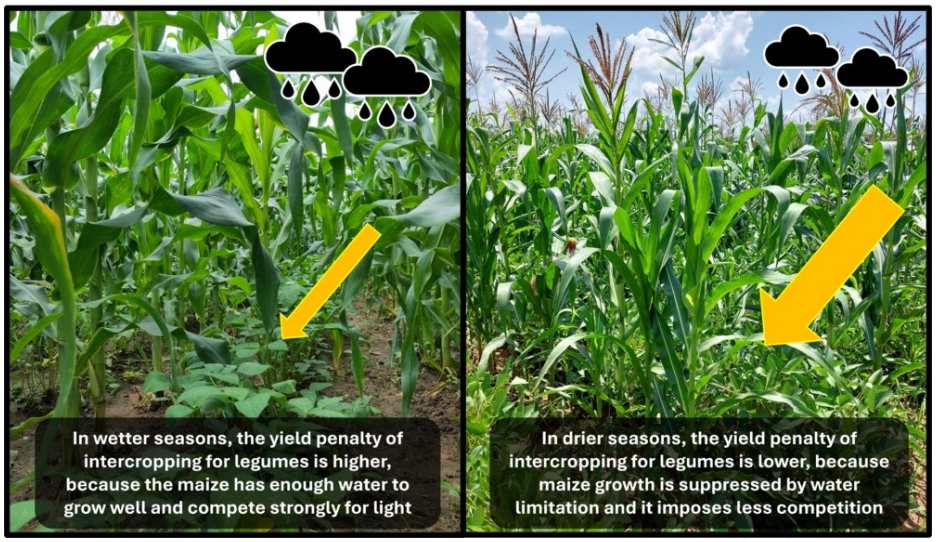
Samuel Coulbourn Flores[1]
[1] Swedish University of Agricultural Sciences

Abstract: Tree and other perennial crops promise carbon sequestration, soil improvement, and higher incomes compared to annuals, but are still susceptible to drought and fluctuations in price and yield. Intercropping makes use of land between rows of trees, and hedges against price and yield fluctuations. Citrus × latifolia (Persian lime) and Coffea arabica are absent from the literature but arguably compatible biologically and commercially; however lime is susceptible to droughts which are becoming longer and more frequent in many areas due to climate change, and both trees require nitrogen inputs. We implemented cover cropping with Arachis pintoi to fix nitrogen and provide protection from drought. We also applied a mycorrhizal inoculant to the Coffea arabica upon planting, aiming to improve nutrient and water uptake. We evaluate water stress by measuring soil humidity, soil and foliar temperature, and foliar transpiration. We also evaluate nutrition and health by soil and foliar N and K and foliar chlorophyll. We also discuss the potential gains in soil improvement, carbon sequestration, and biodiversity. The results argue for the use of the cover-cropped intercropping system as an environmentally friendly, climate- and market-resilient system.

S21.3 - Benefits and trade-offs among rotations, strip crops and intercrops vary along a rainfall gradient in Zambia

Chloe MacLaren[1, 2]
Joao Silva[2], Kelvin Kalala[3], Blessing Mhlanga[2], Ingrid Öborn[1], Christian Thierfelder[2]
[1] Department of Crop Production Ecology, Swedish University of Agricultural Sciences, Sweden
[2] Sustainable Agrifood Systems, CIMMYT, Zimbabwe
[3] Sustainable Agrifood Systems, CIMMYT, Zambia

Abstract: Extensive evidence shows that crop diversification can improve crop production for smallholder farmers, through enabling positive interactions between different crops. However, these interactions and their effects on yields vary between cropping systems and in relation to environmental conditions. Here, we used a network of on-farm trials in Zambia to investigate how the relative productivity of rotations, intercrops, and strip crops changed along a gradient of rainfall amount and distribution. Rainfall amount was measured as total rainfall during each cropping season and ranged from 264mm to 1034mm across communities and years. Rainfall distribution, quantified as the mean rainfall per rainy day during each cropping season, ranged from 11mm to 25mm. Rainfall amount had a strong influence on the effect of cropping system on yields, while rainfall distribution had only a minor influence. Relative maize and legume yields contrasted in their responses to rainfall amount: in wetter seasons, the yield penalty to maize of intercropping and strip cropping was smaller, while in drier seasons, the yield penalty to legumes was smaller. However, the overall ranking of diversification options did not change along the gradient of rainfall amount, with rotations consistently providing the highest relative yields of each crop. Conversely, intercrops and strip crops had lower yields, but high land equivalent ratios (LERs) around 1.45. Therefore, farming system context (i.e. land and labour availability) should be a stronger guide than rainfall when targeting diversified cropping systems for sustainable intensification in southern Africa.



S21.4 - Re-imagining Youth and Irrigation future: A Systematic Scoping Review

Gitta Shrestha[1]
[1] Swedish University of Agricultural Sciences

Abstract: The modernization of indigenous irrigation systems into large-scale modern systems has witnessed tremendous investments by governments and international financial institutions in developing countries in recent years. These high-priority projects in national development plans visibly aim for high farm productivity, import substitution, and economic growth. Additionally, such projects include agendas of creating local livelihood opportunities and reducing youth out-migration. Evidence suggests that despite the expansion of large-scale systems, youth—mostly men—continue to out-migrate for labour jobs. Women (marginalized) are increasingly stepping into roles traditionally held by men; however, they are largely excluded from irrigation decisions. Furthermore, without adequate interventions to address structural constraints, they face newer forms of vulnerabilities and violence—issues less documented. These dynamics raise concerns about the future of indigenous irrigation systems and youth's relationship to irrigation commons. Despite being integral to sustainable irrigation futures, current scholarship lacks a systematic assessment of knowledge at the intersection of irrigation and youth. This presentation aims to fill this gap by reviewing existing scientific literature on changing human-water relationships, focusing on youth (differentiated by gender, caste, class, age) and irrigation. The review explores how youth engagement with irrigation water has been conceptualized in the literature and what it means for their future as stewards of irrigation commons.

This is a work in progress. The presentation will also include insights from an exploratory field visit in Nepal.

S21.6 - Gendered migration and support in climate-vulnerable district of Zomba, Malawi

Marianne-Sara Banda[1]
[1] Södertörn University

Abstract: This study investigates the interplay of socioeconomic, cultural, and climatic factors influencing migration in Malawi's Zomba district, using the New Economic Labour Migration theory framework. Through semi-structured interviews, the research reveals the significant role of variables such as income, education, access to healthcare, and social support networks in shaping migration decisions. Additionally, climatic disruptions, including floods, droughts, and heatwaves, exacerbate vulnerabilities, particularly for rural farming communities, where livelihoods depend heavily on stable weather patterns. These factors compel some individuals to migrate in search of better opportunities, while others adapt. The findings emphasize the critical role of government support in enabling adaptation and mitigating migration pressures. Key interventions include establishing early warning systems for climate-related disasters, generating employment opportunities, and providing education on climate action, sustainable agriculture, and land management. Women, in particular, face disproportionate burdens when men migrate for income, assuming extensive household responsibilities, including managing farms, livestock, and caregiving roles for families.

This study underscores the profound impact of climate change as a driver of migration and highlights the need for government interventions to empower communities. By addressing these interconnected challenges, the findings suggest that vulnerable populations can adapt, and survive, despite facing some of the harshest conditions brought about by socioeconomic inequalities and environmental change.

Keywords: Climate change, migration, Vulnerability, Gender, policy, Malawi

Oral presentations online

Online session 1

2025-09-24
15:00 - 16:30
Online session 1

O1 - Beyond the Harvest: Nurturing the Next Generation of Food System Leaders

Peter Lofane[1, 2]
[1] Executive Director, Manna Development Agency (MADA), a member of Uganda for Resilience (U4R) under the Africa for Resilience (A4R) network
[2] Associate Researcher PhD: Political Science (Specialist in Terrorism). Thesis- Analysis of the effectiveness of African Union in addressing the root causes of terrorism in Africa: the case of Al-Shabaab in Somalia-(University of Johannesburg-2022)

Concept note: In the face of climate change, food insecurity, and shifting global priorities, the transformation of food systems hinges on the emergence of empowered, skilled, and visionary leadership. As communities around the world confront more frequent extreme weather events, resource scarcity, and rising geopolitical tensions, the call to invest in the next generation of food system leaders has never been more urgent.

This theme centres on nurturing young changemakers who can lead sustainable food transitions grounded in regenerative, climate-resilient, and inclusive practices. Youth especially from marginalized, indigenous, and underserved communities are already demonstrating leadership by pioneering entrepreneurial solutions, embracing digital innovation, promoting climate-smart agriculture, and strengthening local governance systems. Their energy, creativity, and strong ties to their environments and cultural identities position them as powerful agents of change. However, to unlock their full potential, young leaders must be supported by robust and inclusive ecosystems that offer mentorship, institutional backing, and equitable access to land, finance, technology, and relevant education.

The integration of traditional ecological knowledge with modern agri-tech offers a transformative pathway, one that not only honours ancestral wisdom but also leverages scientific advancements to foster more resilient food systems. Equipping youth with the skills and confidence to navigate this intersection is essential to creating food systems that are productive, culturally grounded, and environmentally sound.

Beyond technical and entrepreneurial capacity, youth leadership must also be sustained through attention to mental health, peer-to-peer support networks, and the cultivation of regenerative mindsets that promote well-being, responsibility, and long-term stewardship. Policies, education systems, and financial mechanisms must evolve to reflect this holistic vision by prioritizing youth-led initiatives, participatory governance, and inclusive access to all levels of decision-making.

This theme invites contributions from a wide array of actors including researchers, policymakers, development practitioners, civil society, and private sector leaders to explore actionable strategies for strengthening youth leadership in food systems. Focus areas include capacity-building programs, financial empowerment, storytelling for transformation, and effective multi-stakeholder collaboration.

By fostering resilient and inclusive youth leadership beyond the harvest, we lay the foundation for food systems that are sustainable, equitable, climate-smart, and future-ready.

Key words: Empowerment, Leadership, Innovation, Sustainability, Resilience

Online session 2 - Food fighters: Innovating nutrition and resilience on the frontlines

2025-09-24
15:00 - 16:30
Online session 2 - Food fighters: Innovating nutrition and resilience on the frontlines

O2.1 - Nasha as Nutrition: A Culturally Embedded, Climate-Resilient Weaning Food for Infants in Humanitarian Settings

Manhal Gobara Hamid[1, 2]
Khitma A. Sir Elkhatim[1, 2], Faraz Muneer[2], Mahbubjon Rahmatov[2], Mohammed Elsafy[2], Tilal Abdelhalim[1]
[1] Biotechnology and Biosafety Research Center, Agricultural Research Corporation, Shambat, Khartoum, North Sudan
[2] Department of Plant Breeding, Swedish University of Agricultural Sciences (SLU), PO Box 190, 234 22 Alnarp, Sweden

Abstract: In conflict- and climate-affected regions of Sudan, *Nasha*, a traditional, sorghum-based weaning porridge, emerges as a culturally resilient solution to infant nutrition. This study explores Nasha not only as a staple food, but as a lifeline in humanitarian settings where access to commercial weaning products is limited or non-existent. Utilizing sensory data from 54 infant feeding interactions, we evaluated behavioral responses to different Nasha formulations using positive (e.g., eager, happy, satisfied), neutral (thoughtful, playful), and negative (rejecting, disgusted) indicators. More than 80% of reactions fell under the "enjoyment & acceptance" category. *Eager* (52%) and *accepting* (39%) were most frequent, followed by *happy* (31%), *curious* (24%), *joyful* (21%), and *satisfied* (15%), suggesting strong cultural familiarity and palatability. Neutral behaviors such as *cautious* (16%) and *distracted* (12%) indicate manageable uncertainty during weaning. Negative reactions (e.g., *rejecting*, *disgusted*, *upset*) were observed in less than 2% of cases, underscoring high acceptability. Formulations using biofortified sorghum (Dahab) alone or blended with local landrace (Dabar) received the highest liking scores, confirming both nutritional adequacy and consumer appeal. Nasha requires no imported inputs or cold chains, making it a scalable, low-cost solution in fragile contexts. Rooted in women's knowledge and local varieties, it offers a dignified response to infant malnutrition. Integrating Nasha into food aid and nutrition policies supports food sovereignty, gender equity, and climate-resilient, community-led recovery in humanitarian settings.

Keywords:
Nasha, infant nutrition, sorghum, sensory acceptance, humanitarian food systems

O2.2 - Advancing regenerative food systems in a changing climate: The role of Communities of Practice (CoP) - a case of Nourish North Community, Sri Lanka.

Prabu Nadaraja[1, 2]
Shribavan Kanesamoorthy[1, 2]
[1] University of Western Ontario, London, Canada
[2] Suvadi, Jaffna, Sri Lanka

Abstract: For decades, Northern Sri Lanka has faced persistent malnutrition, worsened by a three-decade-long armed conflict and recurring extreme weather events. Following the recent currency devaluation in 2022, a community of practice (CoP) was formed and sustained to address malnutrition in targeted villages across the Jaffna, Kilinochchi, and Vavuniya districts. The Nourish North Community consisted mainly of indigenous medical and public health practitioners working to integrate traditional and evidence-based knowledge systems to address malnutrition, collaborating with mothers' clubs and rural cooperatives in those villages.

Ongoing engagement in diverse activities and systematic reification helped sustain the community amid the country's ongoing economic crisis**.** Community members have developed a negotiated enterprise and accumulated a repertoire of resources over time. The members of Nourish North recognised the similarities in styles and discourses with other groups affiliated with the Slow Food movement and later, in 2023, officially aligned itself with Slow Food. Then, different discourses and styles have been imported from other Slow Food groups and tailored to fit regional needs.

At the periphery of CoP, new members were recruited and later became full members of the community. Building a CoP has been proven to be a strategy in empowering the next generation of food systems leaders in nurturing regenerative food systems in a changing climate. The challenges and the enablers of sustaining the community of practice will be discussed. Furthermore, how similar CoPs can form a constellation across geographic boundaries and function as a social movement demanding regenerative food systems will be explained.

O2.3 - Evaluation of nutritional quality of locally developed food composites targeting needs of persons experiencing nodding syndrome in Northern Uganda

Bonny Aloka[1, 2]
Solomon Olum[1], Duncan Ongeng[1]
[1] Department of Food Science and Postharvest Technology, Faculty of Agriculture and Environment, Gulu University, Uganda
[2] Department of Science and Vocational Education, Faculty of Education, Lira University, Uganda

Abstract: Undernutrition is widespread in developing countries, exacerbated by conditions like nodding syndrome, prevalent at 4.5% in northern Uganda. To combat this, nutrient-rich composite foods were developed using locally sourced ingredients. Sensory evaluation was conducted to identify the most preferred formulae, and they were analysed for nutritional, physico-chemical, antinutritional, and functional properties using standard methods. The composites consisted of ingredients in the ratio of 70:2:15: 5:3:5 for maize/sorghum: silver fish: soybean: orange-fleshed sweetpotato: beans: chia seeds respectively.

Maize-based formula had significantly higher potassium, selenium (18.43 µg vs 17.83 µg), vitamins A and D, and bioavailability of iron (50.01% vs 22.92%) and zinc (54.93% vs 33.53%) than sorghum-based formula. It also exhibited higher in vitro protein digestibility (37.4% vs 35%). Furthermore, it had lower levels of phytate, tannins, and trypsin inhibitors and a better fatty acid profile—oleic, linoleic, and linolenic acids—than the sorghum-based formula ($p<0.05$). On the other hand, the sorghum-based formula had significantly higher levels of ash (2.23% vs 2.08%), crude protein (7.85% vs 7.45%), magnesium (115.83mg vs 105.07mg), calcium (144.35mg vs 134.52mg), and vitamin C, higher oil absorption capacity (3.0% vs 1.36%), and bulk density (0.89 g/cm^3 vs 0.78 g/cm^3).

Overall, maize-based formula outperformed sorghum-based formula in terms of most parameters, making it a better option for combating undernutrition in nodding syndrome cases. When utilising sorghum-based formulations, methods for reducing antinutritional factors, which affect the bioavailability of nutrients, should be explored.

KEY WORDS: Functional property, nodding syndrome, northern Uganda

Table 3: Minerals and vitamin profile of locally formulated composites targeting nodding syndrome cases in Northern Uganda

Parameter	Main energy source		t (p-value)
	Maize-based formula	Sorghum-based formula	
Sodium (mg)	74.553±0.479	74.370±0.902	0.311(0.771)
Potassium (mg)	351.693±1.213	314.377±1.842	29.305(p<0.001)
Magnesium (mg)	105.073±1.747	115.827±1.625	-7.806(0.001)
Calcium (mg)	134.522±0.878	144.352±0.876	-19.420(p<0.001)
Phosphorus (mg)	269.443±32.853	247.543±33.878	0.807(0.465)
Zinc (mg)	2.073±0.015	2.053±0.015	1.604(0.184)
Iron (mg)	2.740±0.020	2.763±0.015	-1.606(0.184)
Copper (mg)	0.260±0.036	0.270±0.026	-0.387(0.718)
Manganese (mg)	0.433±0.058	0.523±0.023	-2.507(0.066)
Selenium (µg)	18.433±0.252	17.833±0.208	3.182(0.033)
Vitamin A (µg)	42.370±0.415	36.177±0.419	25.751(p<0.001)
Vitamin D (µg)	334.793±5.998	195.61±32.771	7.236(0.016)
Vitamin B6 (mg)	21.147±0.215	26.247±0.598	-13.903(p<0.001)

O2.4 - Factors Influencing Farmer's Adoption of Crop Intensification Practices in Major Maize Production Areas of Rwanda.

Chantal Uwituze[1]
Charles Bucagu[1], Francois Xavier Naramabuye[1], Florence Uwamahoro[2], Mattias Jonsson[3]
[1] University of Rwanda _College of Agriculture, Animal Sciences and Veterinary Medicine
[2] Rwanda Agriculture Board
[3] Swedish University of Agricultural Sciences

Abstract: The Crop Intensification Program has been implemented in Rwanda to enhance agricultural productivity and sustainability. It focuses on land consolidation, improved seed distribution, fertilizer use, irrigation, mechanization, and post-harvest handling to enhance agricultural productivity and food security. This study focuses on the factors influencing maize farmers' adoption of the Crop Intensification Program in major maize-producing regions, and is part of a PhD project aiming to assess and improve the program regarding its environmental impact and effectiveness in managing pests, weeds, and soil fertility.A survey was conducted during the long rainy season 2024 across six districts representing upland, midland and lowland regions of Rwanda. Data were collected through structured questionnaires and face-to-face interviews with 180 maize farmers practicing either traditional farming or crop intensification systems.

Results showed that participation in the Crop Intensification Program significantly increased with size of own land (from 31% to 69% for areas below 0.05 to above 4 hectares) and that farmers with rented land only were significantly more likely to participate in the program (84%) compared to farmers that owned land or had access to family land (62%). We also found that gender, literacy, household size, farming experience, rented land size and farmer's age may affect adoption of the program. These findings highlight the importance of land related factors in adoption of the Crop Intensification Program and suggest potential areas for policy and intervention strategies aimed at enhancing participation rates among maize farmers.

Keywords: adoption; crop intensification; traditional farming; land consolidation; Maize production

Online session 3 - Soil health: Unlocking nature’s potential for smallholder farmers

2025-09-24
15:00 - 16:30
Online session 3 - Soil health: Unlocking nature’s potential for smallholder farmers

O3.1 - The Role of Earthworms in Enhancing Maize Cropping Performance: A Review of Agroecological Practices for Climate-Resilient Smallholder Farming

ALHAJI ALUSINE KEBE[1]
[1] The Hungarian University of Agriculture and Life Sciences

Abstract: Soil health is a cornerstone of sustainable agriculture, particularly for smallholder farmers who depend on resilient cropping systems to adapt to climate change. Earthworms, known as "ecosystem engineers," play a pivotal role in maintaining and improving soil quality through enhanced nutrient cycling, soil structure optimization, and organic matter decomposition. This review synthesizes current research on the potential of earthworm activity to enhance maize cropping performance, focusing on agroecological practices such as crop rotation, organic manuring, mulching, and residue management.

The review examines the mechanisms through which earthworms influence soil properties, including nutrient bioavailability, water retention, and microbial activity. It also explores how these processes contribute to improved maize yields and system resilience under varying climatic conditions. Key findings from field studies indicate that integrating earthworm management into agroecological practices can significantly boost crop productivity while promoting long-term soil sustainability. Furthermore, these approaches have shown promise in mitigating the effects of climate variability, such as drought and heavy rainfall, making them particularly relevant for smallholder farming systems.

By consolidating insights from diverse studies, this review highlights the untapped potential of earthworm-based strategies in sustainable agriculture. It underscores the need for further research to optimize these practices and for policy support to facilitate their adoption. Implementing earthworm-enhanced systems within broader agroecological frameworks offers a pathway to achieving food security and climate resilience for smallholder farmers worldwide.

Keywords

Earthworms, Agroecological Practices, Climate Change Adaptation, Smallholder Farming, Sustainable Agriculture

O3.2 - Optimizing nutrient balance in insect frass fertilizer for improved agroecosystem productivity

RICHARD MALINGUMU[1, 2, 3]
Dennis Beesigamukama[1], Jayne N. Mugwe[2], Joseph Gweyi-Onyango[2], Sevgan Subramanian[1], Chrysantus M. Tanga[1]
[1] International Center of Insect Physiology and Ecology, P.O. Box 30772-00100, Nairobi, Kenya
[2] Department of Agricultural Science and Technology, Kenyatta University, P.O. Box 43844-00100, Nairobi Kenya
[3] Faculty of Agriculture and Environmental Sciences, Muni University, P.O. Box 725, Arua, Uganda

Abstract: Insect frass fertilizer is rapidly gaining global traction due to its critical role in agroecosystem health and sustainable food production. However, effective upscaling and adoption would require products with optimal nutrient-balance. This study evaluated the nutrient concentrations and supply potentials, fertilizing indices, and maturity of black soldier fly [BSF] frass fertilizer (BSFFF) derived from three commonly available organic wastes. Results showed that the recycling of one ton of fresh organic waste using BSF technology would produce 188 – 381 kg of BSFFF within 5 weeks. Processing of poultry manure (PM) yielded 19 – 103 % higher BSFFF compared to the other wastes. The BSFFF derived from a mixture of PM and potato waste (PW) had the highest nutrient levels, and better balance of nitrogen, phosphorus, potassium, calcium, magnesium and sulphur than the fertilizers derived from single waste streams. The fertilizing indices of all the BSFFFs were above 3.0, PW [5.0] and market waste [4.6] had the highest and lowest values, respectively. The frass fertilizer produced from a combination of PM and PW had 2.8 – 27% higher nitrogen, phosphorus and potassium supply potentials compared to others. The BSFFF derived from the same substrates combination as well as sole PM had the highest levels of maturity as depicted by favorable pH (7.7 – 7.9), organic carbon (31 – 32%) and C/N ratio (9.7 – 10.4). These findings underscore the role of insect-based waste recycling technologies in producing high-quality, cost-effective and regenerative fertilizer inputs for enhanced soil and agroecosystem health, food security, and climate resilience through circular economy.

O3.3 - Carbon Storage and Nutrient Dynamics under Cowpea–Pigeon Pea Intercropping and Residue Management in Malawi's Drought prone areas

Charles Harry Nthewa[1, 2, 3, 4, 5]
[1] Charles Harry Nthewa, Lilongwe University of Agriculture and Natural Resources, Malawi and Department of Agricultural Research Service, Ministry of Agriculture, Malawi, charlesharrynthewa@gmail.com
[2] Dr Keston Njira, Lilongwe University of Agriculture and Natural Resources, Malawi, knjira@luanar.ac.mw a
[3] Professor Patson Nalivata, Lilongwe University of Agriculture and Natural Resources, Malawi
[4] Associate Professor Joseph Chimungu, Lilongwe University of Agriculture and Natural Resources, Malawi
[5] Dr Austin Phiri, Department of Agricultural Research Service, Ministry of Agriculture, Malawi, phiriaustin534@gmail.com

Abstract: Soil degradation, nutrient depletion, and declining organic matter challenge smallholder farmers in semi-arid regions like Malawi. Legume-based intercropping and residue incorporation offer nature-based solutions to enhance soil fertility and climate resilience. This study assessed the effects of cropping systems and residue management on soil carbon storage and nutrient dynamics in cowpea (Vigna unguiculata) and pigeon pea (Cajanus cajan) intercropping systems under semi-arid conditions.

A field experiment conducted at Chinguluwe and Lunzu EPAs tested five cropping systems: sole cowpea, sole pigeon pea, sole sorghum, cowpea–pigeon pea intercrop, and a residue-removed control. Treatments followed a randomized complete block design. Crop residues were analyzed for nitrogen (N), phosphorus (P), potassium (K), and organic carbon (OC), while soil samples from 0–20 cm and 20–40 cm depths were analyzed for soil organic carbon (SOC), ammonium (NH_4^+), nitrate (NO_3^-), total nitrogen (TN), and phosphorus (P).

Intercropping significantly improved soil nitrogen through biological nitrogen fixation, enhanced SOC, and increased P availability, especially with residue incorporation. Cowpea residues, rich in nitrogen, decomposed rapidly, while pigeon pea contributed more biomass, supporting long-term SOC buildup. Residue incorporation increased NH_4^+, NO_3^-, TN, P, and SOC, with the highest benefits in intercropped plots. In contrast, residue removal, particularly in sole sorghum plots, led to nutrient decline.

These findings recommend cowpea–pigeon pea intercropping with residue incorporation as a low-cost, sustainable approach to boost soil health and productivity, especially in resource-constrained, drought-prone areas.

Key Words: Cropping systems, Intercropping, Residue Incorporation, Soil Organic Carbon (SOC), Biological Nitrogen Fixation (BNF), Nutrient Dynamics,

O3.4 - Prosperity in the soil: A Landscape Agroecology Case Study in Rural South Africa

Anthony Fry[1]
Justine Martin[2]
[1] University of the Witwatersrand
[2] Thanda

Abstract: Despite high unemployment and economic decline, small-scale agricultural engagement in rural South Africa is waning, with mixed impacts from social grants and inconsistent government support. Simultaneously, access to nutrient-poor food contributes to rising malnutrition and obesity. This paper presents a critical case study of Thanda, a South African rural development organisation pioneering a landscape-level agroecological system. Thanda's locally responsive program leverages agroecologicl principles to combat food insecurity, acting as an intermediary to cultivate a community-driven initiative informed by global trends. This research investigates the key factors influencing the success and sustainability of Thanda's agroecological intervention, employing a mixed-methods approach encompassing nine years of quantitative data and qualitative insights from a participatory system mapping workshop. Findings underscore the significance of local resource mobilization through bartering, Thanda's role as a connector, and the value of systemic, place-based interventions, notably the education-food nexus. The emergence of a landscape-level agroecological system requires multi-level coordination. At the farm level, Thanda has improved agricultural engagement by facilitating a shift from traditional cooperatives towards collaborative farms of individual producers. At the landscape level, Thanda provides essential logistic support, enabling the recycling of bio-inputs and market access. The paper identifies critical interventions for scaling landscape-level agroecology in rural South Africa and emphasizes the need for aligned support and paradigm shifts to achieve sustainable food system transitions.

Key words: agroecology, multi-level governance, food Security, South Africa, rural development

O3.5 - Towards agroecological transitions in Kenya: Reduction of Highly Hazardous Pesticides and Promotion of Safer Alternatives.

Eustace Gacanja[1]
Wycliffe Nyamao[1], Bo Larger[2]
[1] Kenya Organic Agriculture Network (KOAN);
[2] Swedish Society of Nature Conservation, (SSNC)

Abstract: The global food system faces urgent challenges related to environmental degradation, biodiversity loss, climate change, and food insecurity. The use of pesticides in agriculture poses substantial threats to human health, environment and general public's well-being. Some of the pesticides registered in Kenya have been withdrawn from other jurisdictions including the countries of origin. Studies done on pesticides residues on Kenyan local food have shown high concentrations of pesticides residues. There has also been an increase in interceptions of Kenyan exports especially to the EU mainly due to high levels of pesticides residues, resulting in foreign exchange losses, reduced farmer's incomes, and costly disposal, which burdens farmers further.

This paper explores the integration of agroecology and regenerative agriculture practices as transformative approaches to reduce reliance on Highly Hazardous Pesticides. Drawing on scientific literature, field studies, and case examples from Kenyan farming communities, it examines how these practices can reduce pesticides use while maintaining productivity. The paper also reviews the policy and institutional frameworks needed to support this transition. Findings underscore the potential of agroecology and regenerative systems to reduce use of hazardous pesticides, enhance sustainability and to build resilient food systems that are aligned with global sustainability goals and human rights obligations.

Keywords: Agroecology, Pesticides; Safer alternatives; Resilience

O3.6 - Climate-Smart Soil and Water Management in Smallholder Communities

Isaac Monjo Chavula[1]
Pitchernick Samuel[1], France Gondwe[1]
[1] Tiyeni Organisation, Malawi

Abstract: Tiyeni, a Malawian-led nonprofit organisation, has developed and scaled a proven, regenerative farming method—Deep Bed Farming (DBF)—that addresses two of Africa's most pressing challenges: soil degradation and water insecurity. Over the past two decades, Tiyeni has implemented DBF across Malawi's rural landscapes, working directly with more than 30,000+ farmers and many more indirectly through farmer-to-farmer learning. DBF combines a one-off deep tillage to break compacted soil layers to enhance aeration and water infiltration, and improve crop root development. The contour-aligned boxed furrows harvest rainwater, increase soil moisture retention, control erosion, and significantly increase crop resilience to dry spells. DBF integrates agroforestry, green-manure cover crops and organic cover on beds, enriching soils and improving soil health, leading to dramatic increases in crop yields (often doubling productivity), and water conservation.

This presentation showcases Tiyeni's field-proven successes and offers a compelling model for land restoration and climate adaptation that is both scalable and community-driven. In areas where DBF has been adopted, degraded land has been transformed into thriving, food-secure farms, while reducing pressure on natural water bodies and ecosystems. As climate challenges intensify globally, Tiyeni's work demonstrates that locally adapted, low-cost innovations can deliver transformative impacts in both agriculture and natural resource management.

We invite stakeholders, researchers, and policy leaders to explore and support the broader adoption of DBF as a viable solution for sustainable land use, water security, and rural livelihoods.

Online session 4 - Money, markets & power: Breaking barriers in rural food systems

2025-09-24
15:00 - 16:30
Online session 4 - Money, markets & power: Breaking barriers in rural food systems

O4.1 - Access to financial services and food expenditure in rural areas: a multidimensional causal assessment among farm women in Burkina Faso

Asmo GUIRA[1]
Faustine Kede Ndouna[2]
[1] Center for Economic and Social Studies, Documentation and Research (CEDRES), Thomas SANKARA University, Saaba, Ouagadougou, Burkina Faso
[2] Département d'économie du Development, University of Dschang Cameroun

Abstract: Facilitating women's access to resources on an equal footing with men is a prerequisite for achieving the goal of reducing hunger. Indeed, women's success has a knock-on effect on all communities, and per capita income in the long term could rise by almost as much. Increasing the share of women's income also influences spending on children. If women had the same access as men to means of production such as land, credit and fertilizers, their productivity would increase on a par with men's, and this would have a knock-on effect on household consumption.

This work aims to assess the causal impact of multidimensional financial inclusion on the food expenditure of agricultural women in Burkina Faso, by identifying the differentiated mechanisms by which this access improves food security at household level. Propensity score matching is used to reduce selection bias, and inverse probability weighted regression adjustment (IPWRA) was used to test the robustness of the results. The results show that financial inclusion improves women's food expenditure from 2172 to 2581 FCFA according to the matching method. These results underline the importance for policy-makers to promote innovative rural women's financial inclusion systems through investment in financial institutions. The development of policies aimed at empowering women economically through better financial education and easier access to financial services can contribute to achieving the second of the Sustainable Development Goals.

O4.2 - Diversity in market participation and effects on livelihood indicators: Insights from pastoral and agropastoral households in West Pokot, Kenya

Billy Ipara[1]
David Jakinda Otieno[1], Willis Oluoch-Kosura[1], Angela Andago[2]
[1] Department of Agricultural Economics, University of Nairobi, Kenya
[2] Department of Food Science, Nutrition and Technology, University of Nairobi, Kenya

Abstract: Market participation is an essential pathway to increasing household income, food security, and overall well-being, particularly among pastoral and agro-pastoral communities. Few studies investigate market participation among (agro)pastoralists, and the majority employ binary models that ignore different participation levels. Recent research on market participation further shows that households frequently sell part of their produce to meet financial necessities, thus no observable nonparticipants or nonzero sales. This renders binary approaches to market participation ineffective, necessitating the need for market analysis methodologies that capture varied levels of participation. Based on the aforementioned gaps, this study examined market participation through the lens of diversity. Using the structural equation model on data from 502 households in West Pokot County, Kenya, our study investigated how diversity in market participation affects sales income and food security. The findings demonstrate significant diversity in market participation among pastoral and agro-pastoral households. The findings also reveal that farm production diversity, land size, age, and education level are major drivers of diversity in market participation. Furthermore, we find that households with greater diversity in market participation have higher incomes, translating to lower levels of food insecurity, demonstrating the link between market participation and household welfare in pastoral contexts. The study suggests targeted interventions, such as integrated crop-livestock systems and market-oriented production, to enable pastoral and agro-pastoral households to diversify more effectively.

Keywords: Market participation diversity, pastoral and agro-pastoral households, Structural equation model, Income, food security.

O4.3 - Smallholder farmers' sales and market access through producer organizations in Nigeria: Are women left behind?

Oluwatosin A. Adewusi[1]
Victor Olusegun Okoruwa[1], Kabir Salman[1], Olubunmi Alawode[1], Temitayo Adeyemo[1], Oluwafemi J. Adewusi[2]
[1] Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria
[2] Centre for Health Services Studies, University of Kent, Canterbury, United Kingdom

Abstract: Inaccessible formal markets reduced income for smallholder farmers in many low- and middle-income countries, consequently weakening the food systems. While producer organizations help to overcome this challenge, gender inequalities undermine this innovation. This study investigated the gendered sales gaps and factors driving farmers' participation in producer organizations in Nigeria.

Using a multistage sampling technique, 604 smallholder farmers in two States with functional producer organizations (Kano and Plateau) were selected. Data was elicited using a pretested semi-structured questionnaire and analysed using the descriptive statistics and Blinder-Oaxaca decomposition model (p=0.01). Gendered sales gaps were analysed for males/females, male-headed/female-headed and *de jure*/*de facto* female-headed, households.

There were 63.7% male respondents. The farmers' mean age and education were 40.13±11.95 and 8.42±5.70 years, respectively. Male-headed households were 86.4%, and 47.9% participated in a producer organization. Of the 82 female-headed households, 70.7% and 29.3% were *de-facto* and *de-jure* respectively. The households' mean sales through producer organizations were 0.15 [male-headed=0.16, female-headed=0.07 ($p<0.01$)]. The sales gaps for the males/females, male-headed/female-headed and *de-jure/de-facto* female-headed, households were 0.37($p<0.01$), 0.30($p<0.01$) and -0.02($p=0.924$), respectively. Modern payment system endowment increased sales gaps for males/females (36.07%), male/female-headed (29.83%), and *de-jure/de-facto* female-headed (666.66%) households. For the male-headed/female-headed and *de-jure/de-facto* female-headed households, returns on credit access closed the sales gaps by 3.57% and 85.79% while returns on formal savings closed the gaps by 244.41% and 79.53%, respectively.

Gendered sales inequalities exist among smallholder farmers in Nigeria. To ensure a sustainable agricultural innovation with optimal benefits, agricultural stakeholders need to improve women's financial inclusion.

O4.4 - Making Enterprises at Every Vegetable Integrated Push Pull Technology Value Chain Node: Implications for Rural Women, Youth and Men in UPSCALE Project

Fredrick Aila[1]
Benjamin Ombok[1], George Odhiambo[1]
[1] Maseno University, Kenya

Abstract: Vegetable integrated push pull technology is an innovative adaptation by *icipe* under UPSCALE: EU-Horizon-2020 funded project. It adapts push pull technology by integrating African leafy vegetables in the traditional maize/sorghum cereals and companion fodder intercrops. African leafy vegetables improve food and nutrition of smallholder farmers. However, how can we make enterprises at each node of the value chain for long-run sustainability? Given the main issues challenging PPT long-run adoption, high-value African leafy vegetables have potential for creating enterprises. Making enterprises at each node of the value chain incentivises women, youth and men to agroecological transitioning. We use bottom-of-the-pyramid marketing, social entrepreneurship, actor-network and institutional theory as theoretical frameworks to reflect on how to make enterprises at each node of the value chains. We review extant literature and narrate user stories to fortify our arguments and propose implications for rural women, youth and men. We find that clustering, convening and networking among rural women, youth and men helps in organising them to exploit these opportunities. Training and capacity building/enhancement through dedicated extension service providers reduce skills gaps in production. Business development and advisory services are critical in transforming rural women and youth into social entrepreneurs. Vegetable integrated push pull technology enterprises can sustain agroecological transitioning among rural women, youth and men.

O4.5 - Evaluating Finance for Agrifood Systems: Lessons from Mauritania

Atisha Kumar[1]
Eleni Stylianou[1], Paul Cathala[1]
[1] FAO Investment Centre

Abstract: Financing is a key lever for sustainable agrifood systems. This paper develops an innovative approach to analyzing financing for food systems, aiming to engage policymakers on sustainable finance and how to unlock more and better investment. The country-level evaluation takes stock of existing finance around agrifood systems from public and private sources, highlights its levels, uses and how they shape productivity, scale and sustainability. It presents recommendations to improve the volume and composition of finance for agrifood systems transformation, emanating from the analysis and international examples.

We pilot this approach using data from Mauritania. First, we analyze data from Mauritania's budget from 2009-22 and central bank data on lending to the agrifood sector to analyze public and private financing and identify gaps. Second, we compile quantitative data on prices and trade with qualitative interviews with private sector companies, financial institutions and policymakers to shed light on barriers to private investment in the agrifood sector. On public finance, our findings show that policymakers allocate a large share of public funds to social protection programs, a low level of investment in research and development and extension and a low share of spending on fisheries given its value added to Mauritania's economy. On private finance, lack of storage, transport and logistics, and tailored financial products limit private investment at scale. These findings highlight that policymakers should assess allocating finance across value chains, focus on investment rather than short-term spending. Capacity development for financial institutions and better infrastructure can enhance investment in the sector.

Online session 5 - Facing the heat: Livelihood security and climate adaptation in vulnerable communities

2025-09-24
15:00 - 16:30
Online session 5 - Facing the heat: Livelihood security and climate adaptation in vulnerable communities

O5.1 - Enhancing climate resilience by fostering equitable norms in smallholder communities

Eleanor Fisher[1]
Patti Petesch[2], Jon Hellin[3]
[1] Nordic Africa Institute
[2] Independent consultant
[3] International Rice Research Institute

Abstract: The urgent need to address the inequitable consequences of climate change on food systems in smallholder communities in the Global South is widely recognised. While inequities are known, there is limited understanding of social processes that generate equity, and of how these dynamics can interact with climate adaptation to ensure sustainable food production and consumption. Engaging with theory about social equity and gender and social norms provides tools for opening this black box. We apply an innovative methodology that integrates social equity and justice theory rooted in participatory parity, or the values and norms that encourage people to interact with one another as equals; feminist sociology to address gender and agriculture; and, participatory action learning models. We illustrate our argument with case-study data from an agro-pastoral community in Kenya, drawn from a wider dataset. We argue that social equity is enhanced when a normative climate prevails that encourages the decision-making power and freedom of women, youth and other disadvantaged social categories—who, by their actions and interactions, effectively fuel more equitable terms of recognition, resource access, representation, and intergenerational security. Overall, we suggest that in the face of social processes that fuel inequities, participatory learning tactics can underpin subsequent strategies that may empower low-income women and men, and younger generations who often face the most restrictive norms on their agency, to identify, contribute to, and monitor actions that nurture equity-generating dynamics for food system resilience.

O5.2 - An integrated approach for seasonal planning in paddy cultivation: A case study in rural agrarian community in dry zone, Sri Lanka

Agampodi Supeshala Sithumini Mendis[1]
Ayomi Witharana[2], Upul Kumara Wickramasinghe[3]
[1] Division of Global Agriculture and Food Systems, Royal (Dick) School of Veterinary Studies, University of Edinburgh, United Kingdom
[2] Department of Zoology and Environment Sciences, Faculty of Science, University of Colombo, Sri Lanka
[3] Department of Social Anthropology, University of Edinburgh, United Kingdom

Abstract: Climate change, as a multifactorial phenomenon has begun to impact the paddy cultivation of Sri Lanka over the last two decades. Agricultural communities are severely affected by unexpected heavy rainfalls due to climate change which ultimately leads to food insecurity. This research study is conducted in Ginnoruwa, a rural village in the System C of Mahaweli Authority of Sri Lanka (MASL). Farmers use traditional knowledge to predict unexpected rainfalls and other extreme weather conditions and scientists of MASL use scientific facts-based computer simulations. This study explored the entanglements between farmers and officers of MASL due to changes in rainfall pattern for seasonal paddy cultivation. It was revealed that the commencement date of sowing with respect to timing of water release have a significant impact on the harvesting schedule in order to avoid the damage due to rainfall. Because, one single paddy season is last for 3-4 months hence the prediction on rainfall has become crucial factor to timing the harvest. Therefore, incorporation of farmers' perceptions into the seasonal planning will have significant impacts on reducing the effects of damages by rains. This study highlights the requirement of collaboration with stakeholders including farmers and scientists in seasonal planning of paddy cultivation. Moreover, this study contributes towards scientific, socioeconomic, and policy debates in Sri Lanka regarding climate change adaptation and water management in agriculture with reference to global discourse on climate change more broadly.

O5.3 - Effect of Green Interventions on Livelihood Diversification of Households in the Sahel States in Nigeria

Cecy Balogun[1]
[1] Centre for the Study of Race, Gender and Class, University of Johannesburg, South Africa

Abstract: The paper analysed the effect of green interventions implemented under the Great Green Wall Initiative on livelihood diversification in the Sahel states in Nigeria. The Sahel states in Nigeria continue to grapple with environmental degradation, climate change and socioeconomic variabilities, which exacerbate rural poverty, food insecurity and youth unemployment. The Nigerian government established the National Agency for the Great Green Wall to address desertification and land degradation problems. One of the strategies of the agency was the improvement of livelihoods in affected states. This study analysed the contribution of the initiatives of the agency to livelihood diversification in affected communities in some Sahel states in Nigeria. The study used primary data from Gombe, Kebbi and Sokoto states. The states were selected from the eleven frontline states in the Sahel states due to their high poverty rates. Livelihood diversification was determined by the respondents' continued utilisation of implemented green interventions. Regression analysis showed that the interventions of the agency influenced the diversification of the beneficiaries into other livelihood alternatives, underscoring the potential of the green interventions in improving the livelihoods of affected communities in the Sahel states in Nigeria. The paper recommends that increasing the number of beneficiaries of the initiative can address the problems of poverty and youth unemployment in Nigeria, and interventions like solar-powered boreholes should be prioritised given the relevance of water to the daily living of the beneficiaries.

Keywords: Great Green Wall; Livelihood diversification; Green interventions; Rural poverty; Capacity building

O5.4 - Rural mountain farming and conservation injustice in the Nepal Himalaya

Binod Adhikari[1]
[1] The Swedish University of Agricultural Science (SLU) and the Southasia Institute of advanced studies (SIAS), Kathmandu Nepal

Abstract: Nepal is witnessing a growing encounter between humans and wild animals, leading to significant consequences for rural livelihoods. Particularly, mountain farmers in the middle hills are facing unprecedented agricultural loss from wild animals. The concerns have grown about the conservation approach, which, on the one hand, has failed to deal with the wildlife issue, and on the other hand, has restricted local practices. This has created serious conservation injustice among the smallholder rural farmers. This paper demonstrates the evolving path of conservation strategies and their impact on human (farmers) and wildlife relations. The analysis draws on a critical policy review combined with insights from a field study within a framework of political ecology of conservation territoriality. The analysis highlights that the state's approach to conservation remains hierarchical, bureaucratic, and persistent in expanding territorial control over people and resources, and this has generated wider effects beyond the protected areas. The territorial conservation policies have extended across the farming landscape and other peripheral areas. This imposed similar restrictions that have been applied to the protected areas and limited the farmers' resource access and the practices of dealing with wild animals, and eventually created conservation injustice among the marginal farming communities. This paper argues that a farming landscape is different from the landscape that has been declared for strict conservation, potential, and values that are associated with both humans and wildlife. Therefore, it is crucial to rethink conservation strategies in the broader landscape and how to make practices more integrative, flexible, and context-specific.

O5.5 - Livelihood security shocks and coping strategies in the drylands of Kenya and Uganda - A seasonal analysis

Hawah Nabweteme[1]
Alice Turinawe[1], Goran Bostedt[2]
[1] Department of Agribusiness and Natural Resource Economics, College of Agricultural and Environmental Sciences, Makerere University, P.O. Box 7062, Kampala, Uganda
[2] Department of Forest Economics, Swedish University of Agricultural Sciences, SE-901 83 Uppsala, Sweden, and CERE, Centre of Environmental and Resource Economics, Umeå School of Business, Economics and Statistics, Umeå University, Umeå, Sweden

Abstract: Recurrent shocks and crises threaten dryland household livelihood security by jeopardizing their income and other means of sustenance. In the absence of social protection and weak institutional support, households resort to problematic coping strategies. These strategies have the potential to trap households in chronic poverty and a vicious cycle of livelihood insecurity. This study employed a panel data set from 698 households in the drylands of Uganda and Kenya to assess seasonal and country-level variations in shocks experienced by households, coping strategies, and their determinants. Findings indicate that shock incidences are significantly higher in Uganda's drylands compared to Kenya, particularly during the wet season. Although the degree, direction of influence, and importance varies by country and study site, results show that in the event of livestock death, livestock illness, and reduced crop harvest, households experiencing more shocks were more likely to adopt multiple coping strategies. Furthermore, households that belonged to social groups were less likely to reduce food consumption for all shock types, female-headed and larger-sized households, and those in the drylands of Uganda were more likely to reduce food consumption. The study advocates strengthening social protection programs and agropastoral systems, and prioritizing climate-smart agricultural practices. Furthermore, financial inclusion, access to extension services, organisation of communities into beneficial groups and cooperatives, and investment in human capital are recommended, with government and institutional support.

Keywords Drylands, livelihood security, shocks, coping strategies, Uganda, Kenya

Online Session 6 - Young Voices of Regeneration for Regenerative Food Systems: Youth Debate on Inclusivity, Policy and Food Systems

2025-09-25
14:45 - 16:15
Online Session 6 - Young Voices of Regeneration for Regenerative Food Systems: Youth Debate on Inclusivity, Policy and Food Systems

O6 - Young Voices of Regeneration for Regenerative Food Systems: Youth Debate on Inclusivity, Policy and Food Systems

Miriam Akinyi[1]
Alice Keru[1]
[1] EcoClimate Vision

Concept note: In the era of continuing climate change and ongoing food insecurity, young people, especially those from climate-vulnerable areas, remain underrepresented in food system governance. These young leaders face various challenges. They are disproportionately affected by climate-related challenges and are left out of the actual policy discussions shaping their futures. However, youth participation is pressing and essential as the world moves toward regenerative food systems.

This concept note proposes a 90-minute interactive session under the theme *Empowering the Next Generation of Food Systems Leaders*, which is meant to center and raise young people's voices. The session intends to critically analyze the current food governance narratives and provide practical ideas to guide policy, investment, and institutional practice supporting youth-led food system change.

The session will take place in two dynamic parts. First, a planned debate will investigate the motion: *Are today's food policies empowering or excluding youth from regenerative transformation?* Young leaders, policy makers, and scholars will debate contrary viewpoints, therefore creating a rigorous, evidence-based, intergenerational conversation.
Second, a storytelling and performance segment will highlight real-life stories through spoken word and visual expressions, showcasing how young people are changing food systems using indigenous knowledge, agri-tech innovations, agroecology clubs, and mentorship platforms. Throughout, themes of gender equality, mental well-being, and digital inclusion will be interwoven.

Finally, participants will participate in guided reflection and help build a group "commitment wall" describing institutional and personal subsequent actions. Performances and discussions will be recorded and shared with participants and online communities through social media for post-conference knowledge sharing and advocacy.
Expected results are more visibility of scalable, youth-led regenerative models and specific policy and funding recommendations. The session will combine grassroots knowledge with systems thinking and practice, prioritizing inclusivity by stressing marginalized voices across gender, geography, and age.

In conclusion, this session will position young people as active agents forming fair, resilient, and regenerative food systems today rather than as future leaders.

Keywords: Food Systems, Food policy, Climate change, Food security, Youth leadership, Youth.

Online session 7 - Green leaders rising: Women and youth in food fystem transformation

2025-09-25
14:45 - 16:15
Online session 7 - Green leaders rising: Women and youth in food fystem transformation

O7.1 - Women In Central Tribal India Building Regenerating Food System and Reviving Biodiversity

Vivek Kumar[1]
Darshana Goswami[1], Animesh Mondal[1]
[1] Samaj Pragati Sahayog

Abstract: Agriculture in the central Indian tribal belt is drought-prone, input-intensive, and largely followed by monocropping and conventional cropping patterns. These systems have led to declining soil health, reduced productivity, loss of biodiversity, and rising temperature, ultimately increasing vulnerability to climate change. The area covers 48.33% of small and marginal farmers[1] who majorly follow monocropping practices, which ultimately lead to excessive use of chemical inputs. This paper examines how community-led initiatives, particularly through women-led institutions, can help reduce climate change vulnerabilities. Additionally, this study examines how nature-positive agriculture and regenerative agriculture systems help reduce the input cost and revive biodiversity. By following the Diverse Cropping System (DCS) approach as a research methodology, the study analyses the cost associated with cultivation, including physical parameters of plants such as plant height, number of branches, fruits, and signs of disease infestation. Soil health indicators are also evaluated, incorporating factors such as environmental externalities and yield variabilities by random sampling using diagonal tagging to assess crop health. The results show how women farmers play a main role in creating overall resilience for climate change and restoring biodiversity, natural habitats, improved soil health, reduced input costs, and enhanced crop quality, ultimately increasing overall productivity. These outcomes contribute to climate resilience and food security. Through these results, we recommend a vision of women-led transformative change towards nature-positive farming and regenerative agriculture.

1. https://www.slbcmadhyapradesh.in/agriculture.aspx

O7.2 - Empowering Young Women through Vocational Training for Decent Work and Economic Growth

Doleh Khan[1]
[1] Markaz Community, Research and Development Foundation (RDF), Sindh, Pakistan

Abstract: Gender inequality and economic exclusion remain persistent in rural Asia-Pacific regions, especially in Sindh, Pakistan. Young women face deep-rooted barriers—limited access to education, cultural constraints, and scarce employment opportunities. This session highlights how vocational training is breaking these cycles by equipping young women with market-driven skills that foster economic independence and community development.

Focusing on the tailoring and beautician trades, the session will share the experiences of 254 women trained in Thatta (117), Sujawal (83), Badin (29), and Jamshoro (25). Through their stories, we align with SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), and SDG 4 (Quality Education), showcasing how skills training transforms lives and supports local economies.

A storytelling approach will bring forward powerful case studies of young women who've transitioned into self-reliant entrepreneurs. The session includes interactive discussions, role-plays, visual storytelling, and data-backed insights to enhance engagement and provide actionable recommendations.

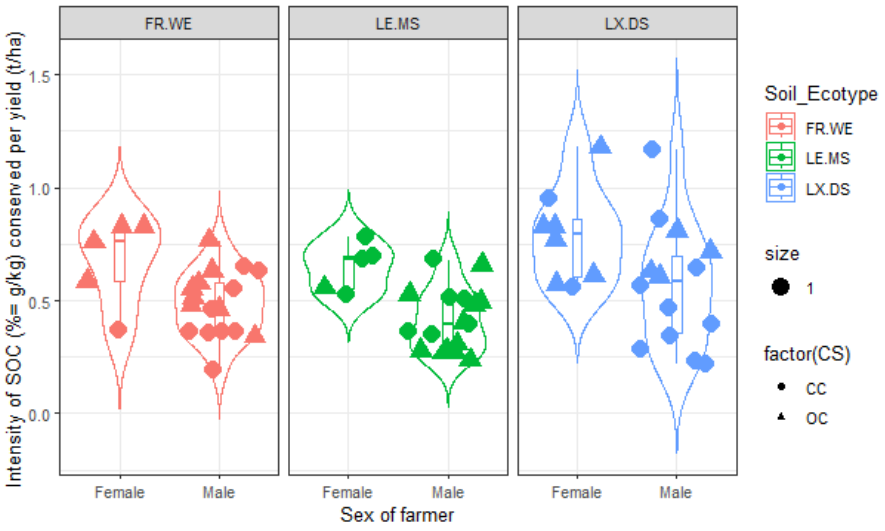
Participants will explore strategies for inclusive skill development programs, tools for policy advocacy, and models for cross-sector partnerships. The session aims to inspire replication of such programs across the Asia-Pacific, reinforcing the vital link between gender equality and sustainable economic development.

Empowering young women through vocational training is key to building resilient, inclusive communities and driving progress toward global sustainable development goals.

O7.3 - Geospatial and gender dynamics of cocoa productivity within organic and conventional agroforestry systems in Ghana

Eric Kofi Doe[1, 2]
Emmanuel Morgan Attua[1], Peter Bilson Obour[1], Frederick Amon-Armah[3]
[1] Department of Geography and Resource Development (DGRD), P.O. Box LG 59, Legon, University of Ghana, Accra, Ghana
[2] Department of Geography and Earth Sciences, University of Environment and Sustainable Development (UESD), PMB, Somanya, E/R, Ghana
[3] Social Sciences and Statistics Unit, Cocoa Research Institute of Ghana (CRIG), P.O. Box 8, New-Tafo, Akyem, Eastern Region, Ghana

Abstract: Unearthing geospatial and gender dynamics of land productivity is relevant for dismantling inequities in cocoa (Theobroma cacao L.) agroforestry food system support services while building climate resilience and gender empowerment. However, a paucity of information on the spatial distribution and gender dynamics of certified organic and conventional cocoa agroforestry systems is hampering the equitable distribution of development supports, reaching resource-deprived farmers. The current study examines the geospatial and gender dynamics of farmland productivity in certified organic and conventional cocoa agroforestry systems. Eleven conventional and 11 certified organic farms were randomly selected for comparative agroecosystem analysis using multi-stage stratified random sampling within three soil-eco types in Ghana. The data collected includes cocoa farm sizes and their polygons, yield and socioeconomic attributes of female and male farmers. Average nearest-neighbourhood (proximity) analysis revealed spatially dispersed polygons of both farms, limiting agglomeration potential due to limited connectivity. Furthermore, the results revealed significant gender disparities, with male dominance (80%) in cocoa farm ownership. Despite these gender disparities, the female (20%) farmers outperformed (1.4 ton/ha) their male counterparts (0.9 ton/ha) in land productivity. In addition, the female farmers were more likely to promote certified organic cocoa agroforestry systems while preserving soil organic carbon. These findings suggest that gender equity and spatial connectivity of cocoa agroforestry systems can empower resource-deprived farmers in achieving Sustainable Development Goals 2.3, 2.4, 5.7 and 13.1. Policymakers and stakeholders should engender cocoa support policies and services to target remote resource-derived farmers to build a climate-resilient and just cocoa agroforestry food system.



O7.4 - Strengthening Universities' Community Food Resilience by a Gender Equality Lens

Wilson Okaka[1]
Jospeh Rwothumio[1]
[1] Kyambogo University

Abstract:

Abstract 3: Theme 1 on Empowering the next generation of food systems leaders

Strengthening Universities' Community Food Resilience by a Gender Equality Lens

Names of Authors: Wilson Okaka and Joseph Rwothumio
Kyambogo University,P.O.Box 1, Kyambogo, Kampala, Uganda
Corresponding Author's Email: wokaka65@gmail.com

Abstract

Introduction: This paper explains the role of Ugandan universities in promoting gender-responsive community-based climate change adaptation (CBCCA) strategies for resilient and sustainable food systems. Despite their potential, many Ugandan university outreach programs are under-resourced and disconnected from the rural marginalized communities. **Objectives:** To assess the effectiveness of current university-led community outreach programs in promoting climate change adaptation for food systems. To examine the integration of gender responsiveness in university-community engagement models. **Methodology:** Analysis of peer-reviewed articles, institutional reports, and grey literature on university outreach, climate change adaptation, gender in agriculture, and sustainable food systems in Uganda and the region. National Climate Change Policy, Uganda Gender Policy, and university strategic plans) that guide university engagement and climate response. In-depth exploration of selected **Results:** The systematic literature review and case study analysis yielded the following findings: University outreach programs focus on agricultural extension, yet few explicitly address gender and climate resilience. Programs that involve community members, particularly women, in planning and implementation tend to show stronger outcomes in food security and climate adaptation. Gender-responsive approaches often improve adaptive capacity through knowledge co-creation, income diversification, and enhanced social capital. **Conclusions:** Ugandan universities possess significant untapped potential to support community-based, gender-responsive climate change adaptation. Strengthening institutional outreach frameworks, aligning them with national policy priorities, and building capacity for gender-integrated programming can contribute to sustainable and resilient food systems. **Recommendations:** Develop gender-sensitive community outreach frameworks across all universities. Strengthen partnerships between universities, government, civil society, and local communities for knowledge co-production. Establish university-based hubs for community-led climate resilience innovation.
Keywords: Ugandan Universities, Community Outreach, Gender-Responsive, Climate,

O7.5 - Are we equipping tomorrow's farmers? A systematic review of circular economy education in agricultural training

Noluthando Aruwajoye[1]
Rojanette Coetzee[1]
[1] School of Industrial Engineering, North-West University, South Africa

Abstract: Food security is a major global challenge, and young people are an important part of the solution. Preparing the next generation to lead in sustainable and regenerative farming is essential for improving food systems in a changing climate. This study shares findings from a systematic literature review that explored how students are learning about circular economy practices in agricultural education. Research articles were identified from three major academic databases: ERIC, Scopus, and Web of Science. More than 500 papers were screened, and those selected focused on student learning through surveys, projects, or practical experiences. Many studies used hands-on methods such as school gardens, project-based learning, and participatory research. These activities helped students understand key ideas like composting, managing water and waste, protecting biodiversity, and using resources efficiently. Most of the studies took place in universities, although some included secondary schools. Reported outcomes included stronger environmental awareness, better practical skills, and more sustainable habits. However, there are important gaps. Few studies looked at the long-term effects of these programs, and many did not include students from rural or low-income backgrounds, who are often most affected by poor farming systems. Additionally, there was limited focus on the use of virtual or digital learning tools, which could expand access to circular economy education, especially in remote or under-resourced areas. This review highlights useful teaching approaches and shows where more research and policy support are needed. To truly empower the next generation, education programs must be inclusive, practical, and focused on long-term change.

Online Session 8 - Hack the food system: Local know-how, global impact

2025-09-25
14:45 - 16:15
Online Session 8 - Hack the food system: Local know-how, global impact

O8.1 - Analyzing the Resilience of Organic Agriculture-Based Territorial Systems: The Case of Mallorca Biodistrict

Elham Kakaei[1]
Cesare Zanasi[1]
[1] university of Bologna

Abstract: In the face of increasing disruptions in the global food systems chains, due to climate change, pandemics, and conflicts, resilience has become a critical factor in building sustainable food systems. This study explores how biodistricts, local systems based on organic agriculture and community engagement, can enhance resilience. The research aims to develop and apply a comprehensive model to assess the resilience of biodistricts, aligned with the principles of the EU Green Deal and the UN Sustainable Development Goals.

The methodology combines an extensive literature review with stakeholders' consultation to tailor the model to the biodistrict context. The model includes four macro-domains representing key resilience dimensions: Adaptability, Culture, Communication, and Collaboration. Each domain includes specific classifications and indicators assessed through structured interviews.

The model was applied to the Mallorca Biodistrict in Spain. Results indicate that while the biodistrict shows strengths in community values and sustainability efforts, it faces significant weaknesses in adaptability, risk culture, and self-organization. In particular, limited redundancy, insufficient risk management strategies, and weak internal collaboration reduce its capacity to respond to shocks. Strengthening trust, planning capacity, and communication networks is essential to enhance resilience.

This study contributes to the understanding of how localized, organic-based food systems can adapt to external pressures, offering practical insights for resilience-building strategies in similar territorial contexts.

Keywords: Resilience, Sustainable food systems , Organic agriculture , Biodistricts, Mallorca

O8.2 - Would home gardening enhance food diversity? empirical evidence from home gardening households in Nigeria

Kehinde Paul Adeosun[1, 2]
Bola Titus Omonona[2]
[1] Department of Public Health, Policy and System, University of Liverpool, United Kingdom
[2] Department of Agricultural Economics, University of Ibadan, Nigeria

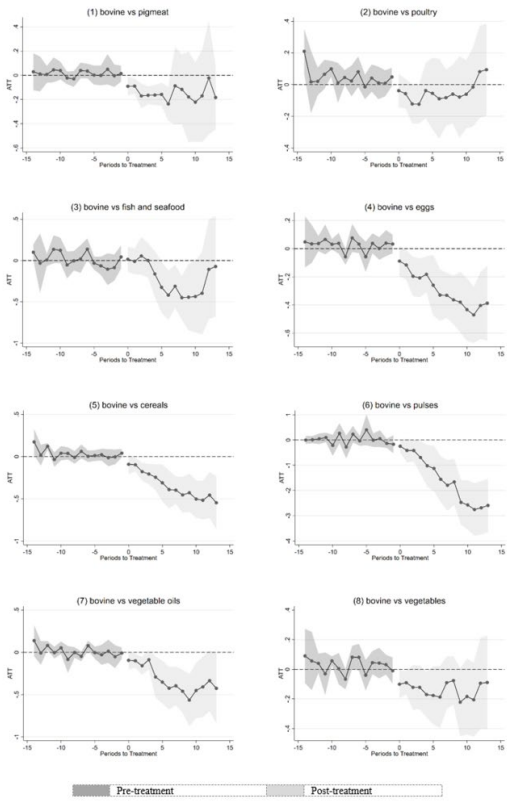
Abstract: Food insecurity remains a pressing challenge in sub-Saharan Africa, where many households face low living standards and limited economic access to diverse and nutritious foods. As a response, home gardening has been promoted as a sustainable strategy to improve food security. Although this practice has existed for decades, its specific impact on household food consumption remains underexplored. Therefore, this study investigated the effect of home gardening on household food item diversity in Southeast Nigeria. Data were collected using a four-stage sampling process. Three and four Local Government Areas (LGAs) were purposively selected from Enugu and Imo, respectively based on high gardening density. Fourteen communities (Enugu-6; Imo-8) were randomly selected proportionate to the sizes of the LGAs. Out of 2,170 home gardening households that were listed, 733 were systematically sampled. Primary data were obtained through a cross-sectional survey using semi-structured questionnaires. The data were analysed using descriptive statistics and a two-step quasi-poisson regression model at α_0.05. Household food item diversity was categorized into staple foods, pulses, vegetables, fruits, fats and oils, and meat. The findings revealed an alignment between the crops produced in home gardens and the households' food item diversity. Food diversity was significantly influenced by plant diversity, marital status, farming activity, household size, garden size, income level, and gardening experience. Home gardening enhanced consumption of staple foods and vegetables food items as most food crops grown in home gardening reflected significantly in food items consumption.

Key words: plant diversity, count-model, food access, food groups, gardening practices, food availability

O8.3 - From meat to plant-based products? The enduring impact of BSE on beef consumption

Jader Velasquez[1]
Shon Ferguson[2]
[1] Universidad de Antioquia
[2] Swedish University of Agricultural Sciencies

Abstract: This study redefines the impact of the BSE outbreak on EU dietary patterns, revealing a significant and lasting shift towards plant-based consumption. Utilizing advanced difference-in-differences techniques on 1980-2020 data, we demonstrate that while beef consumption exhibited a transient U-shaped recovery relative to other meats, it experienced a profound, persistent decline against plant-based products—averaging reductions of 79%, 29%, and 28% for pulses, cereals, and vegetable oils, respectively. This highlights a structural change in dietary habits, overlooked by traditional analyses focusing solely on meat-to-meat substitution. Our findings underscore the critical role of plant-based food groups as a robust control for assessing red meat demand shocks, revealing long-term dietary shifts obscured by conventional methodologies. The findings remain robust under several sensitivity analyses. This research highlights the lasting impact of food safety crises on consumption, suggesting policymakers adopt plant-based substitutions as a direct strategy with enduring effects during red meat demand shocks, benefiting both public health and environmental sustainability.



O8.5 - Comprehension on production practices, microbiological quality and consumer perception of lait caillé, reveals ways to promote its legacy

Geoffroy Romaric Bayili[1]
Charlotte Konkobo Yaméogo[1], Bréhima Diawara[1], Lene Jespersen[2], Hagretou Sawadogo-Lingani[1]
[1] Département Technologie Alimentaire (DTA), Institut de Recherche en Sciences Appliquées et Technologies (IRSAT), Centre National de la Recherche Scientifique et Technologique (CNRST), Ouagadougou, Burkina Faso
[2] Department of Food Science, University of Copenhagen, Rolighedsvej 26, 1958 Frederiksberg C, Denmark

Abstract: *Lait caillé* is a traditional fermented milk product in Burkina Faso. The objective of this study was to provide a global view on the production practices of *lait caillé*, in conjunction with the microbiological quality and consumer perception, as keys for comprehension and promotion of this traditional food legacy.

For this purpose, the production practices in rural and urban areas were identified through semi-structured interviews, while the perceived quality of *lait caillé* in urban area was investigated through a survey. Then, microbiological and physico-chemical parameters were analysed on samples from rural and urban sites. Finally, an attempt to improve the hygiene of the traditional processing was done with endogenous stains of Lactococcus lactis and Leuconostoc mesenteroides used as starter.

The results on the manufacturing processes revealed practices of spontaneous fermentation, backslopping and contact with bacterial biofilms attached to containers. The survey on perceived quality indicated that traditional lait caillé possessed a niche market which could be enlarged by implementation of good manufacturing practices in the production sites. The microbiota of the end products was characterized by high loads of *Enterococcus* spp., *lactococcus lactis*, Enterobacteria, *Saccharomyces scerevisciae, Candida* spp. and *Pichia* spp. Fermented milks by starter cultures showed improved hygienic quality and a positive sensory appreciation. However, a a dilemma, the use of selected strains as starters might be followed by loss of biodiversity and some features of the traditional lait caillé.

Keywords: *lait caillé*; traditional expertise; process upgrading; starter culture

O8.6 - Nudging Dietary Change towards Low-carbon Food: Real-World Experiment in China's Restaurants

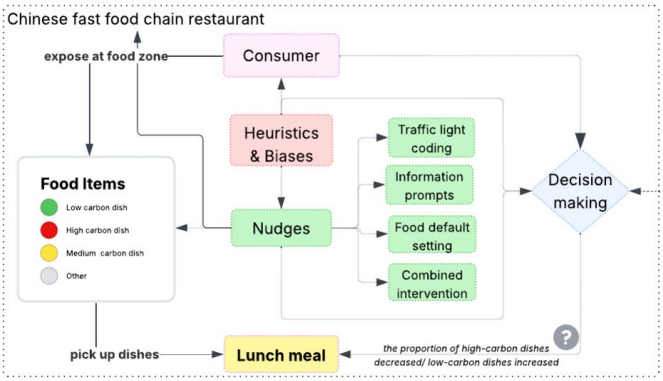
Xi Cao[1]
Xiangping jia[1], SHANG XU[2]
[1] Chinese Academy for Agricultural Science
[2] Ren min University

Abstract: Sustainable food consumption is critical to address global challenge such as greenhouse gas emissions and environmental degradation. In emerging economies like China, urbanization and changing dietary patterns have amplified the environmental footprint of food systems. Behavioral interventions and behavioral changes in these settings have profound impacts in transforming the agrifood sector towards sustainability.

This study implements a real-world field experiment using a difference-in-differences (DID) approach to evaluate the impact of green nudges on consumer dietary choices in fast-food restaurant settings in Beijing. An eight-week intervention was implemented across four fast-food chain restaurants in Beijing, serving 51,232 lunch meals (300-350 meals per lunchtime) with 30-50% membership consumers. Leveraging granular data from integrated Point-of-Sale (PoS) and digital payment systems, the study assesses the effectiveness of behavioral interventions, including traffic-light labeling, informational prompts, and default food settings, in promoting low-carbon food choices.

Results show that traffic-light labeling significantly reduced the selection of high-carbon, animal-based dishes, but its impact on plant-based dishes was limited. Informational nudges and knowledge-based messaging had limited influence, particularly in increasing plant-based food selection. These findings demonstrate the importance of localized, context-specific behavioral strategies that adjust the choice architecture to guide sustainable consumption.

The study's insights are particularly relevant to emerging economies in the Global South, where rapid urbanization and dietary transitions pose increasing environmental pressures. By embedding behavioral economics into business operations, this study provides actionable insights for policymakers and private sectors to implement scalable interventions that support global climate mitigation and environmental sustainability efforts.



Online Session 9 - Governance in action: Legal frameworks and local solutions for food security

2025-09-25
14:45 - 16:15
Online Session 9 - Governance in action: Legal frameworks and local solutions for food security

O9.1 - Governing innovation in agriculture: Insights from the legal and policy frameworks for biotechnologies and plant protection in the Global South

André Rosado[1]
[1] Department of Plant Breeding, Swedish University of Agricultural Sciences. Alnarp, Sweden

Abstract: Conventional agricultural inputs are widely used in farming systems to boost crop yields and protect plants from stress. While effective and affordable, these chemical inputs possess significant risks to human health, biodiversity, and climate. Global and national policies increasingly promote the reduction of chemical input use and the adoption of safer and more sustainable alternative. Innovative solutions have emerged, including products and organisms derived from agricultural biotechnologies and plant protection products. For example, some countries have embraced Genetically Modified Organisms (GMOs) and genome-edited products. Similarly, the use of agricultural biologicals as part of integrated pest management strategies is gaining attention. International and national regulatory frameworks have been developed to oversee the use of these products. In the Global South, such innovations present promising pathways to enhance food security and reduce poverty through more sustainable agricultural practices. This study offers an overview of global environmental policies and regulatory frameworks governing the use of agricultural biotechnologies and plant protection products in selected countries in the Global South. It analyzes key provisions within international biodiversity regime and relevant frameworks. Additionally, this study examines national laws and regulations related to these products and technologies in selected countries. The goal of this study is to enhance understanding of the role of how these policies and frameworks can support biodiversity protection and mitigate climate change while developing sustainable agricultural systems. This analysis serves as a basis for further discussion on the opportunities, challenges and repercussions of such global policies and national approaches in the Global South.

O9.2 - Mapping Policy Narratives on Land and Climate in Indian Parliamentary Questions Using Large Language Models

Tushar Singh[1]
Himangshu Kumar[2]
[1] International Food Policy Research Institute
[2] Atlas Public Policy

Abstract: Legislative discourse reflects how policymakers understand and prioritize environmental challenges. This study investigates how Indian parliamentarians frame issues related to land, climate, and food systems through agricultural questions posed in the Lok Sabha. We ask: What narratives emerge around land-system transitions, climate resilience, and sustainability, and how have these evolved over time?

We build a dataset of parliamentary question-and-answer texts from government records related to agriculture from the Indian Lok Sabha (2000–2024). Texts are extracted and enriched with metadata such as date, ministry, MP name, party, and region. Using large language models, we classify each question under a structured taxonomy of agri-environmental themes such as climate risk, irrigation, soil health, biodiversity, and land tenure. We then analyze emerging narratives and track changes in framing over time, linking these patterns to major policy events and variation by political party, region, and MP characteristics.

Preliminary results suggest a rising trend in climate-related questions. Irrigation and input-related concerns dominate consistently, while themes like biodiversity and soil health remain marginal. Discourse is often framed around scheme performance or administrative issues such as coverage, with relatively little attention to long-term sustainability or ecological impacts.

This study contributes an annotated dataset and a scalable method for applying LLMs to legislative discourse. It highlights how policy priorities are shaped in political forums and identifies gaps that may hinder more regenerative, climate-aligned food systems. The approach is transferable to other legislative datasets, offering a practical tool to support policy engagement and better align political attention with environmental urgency.

O9.3 - Turning Household Waste into Wealth: Our Experience with Garbage Sorting and Composting for Organic Farming

Robert Kibaya[1]
George Nsubuga[1]
[1] Kikandwa Rural Communities Development Organization

Abstract: In Uganda, household waste is often mixed from the point of generation to disposal, contributing to environmental degradation and poor agricultural productivity. Prior to adopting garbage sorting practices, our community experienced widespread littering, with plastics significantly harming soil biodiversity and leading to reduced crop yields.

Over the past six years, we, as a group of neighboring households, have implemented home-based garbage sorting as a grassroots solution to these challenges. By separating waste into perishable and non-perishable categories, we compost the organic material for use in our gardens, enhancing soil fertility, improving household hygiene, and increasing food production. Non-perishable waste, such as plastics, is collected and passed on to unemployed youth and women who sell it to recycling centers, creating an avenue for income generation and community empowerment.

This paper will share our experiences, benefits, and best practices in implementing a sustainable home-based waste management system. It will highlight how simple, community-driven initiatives can contribute to environmental conservation, improved livelihoods, and the promotion of organic farming.

O9.4 - Kenya's Food System Countdown Index: A Strategic Decision-Making Tool for Policy Action

Dorah Momanyi[1]
Deborah Nyanchama[2], Abigael Jepkosgei[1]
[1] The Centre for International Forestry Research and World Agroforestry Centre (CIFOR-ICRAF)
[2] Adaptive Management and Research Consultants (AMREC LTD)

Abstract: Kenya may be poised to build a resilient and inclusive food system for its citizens; however, the various frameworks and pathways lack or have an ineffective monitoring and evaluation frameworks to track the performance of food systems.

A Food Systems Countdown Index (FSCI) for Kenya can track and evaluate the progress of food systems enabling policymakers, advisors, private sector actors and civil society actors to monitor food systems nationally and at county level.

Using the Peng & Berry, 2018 method, a Kenya Food Systems Countdown Index (FSCI) was constructed with 23 variables from the food systems countdown initiative (FSCI) indicator framework. Data was obtained from the food systems dashboard.

The food system count down index remained constant between 2000 to 2008. However, it experienced negative dips between 2009 and 2012, 2012 to 2014 and 2018 to 2019 attributed to post-election violence following Kenya's 2007 general elections, the global economic downturn in 2008 contributing to a spike in food prices in 2009, a severe drought between 2008 and early 2010 and the global price volatility of food commodities in 2012. In 2019, the Covid-19 pandemic led to widespread disruptions in food supply chains. An average index of 0.59 in 2020 reflects a transitional phase with positive initiatives that are yet to transform food systems.

The Food Systems Countdown Index identifies gaps and provides data and insights necessary to make informed decisions, track progress, and ensure accountability in the transformation of food systems in Kenya.

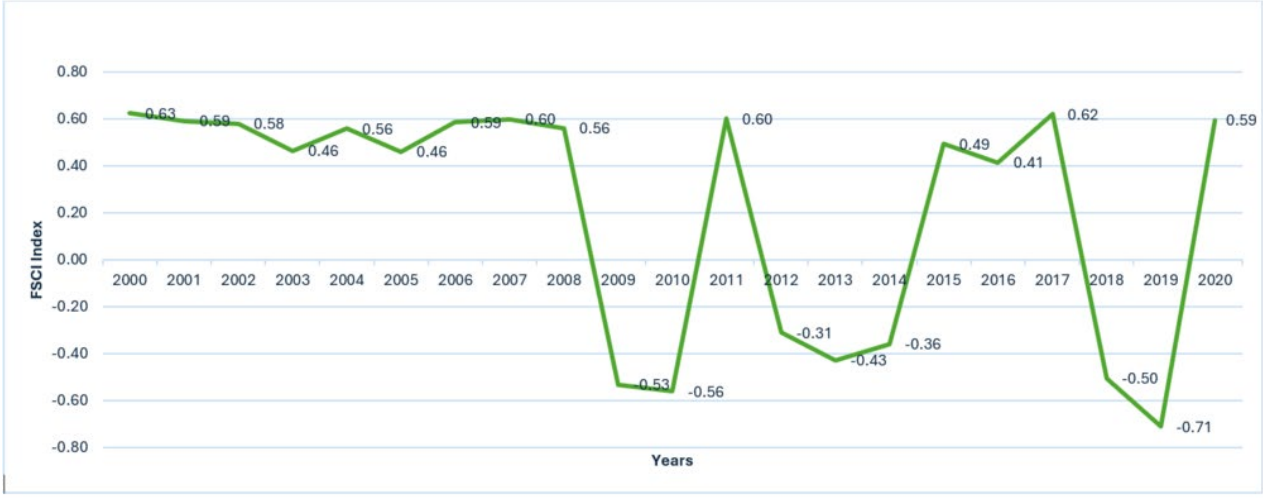


Figure 1: Kenya Food Systems Countdown Index

O9..5 - Commensuration: Jumping through certification hoops in Sweden

Aditi Bisen[1]
[1] Lund University, Helsingborg, Sweden

Abstract: This study responds to calls for interdisciplinary research on agri-food systems. It explores food certification processes such as 'organic', in relation to their implications on small-scale agroecological food production in Sweden.

The project utilizes qualitative data from 480 hours of ethnographic observations on a small-scale agroecological farm in southern Sweden, along with semi-structured interviews with actors.

Theoretically, this research draws on the concept of 'commensuration' within valuation theory from a resourcification perspective. '**Commensuration**' is about "expressing characteristics normally expressed in different units, according to a common metric".

This study problematizes '**metrics**' in certification processes. Certifications like organic focus on 'metrics' like pesticides, drug resistant bacteria, or beneficial fat levels. There is less emphasis on broader principles such as equity (through co-creation of knowledge, fairness, solidarity, responsible governance); or resilience (through diversity, soil health, synergies). Such principles are usually inherent in agroecological production.

Data from actor quotes shows how some conventional farms that follow the so-called required 'metrics' get easily certified as organic. On the other hand, small-scale farms that may follow deeper agroecological principles, somehow do not match the required 'metrics', and need to "jump through many hoops" to get certified. Thus, many times, these farmers prefer not to get certified. Instead, they rely on building relationships with customers, who care less about these certifications. These producers and consumers together create 'epistemic' communities of support.

Keywords: commensuration, certification, metrics, organic, agroecology

Online Session 10 - From code to crop: AI and digital tools in sustainable agriculture

2025-09-25
14:45 - 16:15
Online Session 10 - From code to crop: AI and digital tools in sustainable agriculture

O10.1 - A Unified Multi-Sensor Phenotyping Pipeline for Biomass and Yield Prediction in Barley (Hordeum vulgare L.) Under Field Conditions

Safaa Ouahid[1, 2]
Andrea Visioni[2], Anna Backhaus[2], José Antonio Jimenez Berni[3], Miguel Sanchez Garcia[2]
[1] Programa de Doctorado de Ingeniería Agraria, Alimentaria, Forestal y del Desarrollo Rural Sostenible. Universidad de Córdoba, Córdoba, Spain.
[2] International Center for Agricultural Research in the Dry Areas (ICARDA), Rabat, Morocco.
[3] Instituto de Agricultura Sostenible (IAS), Consejo Superior de Investigaciones Científicas (CSIC), Córdoba, Spain.

Abstract: Climate-resilient crop development requires field-based phenotyping methods that are scalable, high-resolution, and capable of capturing real-world variability. Barley, a drought-tolerant cereal, plays a key role in climate-smart agriculture, especially in dryland systems. We present an integrated high-throughput phenotyping pipeline under development, combining data from multiple sensors—including Light Detection and Ranging , multispectral, and Red Green Blue imagery—to enhance the prediction of complex traits in barley under field conditions.

The system is deployed on the PhenoBuggy, a ground-based phenomobile developed by the international center for agricultural research in the dry areas, which collects high-resolution, non-destructive data across thousands of plots. Over two seasons, we gathered multi-temporal data across diverse genetic panels and contrasting environments. Key plant traits such as canopy height, green cover, and spectral indices were extracted and analyzed over time. Early results show strong correlations between remote sensing features and agronomic traits like biomass, particularly under drought stress.

The pipeline's modularity and scalability make it especially valuable for National Agricultural Research Systems in resource-limited settings. By enabling faster and more precise trait evaluation, this approach supports breeding programs aiming to accelerate varietal selection under climate change.

This work demonstrates the potential of integrating advanced sensing tools and data-driven analytics into a unified phenotyping framework for dryland agriculture, contributing to more efficient and targeted crop improvement efforts.

O10.2 - From Wells to Fields: Applying Oil & Gas Data Intelligence to Agriculture in Emerging Economies

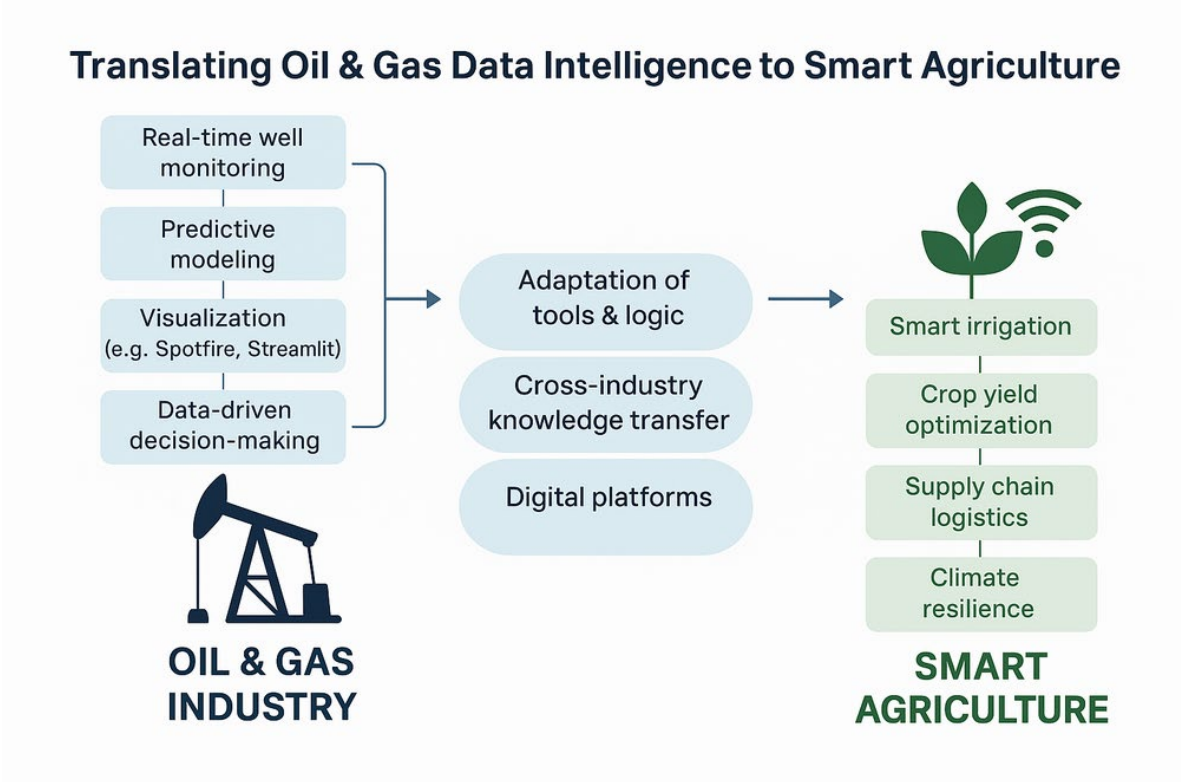
Lambert Allotey[1]
[1] University of Mines and Technology

Abstract: This abstract introduces a cross-disciplinary approach that applies data analytics methodologies from the oil and gas industry to agricultural systems in climate-vulnerable regions. Drawing from petroleum engineering workflows—specifically real-time well performance monitoring, predictive modeling, and data visualization tools like Spotfire and Streamlit—the concept explores how these same tools can be adapted to optimize crop planning, irrigation, storage logistics, and supply chain management in smallholder farming systems.

The proposal is grounded in the belief that resource-efficiency tools from energy-intensive industries can be repurposed to help communities in the Global South improve yields, reduce post-harvest losses, and adapt more effectively to climate shocks. By bridging industry knowledge and grassroots agricultural needs, this approach promotes smart, scalable solutions that align with both environmental and development goals.

The presentation seeks to invite dialogue around system innovation, cross-sector learning, and youth-led approaches to climate-smart agriculture.

Keywords: data analytics, sustainable agriculture, interdisciplinary innovation, smart farming, digital tools



O10.3 - Leveraging Artificial Intelligence for Future-Ready Food Systems: An Empowerment through Mainstreaming Informality of the Agriculture Sector

Vivek Soni[1]
[1] Faculty of Management Studies University of Delhi India

Abstract: The food sector is generally influenced by one of its conventional characteristics -i.e., informality, which allows it to function outside of formal legal and regulatory frameworks. However, it also faces challenges related to food safety, regulations, and access to resources. This research is inspired by the current technology shift, such as the emergence of potential artificial intelligence (AI) technologies to empower the agricultural sector, food security practices, and farming activities, and how to leverage informality into it. The research outlines the development of strategies at the national level to overcome the menace of food security by developing an appropriate AI model to consider enablers of the sustainable food supply chains, to consider elements of informality, to develop and validate an AI-based model to show data-driven demonstrations of the food supply chains (from raw material to consumption). The study will explore how AI can predict food demand and optimize logistics to minimize waste throughout the supply chain, reduce food waste, improve resource utilization, and increase food security. In terms of policy focus, the research leverages the advantages of AI models to show implications to academia and industry and suggest practices for new markets in the Indian farming and agriculture sectors. The study explores transformative pathways to sustainable food markets, encourages new ideas, supports leadership, and suggests policy solutions and the multilateral convention at the national and international levels.

Keywords: Artificial intelligence, agribusiness sector, food security, informality, empowerment

O10.4 - Fostering Sustainable Agriculture through Digital Agricultural Technology Education: Perspectives from West Africa's Academia

Boluwatife Bamidele[1]
Chiemerie Obiora[2]
[1] Department of Agricultural Economics, University of Ibadan, Nigeria
[2] Department of Agricultural Engineering, University of Nigeria, Nsukka, Nigeria

Abstract: Digital Agriculture Technology can enhance agricultural productivity and sustainability in West Africa. However, the educational curriculum in the region remains outdated. This study used mixed data from agricultural university students and lecturers in Nigeria's six geopolitical zones to assess awareness and perceptions about integrating digital agriculture into educational programs and preferred capacity training programs to enhance knowledge about digital tools.

Major findings reveal that among 111 respondents, 64.86% were male, and respondents had a mean age of 29.5 years. About 25.23% were undergraduates, 13.51% were final year students, 56.76% hailed from the South West, and 28.82% were from the Agricultural Economics Department. The highest weighted mean of 4.3 indicated familiarity with Mobile Money coupled with Digital Payment and E-commerce with Online Marketplace, unlike IoT for sensors with Soil Monitoring (3.1), and Blockchain Technology in Agriculture (2.8), which the respondents noted as the least familiar. Notably, 72.07% had not taken any course related to digital agriculture in their institutions. For preferred capacity-building programs, mentorship with experts and internships with AgTech companies received the highest ratings, scoring a weighted mean of 4.3.

The thematic analysis of in-depth interviews suggested a top-down approach to integrate Digital Agriculture Technology into the curriculum, starting with policy reviews to making digital agricultural courses compulsory for all agricultural students. Policy recommendations include targeted educational initiatives, collaborative projects, and practical training programs to harness this enthusiasm and advance the agricultural sector towards a digitally empowered and sustainable future.

Keywords: Sustainable agriculture, digital technology, educational sector, capacity building, students)

O10.5 - Challenges and Opportunities in the Adoption of Conservation Agriculture Technologies: A Case Study of Vibangalala EPA, Malawi

George Ndaziona Chidimbah Munthali[1]
[1] Mzuzu University

Abstract: Adopting Conservation Agriculture Technology (CAT) in rural Malawi is critical for enhancing food security and environmental sustainability. This study examines the challenges and opportunities in adopting CAT among rural farmers in Vibangalala EPA, Malawi. A quantitative cross-sectional design was used, employing structured questionnaires to collect data from 390 participants. Descriptive and inferential statistics were applied for data analysis, with statistical significance set at $p < 0.05$. Key challenges include time-intensive practices (47.9%), illiteracy (10.62%), and financial constraints, while opportunities include increased income (48.78%) and environmental conservation. Independent t-test findings show that there is no statistically significant difference between the balance between the challenges and opportunities ($t(10.578) = -1.098$, $p = 0.297$, CI = -19.78654-6.65745) but underscore the influence of socio-economic and institutional barriers. Adopting CAT requires strengthening social networks, improving literacy through community training, and providing financial and policy support. Future efforts should focus on regionally tailored, participatory interventions to foster sustainable adoption and long-term benefits.

Keywords: Conservation Agriculture Technology, Rural Farmers, SSA, Food Security, Sustainable Agriculture.

Poster onsite

2025-09-24
14:15 - 14:45
Poster session

P1.1 - ASSESSMENT OF LIVESTOCK MANAGEMENT SYSTEMS, FEED AVAILABILITY AND UTILIZATION FOR IMPROVED BEEF CATTLE PRODUCTIVITY IN THE RANGELANDS OF KARAMOJA

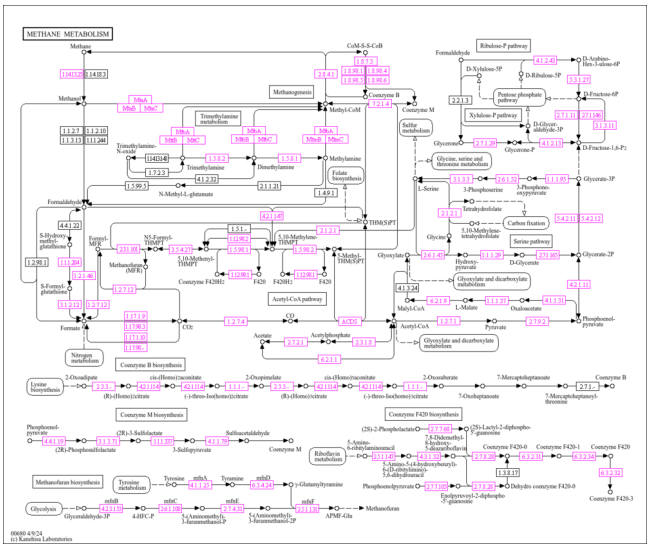
Agnes Nabong[1]
Denis Mpairwe[1], Alice Turinawe[2], Gert Nyberg[3], Horacio L Gonda[4], Ewa Wredle[4], Aida Bargués-Tobella[3], Ingrid Öborn[5]
[1] Department of Animal and Range Sciences, School of Agricultural Sciences, College of Agricultural and Environmental Sciences, Makerere University, P. O. Box 7062, Kampala, Uganda
[2] Department of Agribusiness and Natural Resource Economics, School of Agricultural Sciences, College of Agricultural and Environmental Sciences, Makerere University, P. O. Box 7062, Kampala, Uganda
[3] Department of Forest Ecology and Management, Swedish University of Agricultural Sciences, Lövstigen 57, 90343 Umeå, Sweden
[4] Department of Applied Animal Science and Welfare, Swedish University of Agricultural Sciences, Ulls väg 26, 756 51 Uppsala, Sweden
[5] Department of Crop Production Ecology, Swedish University of Agricultural Sciences (SLU), P.O. Box 7043, SE-750 07 Uppsala, Sweden

Abstract: The main economic activity for Karamoja region is livestock production and wildlife conservation thriving in a rangeland ecosystem. Livestock productivity in Karamoja rangelands is faced by multifaceted challenges of land degradation exacerbated by climate change. Some of the major effects of rangeland degradation are reduced quality feed availability especially during prolonged drought periods amidst abundance during the rain seasons. The feed scarcity is exacerbated by increasing population pressure and overgrazing due to changes in land use systems and diminishing traditional rangeland pastoral resource management. The main livestock (beef cattle) productivity is low with animals taking more than 5 years to attain market weight. In wet season, there is abundance of grass which is always burnt. This grass could be conserved as hay and utilized together with other untapped feed resources in Karamoja during prolonged droughts when there is pasture scarcity. *Lablab purpureus* is a drought resilient protein-rich legume that grows well in the drylands of Karamoja. Arguably, utilization of conserved pasture and lablab hay would offer strategic feeding for livestock production in Karamoja drylands. Therefore, this study will assess livestock management, feed availability and utilization practices that will offer options for improved beef cattle productivity in Karamoja. Household surveys, FGDs and KIs will be conducted to obtain data for assessing livestock management systems, feed availability and utilization. A community feeding trial will be conducted to assess the effects of lablab hay supplementation of Karamajong Zebu cattle grazing natural pastures on feed conversion efficiency, weight gain and meat yield.

P1.2 - Deciphering Seasonal Microbiome Adaptations in Ethiopian Boran Cattle Under Climate Stress

Renaud Van Damme[1]
Wondossen Ayalew[2], Getinet Mekuriaw Tarekegn[3], Juliette Hayer[4], Tomas Klingström[1], Erik Bongcam-Rudloff[1]
[1] Swedish University of Agricultural Sciences
[2] South China Agricultural University
[3] Scotland's Rural College
[4] French National Research Institute for Sustainable Development

Abstract: Ethiopia is Africa's largest beef cattle producer, with over 70 million head playing a central role in the economy and rural livelihood. Unfortunately, the harsh seasonal environmental changes make cattle farming a complex challenge. Climate change is slowly but undeniably deepening the variation in seasonal conditions, such as more intense droughts and heat waves or shorter rainy seasons. This climate change is fuelled partly by the greenhouse gases emitted by farming.
Thus, we have decided to investigate the changes in the microbiota of Indigenous Ethiopian Boran cattle between the dry and rainy seasons. To do so, we have used tools developed in-house and publicly available (MUFFIN and PANKEGG), and tools already freely available.
The aim was to discover which microorganisms were present in which season and their involvement in different metabolic pathways. Twenty individuals were sampled during the dry season, but only 7 survived the drought.
466 metagenome-assembled genomes were retrieved from 7 individuals sampled during the dry and rainy seasons, 70.26% of the orthologs present in the methane metabolism pathway were found through all of those genomes, covering most of the different sub-modules (see picture below).
Other variations between the dry and rain seasons were observed, such as the volatile fatty acids biosynthesis or Vancomycin resistance, which will be detailed in the presentation.
Our microbiota studies have generated a wealth of data that can serve as a foundation for future research into how cattle and their microbiomes adapt to seasonal and extreme environmental changes.



P1.3 - Utilization of Marula Nutritional food products targeting children in South Africa

Fanny Åberg[1]
Nomusa Dlamini[2], Buntubonke Gom[2], Sarah Forsberg[1], Oluwafemi Adebo[3], **Viktoria Olsson**[1]
[1] Kristianstad University, Department of Food and Meal Science, Sweden
[2] The Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa
[3] University of Johannesburg, Department of Biotechnology and Food Technology, South Africa

Abstract: Climate change and food insecurity are growing challenges, particularly in sub-Saharan Africa. This Minor Field Study, funded by the Swedish International Development Cooperation Agency (SIDA), explored the potential of using Marula (*Sclerocarya birrea*)—a locally grown but underutilized indigenous fruit—in the development of a nutritious food product targeting children in South Africa. The project applied the Creative Design methodology, combining laboratory analyses, product development, consumer testing, and surveys to assess Marula's feasibility as a food ingredient. Marulawas processed using traditional methods and evaluated through pH, Brix, microbial testing, and analysis of aroma compounds using GC-MS. A smoothie prototype was developed, and two recipes were tested with a sensory panel (n=54) using a hedonic scale. The pH values confirmed microbiological safety, and GC-MS identified key aroma compounds with sweet, woody, and herbal notes. Sensory evaluation showed no significant differences between recipes, indicating good versatility of Marula juice in product development. A follow-up survey (n=24) revealed positive attitudes toward Marula-based products, with suggestions for incorporating it in beverages, snacks, and dairy products. However, barriers were identified, such as limited accessibility and consumer purchasing habits. The results highlight a market opportunity for culturally relevant, nutrient-rich foods using local ingredients like Marula. This study supports the development of sustainable, health-promoting food solutions while empowering rural communities and preserving local food heritage. Further research is recommended to explore children's acceptance, optimize product formats, and address challenges related to seasonality and processing. The findings align with the UN Sustainable Development Goals, targeting nutrition, sustainability, and poverty reduction.

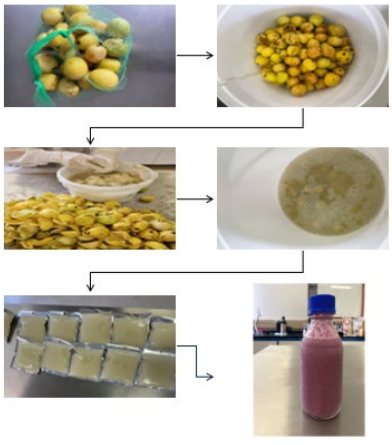


Figure 1. Processing the Marula fruit. Photographer: Fanny Åberg

P1.4 - Systematic literature review and meta-analysis for evidence-based practice in public health: A case of East African Community

Maureen Kuboka[1, 2]
Ianetta Mutie[2], Karin Artursson[1, 3], Johanna Lindahl[2, 3, 4], Florence Mutua[2], Gunnar Carlsson[1], Delia Grace[2, 5]
[1] Department of Animal Biosciences, Swedish University of Agricultural Sciences, P.O. Box 7036, SE-750 07, Uppsala, Sweden,
[2] One Health Research, Education and Outreach Centre in Africa, International Livestock Research Institute, P.O. Box 30709, 00100, Nairobi, Kenya,
[3] Swedish Veterinary Agency, SE-751 89 Uppsala, Sweden, 4Department of Medical Biochemistry and Microbiology, Uppsala University, P.O. Box 582, SE-751 23, Uppsala, Sweden,
[4] Department of Medical Biochemistry and Microbiology, Uppsala University, P.O. Box 582, SE-751 23, Uppsala, Sweden,
[5] National Resources Institute, Faculty of Engineering and Science, University of Greenwich, Kent ME4 4TB, United Kingdom.

Abstract: Systematic literature reviews are considered the highest level of evidence in evidence-based practice.

We conducted a systematic review with meta-analysis to understand levels of three important pathogens in foods in East African Community countries. The aim was to provide evidence for action and policy towards improving food safety and public health.

Published and unpublished literature were retrieved from online databases and university repositories. Studies published between 2000 and June 2022, used probabilistic sampling approach and reported proportion of positive samples were considered. Review was conducted with two reviewers according to PRISMA guidelines and aided by Rayyan AI-tool.

Out of 4133 records, 53 were included in this review. Most studies were conducted in Kenya (n=22) and Tanzania (n=21), no studies were retrieved for Burundi and South Sudan. Studies were only found from 2006 onwards. *E. coli* was the most studied, followed by *Salmonella* spp. Fewer studies analysed *Campylobacter* spp.

Meta-analysis in STATA revealed pooled prevalence of 5.0%, 12.1%, and 38.8% for *Campylobacter* spp., *Salmonella* spp. and *E.coli*, respectively. Meat, especially chicken meat, showed the highest prevalence for the three pathogens. Ready-to-drink beverages were highly contaminated with *E.coli* and *Salmonella* spp. Processed foods were less contaminated than raw foods. Using metaregression, high heterogeneity could be explained by sample sizes and differences in sample types.

Our review highlights gaps in food safety research in the region and evidence on *Campylobacter spp.* Efforts to reduce pathogen levels in food are required to reduce the risk of foodborne diseases.

Keywords: Foodborne diseases, Risk, Pathogens, Policy, Africa

P1.5 - Mind the gap: Bridging Research and Innovation for food waste reduction with Lebanese Agro-Industries

Nathalie Pano[1]
Nada Nehme[1, 2], Jalal Halwani[1, 3], Konstantinos Karantininis[4], Najah Taleb[2]
[1] Doctoral School of Science and Technology, Lebanese University, Hadath, Lebanon
[2] Lebanese University, Faculty of Agricultural Engineering and Veterinary Medicine, Dekwene, Lebanon,
[3] Lebanese University, Water & Environment Science Lab, Tripoli, Lebanon
[4] Swedish University of Agricultural Sciences, Alnarp, Sweden

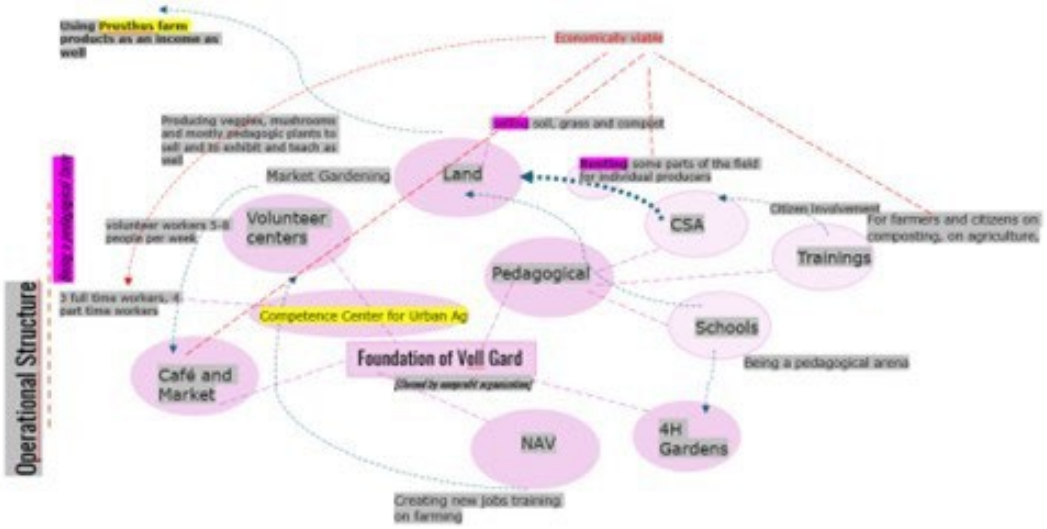
Abstract: Over the past decade, scientific literature on food waste and loss (FLW) has expanded rapidly, especially since 2010, reflecting growing global concern and research investment in this area. Understanding and knowledge of value chain actors regarding this issue are vital for kick-starting initiatives and implementing processes to measure, prevent, and reduce FLW. In developed countries, the value chain actors are participating in the change. But what about the developing countries such as Lebanon? What is the level of knowledge of the Lebanese food-industries toward FLW? In a survey, 30 agro industries answered 3 questions, first about the importance of the topic, second to define food waste, and after clarifying what FLW is, a third question, about what is required to prevent and reduce waste and loss, is asked. This study shows that despite the importance of the FLW issue among the Lebanese agro-industries, there is a significant gap in their FLW' knowledge, that hinder the actions to prevent FLW, 20.69 % have no knowledge at all, 31.03% misunderstand the issue, 27.59% have partial knowledge and only 20.69% have extensive knowledge. Finally, awareness and knowledge about FLW are considered essential in addressing this global challenge. With informed individuals and organizations, effective strategies can be implemented to reduce losses along the entire value chain and work towards sustainable food systems. To foster significant advancement in developing countries, collaboration between agro-industries and researchers is essential, including co-creation of knowledge, participatory research, and better knowledge dissemination practices.

P1.6 - Mapping Food Policies and Urban Pedagogies: Voll Gård as a Good Practice

Beste SABIR ONAT[1]
Heidi VINGE[1]
[1] Nord University

Abstract: The deficiency of food policies increasingly threatens access to healthy food and access to land as well (for citizens and farmers). The *food* by itself became an argument. Every country -in between these interwoven instabilities- emergently needs to prepare their own policy landscapes on multi-scale, related to food provisioning and food system transitions.

This is a complex systemic theme therefore mapping these relations and understanding the stakeholder network possibilities and capabilities is a must to develop *place-based strategies* and policy related interventions and outputs. In this proposal, we use *mapping* as a tool to underpin these informal and formal relations and unfold the policy and relation-based networks in Trøndelag region, Norway. We focus on Voll Gård as a case study: in the Center of Trondheim a pedagogical farm and urban competence center supported by national and regional bottom-up food policies, and as a grassroot organization the farm is dissolving and engaging with the dwellers of the city. 'Regeneration is not only about soil, but also about the people.' Small holder 1, in Trondheim. (From qualitative data research, JustGrow project). We aim to discuss how urban agriculture and sustainable living practices are supported by the urban planning policies on multi levels, how food is interpreted, how the sustainable living practices are understood as a multifaceted issue, and the citizens are supported. While focusing on those relations, on city and regional level, we aim to embed mapping as a facilitator into this process and share a *good practice* with the academia.



P1.7 - Effects of land use/cover type and seasonality on pasture biomass, species richness and diversity in the rangelands of Karamoja, Uganda.

Nabbanja Zamzam RAHMAH[1]
Aida Bargués-Tobella[2], Kamatara Kanifa[1], Leigh Ann Winowiecki[3], Tor-Gunnar Vågen[3], Ingrid Öborn[4], Denis Mpairwe[1]
[1] 1.Department of Animal and Range Sciences, College of Agriculture and Environmental Sciences, Makerere University
[2] 2.Department of Forest Ecology and Management, Swedish University of Agricultural Sciences(SLU) Umeå SE-901 83, Sweden
[3] 3.World Agroforestry (ICRAF), P.O.Box 30677-00100, Nairobi, Kenya
[4] 4.Department of Crop production Ecology, Swedish University of Agricultural Sciences (SLU), P.O. Box 7043, SE-750 07 Uppsala, Sweden

Abstract: Pasture biomass and species richness and diversity influence both the health of rangeland ecosystems and the livelihoods of (agro) pastoral communities who rely on these ecosystems for livestock production. However, changes in land use/land cover (LULC) have adversely affected pasture biomass and species composition, diminishing available grazing resources despite rising livestock populations. While much research has focused on LULC dynamics, their drivers, and, to some extent, their impact on pasture biomass, the effects on pasture species composition and diversity remain largely unexplored. This study aimed at determining the effects of LULC on pasture biomass, species richness and diversity in the rangelands of Karamoja, Uganda. Using the rangeland module in the Land Degradation Surveillance Framework, field data were collected from 155 plots across two sites – Rupa (pastoral) and Matany (agro-pastoral) – during both dry and wet seasons. Plots were classified by LULC type, and Shannon diversity index and species richness were calculated in R. Mixed effects models were used to assess the effect of LULC and seasonality on pasture biomass, species richness and diversity. Results indicate that LULC types with a woody vegetation component tended to be more diverse in terms of pasture species while biomass was higher in grasslands. Additionally, dry season negatively impacted biomass, species richness and diversity, and pastoral rangelands were significantly different from agro pastoral rangelands. These results highlight the need for climate-smart and sustainable rangeland management strategies that consider both land cover and seasonality to maintain pasture biodiversity and support resilient pastoral systems.

Effects of land use/cover and seasonality on pasture composition and biomass in Karamoja

Land cover types

Background

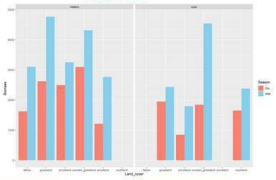
- Land use/cover changes affect pasture quality which in turn affects livestock production in rangelands
- The composition and quantity of pasture in the resultant cover types/uses are not know
- This affects the availability and quality of grazing resources resulting in range deterioration and degradation
- Sufficient biomass and species composition are important for sustainable livestock production

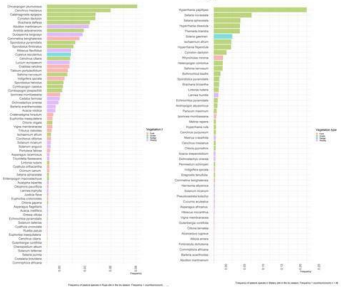
Findings

- Woody cover types are more diverse than grass dominated ones
- Grass dominated cover types have more biomass
- Wet season has more species and biomass than dry season
- Pastoral rangelands have more species than agro pastoral rangelands
- Agro pastoral rangelands have more biomass than pastoral rangelands

Nabbanja Zamzam Rahmah
Makerere University
MSc. Animal Science

Results





P1.8 - Gender dynamics in smallholder poultry farming in rural Rwanda- More than just money "amafaranga"

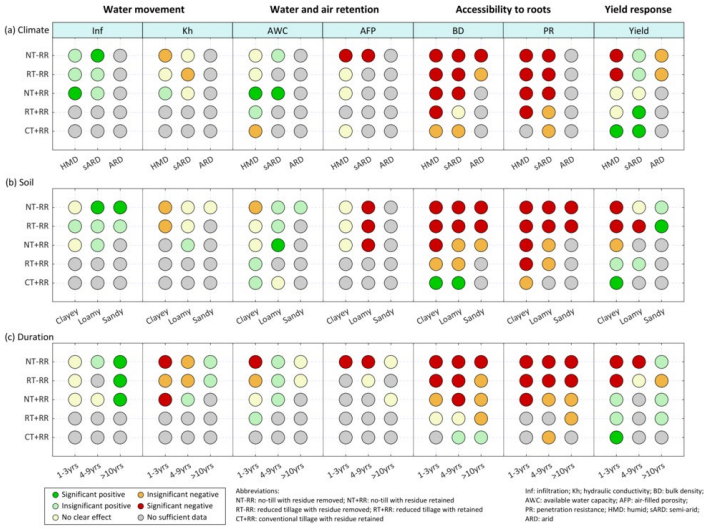
Marie Christine Dusingize[1]
[1] University of Rwanda

Abstract: In Rwanda, smallholder poultry farming is a key rural development strategy aimed at addressing animal protein deficiencies, improving household incomes, and empowering poor communities. However, gender inequalities and limited access to resources continue to constrain its potential, particularly for women. This study explores how current smallholder farming practices intersect with cultural norms and gender relations, with a focus on socio-economic aspects and household care work. Framed through Feminist Economics Theory, which critiques how traditional economic models often ignore informal and unpaid labor,especially women's contributions in agriculture. The study was conducted in Musanze District, Northern Rwanda, and used purposive snowball sampling to select 36 smallholder poultry-keeping households. Data were collected through key informant interviews, focus group discussions, in-depth interviews, and participant observation, and were thematically analyzed using MAXQDA software. Three strong and recurring themes emerged. First, the meaning and significance of poultry keeping, where women, especially widows primarily value poultry for manure, food, income, and social protection, while men focus on income, productivity, manure, and asset growth. Second, poultry, gendered division of labour, care work, and water access, revealing that women bear the burden of unpaid on-farm and domestic tasks, including poultry care and collecting water, while men engage in income-generating activities. Third, poultry keeping as a gendered pathway to asset building, showing that men build assets through investment in hybrid chickens and larger livestock, whereas women rely on smaller animals and land renting. The study concludes that poultry farming holds transformative potential if gender-responsive support structures are strengthened.

P1.9 - Effects of reduced soil disturbance and residue management on soil-plant-water relations

Mosisa Tujuba Wakjira[1]
Renske Hijbeek[1], Joost van Heerwaarden[1], Johan Six[2], Katrien Descheemaeker[1]
[1] Plant Production Systems Group, Wageningen University and Research, Wageningen, The Netherlands
[2] Institute of Agricultural Sciences, ETH Zurich, Switzerland

Abstract: Conservation agriculture (CA) -- a farming practice that is based on three key pillars: reduced soil disturbance, residue retention, and crop rotation -- is promoted as a viable solution to reduce soil degradation, restore soil health, enhance climate resilience in crop production, and mitigate greenhouse gas emissions. Here, we evaluate the effectiveness of no-till (NT), reduced tillage (RT), and residue retention (RR) under different climate and soil conditions from the perspective of soil-plant-water relations. We conducted a global meta-analysis based on 3264 observations from 302 studies to examine how these practices modify soil properties that govern soil-water functions and crop yield. Our results reveal that implementing NT and RT, with or without RR, has no effect on infiltration in the short term (1–3 years), but improves infiltration in the long term (>10 years), particularly in loamy and sandy soils in semi-arid climates. No-till significantly reduces the available-water capacity (AWC) in clayey soils in the short term. However, when combined with RR, it improves AWC, especially in loamy soils. No-till also reduces air-filled pores (AFP) in loamy soils in humid and semi-arid climates. The decline in AFP likely contributes to the observed reduction in humid regions, possibly due to waterlogging. Additionally, NT and RT, regardless of RR, increase soil penetration resistance across all climates and soil types. In conclusion, reduced soil disturbance improves infiltration and soil moisture, but crops benefit minimally from these improvements due to a simultaneous soil compaction that 1) hinders root penetration, 2) decreases available water, 3) limits soil aeration.



P1.10 - A spatial-temporal analysis of the impact of sustainable aquaculture certification on mangrove protection in Vietnam

Uyen Tran[1]
Yaghoob Jafari[1], Lisa Biber-Freudenberger[2, 3], Jan Börner[1, 2]
[1] Institute for Food and Resource Economics (ILR), University of Bonn
[2] Center for Development Research (ZEF), University of Bonn
[3] Institute of Crop Science and Resource Conservation (INRES)

Abstract: With the increasing importance of aquaculture in the global food system, understanding the effectiveness of governance frameworks in promoting sustainable aquaculture value chains is essential. One common concern is the role of aquaculture in driving mangrove loss. Here we ask how market-based conservation interventions, such as sustainable aquaculture certifications, can help curb this loss. Our study evaluates the impact of sustainable aquaculture certifications on mangrove cover. In theory, certified farms offer a win-win model that simultaneously enables environmental and economic sustainability. Certifications may affect mangrove extent directly by requiring mangrove restoration before approval and by monitoring compliance via annual farm audits. Indirectly, they may promote mangrove conservation practices to neighboring farms. Focusing on Vietnam's Mekong River Delta, we compile a spatial-explicit dataset including thirty-year land use change and records of certified shrimp farms. Using matching methods and event-study estimations, we assess the difference in mangrove cover in grid cells with and without certified farms. While we do not find robust evidence for an overall effect of certification on mangrove extent, we observe that a higher concentration of certified farms in a given cell is associated with higher mangrove cover – especially prior to the official certification and in the first year of the certification cycle. Our study provides evidence of the landscape and temporal dynamics of sustainable aquaculture certifications, offering insights for future design and upscaling of certification.

P1.11 - Grasses for the Future: Engaging Youth through Taxonomy Workshops for Education, Awareness, and Regenerative Food Systems

Chandrakant Salunkhe

Abstract: Grasses, often called the “green gold” of the Earth, represent one of the most diverse and ecologically significant plant families, underpinning food systems, and human livelihoods. They form the backbone of global agriculture, from staple crops to fodder grasses that sustain livestock and pastoral systems. Yet, despite their ecological and economic significance, grasses remain understudied in both education and conservation initiatives. To bridge this gap, a comprehensive identification key has been developed from over 35 years of research, featuring diagnostic characteristics of approximately 125 grass genera. Interactive grass taxonomy workshops organized in India (2007, 2008, 2017), Indonesia (2019), and Kenya (2025) empower students and early-career researchers to take leadership in identifying, documenting, and conserving grass diversity. By combining classroom learning with hands-on field training, these workshops not only build technical skills but also inspire youth to recognize the ecological importance of grasses in soil health, climate resilience, biodiversity conservation, and ecosystem restoration, positioning them as future leaders of regenerative food systems. This paper highlights the role of youth engagement in grass taxonomy as a pathway to fostering education, awareness, and leadership for regenerative food systems. Youth participation in taxonomy not only deepens scientific understanding but also builds stewardship, inspiring the next generation to see grasses as vital resources for sustainable agriculture. By placing grasses at the center of education and awareness, this initiative contributes to nurturing regenerative leadership among youth. Empowering young people with knowledge ensures that grasses and the food systems they support remain resilient for the future.

Poster online Flash Talk

Online Flash poster

2025-09-24
14:15 - 14:45
Online Flash poster (onsite at Main hall)

PFO.1 - "Exploring the Key Determinants Influencing Bambara Nuts (Vigna subterranea) Production in Kasungu District - Malawi"

FELIX RICHARD BANDA[1]
[1] MZUZU UNIVERSITY

Abstract: Bambara nuts (*Vigna subterranea*) are a drought-tolerant, nutritionally dense legume with high potential to enhance food security and climate resilience in marginalized agro-ecological zones. Despite these advantages, their production remains constrained by declining yields, limited commercialization, and deep-rooted socio-cultural taboos. This study explored the determinants influencing Bambara nut production in Kasungu District, Malawi, focusing on socio-cultural, institutional, and socio-economic factors. A mixed-methods design was employed involving surveys with 56 farmers and interviews with agricultural officers and community leaders. The findings revealed that cultural beliefs strongly shape production practices, often restricting cultivation to older women due to taboos linking the crop to death and spiritual practices. Institutional constraints—such as limited extension services, seed inaccessibility, and poor market linkages—further reduce the crop's uptake. Socio-economic challenges, including insecure land tenure and labour shortages, also limit its expansion. Nevertheless, the study identified opportunities for integration of traditional knowledge with agroecological practices, community sensitization, and policy advocacy. By addressing these barriers and enhancing institutional support, Bambara nuts could contribute significantly to regenerative and resilient food systems.

Keywords: Bambara nuts, underutilized crops, climate resilience, food systems transformation, socio-cultural beliefs

PFO.2 - Empowering Nutritional Resilience through Regenerative Food Innovation: Fava-Based Crackers for Lactating Women and new bornsin Ethiopia

Naol Adugna Oli[1]
[1] Kirubel Engidawork kitaw

Abstract: In response to the urgent need for climate-resilient, inclusive food systems, our project pioneers a regenerative food solution targeting one of Ethiopia's most nutritionally vulnerable groups—lactating women and and newborns in Ethiopia. Drawing from interdisciplinary research and collaboration with Danish Technical University, we developed a nutrient-rich, fava-based cracker that enhances maternal nutrition while promoting agroecological and circular practices. Leveraging Ethiopia's indigenous crops—fava beans, teff, millet, and sweet potato—our product embodies regenerative agriculture principles, optimizing local biodiversity and soil health. These ready-to-eat crackers, designed for daily supplementation, fulfill key micronutrient needs (Vitamin A, B6, K, folate, iron, zinc, iodine) using plant-based ingredients, thereby offering a sustainable alternative to conventional supplements. Through multiple sensory and nutritional optimization trials, the product assures high quality and acceptability. Policy relevance is emphasized through our model's scalability across low-income urban areas via local value chains and decentralized production. The innovation aligns with national nutrition strategies and SDG targets for zero hunger and maternal health. Market surveys among over 200 women in Addis Ababa confirmed high acceptance and demand, affirming its potential for systemic impact. Our approach synthesizes innovation, digital survey integration, and local governance collaboration to offer a transferrable, gender-sensitive model for food system transformation. This abstract addresses the Agri4D Theme 2 by connecting regenerative science, affordable technology, and inclusive governance to actualize climate-resilient nutrition for vulnerable populations. Keywords: regenerative food systems, maternal nutrition, agroecology, Ethiopia, fava bean, gender inclusion, circular economy, food innovation

Figure 1: *Final prototypes of fava crackers*

Label

Figure 2 shows the label that can be produced and easily printed as a sticker on a vacuum sealed package of fava crackers.

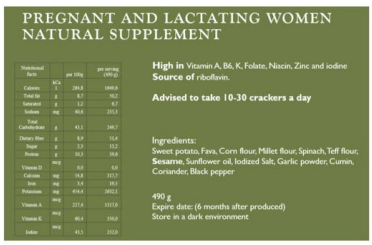


Figure 2: *Nutritional label of product*

PFO.3 - Harnessing Indigenous Knowledge for Regenerative Root and Tuber-Based Food Systems in a Changing Climate

Ibikunle Olaleru[1]
Ephraim Banda[2], Ibukun Busari[3], Olorunfunmi Solana[4]
[1] Farming systems Research Programme, National Root Crops Research Institute, Umudike, Abia State, Nigeria
[2] Extension Methodologist, Ministry of Agriculture, Republic of Zambia
[3] Animal Science Department, University of Ibadan, Oyo state, Nigeria
[4] Department of Home Science and Hospitality Management. Faculty of Agricultural Management and Rural Development Building, College of Agricultural Sciences, Ayetoro Campus, Olabisi Onabanjo University,

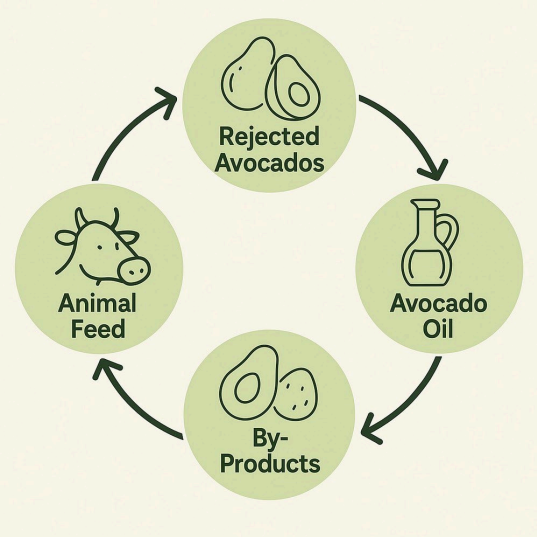
Abstract: Empowering the next generation of food systems leaders requires a deep appreciation of indigenous knowledge and local practices that have sustained communities for generations. This prerequisite is evident in many West African countries, where root and tuber crops such as cassava, yam, and sweet potato form an integral component of the rural agrifood systems. These staple food crops, are traditionally cultivated using practices that enhance soil fertility, conserve biodiversity, and support community resilience.
Traditional cropping techniques such as mixed farming systems as well as indigenous processing methods for root and tuber crops have been integrated into regenerative food system strategies. The use of participatory research approaches, local farmers' wisdom on soil conservation, pest management without synthetic inputs, and sustainable land use has been documented and analyzed. The findings demonstrate that traditional knowledge, when blended with adaptive modern practices, can lead to sustainable increases in productivity, reduced greenhouse gas emissions, and strengthened food security. Additionally, youth engagement initiatives that connect traditional farming wisdom with innovations such as agroecological mapping and climate-smart crop choices are pivotal to empowering the next generation. By recognizing and building on these existing knowledge systems, food systems transformation can be both culturally relevant and environmentally sustainable, ensuring that vulnerable farming communities are not only resilient but also at the forefront of climate adaptation and mitigation efforts.

Keywords: Indigenous knowledge, root and tuber crops, regenerative agriculture, climate resilience, food systems leadership

PFO.4 - Transforming Waste into Wealth: Circular Innovations in Avocado Oil Processing for Sustainable Food Systems in Tanzania

Richard Laizer[1]
[1] Sokoine University of Agriculture

Abstract: In Tanzania, a substantial proportion of avocados are rejected due to strict export standards, leading to post-harvest losses and economic inefficiencies. Avosol Agriventures, a youth-led agribusiness, is implementing a circular innovation model that transforms rejected avocados into high-quality crude oil and by-products such as animal feed and soil conditioners. This approach enhances value chains while addressing food waste, youth unemployment, and climate resilience. The project integrates regenerative agriculture, local partnerships, and appropriate processing technologies to maximize resource efficiency. Early implementation has shown potential for scale, with positive socioeconomic and environmental impacts. This presentation explores practical lessons from applying circular economy principles in a rural African context, with implications for policy, youth engagement, and sustainable food system transformation.



PFO.5 - Sowing Seeds of Change: Using radio and ICTs to empower farmers to transition towards regenerative agriculture in Uganda

Catherine Mloza Banda[1]
Karen Hampson[1]
[1] Farm Radio International

Abstract: Radio and mobile technology still holds the potential to galvanize more inclusive and systemic interactions between farmers, research, NGOs, extension agents, private sector, and farmers organizations in a cost-effective, interactive and entertaining manner in rural Africa. The challenge however is how to creatively package knowledge intensive topics such as regenerative agriculture in a way that would inspire behavior change.

In 2022, Farm Radio International (FRI) introduced the Green Leaf Magazine (GLM) radio program on 12 radio stations in Uganda in order to promote the uptake of circular and regenerative agriculture practices with funding from the IKEA Foundation.

The GLM radio program is made up of different segments and generally runs from 45-60 minutes. Each segment addresses specific objectives and outcomes; for example, *Digging Deep segments* (10-20 minutes) address key issues and topics in depth, facilitating increases in awareness, knowledge and the update of good practices; *Have Your Say segments* (3-5 minutes) poll listeners on topics covered in the magazine allowing for listener inputs and feedback; and *Partners' Corner segments* (5-10 minutes) feature various partners, unpacking their missions and work in regenerative agriculture for listeners and other stakeholder groups.

An evaluation revealed that the radio programs are highly popular, especially among women and youth farmers, and deliver unique outcomes at relatively low-cost. A range of voices and perspectives, including women and young people, engaged in debate and dialogue. Further, 70-75% of Uganda's 18 million farmers have access to weekly GLM programs with around 25% making transitory changes towards regenerative agriculture.

PFO.6 - The Role of Women and Youth in the Transition to Regenerative Food Systems in Rural Communities in Benin

Maanzou BOUKARI[1]
[1] Research Laboratory on Innovation for Agricultural Development (LRIDA)

Abstract: This study analyzes the role of women and youth in the transition to regenerative food systems in rural communities in Benin, focusing on their contribution to sustainability and resilience in the face of climate change impacts. Using a participatory approach combining field surveys, interviews with farmers, community leaders, and local NGOs, the study evaluates how these groups can promote regenerative agricultural practices while overcoming social and economic challenges.

The results indicate that 72% of women and 65% of youth have actively participated in regenerative agricultural initiatives, such as water conservation and organic farming. Furthermore, 85% of women involved in sustainable land management projects reported an improvement in soil quality, while 56% of youth developed skills in the use of modern agricultural technologies, including digital tools for production monitoring. However, significant barriers remain, such as limited access to financial resources and the low coverage of training in new technologies, with only 33% of youth having access to programs on sustainable agricultural practices.

Collaborative initiatives, the use of digital technologies, and the recognition of traditional knowledge have, however, helped strengthen their engagement in regenerative food systems. This study highlights the importance of including women and youth in strategies for the transition to sustainable food systems. Recommendations include improving access to resources and training, as well as developing inclusive public policies to support their role in this transformation. These efforts will not only enhance the resilience of rural communities in the face of climate challenges but also promote sustainable and equitable food security.

PFO.7 - EcoGrow Initiative

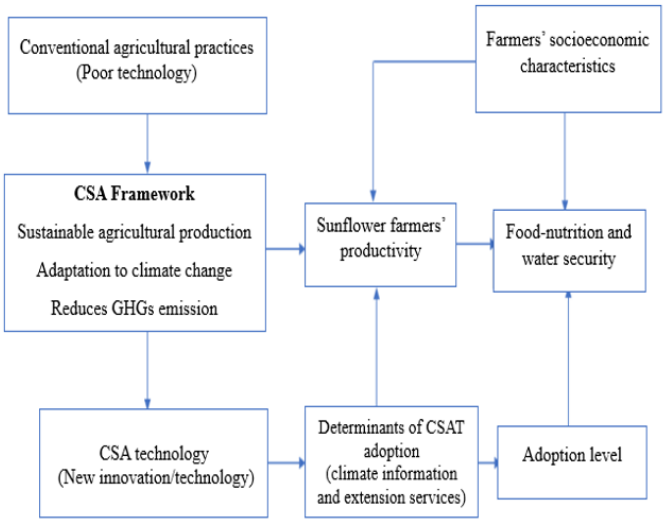
Brown Barasa[1]
[1] Kisii university

Abstract: The EcoGrow Initiative is a youth-led environmental and agricultural empowerment program that aims to promote sustainable practices, climate resilience, and food security in underserved communities. Rooted in the belief that environmental stewardship begins at the grassroots, EcoGrow engages young people in organic farming, agroforestry, waste reduction, and climate education. Through hands-on training, community outreach, and innovation, the initiative seeks to create green jobs, restore degraded landscapes, and foster eco-conscious lifestyles. By integrating traditional knowledge with modern sustainability approaches, EcoGrow empowers communities to take ownership of their natural resources and drive localized solutions to global environmental challenges.

PFO.8 - Climate-Smart Agricultural Technology and Gender Differentiated Food-Nutrition-Water Security: Evidence from Smallholder Sunflower Farmers

Abeeb Omotoso[1, 2]
[1] North West University, Mafikeng, South Africa
[2] Oyo State College of Agriculture and Technology, Igboora, Nigeria

Abstract: This study examines effects of Climate-Smart Agricultural Technology (CSAT) adoption on gender-differential food-nutrition and water security (FNWS) in South Africa. Drawing on a combination of quantitative analysis and qualitative insights from smallholder sunflower farming communities, a multistage sampling procedure was employed in selecting sunflower farmers across some selected villages in South Africa. To understand the linkages between CSAT, household's food-nutrition and water security outcomes (FNWS); endogenous switching regression (ESR) model was employed to achieve the objective. Herewith, water poverty index was used to measure the water security status, while dietary diversity index (Simpson Index) and calorie intake per adult equivalent were used to determine the food-nutrition security (FNS) of the households. The results show that female-headed smallholder sunflower farmers' FNS - dietary diversity and calorie intake increased by 28% and 30% respectively while the water poverty index reduced by 18%. On the other hand, that of their male counterpart increased by 21% and 35% respectively while the water poverty index reduced by 23%, indicating that the farmers' decisions to adopt CSAT influenced their FNWS outcomes. Additionally, CSAT adoption is influenced by access to extension services, climate change information, and off-farm income. Therefore, the study concludes that CSAT adoption enhances water availability, crop yield and FNWS. Therefore, policy on investment in capacity-building initiatives to enhance farmers' knowledge and skills in CSAT adoption, and water resource management, particularly targeting the marginalized communities and women farmers would contribute to the increased implementation of CSAT adoption, thus, resulting in the overall FNWS in South Africa.



PFO.9 - TerraIQ: AI-Driven Regenerative Farming for Climate-Resilient Food Systems

Imaara Keshwani[1, 2]
[1] TerraIQ
[2] University of Manchester

Abstract: Smallholder and family farms are the backbone of global food systems, yet they remain the most climate vulnerable and least-data empowered. TerraIQ is an Ai-driven platform designed to reverse this imbalance by equipping farmers with real-time, regenerative land use insights. The goal with this technology is to transform vulnerable farms into climate-resilient, carbon-positive, and profitable enablers of food security.

Utilising satellite imagery, historical crop data, local weather trends, soil health, and farmer inputs, TerraIQ will generate hyper-local recommendations on crop optimisation. Unlike generic agri-apps, TerraIQ will also embed carbon sequestration modeling into its engine, encouraging practices that not only boost yields, but enhance long-term ecological value. Our platform will allow farmers to visualise soil health improvements, yield forecasts, and estimated carbon offsets in real time.

With current plans to pilot in rural Alberta and England, TerraIQ is tailored for regions where agricultural productivity intersects with climate urgency. By enabling predictive planning, TerraIQ supports small, local farms in transitioning to regenerative systems without the complexity or cost traditionally associated with innovation.

This presentation will explore the technical architecture of TerraIQ, its AI recommendation model, early impact data from simulations, and its potential integration into national carbon accounting frameworks. The benefit of this is two-fold. Firstly, it contributes a scalable blueprint for how digital tools can empower food system transformation. Secondly, this opens discussion into how AI should be integrated into developmental policy, given the potential it has to benefit vulnerable actors in society.

Keywords: Regenerative Farming, Carbon Sequestration, Climate-Resilient Food Systems

PFO.10 Empowering communities through food waste reduction and valorisation of food waste

Dayawatee Goburdhun [1], Arvind RUGGOO [1], Deena RAMFUL-BABOOLALL [1], Roshini BRIZMOHUN -GOPAUL [1], Lakshaya BEEHAREE [1]
[1] Faculty of Agriculture, University of Mauritius, Mauritius

Abstract
Empowering communities through food waste reduction and valorisation of food waste
GOBURDHUN, D*, RUGGOO, A, RAMFUL-BABOOLALL, D, BRIZMOHUN -GOPAUL, R & BEEHAREE, L
[1]*Faculty of Agriculture, University of Mauritius, Mauritius*
*Corresponding author's email : daya@uom.ac.mu
ABSTRACT
In the Republic of Mauritius, a SIDS in the Indian Ocean, the average amount of solid waste disposed at the landfill was estimated to be 541,138 in 2023 and UNEP estimates that about 117 408 tonnes of household food waste was generated in 2023. This paper highlights some of targeted initiatives and collaborative efforts being implemented by the University of Mauritius through the EU funded DeSIRA project.
A comprehensive report titled "Analysis of the status of food waste in Mauritius,'was prepared engaging different actors of the food chain, was compiled to inform and guide food waste management policies in Mauritius. Additionally, a sustainable awareness campaign aimed at reducing food loss and waste was implemented through workshops and awareness talks in collaboration with various partners. Another significant outcome was the release of a distinctive recipe book titled "Valorising Leftovers and Imperfect Fruits and Vegetables - A Collection of 45 Recipes" aiming to valorise leftover foods and imperfect fruits and vegetables. The project's outcomes aligns with the UN SDG12 and has positive implications for individuals, communities, and the environment in Mauritius. It aims to mitigate food waste while promoting sustainable practices and economic resilience.
Key words: food waste reduction, SDG 12, awareness, valorisation

Online Flash poster (onsite at Main hall)

2025-09-25
14:15 - 14:45
Online Flash poster (onsite at Main hall)

PFO.12 - Regenerating Roots: Youth Led Innovation for Agroecological Transformation in Sierra Leone food Systems.

Rugiatu Bah[1]
Saidu Jalloh[1]
[1] Youth In Agriculture and environmental protection

Abstract: In Sierra Leone, where over 60% of the population relies on agriculture for livelihood, food systems face mounting pressure from climate variability, land degradation, and weak policy support. This paper presents the work of *Youth in Agriculture and Environmental Protection (YAEP)*, a youth-led initiative advancing agroecological transformation through regenerative practices, digital innovation, and policy advocacy.

YAEP's approach integrates low-cost, climate-resilient farming techniques such as composting, agroforestry, and natural pest control, to restore soil health, boost biodiversity, and enhance productivity in rural and peri-urban communities. Central to our model is the dream for us to have the means for the deployment of AI-powered mobile platforms that deliver real-time agronomic advice, enabling farmers—especially youth and women, to access tailored guidance, market information, and climate-smart solutions.

We also explore the role of policy in scaling regenerative agriculture by advocating for inclusive governance, youth land access, and green financing mechanisms. YAEP's circular bioeconomy initiatives, including crop-livestock integration and organic waste-to-fertilizer systems, demonstrate measurable improvements in food security, input cost reduction, and ecological regeneration.

This abstract offer evidence-based insights into how grassroots innovation, digital inclusion, and supportive policy frameworks can drive systemic change. It underscores the critical role of youth as change agents in operationalizing regenerative food systems and presents a scalable, inclusive model for sustainable transformation amid a changing climate.

Keywords: Agroecology, Digital Agriculture, Youth Engagement, Climate Resilience, Circular Bioeconomy.

PFO.13 - Willingness to Contribute to Dryland Restoration in Semi-Arid Regions of Kenya and Uganda using Monetary and Non-monetary Numeraires

Hildah Arinaitwe[1, 2]
Alice Turinawe[1, 2], Ingrid Oborn[1], Goran Bostedt[1]
[1] Dry lands transform project
[2] Makerere University

Abstract: The sustainable development of EastAfrican drylands largely hinges on pastoralist communities' ability for collective action, aimed at increasing land productivity. This paper reports results from a study that evaluated the willingness of pastoralist communities in Kenya and Uganda to contribute to dryland restoration through Livestock Cafés. Livestock Cafés are community hubs for knowledge exchange and sustainable land management. Conducted in the dryland area straddling the Uganda-Kenya border, facing challenges like climate-change, land degradation, and poverty, the research uses contingent valuation with split samples to compare monetary contributions and labour contributions. Data from 866 households revealed high overall willingness to contribute, though preferences for the modes of contribution varied by country and livelihood type.

In Kenya, monetary willingness to pay was higher, influenced by prior exposure to existing livestock cafés, while Ugandan respondents preferred labour contributions. Agro-pastoral communities showed greater willingness to contribute labour compared to pastoralist zones. Implicit wage estimates, derived from comparing monetary and labour contributions, were notably low, suggesting that respondents may overestimate their capacity to contribute labour. Key factors influencing contributions included gender, education, and livestock ownership.

Despite skepticism among a minority, most households supported collective action. Policy implications emphasise aligning contribution methods with community preferences by prioritising labour in cash-constrained areas and ensuring inclusive participation across gender and age groups. The study underscores the potential for community-driven dryland restoration, as the sustainability of livestock cafés depends on demonstrating direct benefits, integrating diverse livelihood activities, and leveraging local leadership.

Keywords: Pastoralism, East Africa, Contingent valuation, Land rehabilitation

PFO.14 - TREE-CROP INTERACTION IN SUBHUMID AND SEMI-ARID RWANDA

Charles Bucagu[1, 2, 3, 4]
Alain Ndoli[2], Leon Nabahungu[3], Athanase Mukuralinda[4]
[1] University of Rwanda, Busogo Campus - Musanze, P,O,Box 430 - Busogo Campus - Musanze - Rwanda
[2] International Union for Conservation of Nature- Tanzania
[3] International Institute for Tropical Agriculture – Bukavu, RDC
[4] ICRAF/Rwanda Country Office

Abstract: Integrating trees in agricultural land is a common practice in Rwanda. However, the extent to which agroforestry trees interact with crops remains less explored. The purpose of this study was to improve the understanding of tree-crop interactions in humid and semi-arid regions of Rwanda to support more resilient climate smart farming. An experiment was conducted in Nyakiliba sector (Rubavu district) and Rweru sector in Bugesera district in Rwanda. Measured parameters included soil moisture, Incident Photosynthetically Active Radiation (PAR). The maize crop was grown during the short rainy season of 2016A (September 2015 to March 2016) in both Rubavu and Bugesera sites, with presence of tree species (*A.Acuminata* and *G.robusta* respectively) and an additional open field plot away from any tree, used as a control. Maize was assessed for grain yield production. The results showed that in the sub-humid area in Rubavu site, *A. acuminata* depleted soil moisture under the tree (0 to 2.5 m). The yield of maize was significantly reduced by the presence of *A. acuminata* up to 2 m from tree trunk . The results tend to indicate that inter-planting *A. acuminata* with maize could have an advantage over sole cropping.

Key words: Tree-crop interaction, Soil Moisture Content, PAR, Maize Yield,

PFO.15 - Scaling Zero Budget Natural Farming in Andhra Pradesh: Policy Pathways for Sustainable Agriculture and Rural Transformation

David Sathuluri[1]
[1] Columbia University

Abstract: Zero Budget Natural Farming (ZBNF) offers a transformative approach to agriculture by eliminating chemical inputs and promoting ecological sustainability. Originating in Andhra Pradesh, India, ZBNF has gained traction as a viable solution to pressing agricultural and environmental challenges. This paper examines the policy landscape surrounding ZBNF implementation in Andhra Pradesh, assessing strategies for its large-scale adoption and integration into mainstream agricultural frameworks.

ZBNF relies on locally sourced inputs such as cow dung, urine, and plant-based formulations to enhance soil fertility, control pests, and improve crop yields. This method reduces farmers' financial dependency on external inputs while mitigating the environmental impacts of conventional agriculture. The Andhra Pradesh government, through initiatives like Rythu Sadhikara Samstha (RySS), has played a critical role in promoting ZBNF by providing farmer training, resource access, and market linkages. However, despite these efforts, challenges persist, including limited awareness, resistance to change, and inadequate infrastructure.

This paper proposes a comprehensive policy framework to facilitate ZBNF adoption, emphasizing targeted farmer education, the development of robust supply chains for natural inputs, market incentives for naturally grown produce, and integration into broader agricultural and environmental policies. By analyzing the Andhra Pradesh experience, this study highlights the potential of ZBNF to enhance climate resilience, promote biodiversity conservation, and support rural livelihoods. It underscores the need for interdisciplinary collaboration and policy innovation to scale sustainable agricultural practices globally.

Keywords: Zero Budget Natural Farming, sustainable agriculture, policy framework, Andhra Pradesh, ecological farming, rural development.

PFO.16 - Strengthening Local Governance for Sustainable Food Systems: Lessons from the Matèkpo Rice Initiative, Benin

Maanzou BOUKARI[1]
[1] Laboratory for Research on Innovation for Agricultural Development (LRIDA), University of Parakou (UP), Parakou, Benin

Abstract: The Matèkpo rice initiative, located in southern Benin, serves as a concrete example of community mobilization towards sustainable and resilient food systems. Facing challenges such as climate change, land degradation, and weak market structures, local actors including farmer cooperatives, traditional leaders, municipal authorities, and NGOs have established an organic rice value chain based on agroecological practices.

This paper focuses on the participatory governance mechanisms underpinning the initiative, highlighting inclusive decision-making processes, knowledge-sharing, and the active involvement of marginalized groups, including women and youth. The Matèkpo model promotes both environmentally sustainable agriculture and local economic empowerment. Support from civil society organizations has been key in training farmers, obtaining organic certification, and providing access to technical and financial resources.

The lessons learned from this experience emphasize the importance of decentralized governance and horizontal partnerships in driving agroecological transitions and strengthening the resilience of food systems in the face of climate and socio-economic crises. This paper also suggests pathways for replicating this model in other vulnerable regions.

Keywords: local governance, organic rice, agroecology, inclusion, Benin.

PFO.17 - Inclusive Public Support for Indonesia’s Food Small- and Medium-sized Industries (SMIs): Lessons from Indonesia Food Innovation (IFI) Program

Nareswari Andhara Dahayu[1]
[1] Indonesia Food Innovation

Abstract: Nearly 99% of Indonesia's industrial units are small- and medium-sized industries (SMIs), with almost 40% of those SMIs engaged in the food and beverage sector. Given their scale, food SMIs are vital drivers of local food system transformation. Spread across a huge and diversified archipelago, they represent the heterogeneity of territorial environments, ingredients, and culinary traditions. However, this very diversity also brings structural constraints, particularly unequal access to infrastructure, markets, and supply chains across regions, which restrict their growth and ability to contribute to a resilient and inclusive food system fully.

To overcome these challenges, the Ministry of Industry launched the Indonesia Food Innovation (IFI) program, a structured national initiative supporting early-stage food industries through incubation and acceleration. The incubation phase focuses on business growth, process improvement, and scale-up training. Selected high-potential participants advance to the acceleration phase, where they receive tailored management guidance and legal support to ensure best practices suited to their needs. The program provides participants with access to mentoring, coaching, and networking opportunities that help strengthen their business capacity, expand their market reach, and promote sustainable long-term development.

To assess impact, IFI monitored key indicators and recorded positive results in its first two years: 70.59% of participants improved production capacity, 61.76% expanded distribution, 63.53% increased profit margins, while 48.53% enhanced waste management, and 38.24% adopted eco-friendly packaging.

These outcomes demonstrate how inclusive public support can promote more decentralised, equitable, and environmentally resilient food systems by promoting small-scale business development and enabling greater adaptation and long-term sustainability.

PFO.18 - Empowering Smallholder Farmers through Digital Agroecology in Eastern Uganda

Ivan Mukuve[1, 2]
[1] BUGIRI CROP KINGS INVESTMENTS (U) LTD
[2] access agriculture

Concept note: Smallholder farmers in Eastern Uganda are on the frontline of climate change, experiencing erratic rainfall, pest outbreaks, and soil degradation. In response, Bugiri Crop Kings Investments has developed a grassroots innovation AI for Climate Resilience to transform traditional agriculture into a climate-smart, data-driven system. The initiative integrates artificial intelligence, agroecology, and digital storytelling to train and support farmers, especially youth and women, in regenerative farming techniques.

Through a network of trained community facilitators and mobile-enabled video screenings, we provide context-specific guidance on crop diversification, organic soil fertility, water conservation, and pest management. An AI-powered chatbot, tailored to local languages and literacy levels, allows farmers to access real-time climate advisories and agroecological knowledge

The project has reached over 1,500 farmers and improved yields by up to 20%, while enhancing soil health and reducing reliance on synthetic inputs. Most importantly, it fosters local innovation, enabling farmers to co-create adaptive solutions to emerging climate threats. This presentation will share implementation insights, behavioral change outcomes, and challenges from the field.

We argue that fusing indigenous knowledge with digital innovation is critical for building resilient food systems in vulnerable contexts. Our work demonstrates how low-cost, scalable tech can drive inclusive climate adaptation, empower the next generation of food leaders, and accelerate the transition to regenerative agriculture.

PFO.19 - Assessing Irrigation Effects on Soil Respiration in Agricultural Soils

Therese AVE MARIA[1]
Abraham Joel[2], Orjan Berglund[2], Margueritte Mukangango[2]
[1] University of Rwanda, College of Agriculture, Animal Sciences and Veterinary Medicine (CAVM)
[2] Swedish University of Agricultural Sciences

Abstract:
Soil respiration is a key process in the carbon cycle and a major contributor to carbon dioxide (CO_2) emissions from terrestrial ecosystems. In the context of climate change and increasing irrigation demands, understanding how irrigation influences soil respiration is critical for guiding climate-smart agricultural practices. This study investigates the effects of irrigation on CO_2 emissions under different crop types in agricultural fields in Rwanda. The experimental setup includes irrigated and non-irrigated plots with maize, beans, Irish potatoes, soybeans, and Brachiaria. CO_2 fluxes were measured alongside soil temperature, air temperature, soil moisture, and photosynthetically active radiation to capture the biophysical drivers of soil respiration. Initial information from cleaned data shows that irrigation tends to increase soil respiration, particularly in root-active zones with higher soil moisture levels. After data analysis, we will confirm whether these observations are statistically significant or not. The study will contribute to understanding how crop selection and water management interact with soil carbon dynamics in smallholder systems. Final findings will support evidence-based policies and sustainable water management practices that minimize greenhouse gas emissions.

Keywords:
Soil respiration, Irrigation, CO_2 emissions, Climate-smart agriculture, Crop type

PFO.20 - Challenges of Policy and Governance in Food Safety in South Africa

Ntombizethu Mkhwanazi[1]
Lise Korsten[1]
[1] Department of Plant and Soil Sciences, University of Pretoria

Abstract: Food safety governance in South Africa is a complex and multi-faceted challenge, involving multiple stakeholders, including government agencies, the private sector, civil society, and research institutions. This study employs a policy network approach to analyze the interactions and influences among these actors, revealing systemic challenges in transparency, coordination, and enforcement. The research reviewed three key food safety regulations—R638, R607, and others—highlighting persistent gaps in implementation due to weak institutional capacity, budgetary constraints, and insufficient stakeholder engagement.

Further to this, the study examined food safety governance in the informal sector, which plays a vital role in South Africa's economy but operates with minimal regulatory oversight. Findings indicate that while informal traders contribute significantly to food security and livelihoods, they face challenges such as inconsistent compliance, lack of training, and exclusion from policy-making processes. Stakeholders emphasize the need for inclusive governance, capacity-building initiatives, and technology-driven monitoring to enhance food safety standards in this sector.

Overall, South Africa's food safety governance requires stronger collaboration, better resource allocation, and more participatory policymaking to address enforcement gaps and improve public health outcomes. Future efforts must prioritize stakeholder engagement, institutional strengthening, and adaptive regulatory frameworks to ensure effective food safety management across both formal and informal sectors.

Poster online

Communication Campaign for Climate Change Adaptation and Mitigation in Uganda

Wilson Okaka[1]
[1] Kyambogo University

Abstract: Abstract text is attached as image because thhe browser could not accent direct copy and pasre proces.

Abstract 2: Theme 1 on Empowering the next generation of food systems leaders

Communication Campaign for Climate Change Adaptation and Mitigation in Uganda

Authors: Wilson Truman Okaka and Justine Nakirijja.
Kyambogo University,P.O.Box 1, Kyambogo, Kampala, Uganda
Corresponding Author's Email: wokaka65@gmail.com

Abstract

Introduction: Uganda is increasingly facing the adverse effects of climate change, including extreme weather events, reduced agricultural productivity, and biodiversity loss. Communication campaigns can drive awareness, behavior change, and public participation, yet many existing efforts in Uganda lack the necessary localization, inclusivity, and engagement to be impactful. **Objectives:** Identify existing national communication campaigns on climate change and assess their effectiveness. Analyze the role of community-based communication in supporting climate change responses. **Methodology** Analysis of academic and grey literature on climate change communication. Examination of Uganda's National Climate Change Policy, National Development Plan III, and other related frameworks. In-depth analysis of selected community-based climate campaigns. **Results:** Communication efforts are often fragmented and not aligned with community needs. Community-based strategies such as local radio, participatory drama, and storytelling enhance message retention and action. The use of vernacular languages and engagement with community leaders significantly improves credibility and reach. Successful campaigns incorporated feedback mechanisms and were designed through participatory processes. Infrastructure and digital divides limit the effectiveness of digital communication tools in rural settings. **Conclusions:** A strategic, well-coordinated and facilitates the inclusion of marginalized groups in climate governance. An inclusive national communication campaign is essential for effective climate change adaptation and mitigation in Uganda. Emphasizing community involvement, cultural relevance, and policy alignment will enhance the success and sustainability of climate initiatives. **Recommendations:** Localize content using vernacular languages and traditional media. Build the capacity of communicators and journalists in climate science. Institutionalize participatory communication in climate programs. Enhance collaborations between the government, NGOs, media, and communities.
Keywords: Climate Change, Communication Strategies, Community-Based Adaptation,

Transforming a resilient food system for a sustainable accessibile, affordabile, acceptabile and equitable future food security

KALEP FILLI[1]
[1] Department of Food Science & Technology Modibbo Adama University Yola, Nigeria

Abstract: Future systems must balance accessibility, sustainability, and equity inorder to create a resilient and equitable food systems of the future. It will need holistic approach for all sectors and critical stakeholders in a coordinated approach. Accessibility must ensure that primary producers, especially small farmholders and marginalized groups, have access to resources; technology, financing, and knowledge. Without equitable access, transition vision and advancements will continue to remain concentrated among a privileged few. Creating pathways by shifting towards sustainable food systems must involve adopting practices that protect the environment, conserve biodiversity, innovate alternative resources by deploying mitigatable and adaptable sustainable solutions to climate change. The approach will include employing regenerative food systems, agroecology, reducing food waste and innovating alternative resources like - alternative protein initiatives. Equitable transition must address social inequalities, including gender disparities in the food systems, land ownership rights, and fair wages for agricultural workers. Policies that can empower women and marginalized communities can significantly improve food security of the future. Political will from local governments, regional and international organizations can play a key role in ensuring that agricultural transitions are inclusive and just on a global scale. Critical stakeholders needs to consider policies that can strenghten research and collaborations across sectors/bounderies that can amplify and difuse utilization of envidence based solutions to challenges within our food systems which are key to more impactful future food securiity initiatives. Adopting innovative novel food technologies procedures are critical because solution driven research is a key compnent for an impactful frame work.

Variations in Distribution of Uapaca kirkiana and Casimiroa edulis in Kazomba and Mpherembe, EPAs of Malawi

George Ndaziona Chidimbah Munthali[1]
[1] Mzuzu University

Abstract: Background: Neglected and underutilized crop species (NUs) such as Masuku (*Uapaca kirkiana*) contribute significantly to food security, biodiversity conservation, and climate resilience. Despite its economic and nutritional potential, Masuku cultivation remains largely informal, with limited research on its genetic, ecological, and phenotypic variations. Understanding these variations is essential for improving productivity, conservation, and commercialization efforts, particularly in rural communities where Masuku is a key livelihood resource.

Aim: This study examines the diversity in genetic, ecological, and phenotypic traits of *Uapaca kirkiana* and *Casimiroa edulis* in Kazomba and Mpherembe EPAs of Malawi based on data from 775 respondents.

Methods: A cross-sectional study was conducted among 775 respondents in Mpherembe and Kazomba EPAs. Data were collected through structured surveys and analyzed using descriptive statistics. Key variables included demographic attributes, variety selection, propagation techniques, yield performance, and ecological conditions influencing cultivation.

Findings: Findings reveal that *Casimiroa edulis* (62.3%) are predominant, with high yield potential reported by 45.3% of farmers. Variations of distribution are influenced by ecological zones, propagation methods, and environmental factors.

Conclusion and Recommendations: The study emphasizes the need to conserve genetic diversity, enhance pest resistance and optimize cultivation practices for sustainable production.

Keywords: Masuku (*Uapaca kirkiana*), genetic diversity, phenotypic traits, ecological factors, propagation methods, food security, Malawi.

Transforming food systems: Innovation and implementation

TUMUSENGE ERIC[1]
[1] prof MUGUNGA CANISIUS. UNIVERSITY OF RWANDA

Abstract: Abstract

Ensuring ecological sustainability, climatic resilience, and global food security all depend on changing food systems. Agroecology and regenerative farming techniques are essential to this shift because they combine traditional methods with scientific understanding to improve soil health, assist pollination and natural pest management, encourage biodiversity, and encourage circular resource usage. These natural remedies not only boost output but also strengthen resistance to climate shocks. The impact of sustainable practices is further increased by incorporating innovative and cutting-edge technologies, such as biotechnology and precision agriculture, which improve decision-making and optimize inputs. In order to empower smallholder farmers and simplify value chains, digitalization and artificial intelligence (AI) are essential because they make real time monitoring, predictive analytics, and data driven farming solutions possible.

For effective implementation and stakeholder alignment, multi-level governance, participatory planning, and policy coherence are required. Furthermore, scaling innovations and facilitating the shift to regenerative food systems depend heavily on sustainable finance and investment. Opportunities for climate smart agriculture and inclusive rural development can be unlocked by investments that give priority to environmental, social, and governance (ESG) factors.

These four pillars agroecology, technology, artificial intelligence, policy, and finance work together to create a more resilient, adaptive, and equitable food system. In addition to improving livelihoods, protecting ecosystems, and ensuring wholesome food for current and future generations, putting this integrated approach into practice can aid in achieving global sustainability goals.

Keywords: Agroecology, Regenerative agriculture, Climate resilience, Digital innovation and Sustainable finance

The impact of Food policy measures on the yield of arable crops under changing climate in Nigeria

Adetomiwa Kolapo[1]
Christianah Funmilayo Ojo[1], Akeem Abiade Tijani[1]
[1] Obafemi Awolowo University

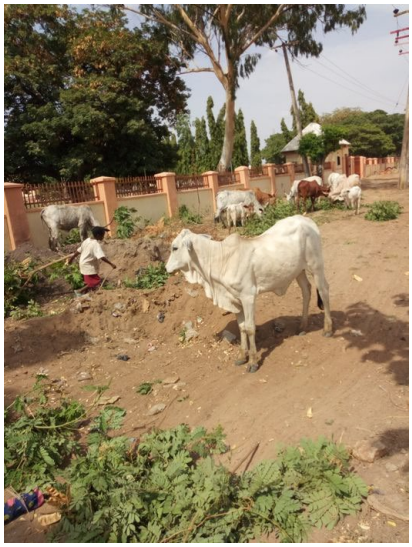
Abstract: Climate change poses significant challenges to agriculture globally, impacting crop yields and food security. This study investigates the yield response of arable crops in Nigeria under changing climatic conditions, focusing on the mediating influence of agricultural food policies. We used secondary data spanning l980-20l9 from reliable institutions including the World Development Indicator (WDI), Nigeria Bureau of Statistics (NBS), Food and Agriculture Organization (FAO). Vector Error Correction Model (VECM), estimator was used to analyze the nature of crop yield response to address endogeneity and simultaneity bias. Findings reveal that the yield of crops such as maize, rice, soybean, cassava, yam, and groundnut exhibit varied responses to temperature fluctuations and altered precipitation patterns. Moreover, the study explores how governmental policies, including price incentives, mediate these impacts. Our result indicates that price incentives received from the agricultural food policies serve as a buffer against negative climate change impact on the yield of the identified arable crops. Effective policy interventions regarding special farming centers like the farm zones and farming settlements should be reappraised to capture current realities based on their significance on the production of most of the selected crops.

LAND USE CONFLICT BETWEEN FARMERS AND HERDSMEN – IMPLICATION FOR AGRICULTURAL AND RURAL DEVELOPMENT IN NIGERIA.

Michael Oke[1]
[1] Michael Adedotun Oke Foundation / Federal Capital Territory Agricultural Development Programe

Abstract: In sub-Saharan Africa, the demand for livestock products, particularly milk and meat, is anticipated to increase between 3.2 and 3.9 percent year between 1997 and 2020 as a result of population expansion, income growth, and urbanization, according to Rose grant et al. (2001). They were evicted from Northern Nigeria due to the worsening environmental conditions, land degradation, and ongoing drought in the Sudan/Sahel savanna between 1960 and 1970. This explained why pastoralists left their home base and moved as far as the Guinean savanna and the edges of the forests in southern Nigeria. 2007 (Fabusoro).The movement of nomadic pastoralists is said to be governed by variations in rainfall, grazing animals, pasture, and water, according to Adisa and Adekunle (2010) and Baba (personal communication). Gbaka (2014) reaffirms that while constantly moving toward pasture, water sources, salt licks, and livestock markets, the nature of the terrain that permits unhindered movement and protective mechanisms for their livestock against the whims of nature, they occasionally avoid the tsetse flies, severe weather, tribal enemies, livestock bandits, tax assessors, and hostile social environments. technique, Land disputes can cause conflict between farmers and herders. The effect of this is noticed on household wellbeing, loss of material resources, agricultural produce, and lower revenue. This is related to lack of grazing resources and climate change. Data was gathered via a structured interview schedule, focus group talks, visual representation, personal observations and descriptive statistics This presentation explores the various conflicts and makes recommendations.

Keywords: Keywords: Farmers, Herdsmen, Nigeria, Land, Conflict



Sustainable Food Systems in sub-Saharan Africa: Estimating the Role of Rural Development in enhancing Climate Change resilience of Crop Production

Omar Mohamed Omar[1, 2]
[1] Institute of Climate and Environment, SIMAD University, Mogadishu, Somalia
[2] Faculty of Economics, SIMAD University, Mogadishu, Somalia

Abstract: Abstract

The agriculture sector in sub-Saharan Africa (SSA) is a lifeline for millions, yet it is under relentless threat from climate change and environmental degradation. Despite its importance, rural development has often been overlooked in climate-agriculture research, with much of the existing literature failing to adequately explore how improvements in rural infrastructure and technological access can buffer agricultural productivity against climate shocks which sustains food systems in the region. Therefore, this study investigates the relationships between climate variables, rural development, and crop production in sub-Sahran Africa from 1999 to 2020. Employing advanced econometric techniques—Panel-Corrected Standard Errors (PCSE), Feasible Generalized Least Squares (FGLS), and Pooled Mean Group (PMG) estimators—the study addresses cross-sectional dependence and slope heterogeneity. The results reveal a complex tapestry of interactions: in the long-run, average rainfall, CO2 emissions, and land under crop production are positively associated with cereal crop yields, while rising temperatures are linked to lower productivity. Interestingly, rural development is associated with higher agricultural output, which highlights the potential role of infrastructure and technological advancements in rural regions. The causality analysis, conducted through the Dumitrescu-Hurlin test, further illuminates that rainfall, CO2 emissions, cropped land, and agricultural employment have a bidirectional association with crop output. Given these outcomes, policymakers should invest in rural development, promote sustainable land management, enhance water resource infrastructure, adopt climate-smart agricultural practices, and prioritize farmer education and training to strengthen food systems in sub-Saharan Africa.

Promoting Entomophagy to Enhance Food Security in Africa

Brian Kithinji[1]
[1] Brian Kithinji

Abstract: Africa is home to over 2,300 species of identified insects, and some cultures have historically consumed insects in their diets. Entomophagy, which refers to the practice of consuming edible insects, offers a sustainable, low-emission alternative to conventional food systems in Africa, where agriculture is increasingly strained by climate changes, ecological destruction, and is a leading emitter of carbon and methane gases. While scientific research on edible insects has largely focused on their role in food and feed, less emphasis has been placed on their use in generating organic fertilizers through entomocomposting. With organic waste comprising approximately 80% of all solid waste in Africa, of which only 4% is recycled, the improper disposal of bio-waste presents serious environmental and public health concerns. As the continent's population grows and waste generation is projected to triple by 2050, insect farming emerges as a viable solution for alternative animal protein and regenerative agriculture. Africa has the potential of annually producing insect-based protein worth $2.6 billion and bio-fertilizers worth $19.4 billion from organic waste. However, inadequate legal frameworks, lack of harmonized standards on insect-based products, negative consumer perceptions on eating insects, limited awareness on the nutritional benefits of insects and the high financial costs of insect-based enterprises are barriers that limit entomophagy in Kenya. To fully harness the benefits of insect farming, there is a critical need to raise awareness of its nutritional, economic, and ecological advantages, while addressing socio-cultural and infrastructural barriers to widespread adoption.

Keywords: entomophagy, entomocomposting, food security, nutrition, bio-waste

Overview of Household Poultry Production and Manure Management in Gwagwalada, Abuja, Nigeria

Michael Oke[1]
[1] Michael Adedotun Oke Foundation

Abstract: Overview of Household Poultry Production and Manure Management in Gwagwalada, Abuja, Nigeria

This study investigates the operational dynamics of household poultry enterprises in Gwagwalada, Abuja, focusing on their contribution to food security and income generation, and critically examining their manure management practices. Family poultry, often defined as small flocks managed by individual farm families for food security and employment, generates significant fecal waste, which currently lacks simple and profitable management technologies.

Through a survey of middle- and lower-class farms, visual observations, focus group discussions, and oral interviews with 50 poultry-keeping households, we assessed management aspects, waste removal, urination control, and feeding. Findings reveal varied practices, from free-ranging chickens to caged systems for layers and broilers, with some high stocking densities. A significant challenge identified is the **inadequate management of poultry waste,** leading to unsanitary conditions, unpleasant odors, and uncontrolled insect breeding (flies, mosquitoes).

Poor waste collection and drainage systems are prevalent. While some vegetable producers purchase and integrate these excretions into their plantations, effective overall treatment and utilization of poultry faeces are lacking. This study highlights the urgent need for improved waste management technologies to minimize environmental and health risks.

Keywords: Poultry, Manure, Waste Management, Households, Gwagwalada, Nigeria

Leveraging Digital Technologies to Transform Food Systems In Uganda.

Prossy Among Eyabu[1, 2]
[1] Boresha Mavuno Agritech
[2] Eyabu Nutrition Hub (ENH)

Abstract: Uganda's food system faces increasing pressure from climate change, land fragmentation, low productivity, and inefficient value chains. This paper explores how new and existing digital technologies are being utilized to improve food production, nutrition, and distribution in Uganda while minimizing environmental impact.

Mobile-based platforms, artificial intelligence-powered advisory tools, and digital weather and soil information services are increasingly helping smallholder farmers make informed, climate-smart decisions. These technologies have led to improved yields, optimized input use, and more resilient farming systems.

In parallel, digital marketplaces and logistics platforms are streamlining the movement of produce from farm to market, reducing post-harvest losses and increasing farmers' access to consumers. These innovations are strengthening value chain efficiency and supporting local food distribution networks.

Digital finance tools such as mobile credit, insurance, and input loans are enabling small-scale producers invest in sustainable practices and access the resources they need to scale. Importantly, these technologies are also facilitating the distribution of nutritious foods by improving coordination among producers, processors, and markets.

The abstract draws on examples from Uganda's emerging Agritech landscape to highlight practical innovations, challenges of adoption, and enabling factors for scale. Inclusive design features such as local language interfaces, offline functionality, and user-centered support are emphasized as critical to ensuring participation of women, youth, and rural farmers.

This contribution offers evidence-based insights into how Uganda's experience can inform scalable, tech-enabled models for resilient, equitable, and environmentally responsible food systems in low-income settings.

Leveraging Technology and Circular Innovations in Root, Tuber, and Livestock Systems for Sustainable Food Production

Ibikunle Olaleru[1]
Ephraim Banda[2], Ibukun Busari[3], Olorunfunmi Solana[4]
[1] Farming Systems Research Programme, National Root Crops Research Institute, Umudike Abia state Nigeria
[2] Extension Methodologist, Ministry of Agriculture, Republic of Zambia
[3] Animal Science Department, University of Ibadan, Oyo state, Nigeria
[4] Department of Home Science and Hospitality Management. Faculty of Agricultural Management and Rural Development Building, College of Agricultural Sciences, Ayetoro Campus, Olabisi Onabanjo University,

Abstract: Transforming food systems requires the innovative integration of crop and livestock technologies to boost productivity, nutrition, and environmental sustainability. Root and tuber crops, particularly cassava and potato, have been explored extensively as sustainable feed resources for livestock. This reduces competition between food and feed production while enhancing circularity in agrifood systems. Through the adoption of feed processing technologies, mobile advisory platforms, and low-cost nutrient evaluation tools, farmers can better utilize surplus and underutilized root and tuber crops in livestock nutrition. This approach will not only improve livestock productivity but also reduce post-harvest losses, minimize environmental waste, and strengthen rural livelihoods.

The mediating role of digital innovations in food systems transformation cannot be overlooked. This includes connecting smallholder farmers to real-time market information and weather forecasting and best agronomic practices, thereby facilitating informed decision-making along the root-tuber-livestock value chain. Promoting the efficient use of local resources and closing nutrient loops, practical pathways have been outlined for implementing regenerative, climate-resilient food systems that benefit vulnerable communities and ecosystems.

Keywords: Root and tuber crops, livestock nutrition, circular economy, digital agriculture, regenerative food systems

IS COMMERCIALLY AVAILABLE POWDERED OKRO IN KWARA STATE SAFE FOR CONSUMPTION?

Wasiu Awoyale[1]
Olabanji ABODUNRIN[1], Lateefat OYAFAJO[2], Lateef Sanni[3]
[1] Department of Food Science & Technology, Kwara State University Malete, PMB 1530, Ilorin Kwara State, Nigeria.
[2] Department of Food Science & Technology, Osun State University, PMB 4494, Osogbo, Osun State, Nigeria
[3] Office of the Executive Director, Nigerian Stored Product Research Institute, PMB 1489, Ilorin, Kwara State,

Abstract: *The production and commercialization of powdered okro is growing in the informal sector in Kwara state, with no documentation on consumer safety related to heavy metal and aflatoxin contamination. Therefore, the purpose of this study is to evaluate the heavy metal and aflatoxin contents of powdered okro sold in several Kwara state markets. Samples of powdered okro (200 g) were collected from markets in Offa, Osi, Ojatuntun, Ojaoba, Elemere, and Malete in a Ziplock bag, and analysed for heavy metals (lead, cadmium, copper, and arsenic) and aflatoxin (B1, B2, G1, and G2) contents using standard methods. As a control sample, powdered okro made in a laboratory was utilised. The findings show that the most common heavy metal and aflatoxin in the powdered okro were, on average, copper (0.20 mg/kg) and aflatoxin G2 (2.95 µg/kg), respectively. Powdered okro from the Malete market had a higher copper concentration (0.32 mg/kg), whereas the Ojatuntun market had a lower copper value (0.11 mg/kg). Aflatoxin G2 levels in powdered okro were highest (3.60 µg/kg) in the Malete market and lowest (1.96 µg/kg) in the Elemere market. Malete market powdered okro and others may be safe for human consumption because its copper and aflatoxin G2 levels are within the FAO/WHO permitted range.* H*owever, to reduce the potential risks associated with long-term accumulation of copper and aflatoxin G2 in the human body, standard operating procedures should be used to produce powdered okro in the Malete market.*

Table 1. Heavy metals and aflatoxin contents of commercial powdered okro from Kwara state

Powdered okro samples	Heavy metals (mg/kg)				Aflatoxin (µg/kg)			
	Lead	Cadmium	Copper	Arsenic	B1	B2	G1	G2
Offa market	0.03±0.01^{b}	0.01±0.00^{a}	0.24±0.01^{b}	ND	1.63±0.02^{a}	2.21±0.00^{a}	1.98±0.01^{a}	2.89±0.03^{c}
Osi market	0.03±0.01^{b}	0.01±0.00^{a}	0.15±0.01^{d}	ND	1.64±0.02^{a}	2.21±0.01^{a}	1.97±0.01^{a}	2.90±0.04^{c}
Ojatuntun	0.02±0.01^{bc}	0.00±0.00^{b}	0.11±0.01^{e}	ND	1.65±0.07^{a}	2.31±0.00^{a}	2.13±0.13^{a}	3.28±0.04^{b}
Ojaoba market	0.00±0.00^{c}	0.01±0.00^{a}	0.21±0.01^{c}	ND	1.76±0.22^{a}	2.27±0.16^{a}	2.11±0.04^{a}	3.20±0.01^{b}
Elemere market	0.02±0.01^{bc}	0.00±0.00^{b}	0.22±0.01^{b}	ND	1.61±0.06^{a}	2.28±0.04^{a}	1.52±0.35^{b}	1.96±0.02^{d}
Malete market	0.06±0.01^{a}	0.02±0.00^{a}	0.32±0.01^{a}	ND	1.63±0.03^{a}	2.28±0.06^{a}	2.06±0.08^{a}	3.60±0.23^{a}
Control	0.04±0.01^{b}	0.00±0.00^{b}	0.19±0.01^{c}	ND	1.54±0.01^{a}	2.24±0.02^{a}	2.09±0.07^{a}	2.82±0.01^{c}
Mean	0.03	0.01	0.20		1.64	2.26	1.98	2.95
p level	**	**	***		NS	NS	*	***

*p<0.05, **p<0.01, ***p<0.001, ND-Not detected, NS-Not significant
Means with different superscripts within the same column are significantly different (p<0.05)

Influence of agronomic management on halophytic plant traits under half-strength seawater aquaponics

Ayenia Carolina Rosales Nieblas[1]
Mina Yamada[2], Satoshi Yamada[2]
[1] The United Graduate School of Agricultural Sciences, Tottori University, Tottori 680-8553, Japan
[2] Faculty of Agriculture, Tottori University, Tottori 680-8553, Japan

Abstract: Growing global water scarcity has prompted the search for alternative water sources and sustainable food systems, especially in arid and saline-affected regions. Seawater-based methods, such as half-strength seawater aquaponics, offer a promising solution by enabling the cultivation of halophytic plants capable of withstanding high salinity. To optimize these systems, it is essential to understand how agronomic management affects halophyte performance. This study examined the physiological and biochemical traits of three halophytes, ice plant (*Mesembryanthemum crystallinum* L.), romeritos (*Suaeda edulis* Flores Olvera and Noguez), and sea asparagus (*Salicornia europaea* L.), grown under half-strength seawater aquaponics (~250 mM NaCl). Four rooting media treatments were evaluated: (C) untreated rearing water, (pH) pH-adjusted rearing water, (pH+S) pH-adjusted rearing water with nutrient supplementation, and (NS) standard nutrient solution + 5 mM NaCl. Salinity was the dominant factor influencing plant performance, but agronomic management significantly affected specific physiological and biochemical traits. Ice plant showed stable growth across treatments due to high succulence, water content, and antioxidative capacity. Romeritos exhibited treatment sensitivity, better osmotic regulation under C and NS, and stress responses under pH and pH+S. Sea asparagus maintained growth under all treatments, likely due to efficient osmoregulation, suggesting low management requirements. While pH adjustment and nutrient supplementation may enhance the viability and concentration of specific nutrients, they do not appear essential for achieving successful growth performance. These findings demonstrate species-specific responses to agronomic strategies and support the development of low-input saline aquaponic systems for sustainable halophyte cultivation in water-limited environments.

Improvement of vanilla agriculture in the Maroantsetra District Madagascar.

Renel BEMARO[1]
[1] President and Founder of NGO AIDEM

Abstract: Madagascar is a country with an agricultural vocation and the first producer and record for the qualities of vanilla in the world, nearly 80 percent of Malagasy working population live in rural areas and derive part of their livelihood from agricultural activities such as livestock, fishing, forestry. Small farms dominate since 70 porcent have an annual cultivated area of less than 1.5 ha. Vanilla is an essential product in food industry, cosmetics and perfumery, 65 percent of the world's vanilla production comes from the Analanjirofo, DIANA and SAVA region of Madagascar, one of the poorest countries in the world. For the past ten years, small vanilla producers and industrialists have been facing a difficult situation. The projectis launching an initiative with small producers to restore the quality of vanilla while improving the food security of small family farmets and preserving biodiversity in the face of climate change in Madagascar. In Maroantsetra District, vanilla producers do not have sufficient access to agronomic techniques advice and lack of the training capacity to produce good quality vanilla and have visibility on their sales. They are forced to sell their vanilla bean at low prices, which keeps them in poverty. The cost of vanilla has been subject to great instabilitiesdue to farmers lack of cash.The project aims to increase the income of small farmers and provide companies with quality and fully traceable vanilla for ten years.

From Concept to Action: Malawian Stakeholder Voices on Sustainable Food Systems for One Health

Stacia Nordin, RD, MA[1]
Katharine Vincent, PhD[1], Megan Styles, PhD[2]
[1] Food Systems Transformation in Southern Africa for One Health, Kulima Integrated Development Solutions (Pty) Ltd., Pietermaritzburg, South Africa
[2] University of Illinois, Springfield, Illinois, USA

Abstract: Malawi's food systems (FS) faces challenges of environmental (soil, water, air, climate), flora/fungi, fauna, and human health, necessitating approaches like the "Food Systems for One Health" (FS4OH) framework. This study investigates how Malawian FS stakeholders conceptualize and apply FS4OH principles.

This study aimed to explore understandings, practical uses, and barriers to FS4OH among FS stakeholders. Discussions with 41 stakeholders from all parts of Malawi's FS at national, district, and extension levels were recorded, and transcriptions analysed thematically to capture perspectives on FS4OH and its operationalization.

Most stakeholders had not heard of FS4OH, but all were familiar with FS and could describe the main components. About two-thirds thought OH was about human health and nutrition, while a third recognized broader connections to environmental, animal, and human health. The latter often described OH with terms such as agroecology, permaculture, organic, or quality over quantity.

Regardless of prior knowledge, participants saw more benefits than drawbacks to FS4OH, citing improved human and environmental health, increased food security, better educational outcomes, and advantages of cross-sector collaboration and resource sharing, though they noted coordination challenges.

Practical implementation included nutrition programs, sustainable agriculture, and integrated policies addressing food safety and zoonotic diseases, with challenges like limited resources and policy fragmentation, but at the same time noting opportunities for innovative partnerships and local solutions.

The study underscores FS4OH's value despite varying terms used to describe FS that are healthy for people and the planet. Regular, inclusive dialogue with diverse stakeholders could catalyse transformative FS that acheives OH.

IMPACTS OF LAND USE CHANGES ON ECOSYSTEM SERVICES IN AN INTENSIVE AGRICULTURAL AREA. A CASE STUDY OF HIPPO VALLEY ESTATES

Wallace Tapiwa Gara[1]
[1] Inel investment (geospatial society)

Abstract: Globally land cover and land use patterns reflect the interaction of human activities with the natural environment. Land use change is one of the main factors driving ecosystem Services to change. This has been achieved by altering ecosystem structure and function. Land use change from natural systems to agricultural environments can obstacle the Sustainability of ecosystems and degrade their ability to provide services. This result in problems such as soil erosion and land degradation, which in turn will seriously affect food Production, and food security and threaten human health and regional ecological security Human influence on land and other natural resources is accelerating at an alarming rate because of rapid population growth and increasing food requirements. The increasing agricultural intensity generates pressure not only on land resources but also across the who le environment.In this case, sugarcane production in Hippo Valley Estates was identified as the main driving force causing changes in ecosystem services in that area because of the growth in population and also the demand for sugar in different parts of the world to cover the food demand. Human expansion throughout the world caused agriculture to be a dominant form of land use globally. Agricultural ecosystems cover nearly 40% of the terrestrial surface of the earth. The research will address the adverse impacts of land use changes on Ecosystem services in the low veld area of Hippo Valley.

Identification of Critical Period of Weed Competition in Maize (Zea Mays L.) at Dambi Dollo, Western Ethiopia

Dinkisa Birisa Shone[1]
[1] Dambi Dollo University, Department of Plant Science, Dambi Dollo, Ethiopia

Abstract: Abstract

Weeds are major constraints to crop production in Ethiopia, particularly during the rainy season. A field experiment was conducted at Dambi Dollo University from June to December 2023 to determine the critical period of weed competition in maize. The study involved ten treatments: continuous weed competition, weed competition for 2, 4, 6, and 8 weeks after sowing, and weed-free conditions for the same durations, including a season-long weed-free plot. Treatments were arranged in a randomized complete block design (RCBD) with three replications. Broadleaved weeds accounted for 90.8% of the total weed flora. Weed competition and removal durations significantly affected key agronomic parameters, including weed biomass, phenological stages, plant height, yield components, and grain yield. The highest plant height (437.5 cm) and grain yield (7777.8 kg/ha) were recorded in plots weed-free for 8 weeks after sowing, closely followed by season-long weed-free plots. The shortest days to tasseling (75.6), silking (96.6), and physiological maturity (125.6) were observed in season-long weed-free plots. The highest number of ears per plant (2.0) and above-ground dry biomass (2716.7 kg/ha) were also recorded in these plots. Season-long weed-free treatment produced the highest grain yield (8851.9 kg/ha), while the unweeded check resulted in a yield loss of 6037.1 kg/ha. Early weed removal at 14, 42, and 56 days after sowing significantly improved grain yield compared to the unweeded check. Overall, maintaining maize plots weed-free for at least 8 weeks after sowing is crucial for maximizing yield in Western Ethiopia.

Keywords: Maize, Critical period, Weed competition

Harnessing Innovations in Agriculture for Food Security in Africa: A Collaborative Initiative

Martin Mwenda[1]
[1] State Department for Agriculture

Abstract: Aim and Objectives:
This initiative seeks to enhance food security across Africa through innovative agricultural practices and data-driven solutions.

Description of Activities and Partnerships:
The project implemented a suite of interventions between 2022 and 2024, focusing on precision agriculture, climate-smart practices, and capacity building for smallholder farmers. Key activities included deploying IoT-based monitoring tools, conducting farmer training programs, and establishing digital platforms for real-time data sharing. Collaborators included Universities, agricultural research institutions, private agritech firms, and local farmer cooperatives.

Outputs and Outcomes:
Key outputs included the deployment of 150 IoT devices in pilot regions, training 5,000 farmers in sustainable practices, and publishing region-specific predictive analytics on crop and climate trends. Outcomes observed included a 25% increase in average yields, a 30% reduction in resource waste, and strengthened farmer resilience to climate variability.

Description of Activities and Partnerships:
The project implemented a suite of interventions between 2022 and 2024, focusing on precision agriculture, climate-smart practices, and capacity building for smallholder farmers. Key activities included deploying IoT-based monitoring tools, conducting farmer training programs, and establishing digital platforms for real-time data sharing.

Outputs and Outcomes:
Key outputs included the deployment of 150 IoT devices in pilot regions, training 5,000 farmers in sustainable practices, and publishing region-specific predictive analytics on crop and climate trends. Outcomes observed included a 25% increase in average yields, a 30% reduction in resource waste, and strengthened farmer resilience to climate variability. The initiative positively impacted over 50,000 individuals by improving food availability and household incomes.

GGE biplot Analysis, Principal Component Analysis, and clustering of Barley genotypes (Hordeum vulgare L.) under Moisture Stress Areas of Ethiopia

Girma Degife[1]
Shimelis Gezahegn[1], Adane Choferie[1], Aliyi Robsa[1]
[1] Ethiopian Institutes of Agricultural Research, Kulumsa Agricultural Research Centre, Kulumsa, Ethiopia

Abstract: Abstract

GGE Biplot analysis illustrates the main effects of Genotype (G), i.e., the mean yield difference between the genotypes and Genotype x Environmental Interaction (GEI). A field experimental trial was conducted to evaluate 25 elite food barley genotypes and assess the effect of genotype and GEI on grain yield, aiming to identify high-yielding and stable genotypes under moisture-stress conditions. The trial was conducted in a 5x5 Triple Lattice Design across ten different environments from the 2019-2022 cropping seasons. Combined ANOVA results indicated a highly significant($p \leq 0.001$) difference due to genotypes main effects, environments, and GE interaction among the studied genotypes. Grain yield variation among genotypes ranged from 3.4t/ha to 4.7t/ha, with high-performing genotypes showing an 11.12% to 14.73% yield advantage over standard checks. Moderate to high broad-sense heritability (H^2) was observed for all traits. Based on GGE Biplot evaluation, the first mega-environment included test environments DH2, AS1, DH6, AN9, AL10, AS5, and DH8, with G2 and G9 showing the highest mean grain yield. Genotype G2 (released as Odesha variety) was identified as relatively ideal and stable across all environments, while G23, G10, and G4 were less stable. PCA revealed that 71% of gross variability was explained by the first three axes, implying significant variation among the barley genotypes that suggests high opportunities for genetic improvement through selection, and 4-clusters were identified through hierarchical cluster analysis, with the 2nd and 3rd clusters potentially suitable for variety release and future barley breeding programs.

Keywords: GGE biplot, Genotype x Environment interaction, stability, cluster analysis

GERMINATION DIVERSITY OF RICE UNDER SALT STRESS IN RHIZOBIUM INOCULATION CONDITION

Abhisek Shrestha[1]
[1] Agriculture and Forestry University, Nepal

Abstract: An experiment "effect of rhizobium inoculation on germination parameter of rice under salt stress condition" at the Rhizobium and Seed Forage Laboratory, Dhanusha. The main objective of study was to find out effect of rhizobium inoculation on rice seedlings on different salinity conditions. Experiment was laid out in five different genotypes (Ghaiya 3, Hardinath3, DRR Dhan 44, Hardinath4, IR 1851001) and 4 different salt concentration (control salt concentration, 1.25 ppm, 2.5 ppm, 5 ppm) and 3 replication under 2 factor factorial CRD.

The genotype IR 1851001 showed higher germination percentage (86.50), lowest mean germnation time (5.258), higher germination rate (16.72), higher germination energy (0.8650), higher germination index (8.891) than other genotypes. The highest germination percentage (86.73) and highest germination rate (16.75) was found in control salt concentration (0 ppm). The mean germination time was found statically at par with in all salt concentration. The higher root length and root to shoot length was found in DRR Dhan followed by Ghaiya 3. The higher shoot length and seed vigor index was found in Hardinath 3, and IR 1851001 respectively. The root length, shoot length, root to shoot length ratio, seed vigor index was found non significant and the data are statically at par in all salt concentration. The result was found non-significant for fresh weight, dry matter, and dry matter accumulation among different genotypes and salt concentration in rhizobium inoculated seeds. However, more research is required, taking a range of rhizobium inoculation techniques, other rice genotypes, and environmental conditions into consideration.

Food insecurity in The Rural Gambia

Alasana Drammeh[1]
[1] Family Therapy Association of The Gambia

Abstract:
One of the endemic problems facing developing nations of the world today is that of food insufficiency and poverty. No nation can be said to be great if it depends on other nations to satisfy her food needs. This paper highlights food security as an indicator for national development in . The paper also identifies the reasons for food insufficiency in rural Gambia and expected role of agriculture in enhancing food security, the role of food security in national development and why food insecurity must be avoided. Recommendations were made on the need to avoid food insecurity which will help in minimizing the effects of food insecurity to healthy life and sustainable national development in The Gambia.

Materials and Methods This study on the rural Gambia food inseruty was nested within a cross-sectional baseline study titled: Towards Security carried objective of the baseline study was to assess the state of food security in The Gambia households. A representative sample of 1,002 households was drawn from twenty (2) regions

Results: Out of 1002 households surveyed, over 98 percent responded to all the questions, which were then analysed. 55 percent did always worry that they would not have enough food. This information is reflected on a Table 5 Conclusion In the short term, an Emergency NAFA Cash support Programme scheme that supplements food rations a programmes needs to be urgently implemented in the country currently. In the long term, the Government of The Gambia needs to implement food security programs

Enhancing Fertilizer-Use-Efficiency through Fertilizer Microdosing as Climate-Smart Practices among Crop Farmers in North Central, Nigeria

Adetomiwa Kolapo[1]
Isaac Busayo Oluwatayo[2], Wale Ayojimi[3], Toluwalase Eniola Awe[3]
[1] Obafemi Awolowo University
[2] Department of Agricultural Economics & Agribusiness, University of Venda, Limpopo, South Africa
[3] Agricultural Economics Program, Landmark University, Omu-Aran, Kwara State

Abstract: The impact of climate change, soil fertility depletion, and land degradation has necessitated the continuous use of fertilizer to enhance crop productivity. However, the high cost of fertilizer coupled with improper use of fertilizer leading to environmental issues has encouraged efficient use of fertilizer. This study draws on farm-level data to assess the link between the implementation of fertilizer microdosing technology and fertilizer use efficiency among cereal crop farmers in Nigeria. This study used Heckman two-stage model to explore the adoption and intensity of adoption since it presents a more precise estimation by effectively addressing the endogeneity arising from latent sample selection biases. We examined the mechanism of the effect of the adoption of fertilizer microdosing technology on fertilizer use efficiency using a 2SLS instrumental variable regression to control for unobserved variables. This study found that adoption of fertilizer microdosing technology is gender-sensitive, thus its application is more common among male farmers. The results show that there is a positive relationship between adoption of fertilizer microdosing technology and fertilizer use efficiency. The estimated elasticities of fertilizer microdosing technology adoption for maize, sorghum, millet, and maize-sorghum are similar, and the average elasticity of fertilizer microdosing technology adoption is around 0.6. Statistically, a 1% increase in fertilizer microdosing technology adoption is associated with a 0.6% increase in fertilizer use efficiency. These results suggest massive promotion of this technology for use among the farmers since it can help reduce fertilizer wastage and ensure a climate-smart practice.

Ensuring Equitable Access and Resilience in Food Systems for All Ages

Betselot Abura[1]
[1] Partnership Officer at Institute of Foreign Affairs Ethiopia

Abstract: Ensuring equitable access to nutritious food across the lifespan is critical in the face of climate change and social inequalities. This abstract explores equity, justice, and resilience within food systems, focusing on age related vulnerabilities. We examine labor conditions, considering worker health and the complexities of formal/informal employment across value chains, recognizing challenges faced by youth and older adults. We address standardization, certification, and formalization, focusing on justice, injustice, and the marginalization of smallholders, paying attention to impacts on different age groups.

Central to our analysis is social and environmental justice, including gender equity, resource access, and fair food distribution, emphasizing meeting the needs of children, youth, adults, and the elderly. We delve into climate adaptation and mitigation, reducing emissions and protecting vulnerable communities, considering climate change's disproportionate impacts on age cohorts.

We discuss interdisciplinary approaches to building resilience in food systems, considering climate change, technology, agrarian transformation, and geopolitical tensions, seeking strategies addressing the specific needs of all ages. The goal: actionable strategies for productive, just, resilient, and sustainable food systems for all ages.

Keywords: Food Systems, Equity, Justice, Resilience, Climate Chang

Development of an Innovative Biotech-Based Nutrient-Dense Meal for Community Food Security and Climate Resilience

Nkosilathi Koma[1]
[1] Enactus Nust

Abstract: In order to address food and nutrition insecurity in low-income and resource-constrained communities, this project proposes the creation of a Nutrient Dish constituting all six major nutrients in their recommended daily quantities. The invention creates a shelf-stable, culturally appropriate meal that satisfies daily human nutritional needs by combining organic, locally accessible foods like sweet potatoes, honey, legumes, and traditional grains. Utilizing drought-tolerant local ingredients, surplus crops, and minimal processing to preserve nutrients and reduce waste, the dish is created using regenerative and agro-ecological principles. It ensures that undernourished populations, especially children and students, have access to reasonably priced, comprehensive nutrition while promoting climate resilience, biodiversity, and value chain circularity. The innovative element lies in the design and formulation of a single, organic, ready-to-eat dish that not only meets but optimizes human nutritional requirements based on WHO dietary standards. It is engineered to be long-lasting without refrigeration, achieved through natural preservation techniques. The formulation draws from both indigenous food knowledge and advanced food technology, incorporating nutrient synergy to enhance absorption. By converting low-cost ingredients into a scientifically balanced, appealing, and sustainable product, the project addresses both undernutrition and food waste simultaneously. This initiative offers a replicable model for food innovation that promotes local entrepreneurship and community engagement. It aims to develop decentralized food systems that are inclusive, climate-adaptive, and nutritionally adequate. Ultimately, this innovation can significantly reduce malnutrition and strengthen food sovereignty across vulnerable regions.

Effects of soil and crop management practices on soil quality and health indicators in the rice-wheat cropping system under semi-arid climate

Rabia Prveen[1]
Muhammad Riaz[1], Rashid Mahmood[2]
[1] Department of Environmental Sciences, Government College University Faisalabad, Faisalabad, Pakistan
[2] Department of Soil Science, Institute of Agricultural Sciences, University of the Punjab Lahore, Pakistan.

Abstract: The rice-wheat cropping system (RWCS) is backbone of agriculture and food security in South Asia including Pakistan. We analyzed 95 soil samples from the rice-wheat belt in Pakistan for physico-chemical and biochemical properties and tested the effects of soil [organic amendments (no vs animal manure), irrigation sources (tube well vs canal plus tube well mixed), rice residue (burning, removal, incorporation and zero tillage), and wheat residue (removal vs incorporated)] and crop management [rice (direct-seeded vs puddled conditions sowing) and wheat (zero tillage vs seed-bed sowing)] practices on soil quality indicators. Application of manure and mixing tube well and canal water reduced soil pH. Incorporation of both rice and wheat residues and zero tillage practices reduced soil BD than burning and removing the crop residues. Soil basal respiration was nearly two-fold higher under mixed water irrigation compared to the tube well irrigation. We also found that incorporation of rice and wheat residues significantly enhanced soil basal respiration and values were two-times higher compared to burning, removing and retaining crop residues under zero tillage practices. Moreover, rice and wheat residue incorporation enhanced TOC contents when compared with residue removal and burning. Chronosequence of adaptation of RWCS showed that soil pH did not change much, BD decreased over the years, and TOC contents increased with increasing duration of adopting RWCS. Our study demonstrated that BD, soil basal respiration and TOC were influenced more by the crop and soil management practices than soil pH and, hence, were more sensitive indicators of soil quality.

Alternative Ways of Problem Soils and Eco-Friendly Insect Prevention of Gourds: A Sustainable Agricultural Approach

JANNATUL FERDAWSI MITI JANNATUL FERDAWSI MITI[1]
[1] Jannatul Ferdawsi Miti – Faculty of Agriculture, Khulna Agricultural University, Khulna-9100, Bangladesh

Abstract: Coastal areas in Bangladesh, particularly in regions like Paikgacha Upazila, face significant challenges due to soil salinity, nutrient imbalance, and pest infestations, which severely hinder agricultural productivity. This project focuses on innovative and sustainable agricultural solutions aimed at improving soil health and preventing pest damage, specifically in gourd farming. The **Tridhora structure**, a raised bed planting method, was introduced to improve water drainage, reduce salinity stress, and enhance soil aeration. Local farmers were trained in sustainable soil management techniques, including the use of organic compost and green manures, leading to a 25% improvement in soil fertility over the project period.

Additionally, eco-friendly insect control methods, including neem oil and diatomaceous earth, were applied to manage pest infestations, resulting in a 30% reduction in pest damage compared to conventional methods. These interventions collectively led to a 40% increase in gourd crop yields, with plants showing healthier growth and reduced dependency on chemical pesticides. The success of this initiative underscores the potential of integrating sustainable practices like the Tridhora structure in addressing the pressing challenges of saline soil and pest control, while promoting long-term agricultural resilience. By engaging farmers in participatory research and knowledge sharing, this project provides a scalable model for enhancing agricultural productivity and environmental sustainability in saline-affected coastal areas of Bangladesh.

Climate-Resilient Livestock Systems for Regenerative Food Futures

Ibikunle Olaleru[1]
Ephraim Banda[2], Ibukun Busari[3], Olorunfunmi Solana[4]
[1] Farming Systems Research Programme, National Root Crops Research Institute, Umudike Abia state Nigeria
[2] Extension Methodologist, Ministry of Agriculture, Republic of Zambia
[3] Animal Science Department, University of Ibadan, Oyo state Nigeria
[4] Department of Home Science and Hospitality Management. Faculty of Agricultural Management and Rural Development Building, College of Agricultural Sciences, Ayetoro Campus, Olabisi Onabanjo University,

Abstract: Climate change presents profound challenges to agrifood systems, particularly in low-and middle-income countries (LMICs). In sub-Saharan region, tropical countries such as Ghana and Nigeria have adopted integrated strategies to adapt to the effects of climate change while promoting mitigation within sustainable livestock production. Through field-based research and community engagement in tropical agricultural zones, the potential of incorporating drought-tolerant forage crops and locally available feed resources into livestock feeding systems has continued to be a sustainable approach to achieving SDG 2—Zero Hunger. These approaches have enhanced feed resilience, reduced dependence on imported feeds, and lowered greenhouse gas emissions associated with conventional livestock production. For instance, research has shown the potential of incorporating drought-tolerant forage crops and locally available feed resources into livestock feeding systems. These strategies are critical to achieving SDG 2 of ensuring zero hunger. Additionally, these approaches align with goal 7 of the African Union Agenda 2063, which calls for environmentally sustainable climate and resilient economies and communities.
Moreover, several studies have highlighted the benefits of circular farming practices. These include the use of agricultural by-products for animal nutrition, which contributes to reduced waste and a lower environmental footprint. Special attention is given to participatory models that empower vulnerable communities with the skills and resources necessary to implement adaptive strategies effectively. Utilising non-conventional feed ingredients, including kitchen waste, in animal nutrition strategies while maintaining environmental stewardship has demonstrated a sustainable pathway for regenerating food systems that are both climate-resilient and socially inclusive.

DEVELOPMENT OF NON-ALCOHOLIC BEVERAGES AND FERMENTED CAKES FROM VIETNAMESE BLACK GLUTINOUS RICE

Kim Chi Nguyen[1]
Ngoc Anh Do[1], Cam Hong Phan[1], Trong Bao Khanh Bui[1], Minh Khoi Dang[1]
[1] Faculty of Food Engineering, School of Chemistry and Life Sciences, Hanoi University of Science and Technology, Hanoi, Vietnam

Abstract: Our project centres on two products crafted from black sticky rice, Heimi and Heibi. The innovation of this project lies in the integration of both fermentation and enzyme technology to use all components of the sticky rice, along with by-products. Heimi, a non-alcoholic drink, is developed through a series of processes, including saccharification, liquefaction, fermentation and pasteurization. Due to the presence of lactic acid bacteria during fermentation, Heimi is able to promote digestive health while maintaining a flavorful aroma. The process is also developed to retain a considerable amount of anthocyanin. This is an antioxidant naturally found in black sticky rice, which helps prevent chronic diseases and improve overall health. Meanwhile, the rice pulp left after filtration, which retains a high protein content (over 50% on a dry matter basis), is repurposed to produce a fermented cake known as Heibi. This serves as a nutritious and convenient snack, offering an additional source of plant-based protein. Its unique value lies in the utilization of protein from black sticky rice, aligning with the growing consumer demand for health conscious and environmentally sustainable plant-based products.

Characterization of physicochemical and functional properties of selected Irish potato varieties developed through gamma irradiation

Victor Musitia[1]
Emmanuel Ayua[1], Miriam Kinyua[2], Heka Kamau[1]
[1] Department of Consumer Sciences, University of Eldoret
[2] Department of Biotechnology, University of Eldoret

Abstract: Gamma irradiation has over time been adopted as a potato post-harvest handling strategy and to modify its nutrient composition. However, few studies have focused on establishing how it affects the physicochemical and functional properties of Irish potatoes and end use when applied as a pre-harvest technique. This study investigated the physicochemical and functional properties of three improved Irish potato varieties (IP1, IP2 and IP3) irradiated at 15 Gy, 30 Gy, and 20 Gy respectively, relative to the parent tubers. Key findings revealed significant increase in tuber dimensions for IP1, with thickness of 63.16±9.25 mm, width (48.87±7.60 mm) and length (82.5±11.17 mm). Notably, IP1 with a shape index of 1.51±0.27 (oval) was identified as optimal for French fries' production, while IP2 and IP3 with shape indices of 1.13±0.11 and 1.17±0.10 (spherical) respectively are suited for crisps. Irradiation significantly increased specific gravity across all varieties, with IP1 (1.20±0.00) classified as high, and IP2 (1.07±0.10), IP3 (1.06±0.10) as low. Crude protein decreased in IP2 (1.67±0.06) and IP3 (1.53±0.11) relative to Sherekea. The total ash was highest in Asante (4.15 g/100g) and decreased post-irradiation in IP1. Irradiation also decreased the peak, breakdown, and final viscosities for IP1 relative to Asante but varied effects were recorded for IP2 and IP3 relative to Sherekea which was dose dependent. Asante had the highest peak viscosity (308.99±4.07) hence suitable for mashing. Overall, gamma irradiation enhanced tuber characteristics influencing their processing suitability. Gamma irradiation can therefore be used to select for desired modification and make new commercial tuber varieties.

BUILDING FIRM FOUNDATIONS FOR FUTURE FOOD SYSTEMS

Karen Namonje[1]
[1] ArcVis Green

Abstract: The old adage goes, "***We pack not for where we came from, but where we are going".*** Likewise, recognizing that young people's future will be impacted by today's decisions and therefore, must be part of making them is the first step to empowering the next generation of food systems leaders.

With interconnected issues affecting food systems today, until we are clear that yesterday's leadership perspectives may not serve us today, we will continue to reproduce the inefficiencies that have preceded us. This is a radical call to reimagine **participatory governance structures**; re-examine how to integrate inclusion and Youth engagement (with a focus on women and people living with disabilities) differently. Prioritizing **the *Free, Prior and Informed Consent*** to build youth leadership will create contextually relevant interventions and enhance collaboration among private, research and public institutions, and other industry stakeholders.

One powerful lever is the strategic use of **traditional and local knowledge**, like the Kayapo Project in the Amazon where intergenerational transfer of indigenous knowledge is integrated in the Territorial and Environmental Management Plans, making young people active participants and stewards of their own future. Rather than discarding indigenous practices, they can be scaled up through innovation and digital technology. Adopting alternative strategies like artivism, compelling storytelling, narrative change and leveraging the media, **AI and digital advocacy** to empower leaders will ultimately shift perceptions, policies and influence consumer behaviors for a better global food landscape.

We must re-think leadership in food systems; as a tool to justice, resilience and zero hunger.

The process of collecting fish in Nigeria's rivers in Abuja

Michael Oke[1, 2]
[1] Michael Adedotun Oke Foundation
[2] Federal Capital Territory Agricultural Development Programe

Abstract: According to Nuhu and Yaro (2005), Tagago et al. (2011), Davies and Kwen (2012), fishing gear includes items like traps, hooks and lines, gill nets, trawls, seine nets, lift nets, clap nets, spears, cast nets, entangling nets, drift nets, and more that are used to catch fish from any body of water. An organism cannot escape from a trap, which is an impounding mechanism into which it is lured for food or shelter. The fish collecting methods and techniques used in Abuja, as well as other aquatic animals found in the rivers, are identified in this research. Through basic discoveries. Conversation and visual depiction. We learn that most fish in the water are extremely sensitive to humans and flee when they are tramped on, and that the use of common fish gear devices made with a variety of technological approaches results in a variety of crayfish, sardines, shellfish, species of mollusca, crustaceans, fish, prawns and salmon. To guarantee profitability, we advise using basic technology, obtaining documentation, controlling harvesting, and putting fish policies into place, investigating further business opportunities in each, and routinely checking fish supply. Additionally, new developments (mechanization) to increase the efficiency of equipment should get considered.

Keywords: Abuja, basic technology, fishing gear

Agroecology in the Margins: Hidden Ecologies and the Living Legacies of the Bāgh

Amir Mousavi[1]
Jenny Kano[1]
[1] Ecologies of Autonomy

Abstract: In the face of the unfolding socioecological polycrisis, agroecology has emerged—across its many expressions—as a compelling alternative to dominant paradigms. Yet much of the discourse surrounding agroecology focuses on formally recognized movements, scientific frameworks, or practices, often overlooking 'hidden' agroecologies that do not explicitly identify as such.

In our research we explore the marginalization of subaltern agroecologies through our encounters with the Bāghs of highland Central Asia; nestled along narrow and often arid valleys from the Pamirs to the Caucuses, these oasis landscapes have both evoked and evaded identification as agricultural systems, paradise gardens, food forests, agroforests, orchards, etc, based on narrow disciplinary perspectives.

For the communities who cultivate and coexist with these spaces, *Bāghs* are more than agrarian systems—they are dynamic socioecological tapestries woven through poetry, textiles, paintings, food, seeds, plants, and memory. We trace threads of biocultural continuity across time and terrain to show how *Bāghs* traverse between imaginaries and lived realities. We question how the disciplinary and often speculative focus on formal Bāghs has overlooked the vast living landscapes that are so prevalent yet so hidden.

Finally, we explore how *Bāghs*, as subaltern agroecologies, emerge within a broader regional biocultural landscape, grounded in e*mancipatory disempowerment*—rejecting identity-centric empowerment in favor of subtle, enduring forms of resistance and resilience.

Keywords: subaltern agroecologies, local ecological knowledge, biocultural landscapes, bāghs, agroforestry

A Study of Abattoir Operations in Gwagwalada, Abuja, Nigeria

Michael Oke[1, 2]
[1] Michael Adedotun Oke Foundation
[2] Federal Capital Territory Agricultural Development Programe

Abstract: This study provides an overview of the operational structure and activities within the typical abattoirs in Gwagwalada, Abuja, focusing on livestock production, slaughtering, and marketing dynamics. It examines the roles of buyers, sellers, and middlemen in the supply chain and the impact of imported bovine resources. Data were gathered through visual aids and interviews with approximately fifty cow buyers and five producers. Findings indicate challenges such as inadequate water supply, poor infrastructure, and unsanitary practices involving cow skin processing and blood collection. The study outlines areas for improvement, including transportation methods, efficiency in operations, and the development of better preservation technologies to enhance economic growth and support the livestock industry.

Key words: Cow, Slaughtering, meat, sellers, buyers, processing, slaughtering

"Enhancing Food Security Through Sustainable Development in a High Crop Diversified Region: A Case Study of Nadia District"

ANANYA SADHUKHAN[1]
[1] Ananya Sadhukhan

Abstract: In developing countries like India, it is evident that although more than 60% of the population earns a livelihood from agriculture or agro-based work, it contributes only 15.6% to the GDP. This situation affects the per capita income and the quality of life of the people engaged in this sector. Although after independence, through various revolutions (Green, Yellow), India has become a self-sufficient country in food grains and the second-largest producer of wheat, cashew, milk, and tea in the world, as well as the second-largest producer of vegetables and fruits, it raises questions, Did this help increase the per capita income of those engaged in it, or was it successful in achieving food security? With the rapid pace of urbanization, land has become one of the most threatened resources, so only a change in cropping patterns can help increase both per capita income and food security. Similarly, India has also experienced a shift in cropping patterns, and the percentage of area under commercial crops has increased over the past decade, while for environmental sustainability, farmers have also started growing crops with higher prices and lower water demand. Based on this concern, the fertile new alluvial agro-climatic zone in the Lower Gangetic Plain of Nadia district has been selected for further study. The research will analyze the concept of changing cropping patterns in India and seeks to explore the relationship between economic profitability and environmental sustainability to ensure food security.