The United Republic of Tanzania
Agricultural Sector Lead Ministries

8th AAPC
ANNUAL AGRICULTURAL POLICY CONFERENCE

CLIMATE CHANGE ADAPTATION AND MITIGATION POLICIES IN THE CROPS, LIVESTOCK, AND FISHERIES SECTOR

POLICY ANALYSIS GROUP (PAG) MEMBERS AND PARTNERS

The United Republic of Tanzania
Agricultural Sector Lead Ministries

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WELCOME TO THE 8th AAPC

TENTATIVE PROGRAM
8th ANNUAL AGRICULTURAL POLICY CONFERENCE
Theme: "Climate Change Adaptation and Mitigation Policies in the Crops, Livestock and Fisheries Sector"
June 6 - 8, 2022
DODOMA (Domiya /Asante Estate)
Facilitators (FacT)

DAY 1: June 6, 2022

TIME	ACTIVITY	RESPONSIBLE
0730-0830	Registration of participants and morning tea - arrival of guests	Secretariat
0830-0845	Arrival of distinguished guests	Protocol Team
0845-0900	Arrival of the Guest of Honor	Protocol Team
	OPENING SESSION	
0900-0910	Welcome Remarks	Hon. Antony Mtaka, Dodoma Regional Commissioner
0910-0925	An Overview of the Annual Agricultural Policy Conferences and Progress Made in Agricultural Policy Reforms	Mr. Audax Rukonge, Chairperson, Policy Analysis Group (PAG)
0925-0940	A Reflection on This Year's AAPC Theme: "Climate Change Adaptation and Mitigation Policies in the Crops, Livestock, and Fisheries Sector."	Prof. David Nyange, Secretariat of PAG/ Chief of Party ASPIRES
0940-0955	Remarks From the Private Sector	Dr. Jacqueline Mkindi, ACT Chairperson/ CEO of TAHA
0955 – 1010	Testimonies From Youth-led Agribusinesses on the Impacts of Climate Change	1. Mr. Revocatus Kimario- Executive Director, SUGECO 2. Lucas Malembo- Founder, MALEMBO FARM 3. Carol Ndosi, Founder of Launch Pad and Kilimo Uza

1010-1025	A Short Documentary on Climate Change, its Impact, Mitigation, and Adaptation A Short Documentary on Tanzanian Youth in Agriculture	ASPIRES

REMARKS FROM DIGNITARIES		
1025-1035	Remarks from the Parliamentary Committee – Agriculture, Livestock, and Water	Dr. Christine Ishengoma Chairperson, Parliamentary Committee – Agriculture, Livestock and Water
1035-1045	Remarks from USAID	Ms. Kate Somvongsiri, USAID Tanzania Mission Director
1045-1055	Remarks from Development Partners/ Agricultural Working Group (AWG)	Ms. Sarah Gordon- Gibson, Chairperson of the Agricultural Working Group
1055-1105	Remarks from the Ministry of Livestock and Fisheries	Hon. Mashimba Ndaki (MP) Minister of Livestock and Fisheries
1105-1115	Remarks from the Ministry of Agriculture, Zanzibar	Mr. Haji Hamid Saleh (Acting Permanent Secretary) Ministry of Agriculture, Irrigation and Natural Resources
1115-1125	Remarks from the Vice-President's Office –Union and Environment	Hon. Selemani Jafo (MP) Minister of State, VPO
1125-1200	Official Opening of the 8th Annual Agricultural Policy Conference (AAPC) by the Guest of Honour	Hon. Hussein Bashe (MP) Minister of Agriculture
1200-1215	Vote of Thanks	Mr. Geoffrey Kirenga Executive Director, SAGCOT Center
	Group photoshoot with the Guest of Honour	
1215-1300	Media Engagement *The rest will network and head out to the lunch buffet*	
1300-1400	**Lunch Break**	All

DAY ONE: June 6, 2022 | AFTERNOON SESSION Chief Guest: Hon. Selemani Said Jafo (MP), Minister of State, Vice-President's Office Environment		
1400 - 1420 - Chief Guest Remarks		
8th AAPC Technical Sessions		**FacT Facilitator**
Keynote Session: The Nexus Between Food, Water, and Energy		**Moderator:** Prof. Nuhu Hatibu, Executive Chairman, AfricAcademy
Presenters (10 minutes each)		
1420 – 1430	1. Climate Change Outlook for Tanzania and the Nexus Between Food, Water, and Agriculture	Prof. Pius Yanda, Centre for Climate Change Studies (CCCS), UDSM
1430 – 1440	2. Carbon Trading: Theory and Practice in Tanzania	Mr. Steve Kisakye, Global Managing Director, Dalberg Implement
1440 – 1450	3. The Triple Impact of Climate Change, Covid 19, and Russian-Ukraine War on Food Security in Tanzania	Prof. David Nyange, Chief of Party, ASPIRES
1450- 1500	4. Food Systems in the Climate Change Nexus	Ms. Clara Makenya, UNEP
1500-1515	**Panel Discussion:** Policy Options for Tanzania for Climate Change Mitigation and Adaptation	
Panelists (5 minutes each)		
Mr. Anthony Mhagama		Programme Manager-SUSTAIN, International Union for Conservation of Nature (IUCN)
Mr. Prosper Makundi		Head, Environment Management Unit, Ministry of Agriculture
Mr. Obey Assery		Senior Advisor, GAIN
1515 – 1605: Q&A Session and Conclusion		**Moderator**

SPECIAL SESSION: Aquaculture in Tanzania	**Moderator:** Dr. Gloria Yona Senior Aquaculture Scientist, TAFIRI
1605– 1615 Paper Presentation: The Rise of Aquaculture and its Potential in Transforming Food Systems: A Case Study from Tanzania	Dr. Limbu Mchele, Senior Lecturer, UDSM
1615 – 16:30 Panel Discussion: Aquaculture and its Ability to Transform Food Systems	
Panelists (5 minutes each)	
Dr. Flower Msuya	Senior Researcher, Founder and Chairperson, Zanzibar Seaweed Cluster Initiative, Institute of Marine Science Zanzibar (IMS)
Dr. Charles Mahika- Private Sector	Chairman, Aquaculture Association of Tanzania (AAT)
Dr. Avit Mmochi	Senior Lecturer and Head, *Marine Technology and Innovation Marine Chemistry and Mariculture*, Institute of Marine Science Zanzibar (IMS)
1630 – 1730: Q&A Session and Conclusion	**Moderator**
Recap and Closing	

DAY TWO: June 7, 2022 Special Guest: Hon. Hussein Bashe (MP), Minister of Agriculture		
8th AAPC Technical Sessions		**Facilitators** FacT
0815-0830: Special Remarks		UNEP
0830-0850	Chief Guest remarks	Hon. Hussein Bashe Minister of Agriculture
0850 - 0900	Ribbon Cutting and Launching of 'URT Food Systems Pathways Report' Hon. Hussein Bashe – Minister of Agriculture Vote of Thanks: Mr. Zlatan Milisic- UN Resident Coordinator, URT	
Thematic Area 1: Enhancing Efficiency in Water Management for Agriculture		**Moderator**: Ms. Emma Isinika Modamba, Senior Agriculture Economist, World Bank
0900 – 0910	**1.1** Adaptation to Climate Variability in Tanzania: Diversifications of Irrigation into Micro-irrigation and Micro-dams	Prof. David Nyange, Chief of Party, ASPIRES
0910 – 0920	**1.2** Rainwater Harvesting in Tanzania and Lessons Learned	Prof. Henry Mahoo Sokoine University of Agriculture
0920 – 0930	**1.3** A Synthesis of Water Rights and Land Rights in Irrigation Schemes in Tanzania	Dr. Wilbert Kapinga, Managing Partner, Bowmans Tanzania
0930 – 0945 Panel Discussion: Adaptation to Climate Variability in Tanzania Through Irrigation		
Panelists (5 minutes each)		
Mr. Roberts Muganzi		Senior Project Officer, Business Development and Entrepreneurship, Aga Khan Foundation East Africa
Ms. Aneth Ambrose Kayombo		Policy, Research and Budget Analysis Specialist, ANSAF
Mr. Timothy Mmbaga		Executive Director, ACT
0945 – 1035: Q&A Session and Conclusion		
1035 – 1055	**Morning Tea Break**	

Thematic Area 2: Research and Seed Systems Adaptation		**Moderator**: Ms. Stella Massawe, AGRA
1055 – 1105	**2.1** Establishing Demand for Land for Private Sector Seed Companies	Mr. Bob Shuma, CEO – Tanzania Seed Trade Association (TASTA)
1105 – 1115	**2.2** Opportunities and Challenges in Seed Systems: Perspectives of a Private Seed Company in Tanzania	Dr. Mary Mgonja, Managing Director, Namburi Agricultural Company
1115 – 1125	**2.3** Private Seed Research and Value Chain: A Case for Horticulture	Mr. Harald Peters, Area Manager, Rijk Zwaan
1125 – 1140: Panel Discussion: Addressing Seed Availability, Access, Utilization, and Sovereignty		
Panelists		
Mr. Patrick Ngwediagi		Director General, Tanzania Official Seed Certification Institute (TOSCI)
Mr Deogratias Lwezaura		Planning, Monitoring and Evaluation Manager, Tanzania Agricultural Research Institute (TARI)
Mr. Ahmed Simba		Technical Manager-Poultry Silverlands Tanzania
1140 – 1240: **Q&A Session and Conclusion**		
1240 – 1340	**Lunch Break**	

SPECIAL SESSION: **Nutrition, Resilience, and Vulnerability (special attention to youth and women)**		**Moderator:** Dr. Bohela Lunogelo, Former Executive Director, ESRF
1340 – 1350	1. The Impact of Climate Change on Nutrition: A Cross-Country Experience	Ms. Boitshepo Bibi Giyose, Senior Officer: Nutrition and Food Systems and Advisor to the CEO AUDA NEPAD
1350 – 1400	2. Food System Transformation in the Context of Climate Change	Ms. Sophie Tadria, Policy Advisor, FAO (virtual)
1400 – 1410	3. Addressing Climate Change Vulnerability to Food and Nutrition Insecurity: MNAP-II Strategic Interventions	Mr. Lutfrid Nnally, Nutrition Research Scientist, TFNC

1410 – 1425:	**Panel Discussion: Nutrition, Resilience, and Vulnerability**	
Panelists		
Hon. Neema Lugangira		Chairperson, Parliamentary Caucus Group on Food Safety
Dr. Hadijah Mbwana		Head of Department, Human Nutrition and Consumer Sciences, SUA
Dr. Reuben Sessa (virtual)		Deputy Workstream Leader, Innovations for Sustainability, FAO
1425 – 1525: **Q &A Session and Conclusion**		
Thematic Area 3: Soil Health Management		**Moderator: Mr. Geoffrey Kirenga**
1525-1535	**3.1** Application of SAGCOT Inclusive Green Growth Principles For Sustainable Agri-business Growth	Mr. John Banga Nakei, Kilombero Cluster and Partnership Manager, SAGCOT Centre ltd
1535 – 1545	**3.2** Mobile Soil Testing Lab: Experiences and Lessons Learned in Tanzania	Dr. Mshindo Msolla, Country Manager OCP Tanzania
1545 – 1555	**3.3** Acid Soils Management: Situational Analysis and Prospects for Solving the Problem	Dr. Liston Njoroge, Program Officer-Policy and Advocacy, AGRA
1555- 1605	**3.4** Environmental Concerns in Relation to the Expanding Avocado Industry in Tanzania	Mr. Vincent Akulumuka, Consultant, AGRI-CONNECT
1605 – 1620: Panel Discussion: Soil Health Management for Climate Change Adaptation		
Panelists (5 minutes each)		
Dr. Nyambilila Amuri		Senior Lecturer, SUA
Dr. Edmond Matafu		Managing Director and CEO, Live Support Systems
Ms. Sia Kwimbere		Consultant, DALBERG
1620 – 1710 Q &A Session and Conclusion		
1710 – 1730	**Recap and closing**	**Moderator**
Evening Tea		

1845 onwards Program	**Cocktail Event: Launching "The Voice of Agriculture" Radio** **Host: AKM Glitters** **Guests of Honor: Minister of Agriculture & Minister of Livestock**

DAY THREE: June 8, 2022 **Special Guest: Hon. Mashimba Ndaki (MP),** **Minister of Livestock and Fisheries**		
8th AAPC Technical Sessions		**Facilitator:** FacT
Thematic Area 4: Facilitating Water, Pasture, and Feed Availability for Livestock and Climate Resilience		Moderator: Dr. Nyankomo Marwa, Senior Lecturer, University of Stellenbosch
0830 – 0850	Chief Guest remarks	Hon. Mashimba Ndaki (MP) Minister of Livestock and Fisheries
0850 – 0900	**4.1** The Need for the Establishment of the Livestock Infrastructure Development Unit	Prof. David Nyange, Chief of Party ASPIRES
0900 – 0910	**4.2** Pasture and Rangeland Management: Lessons from the Wildlife Sector	Dr. Julius Keyyu Director of Research Development and Coordination, Tanzania Wildlife Research Institute (TAWIRI)
0910 – 0920	**4.3** The Impact of Climate Change on Fisheries and Aquaculture (Blue Economy) of Tanzania	Dr. Mathew Silas, Fisheries Researcher, Tanzania Fisheries Institute (TAFIRI)
0920 – 0935: Panel Discussion: Facilitating the Availability of Water, Pasture, and Feed for Livestock		
Panelists (5 minutes each)		
Prof. Anthony Sangeda		Associate Professor-Natural Resource Management, SUA
Prof. Martin Shem		Founder, Morogoro Fresh Meats
0935 – 1035 – Q&A Session and Conclusion		
1035 – 1055	**Morning Tea Break**	
Thematic Area 5: Leveraging Storage, Value Addition, Markets, and Trade for Enhanced Farmers' Income and Jobs Creation		**Moderator:** Mr. Honest Mseri, Head of Operations, ANSAF

1105 – 1115	**5.1** Shared Marketing Facilities for Regional Food Trade	Dr. Moshi, Chief Executive Officer, Cereals and Other Produce Board (virtual)
1115 – 1125	**5.2** Promotion of Soybean as a Nutritious Food, Livestock Feed, and Edible Oil in Tanzania	Dr. Baijukya Frederick, Farming Systems Agronomist, IITA
1125 – 1150 Panel Discussion: Reduction of Post-Harvest Losses Leading to Less Demand on the Environment		
Panelists:		
Dr. Honest Kessy		Director of National Food Security, Ministry of Agriculture
Dr. Lucas Katera		Director of Collaborations and Capacity Building, REPOA
Mr. Amani Temu		General Manager, TAHA FRESH
Mr. Amanyisye Luvanda		Market Development Analyst, AMDT
Mr. Dharmesh Ganatra (virtual)		Chief Executive Officer, iLogix Consulting Ltd
1150 – 1240 – Q&A Session		
1240 – 1340	**Lunch Break**	
Thematic Area 6: Agricultural Diversification for Climate Resilience		**Moderator:** Prof. Isaac Minde, Regional Coordinator, MSU led USDA/USAID Project
1340 – 1350	**6.1** Diversification in the Crop-Livestock Farming System in Response to Climate Change Variability: The Case of Singida	Prof. Ntengue Mdoe, Sokoine University of Agriculture
1350 – 1400	**6.2** Promotion of Tree Crops as a REDD+ Strategy: A Case of the Cashew Nut Sector in Tanzania	Dr. Malogo Kongola, Value Chain and Business Development Expert
1400 – 1410	**6.3** Agroforestry in National Policies and Plans for Resilience and Sustainable Development	Mr. Owen Nelson, Value Chain Specialist, ANSAF

1410- 1425 Panel Discussion: Value Chain Diversification	
Panelists	
Ms. Neema Mrema	Team Leader for AgResults Dairy Productivity Challenge Project
Ms. Elizabeth Swai	Founder, AKM Glitters
Mr. Stephen Michael	Director of Production and Marketing, Ministry of Livestock and Fisheries
1425 - 1525 – Q&A Session and Conclusion	

Thematic Area 7: Leveraging Technology and Financing for Climate-Smart Agriculture		**Moderator:** Mr. Kelvin Remen, Business Environment Manager, TAHA
1525 - 1535	**7.1** Public Investment for Climate Change Adaptation and Mitigation: A Case of PER for the Agricultural Sector in Tanzania	Dr. Hussein Nasorro, Lecturer IFM
1535 - 1545	**7.2** Micro-insurance for Climate Change Mitigation in Agriculture and the Livestock Sector	Mr. Frank Kitende, Assistant Lecturer, IFM
1545 - 1555	**7.3** Promoting Clean Energy: Application of Solar Technologies in the Agricultural Sector	Mr. Malik Nkoba – Consultant, Dalberg
1555 - 1610 Panel Discussion: Leveraging Technology and Financing for Climate-Smart Agriculture		
Panelists		
Mr. Maregesi Shaaban Mr. Peter Christopher		Agriculture Financing and Climate Smart Funding Experts, CRDB Bank
Mr. Yohane Kaduma		Managing Director, PASS Trust
Mr. Frank Nyabundege		Managing Director, Tanzania Agricultural Development Bank (TADB)
Dr. Nyankomo Marwa		Senior Lecturer, University of Stellenbosch
1610 - 1710 Q&A Session and Conclusion		
1710 - 1730	Emerging Policy Issues and Closing Remarks	**Moderator**
Closing Ceremony **Dr. Christine Ishengoma Chairperson, Parliamentary Committee – Agriculture, Livestock and Water**		
Evening Tea		

The Context: 8th AAPC Theme and Sub-themes

There is compelling evidence that Tanzania is already experiencing the negative impacts of climate change. Changes in precipitation patterns, rising temperatures, and extreme weather events pose an increasing threat to the country's economy. Among other sector economies, the agricultural sector is at the forefront of experiencing climate change's brutal impact. The sector's heavy reliance on rainfall and natural resources intensifies its vulnerability and further complicates the country's efforts to improve sector productivity. Agriculture remains a key driver of rural development employing 61 percent of the population while contributing 29 percent and 24 percent to the country's GDP and export earnings respectively (URT 2021a, URT 2021b). The Agricultural sector's economic contribution warrants immediate action towards climate change adaptation and mitigation.

Climate change has been among the top global agendas in 2021, highlighted by the successful conclusion of the United Nations Climate Change Conference COP26 in Glasgow, Scotland, and the United Nations (UN) Food Systems Summit at the UN General Assembly in New York. Tanzania has been at the forefront in supporting the climate agenda, as evident in a speech by Her Excellency Samia Suluhu Hassan, the President of the United Republic of Tanzania, at the United Nations General Assembly (UNGA). The President emphasized how climate change affects food security, livelihoods, and income across the globe, especially in developing countries. She pointed out the economic burden developing countries like Tanzania have to shoulder as a result of the effects of climate change, stating, "Tanzania's government spends 2 to 3 percent of GDP to mitigate and build the resilience of communities, and this is a lot in a country that is still fighting against poverty".

In line with the Global and National Agenda on Climate Change, the theme of the **8th AAPC** intends to further emphasize the importance of this agenda to the Tanzanian economy.

Agriculture's vulnerability to climate change is further exacerbated by its heavy dependency on natural resources such as water and energy resources. Sustainable utilization of these resources is vital for the growth and sustainability of the sector and the economy in general. The sector is the largest user of freshwater, utilizing 70 percent of total global withdrawal, while more than one-fourth of energy used worldwide is an input for food production, distribution, and consumption (FAO 2014). In addition, food production and supply chain simultaneously utilize approximately 30 percent of the total energy used globally (FAO 2019). This emphasizes the importance of the water-food-energy nexus to sustainable development as the demand for all three increases. The expected increase in agricultural production will bear heavily on Greenhouse Gas emissions and climate change.

Tanzania has one of the most extensive forest covers in Eastern and Southern Africa. The country has 35.3 million hectares of forests, out of which 16 million hectares comprise of reserve

forests, 2 million hectares are forests in national parks, and the remaining 17.3 million hectares (49% of all forestlands) are unprotected forests on public land (URT 2012). Despite a relatively high amount of forest stands, all are under significant threat of deforestation. The country has an annual deforestation rate of about one percent, around 400,000 hectares, twice the world rate of 0.5 percent per year. Between 1990 and 2010, Tanzania has lost 19.4% of its forested land, equivalent to about 8 million hectares. There is very little remaining primary forest in the country, and the high deforestation rate is likely to lead to increased clearings (Project Gaia 2015). The main reasons for deforestation include clearing for agriculture and settlement, energy needs, and over-exploitation of wood resources for commercial purposes. These activities contribute a significant share to the increase of CO_2 in the atmosphere at a time when carbon sink is progressively reducing. Consequently, temperatures are projected to rise by 1.40C – 3.60C by 2080 throughout the country. Precipitation trends will remain uncertain, and annual precipitation is expected to decrease by up to 42 mm by 2080 (GIZ 2021).

Climate change and climate variability create a ripple effect as temperatures rise due to reduced forest cover. Water resources in the country are also becoming more vulnerable. In the form of lakes, the country's freshwater reserves store approximately 29,425 km^3 of all the world's freshwater resources. This is about 25% of the world's fresh surface water. The reserve also includes water dams with a capacity of over 1,000,000 m^3, six of these dams are currently used for hydroelectric power generation. The country also has a significant annual average renewable water resource of 126,262 mcm[1] per year, amounting to about 2,300 m^3 per capita, above the globally agreed Falkenmark Water Stress Indicator of 1700 m^3/cap/yr (URT 2019a).

Despite the abundant water resources, the increasing water demand in the key economic sectors such as agriculture, energy, and manufacturing, alongside rising population growth requirements, show the country is moving toward a water deficit status. Tanzania's economy is already suffering directly from a lack of water. A study estimated that overall GDP growth in 2011 was reduced from 7 percent to 6.4 percent due to drought affecting water and hydropower. A 0.6 percent reduction in GDP corresponds to a $142 million in 2011 prices. Based on average GDP per capita figures, this is equivalent to the contribution to GDP of over a quarter of a million people (2030WRG 2014). The future projection for the per capita average renewable water resources is expected to decline to below 1,700 m^3 per person by 2035(URT 2019a). An increase in surface water availability, particularly in the dry season, could be achieved by capturing water in storage reservoirs in the rainy seasons and promoting efficient water use technologies for the agricultural sector like micro-irrigation schemes.

Tanzania's energy sources include hydropower, natural gas, coal, biomass, solar, wind, geothermal, biomass, and tidal waves. Of all these, the biomass energy resource, which comprises fuelwood and charcoal, accounts for 85 percent of total energy consumption, of which 75

1 Million cubic meters

percent is consumed in rural areas, heavily contributing to deforestation (URT 2020). Natural gas and hydropower are significant sources of commercial energy in the country, comprising 94 percent of the total grid installed capacity in the country. It is reported that Tanzania has an estimated 7491 MW potential for hydropower capacity (URT 2020); however, only a tiny percentage has been tapped. Climate change has been one of the major constraints to achieving this potential, as drought conditions have led to a significant decline in water levels in most hydropower stations. In a recent statement issued by Tanzania Electric Supply Company Limited (TANESCO) at the end of 2021, a drop in power generation is attributed to the declining water levels in hydropower rivers and dams. Daily power generation has dropped by 345 MW, equivalent to a 21 percent drop in daily power production (Mwananchi 2021). Blackouts and power rationing due to low water levels in the hydropower dams have forced TANESCO to rely on gas-powered generators. Power rationing for domestic and industrial use makes Tanzania's economy more vulnerable to climate change-related disasters.

Climate change also jeopardizes food security and nutrition. Every 1°C temperature increase is associated with a 1.64% global increase in the probability of severe food insecurity, which in turn drives up malnutrition (Romanello, 2021). The relationship between climate and the agriculture sector (crops, livestock, and fisheries) puts the food system and environment at risk as crop yield, crop nutrients, crop composition, crop quality, and density are all affected. This negative relationship leads to the availability, accessibility, and affordability of nutritious food being further impaired. Additionally, climate change affects the availability of safe and clean water, which is critical in reducing water-borne related diseases and improving water, sanitation, and hygiene practices (WASH) for improved nutrition. Less clean and safe water leaves communities with limited food and consumable water choices, thus increasing various forms of malnutrition such as Dietary Related Non-Communicable Diseases.

There is urgency in understanding the connections between agriculture (growing enough food) and its primary resources. Balancing rising energy needs and providing enough water for all sectors and domestic use remains central to climate change response and sustainable economic development.

Responses to climate change include adaptation, mainly to reduce the vulnerability of people and ecosystems to climatic changes, and mitigation, to reduce the magnitude of climate change impact in the long term. However, neither adaptation nor mitigation alone can offset all effects of climate change. It is necessary to focus on mitigation by reducing the emission level of gases contributing to global warming and adaptation by supporting local communities in dealing with the impact. To this effect, there is a need for adequate information to guide effective decision-making and policy interventions that can harmonize the use of critical resources within the agricultural production. The 8th AAPC will serve as a timely initiative to stimulate discussions on climate actions within the agricultural sector.

The 8th AAPC looks into climate change and the Agricultural sector within five themes. The themes are:

- Adaptation and Building Resilience
- Livestock Systems and Climate Change
- Innovations Toward Climate Change Mitigation
- Cross-cutting Issues

Regional and Global Experience: Policies for Climate Change Adaptation and Mitigation

At a global level, the threat of climate change is being addressed by the United Nations Framework Convention on Climate Change (UNFCCC) and its treaties. UNFCCC's long-term objective is to combat "dangerous human interference with the climate system," in part by stabilizing Greenhouse Gas (GHG) concentrations in the atmosphere (UNFCC 1992). To ensure its objective's attainment and further strengthen the Convention, UNFCCC adopted the Kyoto Protocol in the early 1990s. The treaty put in place legally binding emission reduction requirements for industrialized countries. The Kyoto Protocol was superseded by the Paris Agreement, which entered into force in 2016, aiming to increase governments' ability to adapt to climate change effects and mobilize sufficient finance.

Since the establishment of UNFCCC, most industrialized nations and developing countries have implemented climate change-related policies. Global policy recommendations on reducing GHG have focused mainly on using economically efficient market-based policy instruments, such as carbon taxes, fuel excise taxes, and emissions trading systems (OECD 2021). Other market-oriented policy instruments that countries have used include taxes on carbon or energy, the removal of environmentally harmful subsidies, tradable permit schemes, and the Kyoto Protocol flexibility mechanisms. Experience has shown governments often face significant opposition from affected industries when implementing policy instruments that affect company revenues and incomes. Best practices that countries have used to address competitiveness have often included recycling tax revenues back to the affected sectors while having in place policy incentives to minimize GHG emissions.

African countries contribute marginally to the changing climate, with just two to three percent of global emissions. However, it stands out disproportionately as the most vulnerable region in the world. This makes adaptation to climate change a primary concern for African countries, as reflected in the predominance of adaptation measures in their Nationally Determined Con-

tributions (NDCs) (WMA 2021). Priorities identified in the NDCs of African countries reflect the heavy dependency of Agriculture in African economies. Most countries' national climate change responses indicate a need for policy instruments that ensure early warning systems to help them to respond to weather, water, and climate-related hazards.

Nonetheless, successful adaptation and mitigation measures for major sectors like the Agricultural sector also require greater policy attention to accelerate the uptake of existing green technologies and practices. This is evident in Ethiopia, where farmers have adopted a range of green technology and its practices, including altering crop varieties, adopting soil and water conservation, and changing planting and harvesting periods.

A survey of 48 crops grown in the Nile River basin of Ethiopia showed that farmers who took up adaptation methods produced between 93kg-300kg per hectare, more than those who did not alter their farming techniques, reflecting a 10-29% difference in output (Joto-Africa 2009). Factors that increased farmers' capacity to adapt included:

- Access to early warning systems and information on food prices and weather (even with simple text or voice messages to inform farmers on when to plant, irrigate or fer tilize. That is, enabling climate-smart agriculture)
- Access to a well-informed extension service
- Access to climate-smart technologies, including sustainable agro-mechanization tech nologies, improved inputs, seeds, fertilizer

Under the Africa Adaptation Program (AAP), initiatives at the regional level have led to 16 countries incorporating climate change considerations into government investment plans. Kenya, for example, adopted the Threshold 21 (T21) model, which was integrated into the Ministry of State for Planning, National Development, and Vision 2030 in the Macro-Planning Directorate. The model is uniquely customized for the long-term integrated development planning and scenario analyses of climate adaptation options under uncertainties. The model also allows the cost of adaptation to be quantified, which is a pre-requirement for attracting financing for adaptation. In Niger, climate change resilience has been integrated through its Economic and Social Investment Plan. While the Government of Nigeria has integrated climate change into national macroeconomic policies (UNDP 2018).

KEY POLICY QUESTIONS FOR DISCUSSION

Based on the theme and sub-theme for the 8th AAPC, the following are some of the critical questions that will be addressed during presentations and discussions:

1) How has Tanzania positioned itself to tackle climate change?
2) Is the Agricultural sector adapting to climate change?
3) How can stakeholders sustainably finance the cost of climate change?
4) What lessons could Tanzania draw from other countries on climate change adaptation and mitigation for the Agricultural sector?
5) How effective are existing policies on climate change mitigation?
6) Are there legal, regulatory, and institutional frameworks in place to implement climate change adaptation policies?
7) Do significant sector policies adequately integrate climate change adaptation and mitigation strategies?
8) Is cross-sectoral planning on climate change mitigation evident?
9) What is the institutional capacity and knowledge at the national and local level addressing climate change?
10) Is there enough research and data to inform the development of adaptive strategies within the Agricultural sector?
11) How is the Nutrition sector prepared to deal with climate change?
12) Are there any climate change adaptation policies to curb malnutrition?

ABOUT PAG AND AAPC

The Annual Agricultural Policy Conference (AAPC) is organized by the Policy Analysis Group (PAG) in collaboration with the Ministry of Agriculture. The PAG is an informal (community of practice) and a voluntary group that consists of members working on Agricultural policy projects/initiatives, academia, and local and international policy think tanks. Established in 2013, the group has about 20 members and provides a platform for sharing information on policy research findings to enhance coordination, collaboration, and synergy. The PAG also aims at ensuring consistency in policy messaging.

The AAPC brings together over 150 participants from academia, research institutions, policymakers, advocacy groups, and development practitioners from Tanzania in the region and beyond. The Conference provides an opportunity to assess progress in implementing policy reforms under the Comprehensive Africa Agriculture Development Programme (CAADP) framework of the New Alliance on Food Security and Nutrition. In addition, the Conference discusses successes, lessons learned, identified remaining gaps, how to increase competitiveness within the alliances, and emerging issues that require attention.

PAG members are deliberating at a PAG retreat on the 21st of January 2022. ASPIRES Tanzania hosted the event in Dar-es-Salaam

The Policy Analysis Group (PAG) include the following:

- Aga Khan Foundation (AKDN)
- Agricultural Markets and Development Trust (AMDT)
- Agricultural Non-State Actors Forum (ANSAF)
- Agricultural Sector Lead Ministries (ASLMs)
- Agricultural Sector Policy and Institutional Reforms Strengthening (ASPIRES)
- Alliance for a Green Revolution in Africa (AGRA)
- Dalberg
- Eastern Africa Grain Council (EAGC)
- Economic and Social Research Foundation (ESRF)
- Feed the Future Tanzania
- Financial Sector Deepening Trust (FSDT)
- International Fund for Agricultural Development (IFAD)
- International Food Policy Research Institute (IFPRI)

- International Livestock Research Institute (ILRI)
- One Acre Fund (OAF)
- Policy Link
- Research on Poverty Alleviation (RE
- POA)
- Sokoine University of Agriculture (SUA)
- Southern Agricultural Growth Corridor of Tanzania (SAGCOT)
- Tanzania Horticultural Association (TAHA)
- TAHA Fresh
- Tanzania Private Sector Foundation (TPSF)
- Trademark East Africa

Development Organizations who have been close partners to the PAG and financial contributors to AAPC through the years include:

- Food and Agriculture Organization of the United Nations (FAO)
- Japan International Cooperation Agency (JICA)
- The World Bank
- UN Women
- USAID

PAG also recognizes the close collaboration of corporate organizations who have supported and financially sponsored AAPC through the years:

- CRDB
- National Microfinance Bank (NMB)
- PASS TRUST
- Tanzania Agricultural Development Bank (TADB)

Preamble for value chain sessions

Climate Change and Food Security

Climate change is one of the most pressing issues affecting agriculture and food security in developed and developing nations. It is a serious and growing threat to resource-poor farmers' food and nutrition security worldwide. As defined by the Food and Agriculture Organization of the United Nations, food security exists when all people have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life. However, climate change harms food security elements such as food availability, food access, food utilization, and stability. (El Bilali, *et al.* 2020; Schmidhuber *et al.* 2007).

Climate change impacts food systems in various ways, ranging from crop production to supply flows and food price spikes. Climate change affects the crop subsector and the fisheries subsector due to the gradual increase in sea and inland water surface temperature. Evidence suggests that climate change reduces crop, livestock, and forestry productivity (Gitz *et al.* 2016).

Climate change adaptation of seed systems has also been a major issue. Similarly, climate change threatens to exacerbate soil erosion and degrade soil quality. The question is, what can be done in addition to genetic makeup, nutrition, and management to mitigate and build resilience to climate change. Crop adaptation to climate change necessitates the introduction of crop varieties and recommendations to assist farmers in matching the best variety to their field. All of this necessitates proper soil health knowledge for climate change management and mitigation, robust extension services, and a skilled labor force for sustainable cropping systems, soil, and water quality.

Due to the threat posed by climate change, East African countries such as Tanzania, Kenya, and Uganda are expected to experience a 22% decline in agricultural production rates by 2050, further deepening poverty and malnutrition among vulnerable farmers. Furthermore, it is estimated that as a result of climate change, approximately 38 million people in Sub-Saharan Africa (SSA) will be at risk of hunger in 2050 (IFRPI, 2018).

As a result, climate change increases developing countries' reliance on imports of food products. The impact is likely to be significant, particularly for net food-importing countries, as food exports may be reduced or banned in the event of extreme weather events (El Bilali *et al.* 2020).

Critical challenges for climate change and food security include:

- Inadequate funding for crop/seed breeding and research
- Integration of knowledge on sustainable and climate-friendly farming practices to the existing extension services curriculum

The following key policy issues dominate the discussion concerning climate change and food security:

- How can Agriculture sector policies integrate climate change adaptation measures for extension services?
- What policy measures could transform the existing seed system to be more efficient and adaptable to climate change?
- What policy measures could be taken to avoid competition across the sector for critical resources like water and energy?
- How can tree crops such as cashew nut and fruit trees such as avocado help mitigate climate change?
- How can the agriculture and nutrition sector ensure that nutritious foods are accessible and affordable to those in need?

Adaptation and Building Resilience

Preparedness and Early Warning Systems: Weather Forecast, Market Intelligence, Managing Public and Private Stocks

Ensuring food security and good nutrition in a changing climate requires effective adaptation and building resilience at all levels, from policies to better technologies to address the changing agricultural landscape. Climate change preparedness has become a widely accepted tool for governments to reduce the risks to future events. Essential components in preparedness and early warning systems include weather forecast, risk assessment, market intelligence, and public and private stocks management. Providing timely and reliable weather information that aids decision-makers and farmers in making critical management and production decisions is an essential component of climate change planning. If used correctly, this information can help mitigate the effects of drought and other extreme weather events (Wilhite 2000).

Tanzania has experienced a variety of rainfall patterns over time, reflecting complex patterns of seasonality and inter-annual variability. Crop adaptation measures at the production level include changes in crop management, particularly planting dates, and the use of adapted seed varieties or breeds with varying environmental tolerances. Similarly, various adaptation options for livestock production are available at multiple scales, including breeding livestock and cultivated forages and crop residues.

Climate change also creates difficulties in the marketing of agricultural products. It impacts agriculture, resulting in changes in production patterns and prices that affect both producers and consumers, and changes the profitability of agricultural produce. Market intelligence is critical in responding to a climate shock because it provides market information and connects producers to domestic and regional markets. Therefore, policies and regulations that promote market functionality, timely and accurate market information, transparency, low transaction costs, and incentives for long-term investments are critical (Gitz et al. 2016).

Furthermore, climate change contributes to post-harvest losses and, as a result, food insecurity. While post-harvest losses in Tanzania are estimated to be 40%, it is critical to improving farmers' technical knowledge of adapting farming systems to climate variability. Additionally, post-harvest management training can reduce food losses and improve household food security (Abass et al. 2014). Management of public and private food stocks is critical to ensuring the country's food security stability. One strategy for managing food stocks is for the government to increase the capacity of the National Food Reserve Agency (NFRA) to procure, reserve, and release food stocks in response to a climate shock in the country.

Private Sector and Agribusiness Response to Climate Change

The adverse impact of climate change is a threat to individuals, communities, and the private sector. The latter is a key contributor to employment (75% of the Tanzania workforce), economic growth, and poverty reduction (URT 2021b). Direct climate-related risks to the private sector affect core business operations. Extreme weather events are increasingly becoming a business risk that can cause business interruption and damage infrastructure and physical assets. Unfavorable temperatures can impact staff health and crop and livestock productivity. Water scarcity will pose challenges for river transport, industrial cooling, and hydroelectricity. Sectors that will be particularly affected include agriculture, infrastructure operators, and tourism, most of which are private sector driven (DECD 2016). This makes the private sector a critical player in the climate action space.

The private sector is increasingly becoming aware of climate change and has started making efforts towards climate adaptation and mitigation measures. However, more efforts are needed for the private sector to become more fully engaged and effective in responding to climate change (Biagini 2013). Such efforts include:

- Increasing awareness about the significance of climate change
- Inclusion of the private sector in national and international adaptation efforts
- Engaging private sector innovation in developing products and services that can reduce the costs and impacts of climate change
- Ensuring the existence of an appropriate policy framework and an enabling environment that fosters sustainable investments and growth of the private sector

Building Nutritional Resilience to Climate Change

Climate change increases the overall risk of hunger and undernutrition, affecting food and nutrition security. It also has a bearing on environmental health issues such as sanitation, water availability, access, and quality, and the transmission of water-borne, food-borne, vector-borne, and other diseases, which further exacerbate undernutrition (Tirado et al. 2013).

Agriculture remains central to reducing global hunger and is integral in improving nutrition outcomes. Climate change presents an urgency to finance more sustainable, resilient, and efficient ways of producing, distributing, and consuming agricultural food products. This, combined with the conventional nutrition intervention programs for women, children, and youth, can reduce food and nutrition security threats.

A woman sets up a solar-powered irrigation system in her villagePolicy issues pertaining to adaptation and building resilience revolve around the following areas:

- Unreliable investments in infrastructure for water storage
- Inadequate infrastructure for water management
- Nutrition integration in climate change initiatives
- Efficient management (including accurate tracking of stock movements and balances) of public and private food stocks in Tanzania

Key policy questions for the discussion include the following:

- What policy measures can ensure sustainable financing of climate change adaptation and mitigation measures?
- What policy reforms are necessary to incentivize private sector investments in climate change adaptation initiatives?
- How best can the government integrate policies and institutional frameworks that rec ognize and timely address the climate-related early warnings?
- How can agricultural market information systems be integrated into the sector's poli cies to strengthen the response to climate change?
- What policy reforms can ensure efficient public and private food stock (real-time tracking of stock movements and balances)?
- What policies are needed to stimulate smallholder farmers' adaptation and mitigation to climate change?

Livestock, Fisheries Systems, and Climate Change

Impact, Adaptation, and Mitigation: Need for Improvement of Pastureland and Water Management

The possible effects of climate change on food production are not limited to crops. Climate change will have far-reaching consequences for dairy, meat, and egg production. Higher temperatures and changing rainfall patterns affect livestock production (through competition for natural resources such as water), quantity and quality of feeds and forage, heat stress, increased spread of livestock diseases and pests, and biodiversity loss. This is at a time when demand for livestock products is expected to increase by 100 percent by the mid-21st century (Garnett 2009).

Tanzania has the second largest livestock population in Africa after Ethiopia; the country has approximately 30.5 million cattle, 18.8 million goats, and 5.3 million sheep. Other livestock kept in the country includes 38.2 million local breed chicken, 36.6 million exotic breed chicken, and 1.9 million pigs (URT 2017a). The country is endowed with 60 million hectares of rangeland suitable for livestock grazing (URT 2007). Climate change is expected to shrink further the rangelands, essential for livestock-keeping communities in Tanzania. This shrinkage will be further aggravated because 60% of the total rangeland is infested by tsetse fly making it unsuitable for livestock pastures and human settlements (URT 2007). Similarly, studies show that the existing number of cattle in Tanzania has already surpassed the average carrying capacity in most areas, creating more pressure on the available resource. This, coupled with increasing concern on the impact of livestock systems as one of the main contributors to global Greenhouse emissions, warrants measures to combat the effect of climate change on the sector.

Through a range of management options combined with climate change adaptation strategies, livestock systems can be friendly to the environment. Initiatives like securing water access for livestock (especially during dry and drought conditions), water harvesting (in the form of dams), improving water infrastructure efficiency, decreasing stocking rates, targeted breeding, and reintroducing native species and silvopastoralism could all be beneficial to the environment.

Cows grazing in a stable

Fisheries and Climate Change

Tanzania is well endowed with natural resources in terms of fisheries. The country has several lakes, dams, rivers, wetlands, and marine waters. The country has a total water coverage of 346,337 km^2, equivalent to 36.7% of 945,000 km^2 of the total land area. The fisheries potential from all water bodies is estimated at 750,000 metric tons, whereby 100,000 metric tons is from marine waters, and 650,000 metric tons is from inland waters (URT 2019b). Climate change represents a threat to the sustainability of captured fisheries and aquaculture development.

The consequences of global warming and the associated physical changes will become increasingly evident, along with the impact of more frequent extreme weather events. The effects of increased pressure on fisheries (environmental pollution, environmental degradation resulting from unsustainable aquaculture practices, intensive exploitation of marine resources), together with future climate change, will have a bearing on fisheries in different socio-economic and geographical contexts. There is a dire need to understand the direction and consequences of the changing climate on fisheries resources to guide adaptation and mitigation strategies of affected populations.

Some of the challenges facing livestock and fisheries systems:

- Competition for land among crops, livestock, and wildlife
- Inadequate water resources due to land degradation and climate change
- Overstocking of livestock

Key policy issues for discussion:

- How are sector policies incorporating issues of climate change?
- Are there policy strategies to transform the livestock sector to be more environmentally friendly?
- Is pastureland management achievable?

Freshly caught fish

Innovations Towards Climate Change Mitigation

1. Green Growth Financing

Increased threats posed by climate change have placed Green Growth and the transition towards a green economy among the world's top agendas. To achieve this transition towards a green economy requires enormous financial investment by both public and private investors, with the latter playing an increasingly important role. Access to finance for smallholders and large-scale producers is critical in increasing the country's agricultural productivity sustainably. The emerging move towards sustainable financing by local banks with support from international organizations and NGOs is key in boosting and extending Tanzania's climate-smart agriculture (CSA) financing. Considering that most farmers in Tanzania are smallholders, developing mechanisms for green growth financing is inevitable. The following approaches can be considered:

- Financial institutions developing and deploying customized financial products that will enable farmers, especially smallholders, to access loans for green energy technologies

- Developing tool kits that will aid financial institutions in evaluating potential loan re payment risks, e.g., Inclusive Green Growth (IGG) tools developed by SUSTAIN-Africa

- Financing initiatives such as micro-irrigation schemes that use green energy while con serving natural resources such as water (pivot/drip irrigation)

2. Mechanization

Agriculture mechanization in Tanzania is still low, with only 7 percent of farmers using improved technologies (URT 2017b). Evidence of agricultural sector transformation suggests an increase in agricultural mechanization soon. It is essential to guide the uptake of agricultural mechanization towards sustainable investment. The kind of mechanization that adopts conservation agriculture practices and enables agriculture to be productive and profitable for farmers while preserving and enhancing the resource base and the environment. It protects the soil, conserves water, uses less energy, improves input-use efficiency, and reduces post-harvest losses.

3. Adoption of Renewable Energy in Agriculture

The demand for conventional energy in the Agricultural sector is still relatively low due to the low level of technology employed by most Tanzanian farmers and producers. Nevertheless, as the Agricultural sector is transforming with evidence of increased medium-size farmers and an expanding agro-industry subsector, the energy demand is expected to grow significantly. Presently, the most common energy sources for agricultural activities in Tanzania include electricity from hydroelectric power, and petrol and diesel for agricultural machinery. In the past years, drought has caused the drying up of major hydropower dams affecting electricity production, while diesel and petrol are significant contributors to Greenhouse emissions. Tanzania's Agricultural sector dependence on climate-sensitive energy sources makes the sector vulnerable, posing a threat to agricultural production and productivity.

Tanzania has abundant potential for renewable energy, including more than 670 MW of solar energy, over 1,000 MW of wind energy, and 5,000 MW of geothermal resources, which can be harnessed for power production (URT 2020). Yet none of these renewable energies contribute electricity to the national grid, and little attempt is being made to utilize these energy sources off-grid.

The existing renewable technologies can supply enough energy to the agri-food value chains. Opportunities range from solar/wind water pumping for irrigation and livestock, solar/geothermal food drying machinery, solar/wind/hydro milling agro-industries, and solar-powered refrigeration trucks for transport of agro-produce. Additionally, since most of these energies are locally concentrated, farmers could potentially sell the surplus energy they produce (e.g., electricity generated from wind turbines, biofuels, and products from biomass). This will potentially reduce the carbon footprint, lower the cost of energy as input, and reduce the production costs of low-carbon agricultural products. Harnessing these resources will significantly enhance energy resilience.

Issues of concern on innovations towards climate change mitigation include the following:

- Access to sustainable agricultural technologies in adapting to climate change.
- Investment in alternative clean energy sources
- Inadequate financing climate change initiatives
- Participation of local financial institutions in green financing

Key policy issues concerning innovation towards climate change mitigation:

- Is there a policy and regulatory framework to promote public-private investment in green finance?
- What policy reforms can incentivize private sector investment in green finance?
- Does the existing policy framework enable access to energy-efficient technologies and innovations?
- Do Tanzania's financial sector policies incorporate green financing?

A solar-powered irrigation system

Cross-cutting Issues

Vulnerability and Resilience: Women Youth and Other Vulnerable Groups

Impacts of climate change affect women, youth, and vulnerable groups in different ways due to their different roles in society. Integrating a gender perspective in climate change adaptation is critical, and empowering women has positive outcomes in their capacity to adapt to climate change. Considering the inequitable impacts of climate change, interventions and implementation of adaptation and mitigation strategies to climate change need to account for gender and marginalized groups. Without this specific focus, there is a risk that adaptation can perpetuate and enhance existing inequalities. To narrow the gender gap and promote inclusivity, the following interventions need to be considered:

- Integrating gender and vulnerable groups by relating issues into climate change initiatives
- Ensuring that climate change research generate gender-disaggregated data on impacts and response
- Enhancing equitable representation of women, youth, and vulnerable groups at all levels in planning, decision making, and implementation of adaptation and mitigation initiatives
- Promoting safeguards that will ensure women, youth, and vulnerable groups equity in sharing climate change initiatives

Key challenges and policy issues

- What policy measures could be taken to improve and incentivize women, youth, and vulnerable groups to participate in climate change initiatives?

Participants

The three-day conference will bring together more than 200 stakeholders from the agricultural and nutrition-sensitive sectors. These include representatives from the following entities:

- Agricultural Sector Lead Ministries
- Nutrition specific and nutrition-sensitive sectors/ organizations
- Regulatory authorities in agriculture
- Members of the Parliamentary Committee on Agriculture Livestock and Water
- Farmers and agribusiness associations
- Development partners
- NGOs engaged in agricultural development
- Research and training institutions
- Private sector

The Approach

AAPC continues to intensify its regional and international character. This conference is the second AAPC that has engaged its participants both on the ground and virtually. The hybrid conference allows over 100 participants to take part in the proceedings in-person and more than twice this number to participate virtually. The conference will take a partial “Davos” style, in which thematic papers are presented, followed by a panel discussion before opening the session to the floor for questions and answers. All meetings at the conference will take place in facilities that can support virtual meetings. The technology used provides the output in high-resolution format, and the AAPC task force works with virtual communication professionals with experience in managing virtual meetings.

The blended format also motivates buy-in from the donor community. Best practices from the AGRA’s African Green Revolution Forum (AGRF) and tools from the AGRF will be adapted to ensure a successful 8th AAPC.

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Dignitaries

GUEST OF HONOUR

Hon. Hussein Bashe (MP)
Minister of Agriculture

Hon. Anthony Mtaka
Dodoma Regional Commissioner

Dr. Christine Ishengoma
Chairperson, Parliamentary Committee – Agriculture, Livestock and Water

Kate Somvongsiri
USAID/Tanzania Mission Director

Ms. Sarah Gordon Gibson
Chairperson of the Agricultural Working Group (AWG)

Hon. Mashimba Ndaki
Minister of Livestock and Fisheries

Mr. Haji Hamid Saleh
(Acting Permanent Secretary) Ministry of Agriculture, Irrigation and Natural Resources

Hon. Selemani Jafo (MP)
Minister of State, Vice-President's Office - Environment

Speakers on DAY 1 morning

Mr. Audax Rukonge
Chairperson, Policy Analysis Group (PAG)

Audax Rukonge is an experienced agricultural policy expert promoting evidence-based advocacy for practical policy solutions. He is the Executive Director of ANSAF and a board member of various national and international organizations. Before joining ANSAF, he worked for reputable local and international organizations. ANSAF primarily provides platforms for non-state actors to reflect on agricultural policies and advocates for change, focusing on smallholder producers, SMEs, women, and youth. He has been involved in national and regional programmes such as the Agricultural Sector Development Programme (ASDP), Comprehensive Africa Agricultural Development Programme (CAADP), and EAC Regional Agricultural Investment Plan. He believes in inclusive policies for achieving national, regional, and global sustainable development goals. Mr. Rukonge has authored various economic books on mining, agriculture, and finance. Mr. Audax holds a master's degree in Development and International Cooperation from Jyväskylä University, Finland, and a BSc. in Agriculture from Sokoine University of Agriculture, Tanzania.

Prof. David Nyange
Chief of Party, ASPIRES

Professor David Nyange is a Tanzanian national and agricultural economist with over 20 years of experience in agriculture and rural development, particularly in strategic analysis, program design, portfolio management, trade, and private sector development. Prof. Nyange is currently an Associate Professor for International Development at Michigan State University, Department of Agricultural, Food and Resource Economics. In this capacity, he also serves as a Policy Advisor to the Ministry of Agriculture through the USAID-funded SERA BORA project. Until June 2013, Prof. Nyange worked for USAID as a Senior Agricultural Economist and Deputy Team Leader for Feed the Future in Tanzania. At USAID, he was instrumental in the design and rolling out of a food security and nutrition program under the Feed the Future initiative. Prof. Nyange also led efforts to design and manage programs to mitigate the impact of the 2009 Global Financial Crisis through a safety net program, policy reforms, and interventions in the financial sector. Prof Nyange holds a Ph.D. and Master's in Agricultural Economics from Kyoto University (Japan) and Cornell University (USA), respectively. He has published several journal articles and co-authored book chapters on agriculture, food security, and rural development.

Dr. Jacqueline Mkindi
ACT Chairperson

Dr. Jacqueline Mkindi is a development manager specializing in agriculture business and trade. She is the CEO of the Tanzania Horticultural Association (TAHA) and chairperson of TAHA commercial companies (TAHAFRESH Handling Ltd and GreenCert Ltd). She has provided strong leadership in shaping and transforming the multi-million-dollar horticultural industry in Tanzania. She has been instrumental in creating and facilitating transformative partnerships with the Government of Tanzania and several development partners. She has participated in several trade facilitation and negotiation platforms, notably in EAC, SADC, ECOWAS, EU, and USA. Jacqueline serves on advisory boards of several public and private local, regional and international platforms. She chairs the Agriculture Council of Tanzania (ACT) and sits on the executive council of the Board of the Tanzania Private Sector Foundation (TPSF). She also represents Tanzania in the Consultative Committee of the Common Fund for Commodities headquartered in The Hague. She has recently been nominated member of the International Steering Committee of the Food and Forest Development Finland (FFD) - Hope, a platform to promote climate responsibility and sustainable development to mitigate climate change risks. She represents the Southern Farmer Organizations World. Jacqueline is a Certified Director and has been awarded a Certificate in Directorship (CiDir) by the Institute of Directors in Tanzania (IoDT) in August 2019. She has been a recipient of several awards --among which is “A Woman of Impact” in transforming agriculture, particularly the horticultural industry in Tanzania.

Revocatus Valery Kimaro
Executive Director of SUGECO

Revocatus Valery Kimario is the Executive Director of Sokoine University Graduate Entrepreneurs Cooperative (SUGECO), a youth agribusiness incubator. The organization promotes youth engagement in agriculture and agribusiness value chains at the Sokoine University of Agriculture (SUA) in Morogoro, Tanzania. SUGECO works to enhance skills development, technology transfer, and space provision for an innovation ecosystem to bridge the agribusiness skills gap in Tanzania. He has several years of work experience working with local and international organizations serving in different capacities and sectors, including banking, community development projects, and private sector organizations in agriculture and the entrepreneurship value chain. Revocatus is a graduate of the University of Dar es Salaam, Tanzania, with a Master’s degree in Business Administration (MBA) and a Bachelor's degree in Land Use Planning and Environmental Management (Hon. 2nd Upper Class). He has attended international training and received a post-graduate diploma in climate change adaptation in agriculture and natural resource management awarded by Wageningen University, Netherland. He also has a post-graduate diploma in entrepreneurship and cluster development offered by the Entrepreneurship Development Institute of India (EDI).

Lucas Malembo
Founder, MALEMBO FARM

Carol Ndosi
Founder of Launch Pad and Kilimo Uza

Carol has a rich background in media, strategic communications, and entrepreneurship. She conducts consultancy in business development, project management, SMEs development, digital strategy, digital advocacy, and creative industries. She is a co-founder and director of Launchpad Tanzania (CSO). Carol manages programs and donor-funded projects targeting women and youth advancement in skills development, future of work, digital inclusion, gender, and technology, and heading the organization's arm on digital matters. She started a movement called #100TanzanianSheroes, which celebrates and spotlights 100 women every year since 2018 and forms mentorship relationships between the girl child and Tanzanian women professionals and role models for career inspiration and advancement. A Mandela Washington Fellow 2016 and Chevening Alumni 2018, Carol is the co-founder of a digital solution for farmers (KilimoUza), a global goals champion with the UN Tanzania, and global goals goalkeeper with the Gates Foundation. Carol is also the Country Lead for women at Web in Tanzania, a regional network in Uganda, Kenya, Tanzania, and Rwanda, established and supported by DW Akademie and The German Cooperation to bridge the digital gender divide. She is a certified trainer and coach in digital skills, employability skills, entrepreneurial skills, gender, and design thinking process.

Mr. Geoffrey Kirenga
Executive Director, SAGCOT Center

Mr. Kirenga has a wealth of experience in Eastern African agriculture value chains. He is currently the Chief Executive Officer of the Southern Agricultural Growth Corridor of Tanzania (SAGCOT). Before joining SAGCOT, he was Director of the Crop Development Division at the Ministry of Agriculture in Tanzania. Mr. Kirenga specialized in crop promotion, pest management, and plant health services. Mr. Kirenga has an extensive network in Tanzanian and international agriculture and agribusiness communities. He is highly committed to driving SAGCOT to deliver on its role as the catalyst dedicated to transforming Tanzania's agricultural sector. Mr. Kirenga holds a BSc (Sokoine University of Agriculture) and an MSc and DIC (Imperial College, University of London).

FACILITATORS

Dr. Aichi Kitalyi

Dr. Barney Laseko

Dr. Mary Shetto

Keynote Session: The Nexus Between Food, Water, and Energy

Prof. Nuhu Hatibu
Executive Chairman, AfricAcademy

Moderator

Prof. Hatibu is currently the Executive Chair of AfricAcademy Limited, which owns the Arusha Science Schools (www.aaarusha-science.co.tz). He has occupied various directorship roles in his career. In a descending sequence timewise, Prof Hatibu has been: East Africa Regional Director, Alliance for a Green Revolution in Africa (AGRA). responsible for Tanzania, Uganda, Rwanda, and Kenya Chief Executive Officer of Kilimo Trust (KT) which is a regional organization for agricultural development in the East African Community in which KT focuses on the expansion of regional cross-border trade in food staples Founding Regional Coordinator of the Soil and Water Management Network for East, Central, and Southern Africa (SWMnet) hosted by the International Crops Research Center for the Semi-Arid Tropics (ICRISAT) for the Association of Agricultural Research in Eastern and Central Africa (ASARECA) Founding Chairperson (Presidential appointment), of the Board of the Tanzania National Irrigation Commission Chairperson (Presidential appointment) of the Board of Trustees of the Tanzania Marine Parks and Reserves, which focused on enhancing the management of natural resources at these parks He is the founding director of the Bureau for Agricultural Consultancy and Advisory Services (BACAS) and founding leader of the Soil-Water Management Research Group (SWMRG), a leading research center at SUA. Prof. Hatibu was once the Dean of the Faculty of Agriculture at Sokoine University of Agriculture. He has published books, book-chapters, and several journal papers. Prof. Nuhu has also been a member of several consultancy teams.

Prof. Pius Yanda
Centre for Climate Change Studies
(CCCS), UDSM

Presenter

Abstract

Water- Food Nexus in a Changing Climate – Reflection from Tanzania

Climate change is happing, affecting different parts of the globe differently. Developing countries, especially SSA, are extremely vulnerable to climate change impacts, as they lack the resources to adapt. The impacts of changes in rainfall and temperature patterns are already evident in southern Africa. Agriculture, climate change, food security, and poverty reduction are inextricably linked. According to FAO, as the world population grows to a projected 9 billion by 2050, agricultural production must also increase by an estimated 70 percent. However, climate volatility, more frequent extreme weather events, and temperature changes increasingly threaten the viability of agricultural production throughout the world. Hence, water and food security are the key challenges to climate change. They are highly vulnerable to continuously changing climatic patterns. Studies have predicted that the average global temperature may increase by 1.4–5.8 C.

In Sub-Saharan Africa, by 2050, rainfall could drop by 10%, which would reduce drainage by 17%. Thus, such changes in temperature and precipitation would substantially reduce freshwater resources and agricultural yield by the end of the 21st century. It is anticipated that by 2050, water and food demands will have increased by over 50%. These challenges would exacerbate a host of other challenges such as malnutrition, poor health, sanitation, and migration. Climate projections in Tanzania show that most regions in the country are projected to have increased temperatures (minimum and maximum). Minimum temperatures are expected to increase throughout the country. The minimum increases and maximum temperatures are expected to compromise socio-economic activities in many regions. Adaptation strategies should be formulated to adapt to the projected increase in temperatures over different regions.

Mr. Steve Kisakye
Global Managing Director, Dalberg Implement

Presenter

Steve Kisakye is the Global Managing Director of the Dalberg Implement business based in Dar es Salaam, Tanzania. Steve also serves as a team lead for an interim secretariat currently leading the Africa Public Health Foundation. He currently provides implementation oversight to a new strategic partnership with the MasterCard Foundation under the Young Africa Works initiative.

Steve has done extensive work supporting clients to develop robust agriculture strategies to drive sector transformation. He co-led the Dalberg team that finalized the National Agricultural Sector Development Program II and created a national agro-processing plan in Tanzania. He has conducted numerous value chain analyses (cotton, sunflower, cassava, rice, sorghum, beef, poultry) to increase productivity and processing ability. He also led a team that mapped out investment opportunities in the dairy sector in Tanzania.

Before Dalberg, Steve worked in the mining sector across Africa, leading community health and safety programs focused on managing infectious diseases and broader development programs. He has also worked in the areas of rural health initiatives to scale up HIV/AIDS care and treatment programs through health care worker training and improved access to care and treatment services. Steve holds an executive accreditation from Harvard University on early childhood development, a public health qualification from Makerere University, a post-graduate qualification in business management from the University of Cape Town – Global Business School, and an accreditation in community relations practice in the extractive sector from the University of Witwatersrand.

Abstract

Carbon Trading: Theory and Practice in Tanzania

Deforestation in Tanzania is happening rapidly, with about 469,420 hectares of forest lost annually (i.e., a forest 3 times the size of the Dar es Salaam region). Direct human-induced land-use activities (e.g., agriculture) are the leading causes of deforestation and a key contributor to carbon emissions driven by communities in search of livelihoods.

Carbon credit markets present an opportunity to tap into global markets to incentivize smallholder farmers (SHFs) to adopt climate-smart agricultural practices. The model works by rewarding SHFs with monetary benefits for carbon sequestrated through soil or crops (especially in agroforestry).

For Tanzania to fully capitalize on these markets, there is a need for investment in (i) enabling policies to attract investments which entails clear oversight guidelines on carbon trading, supportive taxation policies, and predictable climate policy priority framework, and (ii) technical capacity and technology which involves capacity-building opportunities for public-private partnership through the National Carbon Monitoring Center and attracting technology transfer through partnerships with globally leading technology firms.

These investments would have significant benefits in four areas: (i) Improvement in SHFs' livelihoods –increase in yields from climate-smart practices, higher incomes for SHFs due to yields and carbon credits sales, and increased climate resilience for SHFs (ii) Attainment of climate goals – support Tanzania overall to attain Green House Gas emission targets through reduced emissions, (iii) spillover of carbon trading into new sectors, e.g., blue carbon from seaweed farming, and lastly (iv) overall positive economic impact – reduced poverty, job creation, and technology transfer.

Prof. David Nyange
Chief of Party, ASPIRES

Presenter

Professor David Nyange is a Tanzanian national and agricultural economist with over 20 years of experience in agriculture and rural development, particularly in strategic analysis, program design, portfolio management, trade, and private sector development. Prof. Nyange is currently an Associate Professor for International Development at Michigan State University, Department of Agricultural, Food and Resource Economics. In this capacity, he also serves as a Policy Advisor to the Ministry of Agriculture through the USAID-funded SERA BORA project. Until June 2013, Prof. Nyange worked for USAID as a Senior Agricultural Economist and Deputy Team Leader for Feed the Future in Tanzania. At USAID, he was instrumental in the design and rolling out of a food security and nutrition program under the Feed the Future initiative. Prof. Nyange also led efforts to design and manage programs to mitigate the impact of the 2009 Global Financial Crisis through a safety net program, policy reforms, and interventions in the financial sector. Prof Nyange holds a Ph.D. and Master's in Agricultural Economics from Kyoto University (Japan) and Cornell University (USA), respectively. He has published several journal articles and co-authored book chapters on agriculture, food security, and rural development.

Abstract

The Triple-Impact of Climate Change, Covid-19, and Russian-Ukrainian War on Tanzania's Food Security

Climate change impact is becoming evident in Tanzania in recent years as we witness frequent droughts, changes in rainfall patterns, high temperatures, and floods. The Tanzania Meteorological Authority (TMA) recently issued early warnings that long rains for the 2021/2022 season are likely to be below average, with expected prolonged dry spells in most areas. The United Nations agencies predict that 39 million people are vulnerable to food insecurity in the Eastern part of Africa. Tanzania agriculture is predominantly rainfed (96%), and hence rainfall reliability is crucial to ensuring food security. Vulnerability to food insecurity is accentuated by the impact of Covid-19, a pandemic that has fuelled global inflation arising from supply chain constraints.

Moreover, the Russian-Ukrainian war has exacerbated energy, fertilizer, and food prices. Ukraine and Russia provide around 30% of the World's wheat, 20% of its maize, and more than 50% of its sunflower oil. Russia is the World's top natural gas exporter and second-largest oil exporter after Saudi Arabia. Russia and Belarus account for 20% of the World's fertilizer. Recent analytical reports show that global commodity prices have increased substantially compared with last year—for example, food prices are 34% higher, fertilizer over 100%, and oil 60%.

Tanzania imports over 90% of its fertilizer. Annual fertilizer import during the past three years is 770,000 tons, of which 530,000 is for the domestic market and 250,000 re-exported to land-locked countries. The fertilizer import bill for 2020 was $186 mil. Tanzania imports over 60% of edible oil (400,000 tons) annually in which in 2020, the oil import bill was $270 million. Tanzania imports about 1.2 million tons of wheat annually, of which 90% is from Russia. This paper synthesizes the triple impact of climate change, Covid-19, and the Russian-Ukrainian war on Tanzania's food security. Policy options for the mitigation of food insecurity are discussed.

Ms. Clara Makenya
UNEP

Presenter

Mr. Anthony Mhagama
Programme Manager-SUSTAIN, International Union for Conservation of Nature (IUCN)

Panelist

Mr. Mhagama is a Programme Manager for the SUSTAIN initiative implemented by the International Union for Conservation of Nature (IUCN) within selected clusters of the Southern Agricultural Growth Corridor (SAGCOT) region in Tanzania. He has several years of progressive work experience in development cooperation and technical implementation of agricultural sector development projects, focusing on local economic development, value chain development, and market systems development in Tanzania. In the past, he has worked with the National Network of Smallholder Farmers in Tanzania (MVIWATA), the Swiss Foundation for Technical Cooperation (Swisscontact), Netherlands Development Organisation (SNV), and the Danish International Development Agency (DANIDA) in Dar Es Salaam. He is an agricultural economist and a graduate of the Sokoine University of Agriculture, Morogoro, Tanzania.

Mr. Prosper Makundi
Head, Environmental Unit, Ministry of Agriculture

Panelist

Mr. Makundi heads the Environment Management Unit at the Ministry of Agriculture, which guides the sector on how agricultural activities should sustainably be conducted by ensuring that environmental and climate change issues are well observed and implemented in all existing/emerging Ministry's guiding documents, such as policies, programs, plans, strategies, and projects. He is an expert involved in the preparation/reviewing of several Ministry's guiding documents, strategies, plans, and programs, as well as projects such as the Agricultural Sector Environmental Action Plan, Agriculture Climate Resilience Plan 2014 – 2019, Climate Smart Agriculture Guidelines of 2017 and Tanzania Agriculture Food Security Investment Plan (TAFSIP) Mr.Makundi holds a Master's degree in Natural Resources Assessment and Management from the University of Dar es Salaam and a Bachelor's degree in Agriculture from the Sokoine University of Agriculture.

Mr. Obey Assery
Senior Advisor, GAIN

Panelist

SPECIAL SESSION: Aquaculture in Tanzania

Dr. Gloria Yona
Senior Aquaculture Scientist-TAFIRI

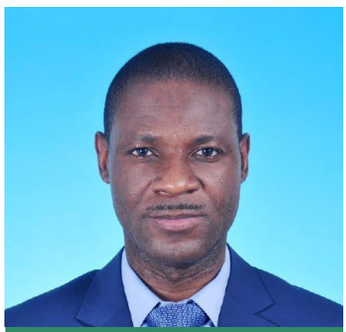
Moderator

Dr. Gloria Yona is currently working with the Tanzania Fisheries Research Institute (TAFIRI) as a Senior Aquaculture Scientist. Her vast experience includes working with temperate, tropical, freshwater, and marine water organisms.

Dr. Gloria leads a massive tilapia aquaculture project, working through the whole value chain from fingering, production, processing, and consumption. The project is conducted in three zones across Tanzania, i.e., the Southern Highlands, Eastern Zone, and Lake Zone.

She has managed three national-funded projects concerning aquaculture development in Tanzania and the impacts of climate change on marine fish. She worked with the Ministry to promote mariculture development along the coast of Tanzania. She was part of the national team that participated in developing the Tanzania Mariculture Strategic Plan and the National Aquaculture Strategic Development Programme. She is a member of the 2022 National Secretariat Committee (NSC) for the International Year for Artisanal Fisheries and Aquaculture (IYAFA).

Dr. Gloria Yona obtained her Ph.D. degree studying 'Impacts of Climate Change and Variability on Mangrove Dependent Fish and Coastal Fish.' She has two MSc. degrees, one from the University of Ghent, Belgium, and another from Sokoine University of Agriculture.



Dr. Samwel Mchele Limbu
UDSM, Students of Aquaculture

Presenter

Dr. Limbu is a senior lecturer in aquaculture nutrition and environmental health at the University of Dar es Salaam. He has a Bachelor of Science in fisheries and aquaculture from the University of Dar es Salaam and a Master's in aquaculture nutrition from the University of Stirling in Scotland, UK. He later joined East China Normal University, Shanghai - China, for his Ph.D. in Zoology, specializing in aquaculture nutrition and environmental health. Dr. Limbu has several local and international awards, and he is currently head of the department of aquaculture technology at the University of Dar es Salaam. Dr. Limbu has several paper publications as well as book chapters. He currently serves as an associate editor for the journal of applied aquaculture. He is also a review editor for Frontiers in Animal Science and Production and Frontiers in Tropical Diseases. Dr. Limbu is a member of various professional bodies, including the Western Indian Ocean Marine Science Association, Tanzanian Young Academy of Science under Tanzania Academy of Sciences, Sustainable Aquaculture Research Networks in Sub Saharan Africa, and AfriMAQUA.

Abstract

Tanzania has mainly depended on capture fisheries as the main source of protein, income and employment for several decades. Indeed, the capture fisheries in Tanzania have experienced an increase in fish production between 320,900 and 422,859.78 metric tonnes between the year 2000 and 2020/2021. However, the consumption fish in Tanzania is low as reflected by the per capita fish consumption of 8.5 kg as compared to an average of 20 kg globally. The country intends to increase the fish per capita consumption to 10.5 kg, which translates into an additional demand of about 100,000 metric tonnes of fish. The required fish to fill the gap is expected to come from aquaculture production because fish supply from capture is no longer capable of keeping pace with demand due to the fast-growing population. Currently, Tanzania has 30,064 fish farmers in different parts of the country, which has increased the fish production from 220 metric tons in 2000 to 22,793.20 metric tons (mainly from aquaculture 20,258 tons) by April 2021. This shows that aquaculture is the future sector for fish production in the country. However, to realize the potential, Tanzania has to tackle inadequacies in institutional capacity and legal framework, key input supplies, improve management practices, access to credit, limited cold chain facilities, value addition and markets and skills, knowledge generation and sharing.

Dr. Flower Msuya
Senior Researcher, Founder and Chairperson, Zanzibar Seaweed Cluster Initiative, Institute of Marine Science Zanzibar (IMS)

Panelist

Dr. Flower E. Msuya is a senior researcher, founder, and chairperson of the Zanzibar Seaweed Cluster Initiative in Tanzania. She holds a Ph.D. in Seaweed Aquaculture from Tel Aviv University, Israel. For over 30 years, Dr. Msuya has researched on the impact of seaweed farming on farmers' livelihoods and produced the first seaweed value-added product in Tanzania in 2006. She has recently been engaged in developing innovative farming and value addition technologies to address the negative impacts of climate change by working with farmers and small-scale processors. Her work has helped marginalized women to improve their livelihoods through the production of seaweed products.

Dr. Charles Mahika
Chairman, Aquaculture Association of Tanzania (AAT)

Panelist

Dr. Mahika has several years of professional experience capturing fisheries and aquaculture in Tanzania and East Africa. Throughout his career, Dr. Mahika has had several accomplishments. The key ones are:

• He developed the Cage Fish Farming Policy (CFFP) for the East African Community

• He was among a 3-Member Team of Regional Aquaculture Experts who validated the draft Cage Fish Farming Guidelines for the East African Community-subsequently published as an EAC document

• Dr. Mahika is an FAO-recognized national aquaculture training specialist

• He assessed the aquaculture training needs, curricula, employment, and employability status of aquaculture graduates from universities and fisheries colleges

Dr. Mahika led a Tanzanian team to a Regional Expert meeting in Zambia and DRC (Congo), during which the Lake Tanganyika Aquaculture Draft Policy was formulated. Professor Swan, an internationally acknowledged policy formulator, facilitated the policy formulation process. He led a national team supported by the Ministry of Livestock and Fisheries to formulate Draft National Aquaculture Biosecurity Guidelines and Standard Operating Procedures (SOPs) for cage fish farms in Tanzania. He also worked with a ministerial team that formulated the Fisheries (and Aquaculture) Policy and took part in the TAFIRI Research Policy formulation process.

Last year, Dr. Mahika consulted for Msingi East Africa to, among other things, establish the legal, policy, and institutional framework of cage and pond farming in the Lake Victoria Basin, Tanzania.

Dr. Mahika holds a Ph.D. in Aquaculture, a Master of Philosophy (MPhil) in Fisheries Management, a BSc in Marine Biology, and a General Diploma in Fisheries.

Dr. Avit Mmochi
Senior Lecturer and Head, Marine Technology and Innovation Marine Chemistry and Mariculture, Institute of Marine Science Zanzibar (IMS)

Panelist

Dr. Mmochi is a senior lecturer and head of the Marine Technology and Innovation Section at the Institute of Marine Sciences at the University of Dar es Salaam in Zanzibar. He has a master's degree in Marine Chemistry from the University of the Ryukyus, Japan, and a Ph.D. in Pesticides Sciences from the University of Dar es Salaam with experience in marine chemistry and mariculture. Dr. Mmochi has several years of experience in research, consultancy, and public service in marine chemistry and aquaculture. He played a crucial role in the introduction of mariculture in Tanzania. He worked with students and colleagues to identify five tilapia species that can grow well in a marine environment. He identified Rufiji/Wami tilapia as supper males that, when crossed with female Nile tilapia, will produce all males that can survive and grow well in estuarine and marine waters. Dr. Mmochi has worked with FAO as a Senior National Consultant and was instrumental in launching the Korea Zanzibar Multispecies Mariculture Program. He was a node leader in the NORAD NORHED TRAHESA project on aquatic health, which introduced veterinary in aquaculture in Africa, and ECARE-SA, which dealt with aquatic health. Dr. Mmochi also participated in the fattening mangrove crabs and farming milkfish, seaweeds, pearl oysters, and pearls. He is currently a principal investigator (PI) of the innovation and commercialization of farmed seaweeds, shells, pearl products, breeding silver pompano projects, and a Co-PI in sandfish farming project. Dr. Mmochi is an expert in fish culture, including feeds, larvae rearing, reproduction, and growth stages.

Thematic Area 1: Enhancing Efficiency in Water Management for Agriculture

Ms. Emma Isinika Modamba
Senior Agricultural Economist,
World Bank, Tanzania

Moderator

Prof. David Nyange
Chief of Party, ASPIRES

Presenter

Professor David Nyange is a Tanzanian national and agricultural economist with over 20 years of experience in agriculture and rural development, particularly in strategic analysis, program design, portfolio management, trade, and private sector development. Prof. Nyange is currently an Associate Professor for International Development at Michigan State University, Department of Agricultural, Food and Resource Economics. In this capacity, he also serves as a Policy Advisor to the Ministry of Agriculture through the USAID-funded SERA BORA project. Until June 2013, Prof. Nyange worked for USAID as a Senior Agricultural Economist and Deputy Team Leader for Feed the Future in Tanzania. At USAID, he was instrumental in the design and rolling out of a food security and nutrition program under the Feed the Future initiative. Prof. Nyange also led efforts to design and manage programs to mitigate the impact of the 2009 Global Financial Crisis through a safety net program, policy reforms, and interventions in the financial sector. Prof Nyange holds a Ph.D. and Master's in Agricultural Economics from Kyoto University (Japan) and Cornell University (USA), respectively. He has published several journal articles and co-authored book chapters on agriculture, food security, and rural development.

Abstract

Adaptation of Climate Variability in Tanzania: Diversification to Micro-irrigation and Micro-dams

The adoption of irrigation in Sub-Saharan Africa is low compared to other continents. Globally, 20% of cultivated land is irrigated, but for SSA, it is 5% and for Tanzania is about 3.5%. Irrigation is important to achieve high yields. To unleash agriculture productivity, three factors need to be addressed. These are improved crop seed varieties, improved nutrition (fertilizer and water), and improved agronomic practices, including the management of pests and diseases. Tanzania has adopted the National Irrigation Master Plan (NIMP-2), which aims to expand the area under irrigation from 475,000 hectares in 2015 to over 1 million ha by 2035. The predominant irrigation method is flood or surface irrigation, accounting for 92% of irrigated areas.

Conversely, 8% of irrigated farmland is under micro-irrigation. As freshwater is becoming scarcer due to climate change, it is imperative to diversify irrigation systems into micro-irrigation, which is more water-efficient. Countries in East and Southern Africa are gradually adopting micro-irrigation technologies. For example, 33% and 44% of irrigated farmland are under micro-irrigation in Kenya and South Africa, respectively. India has successfully developed over 10 million ha under community micro-irrigation. The cost of micro-irrigation is relatively lower ($600-$1000 per ha) than the canal irrigation system ($5,000-$8,000 ha).

Prof. Henry Mahoo
Sokoine University of Agriculture

Prof. Mahoo holds a BSc in Applied Hydrology (University of Dar es Salaam, Tanzania), MSc in Irrigation Engineering (Univ. Newcastle, UK), and a Ph.D from Sokoine University of Agriculture, Tanzania. His areas of specialty include hydrology, irrigation, drainage, water harvesting and climate change, climate smart agriculture, system of rice intensification (SRI) and indigenous weather forecasting. Prof Mahoo has been a project leader of several SUA, DFiD, IDRC, IWMI and COSTECH funded projects and has published widely.

Presenter

Abstract

Rainwater Harvesting in Tanzania and Lessons Learned

Rainwater harvesting (RWH) is a method of inducing, collecting, storing , and conserving local surface runoff for agricultural production (crop, livestock and aquaculture) and domestic water use. This presentation presents a brief treatise, of rainwater harvesting, and its historical perspectives. The paper reviews major techniques of RWH for crop production being practiced. These fall into three broad categories namely: In-situ, Internal (Micro) and External (Macro) catchment RWH. The paper finally gives specific examples of RWH techniques being practised in Tanzania. The presentation looks at different techniques of RWH in Tanzania and the role of RWH for community livelihoods. The presentation concludes by raising some key policy issues for discussion which are related to RWH.

Dr. Wilbert Kapinga
Managing Partner, Bowmans Tanzania

Dr. Wilbert Kapinga is the managing partner at the law firm Bowmans Tanzania.

He has several years of experience advising domestic and international financial institutions and corporations on corporate, regulatory, and transactional matters. Wilbert has advised on numerous project, finance, and infrastructure development transactions, including roads, railways, sea travel, and airports. Before entering private practice, Wilbert was a Senior Lecturer and Dean of the Faculty of Law at the University of Dar es Salaam where he was a member of the teaching and research staff for several years.

Chambers and Partners consistently ranked Wilbert in Band 1 for general business law for five consecutive years. IFLR1000's Financial and Corporate Guide rated Wilbert as a highly regarded lawyer for capital markets, energy and infrastructure, project development, banking, finance, and M&A for five consecutive years.

Presenter

Wilbert holds an LLB (Honours) from the University of Dar es Salaam and masters' degrees in law from both the University of Dar es Salaam, Tanzania, and Columbia University in New York, USA, as well as a Doctor of Philosophy degree from North-Eastern University in Boston, USA.

Abstract

Synthesis of Land Rights and Water Rights in Irrigation Scheme Farmlands in Tanzania

A key requirement of security of tenure for farmlands in irrigation schemes in Tanzania is farm owners' title to land. Security of tenure for farmlands in irrigation schemes is associated with four sets of rights: 1) user rights to grow crops, trees, make permanent improvement, harvest trees and fruits, and so on; 2) transfer rights on the land or use rights, that is to say, rights to sell, give, mortgage, lease, rent or bequeath; 3) exclusion rights for an individual, group or community to exclude others from the user rights and transfer rights; and 4) enforcement rights with respect to the legal, institutional and administrative provisions to guarantee rights.

The paper is an assessment of land and water rights for a sustainable security of tenure in irrigation scheme farmlands in Tanzania. The legal regime has a plethora of legislations that require to be considered in understanding of the interrelated rights listed above. The vital legislations that will be reviewed are as follows: 1) the National Irrigation Act; 2) the Village Land Act; 3) the Land Acquisition Act; 4) the Land Registration Act; and 5) the Water Resources Management Act.

The analysis concluded that despite the numerous legislations on the subject, there is in place a reasonably adequate legal regime for land rights which afford security for tenure on the land. The regime provides for land rights which encompass user rights to grow crops, trees, make permanent improvement, harvest trees and fruits, and so on; transfer rights to sell, give, mortgage, lease, rent or bequeath; exclusion rights are rights by an individual, group or community to exclude others from the rights discussed above; and enforcement rights for institutional and administrative provisions to guarantee rights.

The land tenure system in irrigation scheme farmland is fully aligned to the national regulations affecting the schemes. Customary rights of occupancy are recognized as having unlimited tenure period. With respect to the rights of occupancy other than on village land, the tenure is up to 99 years. There are robust modes of land rights and security of tenure which define the legal and regulatory framework of irrigation schemes financing and management.

The existing regime to acquire land rights and to give security of tenure in Tanzania adequately provides for the intended security of tenure in development and management of farmland in irrigation schemes. At the level of policy and law, it is the right of every citizen of Tanzania, regardless of gender, to acquire, hold, use and deal with land. The land laws have also clarified existing land rights and long-standing occupation or use of land.

Mr. Roberts Muganzi
Senior Project Officer, Business Development and Entrepreneurship, Aga Khan Foundation East Africa

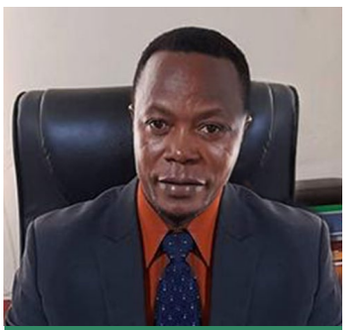
Panelist

Mr. Roberts Aaron Muganzi is a senior project officer for business development and entrepreneurship at Aga Khan Foundation, leading the implementation of the Accelerating Women Climate Entrepreneurs project, which intends to support women entrepreneurs starting and growing climate-related businesses. Before joining AKF, he was chief executive officer at Renewable Energy Development Company Limited (REDCOT), where he applied his deep understanding of climate resilience and the financing sector in Tanzania to boost business development and initiate new markets for solar PV, wind turbines installations, mini-grids, and biomass power generation using agricultural waste products. Mr. Muganzi is a seasoned consultant on climate change mitigation and adaptation and agro-processing. His notable recent works in this field include facilitating financing for Union Service store (barley, sorghum & animal feed milling plant in Kilimanjaro), Yaza Investments Limited (sunflower processing plant in Singida), and Ilandutwa Agribusiness Farm (a medium-scale dairy farm in Iringa). These projects have supported over 15,000 smallholder farmers in their schemes. Mr. Muganzi holds a master's degree in project management and a BA in Business Administration, both from Makerere University.

Ms. Aneth Ambrose Kayombo
Policy, Research and Budget Analysis Specialist, ANSAF

Panelist

Aneth has several years of experience in agricultural policy analysis across public, private, and civil society organizations. She has worked for USAID Feed the Future program on two projects- SERA and Enabling Growth Through Investment and Enterprise Program (ENGINE) policy projects. She has also been an economic consultant on food security, monitoring, and market analysis working with USDA's Economic Research Services and Food Security Department at the Ministry of Agriculture. Currently, she is a policy research and budget analysis specialist with Agriculture Non-State Actors Forum providing support and strategic direction to members. She is closely involved in the regional and national programs' processes, such as CAADP biennial review reporting, working with the Ministry of Agriculture- International Cooperation Coordination for Agriculture Development (iCCAD) Unit. Aneth holds a master's in agricultural economics and a Bachelor of Science in agricultural education and extension, both from Sokoine University of Agriculture, Tanzania.



Mr. Timothy Mmbaga
Executive Director, ACT

Panelist

Mr. Timoth Mmbaga is the Executive Director of the Agricultural Council of Tanzania (ACT). Before then, he was Director of Policy, Planning, and Advocacy in the ACT. He has worked with the Ministry of Agriculture, serving in different positions such as Head of Multilateral and Bilateral Cooperation Unit and Planning Officer in charge of Parliamentary issues. From 1998 to 2005, Mr. Mmbaga worked in two different agricultural development programs, namely Soil and Water Conservation Program and the Participatory Irrigation Development Programme (PIDP).

Mr. Mmbaga has vast experience and exposure to policy-related issues within Tanzania's agriculture sector. He has participated in national and international dialogues and forums, including World Economic Forums (Davos – Switzerland and Cape Town – South Africa), workshops, and negotiations. He has participated in different policy formulation and review workshops in Tanzania. He has broad knowledge and experience in Tanzania's agricultural development initiatives and advocacies.

Mr. Mmbaga holds a B.Sc. Agriculture General (Sokoine University of Agriculture 1993-1997) and MBA-Agribusiness (Sokoine University of Agriculture 2007-2009).

Thematic Area 2: Research and Seed Systems Adaptation

Ms. Stella Massawe
AGRA

Moderator

Mr. Bob Shuma
CEO – Tanzania Seed Trade Association (TASTA)

Presenter

Mr. Shuma is currently an Executive Director, Tanzania Seed Trade Association (TASTA)—a position he has held for two decades. Before then, he was Marketing Manager of Tanzania Seed Company (TANSEED), a position he held for one and half decades. Mr. Shuma is a member of several seed related national and regional organizations, including: National Seed Committee Eastern Africa Seed Committee ASARECA Tanzania Seed Committee Mr. Shuma observes the following as his notable achievements during his seed development career: Coordinator of the 1st NAtional Agricultural Show in Arusha in 1999 Getting TASTA registered Organizing the first African Seed Trade Association (AFSTA) in Tanzania A national task force member responsible for getting membership in shaping the path for Tanzania to get UPOV, ISTA, and OED platforms Mr. Shuma's highest academic qualification is a master's in business administration obtained from Washington International University.

Dr. Mary Mgonja
Managing Director for Namburi Agricultural Company Ltd

Presenter

Mary Mgonja is the Managing Director for Namburi Agricultural Company Ltd, which deals with crop seed and consultancy services. Mary has a Ph.D. in Plant Breeding and Genetics from the University of Ibadan, Nigeria; an MSc in Plant Breeding and Genetics from the University of Arkansas Fayetteville-USA, and a BSc in Agriculture General from the University of Dar es salaam. She also did post-doctoral work on Mutation Breeding with North Dakota State University Fargo. Mary started her career in field crops research and development, working for the Ministry of Agriculture in Tanzania. She then worked as a SADC Region Sorghum and Millet Improvement network coordinator and Principal Scientist with the International Crops Research Institute for Semi-Arid Tropics in Zimbabwe and Kenya. Mary has co-supervised several Ph.D. and Master's students registered at several universities in Eastern and Southern Africa. Mary also served as a Country Head for AGRA-Tanzania before moving on to the private sector to develop, support, and manage a family-owned seed company. Mary has contributed to and published on seed policy harmonization in SADC and EAC. Mary has to her credit 64 publications, including a book on "Finger Millet improvement in East Africa." Mary holds several honorary positions and has won several awards, including the Women Mean Business Award and First Prize Award Winner as the entrepreneur of the year.

Abstract

Opportunities and challenges in seed systems: Perspectives of a private seed company in Tanzania

Climate change is a serious threat to agriculture and food security. Extreme weather conditions such as high temperatures and changing patterns of precipitation lead to a decrease in crop productivity by reducing the length of growing period. Drought is the most problematic climatic hazard in Tanzania, especially in regions like Dodoma, Singida, the northern parts of Iringa, north-eastern parts of Tabora, eastern areas of Shinyanga, Simiyu, southeastern parts of Mara, parts of Manyara, north-western parts of Arusha, and south-western parts of Kilimanjaro. Additionally, small scale farmers are more likely to suffer the adverse effects, given their reduced adaptive capacity. Use of improved drought tolerant and early maturing crop varieties that escape terminal drought are the most cost-effective Climate Smart Agriculture (CSA) technological practices. There are several opportunities for the private sector to enhance certified seed production of climate smart varieties to support CSA initiatives in Tanzania. By the year 2020, research and development programs by public and private sector partners, and in some cases, in collaboration with International Agricultural Research Centers (IARCs), had released a total of 585 improved crop varieties in Tanzania of which 16 varieties are sorghum (a drought-tolerant crop). Further, more than 50% of the 193 maize varieties are early to medium maturing and adapted to low /medium rainfall areas. To support dissemination of improved varieties, there are more than 40 active seed companies that contribute to the growth of the seed system in Tanzania and these seed companies (local and multinational) contribute 70%-80% of the certified seed produced in Tanzania. The Plant Breeders Right (PBR) Registrar's office was established in 2005 and its main function is to facilitate licensing of public varieties; by 2021, the PBR had protected 82 varieties from the public sector. The 2011 Ministerial Circular provisioned licensing of protected public varieties to private seed companies to access breeder seed of the protected public varieties to produce basic and certified seeds. The circular opened opportunities to address limited availability of Early Generation Seed (EGS). In spite of these advances, private seed companies are constrained with limited land for seed production, limited access to credit, unavailability of EGS, poor seed market information, lack of accurate information and data on seed demand, limited promotion of public varieties and unpredictable policy environment. Private seed companies are looking for increased and consistent enabling environment to facilitate increased seed production to meet domestic and export demand.

Mr. Harald Peters

Area Manager, Rijk Zwaan

Presenter

Harald has a career in agriculture and horticulture in Tanzania, spanning three decades. Operating from Mto wa Mbu in Tanzania, his early engagements mainly focused on supporting entrepreneurs, farmers, and cattle holders in Monduli, Ngorongoro, and Karatu Districts. Later, he joined Rijk Zwaan in Tanzania as a Managing Director. Under his leadership, the seed production expanded fourfold. Harald engineered new activities in the organization, such as breeding on Rijk Zwaan Afrisem to improve and hybridize ngogwe, sukuma wiki, pili pili mbuzi, and develop an outdoor determinate tomato. Later, Harald set up a department dealing with sales and product development for Rijk Zwaan in Tanzania. After that, Harald was elevated to Area Manager, Africa, to support sales and marketing on the continent through public-private partnerships, chain development, and digital/social media. Harald set up the Facebook and Instagram pages for Rijk Zwaan Tanzania/Africa/Afrique de l'Ouest with a combined 50k followers. Harald has been a board member of TAHA for six years, TASTA for two years, and SEVIA for four years. Harald holds a master's degree in Agricultural Engineering from the Catholic University of Leuven, the oldest university in (600 years), Belgium. He also has an Executive MBA in leadership development from IESE Business School in Barcelona under the University of Navarra, Spain.

Abstract

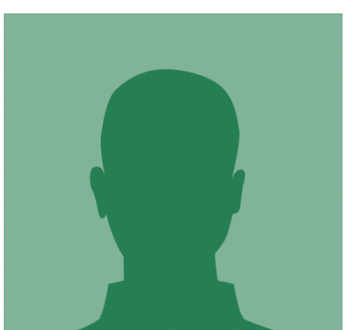
Private Seed Research and Value Chain: A Case for Horticulture

Rijk Zwaan (RZ) is a Dutch family-owned and people-centric company with a strong entrepreneurial spirit. It ranks 4th in the global vegetable seed market with 3500 employees, over 1200 products, and sales in over 100 countries. Our African journey started in Arusha in 2002 with the creation of RZ QSem Ltd. From our initial focus on seed production and staff training, our ambition grew to include breeding support before joining East-West in 2006 to create RZ Afrisem Ltd. At RZ Afrisem, our goal has been to deliver quality hybrid seed and technical know-how to African farmers. We do so in collaboration with many like-minded public and private stakeholders using the "Seeing is Believing" concept. Using hands-on training and hard data, together with our distributors and partners, we make a case for and promote agriculture that relies on the sustainable use of resources to deliver quality, healthy and safe vegetables to a growing and increasingly urbanized African population. Today, Rijk Zwaan Tanzania employs over 500 staff; has trained, together with its partners, over 50,000 farmers; and released ten commercial varieties bred in Africa for tropical Africa. Our Africa team is actively engaging in person and virtually the entire value chain from farmers, nursery, aggregators, retailers, consumers, and processors to develop a thriving Sub- Saharan horticultural sector.

Mr. Patrick Ngwediagi
Director General, Tanzania Official Seed Certification Institute (TOSCI)

Panelist

Patrick is Director General of Tanzania Seed Certification Institute (TOSCI) in Morogoro. Formerly, Patrick was Registrar of Plant Breeders' Rights at the then Ministry of Agriculture, Livestock and Fisheries. Before this, Patrick was Director-General, Chief Seed Certification Officer, and Ag. Chief Executive Officer at TOSCI. He is a member of the Plant Breeders Association of Tanzania (PBAT), National Variety Release Committee (NVRC), and National Seed Committee (NSC). Patrick is the Tanzanian representative of the International Union for the Protection of New Varieties of Plants (UPOV), with its Headquarters in Geneva, Switzerland. Formerly, Patrick was Chairman of the Governing Board of the AfricaSeeds, which is the Africa Union's institution to implement its Seed and Biotechnology Programme-ASBP. Patrick has a master's degree in seed technology from the University of Edinburgh, Scotland, and a bachelor's degree in agronomy from the Wonsan University of Agriculture, DPR Korea.



Dr. Deogratias Lwezaura
Planning, Monitoring and Evaluation Manager, Tanzania Agricultural Research Institute (TARI)

Panelist

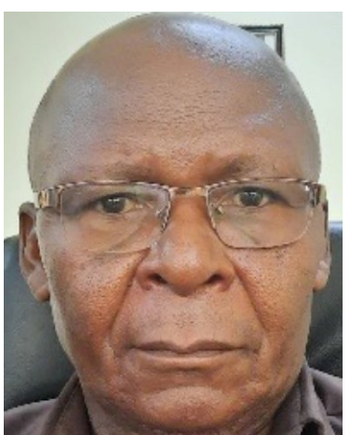
Dr. Lwezaura has experience supporting the design, management, and strategic planning of agricultural projects/programs, focusing on improving organizations' monitoring and evaluation systems. He has worked and participated in various assignments working with development partners concentrating on key areas such as SIDO/IFAD – programme formulation and management, USAID/ Aga Khan Foundation -educational programmes, UNDP - environmental management, IDRC – climate change, IFPRI – agricultural science indicators, NGORC/Zanzibar – Local Government capacity assessment, AMREF/EU - youth sexual reproductive health, Kenya Agricultural Research Institute, and McGill University – resilient farming systems in semi-arid areas; and BecA-ILRI – Aflatoxin surveys and management. Other partners he has worked with are the African Evaluation Association / Africa Capacity Building Foundation – project impact assessment, Measure Africa/PREPARED/UNESCO– climate change and impact; FAO – Youth capacity building, ECAPAPA/ASARECA/UN Women – Gender analysis. Mr. Lwezaura has coordinated regional mentorship programmes: Partnering to Educate and Coach Evaluators (PEACE) - a program for professionals in the peacebuilding, development, and humanitarian fields; and EvalYouth Mentoring Programme/Kenya. More specifically related to seed, Mr.Lwezaura has been involved in conducting two studies and has publications related to seed: i) A transaction cost analysis on the acquisition of rice seed by small-scale farmers in Eastern and Central Africa (2017); and ii) Policy updates of the seed industry in Tanzania (2019) – ESRF/TARI. Mr. Lwezaura holds a Ph.D. in economics, MSc in agricultural economics, and BSc in general agriculture. Currently, Dr. Lwezaura is a principal economist and manager for research programs, monitoring, and evaluation at Tanzania Agricultural Research Institute (TARI).

Dr. Ahmed Simba
Technical manager, Poultry division of Silverlands Tanzania Ltd

Panelist

Silverlands Tanzania Ltd (STL) is a private equity investment through SilverStreet Capital. SilverStreet Capital is the largest African agricultural fund. It oversees businesses across six countries in Sub-Saharan Africa in a range of crops, poultry and across the value chain. Silverlands Tanzania is mainly involved in Crops, poultry and poultry feeds production. Currently, the company produces about two hundred thousand chicks a week, targeting twelve million chicks this year. I hold a bachelor of Veterinary Medicine degree (BVM) and MSc. Worked for about 20yrs in commercial poultry production. Prior to STL, I worked in the Middle East with one of the largest, industrial scale poultry production companies, Watania. I believe that the Poultry and Livestock in general can contribute significantly to improving, not only household economies and nutrition, but also the greater national economy. Pre-requisite for the sector to contribute meaningfully is improvement in production efficiency and scaling-up production volumes.

SPECIAL SESSION: Nutrition, Resilience, and Vulnerability (special attention to youth and women)



Dr. Bohela Lunogelo
Former Executive Director, ESRF

Moderator

Dr. Lunogelo holds a Ph.D. MSc. degrees in Agricultural Economics from the University of London (United Kingdom), and a BSc (Agriculture-Rural Development from Sokoine University of Agriculture, Tanzania. He has several years of experience in research and advisory work as a public servant with the Government of Tanzania (Ministry of Agriculture's Planning Division and as a manager of international consultancy firms. He has also provided consultancy services with GoT, several other countries, and donor organizations. He also served as the third Executive Director of the Economic and Social Research Foundation (ESRF). During his tenure at ESRF, he directly participated in leading teams that reviewed Tanzania's National Development Vision (NDV) 2025, leading to the resumption of the 5-Year Development Planning process, formulation of EAC's Trade-Based Food Security Framework that the EAC Parliament spearheaded, and in the review of Tanzania's Agricultural Sector Development Strategy (ASDS). He also worked with the Ministry of Agriculture to prepare Tanzania's South-South Cooperation Strategy in the agricultural sector. Other recent work areas include preparing a report on green economic growth options for the EAC countries to attain SDG2030; published papers on Africa-India-China trade and economic relationships; and Tanzania's perspectives on Indian Ocean maritime governance. He was also heavily engaged in ESRF-managed studies such as the Review of the Second Five-Year Development Plan and National Export Strategy. Dr. Lunogelo has served on several boards in Tanzania.

Ms. Boitshepo Bibi Giyose
Senior Officer: Nutrition and Food Systems and Advisor to the CEO AUDA NEPAD

Presenter

Jessica Fanzo, PhD
Bloomberg Distinguished Professor of Global Food Policy and Ethics
Johns Hopkins University, Washington DC 20036

Presenter

Jessica Fanzo, Ph.D., is the Bloomberg Distinguished Professor of Global Food Policy and Ethics and Vice Dean of Faculty Affairs and the Nitze School of Advanced International Studies (SAIS) at Johns Hopkins University. She holds appointments in the Berman Institute of Bioethics and the Bloomberg School of Public Health. She serves as the Director of Hopkins' Global Food Policy and Ethics Program and as Director of Food & Nutrition Security at Hopkins' Alliance for a Healthier World. She is the Editor-in-Chief for the Global Food Security Journal and leads the Development of the Food Systems Dashboard in collaboration with GAIN.

Fanzo has served at the Food Systems Economic Commission, the Global Panel of Agriculture and Food Systems for Nutrition Foresight 2.0 report, and the EAT-Lancet Commission. She was also the Co-Chair of the Global Nutrition Report and Team Leader for the UN High-Level Panel of Experts on Food Systems and Nutrition. Before coming to Hopkins, she also held positions at Columbia University's Earth Institute and College of Medicine, the Food and Agriculture Organization of the United Nations, the UN World Food Programme, Bioversity International, and the Millennium Development Goal Centre in Kenya. In 2021, she published her first book, Can Fixing Dinner Fix the Planet? and co-wrote Global Food Systems, Diets, and Nutrition: Linking Science, Economics, and Policy. Fanzo holds a Ph.D. in Nutrition from the University of Arizona and completed a Stephen I. Morse postdoctoral fellowship in immunology in the Department of Molecular Medicine at Columbia University.

Abstract

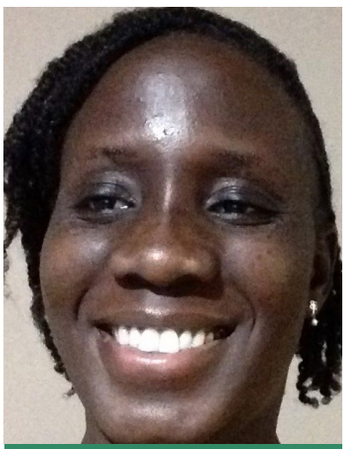
The Impact of Climate Change on Nutrition: A Cross-Country Experience

In the context of the broad global trends of population growth, climate crisis, and unhealthy diets, food available for consumption will need to increase by more than 50 percent to meet the world's population's food security and nutritional needs by 2050. Additionally, rising incomes will likely increase the demand for climate-intensive diets, which tend to have higher negative environmental impacts. These projections indicate that without significant transformation towards more sustainable food production practices, less waste, and healthier diets, food systems will continue to exert high pressure on biodiversity loss, land and water use, air and water pollution, greenhouse gas emissions, and their currently known planetary boundaries. Transgressing these boundaries could constrain food systems' resilience, the ability to provide safe and sufficient food for everyone and have adverse impacts on human and ecological systems more broadly, particularly in times of disturbances, conflicts, and shocks. With the triple C threat—COVID-19, climate change, and conflict—there are significant new uncertainties and profound implications for achieving and maintaining this resilience and sustainability worldwide. Food systems are under pressure to deliver safe and high-quality food in adequate quantities in a sustainable way to improve nutrition outcomes.

The intersection of climate change, food security, and nutrition is critical given growing adverse climate change impacts that threaten food security and nutrition outcomes, especially for the most vulnerable in

the low-income and resource-constrained settings, with a pronounced impact in sub-Saharan Africa and Southeast Asia and among the rural poor. A better understanding of the pathways linking climate change and nutrition is critical for developing effective interventions to ensure that the world's population has access to sufficient, safe, and nutritious food.

The global food system both drives and is impacted by climate change. Countries have adapted and mitigated against climate change in different ways, but overall, in the climate policy arena, food system impacts have been ignored. Without action, climate change will impact nutrition through decreased food quantity and access, decreased dietary diversity and quality, and decreased nutrient content of foods. Estimates suggest that undernutrition can and will be exacerbated by the effects of climate change at all stages of food supply chains. In addition, disease is affected by climate and can, in turn, increase nutrient demands and reduce nutrient absorption. Dietary diversity and animal-source foods can be important tools for improving nutrition and health in nutritionally deficient populations. This talk uses a food systems approach to analyze the bidirectional relationships between climate change and food and nutrition along the entire food system. It identifies adaptation and mitigation interventions towards a more climate-smart, nutrition-sensitive food system.



Ms. Sophie Tadria
Policy Advisor, FAO (virtual)

Presenter

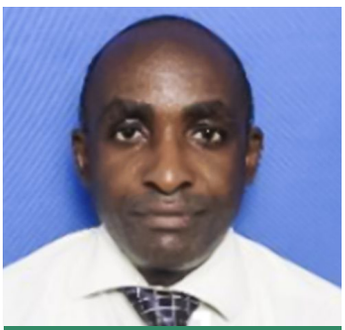
Sophie is a Policy Advisor (Food Systems, Food Security and Nutrition) under the FAO/EU Policy Assistance Facility called FIRST (Food and Nutrition Security Impact, Resilience, Sustainability, and Transformation). FIRST aims to strengthen countries' capacities, policies, and institutional environment for Food and Nutrition Security and Sustainable Agriculture (FNSSA). In the United Republic of Tanzania, FIRST supports the formulation of food security and nutrition policies; formulation of sector policies with explicit food security and nutrition objectives; implementation of policies through developing action plans, monitoring frameworks, and institutional frameworks; strengthening human/organizational capacity in the FNSSA domain.

Abstract

Food systems transformation in the context of climate change

The COP-26 and UN Food Systems Summit (UNFSS) from 2021 accelerated progress on climate change and food systems transformation, respectively, but fell short of strengthening the link between these two agendas. Both processes recognized that one could not be addressed without the other, with food systems contributing around 30% of global GHG emissions but significantly more in agrarian-based economies. The recent State of Food Security and Nutrition reports indicate that we are not on track to ending world hunger and malnutrition in all its forms by 2030, as per SDG targets. The world is failing to meet the Paris Agreement goals and limiting global warming to 1.5°C above the pre-industrial level. The situation is compounded by the continuing effects of the Covid-19 pandemic. Without food systems transformation, climate targets will never be met, and food systems will not be able to nourish the world if climate change is not integrated into global, regional, and local food systems.

Actions to support a systemic transformation of our global and national food systems under climate change include; 1) Redirecting farming and rural livelihoods to pathways that reduce emissions and are climate-resilient while also addressing inequality, gender, and social inclusion; 2) De-risking livelihoods, agriculture and value chains to deal with the increasing vagaries of weather and extreme events; 3) Reduce emissions through diets and value chains, targeting health and climate outcomes; 4) Realign policies, finance, support to social movements, and innovation to facilitate action in the above action areas. The upcoming COP-27 and the implementation of the Food Systems Action Tracks is an opportunity for identifying and operationalizing mutually reinforcing opportunities in the food systems, nutrition, and climate change agendas at the country level. The review of the climate change Nationally Determined Contributions (NDC) of the Paris Agreement by governments as part of the upcoming COP-27 in November 2022 is an excellent opportunity to introduce better food systems transformation and dietary change in the country-specific climate change commitments.



Mr. Lutfrid Nnally,
Nutrition Research Scientist, TFNC

Presenter

Mr. Mnally has several years of experience in championing food and nutrition research and programming activities at a national level. He provides technical support to the Tanzania Food and Nutrition Centre (TFNC) on all matters of food security, vulnerability, resilience, and adaptation related to nutrition. His specific experience is in the areas of developing and implementing educational and training programs (including training needs assessment, development of training packages, and facilitation of training sessions); development of nutrition social and behavior change communication programs; mainstreaming nutrition in value chains of agricultural products; designing and implementing national-level research on nutrition and related issues, and program design. Mr. Mnally has a Master of Science in Agriculture Economics from the Sokoine University of Agriculture in Morogoro, Tanzania. A Bachelor of Science in Human Nutrition from the Sokoine University of Agriculture and a Post Graduate Diploma in Food and Nutrition Security from Wageningen International Agriculture Center in the Netherlands.

Abstract

Addressing Climate Change Vulnerability to Food and Nutrition Insecurity: MNAP-II strategic interventions

Affiliation: Tanzania Food and Nutrition Centre

Tanzania is striving to achieve a high level of economic growth amid several obstacles, including unacceptable levels of malnutrition. Investment in nutrition is paramount since the evidence shows that good nutrition is a prerequisite for human capital development, increased productivity, and survival. The consequences of malnutrition are not limited to the rising cost of healthcare but also economic loss. Recent evidence shows that African countries are losing between 1.9% and 16.5% of their GDP due to child under-nutrition.

Climatic shocks resulting from climate change are a nuisance to sustainable and resilient food systems. As such, they are building a resilient and sustainable food system that requires concerted efforts to strengthen the adaptive and absorptive capacities of the communities in the face of climate change and variability. A resilient food system can anticipate and prepare for, adapt to, absorb and recover from the impacts of changes in climate and extreme weather. Promotion and support for a livelihood system that sustains a resilient food system are important because food security is among the underlying causes of malnutrition.

From this backdrop, the Second National Multisectoral Nutrition Action Plan (MNAP II) underscores the significance of strengthening the food system in addressing the challenge of malnutrition. Actions to enhance the food system in MNAP II are vivid in Strategic Outcome 3: Sustainable and resilient food systems that are responsive to nutritional needs. Under this Strategic Outcome, issues of food safety, access to nutritious foods, supply chains, consumer education, and food quality, among others, are covered. Thus a successful national effort to address malnutrition requires the implementation of short and long-term climate change mitigation and adaptation strategies. Transparency and inclusive participation of multiple actors and stakeholders in decision-making and management processes are equally paramount.

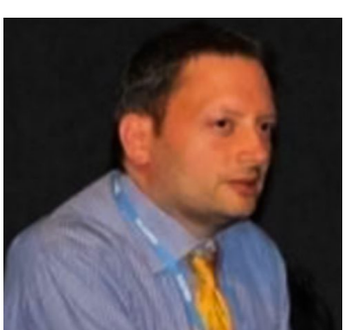
Hon. Neema Lugangira
Chairperson, Parliamentary Caucus Group on Food Safety

Panelist

Dr. Hadijah Mbwana
Head of Department, Human Nutrition and Consumer Sciences, SUA

Panelist

Hadijah is a lecturer and researcher in the Department of Human Nutrition and Consumer Sciences at Sokoine University of Agriculture (SUA) Morogoro, Tanzania. She holds a BSc in Home Economics and Human Nutrition from SUA and MSc in Human Nutrition from Massey University New Zealand. She obtained her Ph.D. in Agriculture and Nutrition from SUA/University of Hohenheim, Germany. She is currently the Acting Head of the Department. She is actively involved in community nutrition research; has worked on several research involving the promotion of production and consumption of green leafy vegetables, dietary practices, and patterns of the vulnerable groups to explore the potential of indigenous and locally produced foods throughout the food value chain in mitigating hunger and malnutrition; particularly micronutrient deficiencies. She is competent in planning and executing quantitative and qualitative research and monitoring and evaluating nutrition and health projects.



Dr. Reuben Sessa
Deputy Workstream Leader, Innovations for Sustainability, FAO

Panelist

Reuben has a Ph.D. in genetics, biochemistry, and plant pathology from Imperial College London, an MSc in biochemistry from Wye College, and a biology degree from Southampton University. He joined FAO and worked for the Global Terrestrial Observation System (GTOS) and Global Land Cover Network (GLCN), where he coordinated the development of international remote sensing standards for terrestrial climate variables. He then worked for the Director of SDRN/NRC/CBC, where he held several roles, including Secretary of the IDWG on climate change, UNFCCC coordinator, and manager of CSA, a concept that he created. At REU, he was the focal point for GCF, climate change, environment, DRR, CSA, and bioenergy. During his time in SP2, he coordinated issues on climate change, forestry, fisheries, and GCF and GEF. Reuben has coordinated several youth initiatives, including YUNGA, and is a Vice-Chair of the FAO Youth Committee. In OCB, he is coordinating the innovation work area.

Thematic Area 3: Soil Health Management

Mr. Geoffrey Kirenga
Executive Director, SAGCOT Center

Mr. Kirenga has a wealth of experience in Eastern African agriculture value chains. He is currently the Chief Executive Officer of the Southern Agricultural Growth Corridor of Tanzania (SAGCOT). Before joining SAGCOT, he was Director of the Crop Development Division at the Ministry of Agriculture in Tanzania. Mr. Kirenga specialized in crop promotion, pest management, and plant health services. Mr. Kirenga has an extensive network in Tanzanian and international agriculture and agribusiness communities. He is highly committed to driving SAGCOT to deliver on its role as the catalyst dedicated to transforming Tanzania's agricultural sector.

Mr. Kirenga holds a BSc (Sokoine University of Agriculture) and an MSc and DIC (Imperial College, University of London).

Moderator

Mr. John Banga Nakei
Kilombero Cluster and Partnership Manager,
SAGCOT Centre ltd

Presenter

Mr. Nakei is a senior agricultural officer training in general agriculture with a strong focus on rural development policies and sustainable farming systems. He has several years of work experience in agriculture. He worked for more than half a decade in the Ministry of Agriculture and later in the Environment Management Unit to integrate principles of environmental management into the Ministry's programs and projects through policies and regulations. Currently, Mr. Nakei works at SAGCOT Centre Ltd as a Kilombero Cluster and Partnership Manager and focal person on sustainability issues in the SAGCOT partnership. He also serves as the SAGCOT National Green Reference Group (GRG) secretary. GRG is a platform that brings multisectoral actors from the Government, academia, private sector, civil society organizations, development partners, and farmer organizations to develop consensus on facilitating inclusive commercially viable agribusiness projects under SAGCOT Initiative. Over the years, Mr. Nakei has also been associated with the following institutions and initiatives: i) the World Bank's environmental and social safeguard for the Bank's funded projects, rural community leadership developments, biodiversity information management systems (BIMS), inclusive green growth (IGG) in the agricultural sector, and generating policy ideas on the management of food systems for poverty alleviation and economic growth.

Dr. Mshindo Msolla
OCP Tanzania Country Manager

Presenter

Dr. Msolla holds a Ph.D. in Soil Science (majoring in soil chemistry and soil fertility). Dr. Msolla has worked for several years in the agricultural sector in the Government of Tanzania, several NGOs, donor agencies, and the private sector. He has worked as a researcher, agronomist, agricultural adviser, assistant director and director at the Ministry of Agriculture, a board member on various boards (cotton, smallholder tea farmers, SUA Council, Tanzania Fertilizer Company), chairman of Tanzania Fertilizer Regulatory Authority board and AFAP Country Manager for Tanzania. During his tenure at the Ministry, he was instrumental in formulating the Fertilizer Act and its regulations of 2011. While working with AFAP, he participated in the formulations of the regulations of 2017. He has made several presentations in most international meetings involving agricultural inputs related issues (technical and policy) and soil fertility. Dr. Msolla is currently the OCP Tanzania Country Manager.

Dr. Liston Njoroge,
Program Officer-Policy and Advocacy, AGRA

Presenter

Liston works at the Alliance for a Green Revolution in Africa (AGRA) as a Program Officer for Policy and Advocacy. He also supports activities that involve government engagement and collaboration. He has recently supported projects to improve the CAADP biennial review results, assessing and recommending improved data systems for predictable food trade and seed policy decision-making. He has worked with PO-RALG to strengthen the coordination of ASDPII implementation in LGAs, focusing on developing District Agricultural Development Plans (DADPs). Before joining AGRA, he worked at the TNS Global Market Research Company as the Account Manager for the Social and Public Research Division. Liston holds an MSc (Agricultural Economics), an MBA from the University of Nairobi, and a Ph.D. in Public Policy Analysis from Walden University.

Abstract

Acid soils management: Situational analysis and prospects for addressing the challenge

Various studies have estimated that between 15% and 29% of agricultural land in sub-Saharan Africa is acidic, with the estimates for Tanzania standing at 14.3%. Soil acidity mostly affects high potential arable agricultural lands, hence limiting crop productivity and risking national and regional food security. Agricultural lime is regarded as one of the most effective remedies for acidic soils. Unfortunately, lime use has traditionally been missed from prioritized agricultural inputs such as fertilizers and improved seeds at the policy level. To understand the situation and generate remedial recommendations, AGRA commissioned a study to examine policy status, challenges, bottlenecks, and the impact of the existing policies on the production, distribution, and use of agricultural lime. The study identified technical and policy-related bottlenecks that deter widespread adoption of agricultural lime. They include limited awareness, value chain challenges, inadequate incentives for private sector participation in the lime value chain, weak and inadequate agricultural lime policies, and a lack of national and regional standards and guidelines for lime. Recommendations include strengthening effective demand through awareness creation and demonstration, promoting soil testing and soil acidity mapping, and including lime in the national input subsidy program.

Mr. Vincent Akulumuka
Consultant, AGRI-CONNECT

Presenter

Mr Vincent Akulumuka has over 25 years of experience working as an agriculture professional in Tanzania and the East and Central African region. Mr Akulumuka has a profound understanding of Tanzania's agriculture sector and is highly knowledgeable on value chain development, including non-traditional cash crops. In addition, he is highly familiar with the agricultural landscape in the East and Central African region. Value chains development in horticulture has been the key subject in the majority of his assignments. While working with the agricultural value chains, numerous assignments have involved analysing policy, regulatory frameworks and developing policy and business guidelines. Mr Akulumuka is experienced in training and capacity building to Government institutions; Non-State Actors; Cooperatives, and Farmer Organisations. Currently, Mr Akulumuka is a consultant with the Finnish Consulting Group (FCG) Sweden and a member of the European Union (EU) funded AGRI-CONNECT Technical Assistance Team (TAT) based at the Ministry of Agriculture in Dodoma. He is responsible for supporting policy, regulatory and business environment on horticulture in mainland Tanzania. Before that, he was a Regional Manager for the Eastern Africa Agriculture Productivity Programme (EAAPP) for Ethiopia, Kenya, Tanzania and Uganda. Previously, he worked for the Embassy of Ireland as an Agriculture Advisor. He also worked for Save the Children (UK) as a Food and Security Manager. Also, he worked as a Senior Agricultural Research Officer and a Project Coordinator of the Eastern Zone Client-Oriented Research and Extension (EZCORE) with the Ministry of Agriculture.

Dr. Nyambilila Amuri
Senior Lecturer at Sokoine University of Agriculture (SUA)

Panelist

Dr. Nyambilila Abdallah Amuri, Ph.D., is a senior lecturer at Sokoine University of Agriculture (SUA), Morogoro, Tanzania. Currently, she serves as the Director of Undergraduate Studies at SUA. She also served as Coordinator for various research and publications. She was the Head of the Department of Soil and Geological Sciences at SUA from 2016 to 2020. Dr. Amuri earned her Ph.D. in Soil Science from the University of Arkansas, Fayetteville, USA. She holds a Bachelor of Science in Horticulture and MSc in Soil Science and Land Management from SUA. Dr. Amuri has research and outreach experience in carbon and nitrogen dynamics, residue management in agricultural soils, soil health, integrated soil fertility, agroecological management, appropriate fertilizer uses in agriculture, agronomic micronutrient fortification, the mineral nutritional quality of food crops, site-specific fertilizer, innovative and cost-effective soil testing methods, and soil chemistry for sustainable agricultural production. Dr. Amuri served as Secretary-General for the Soil Science Society of East Africa (SSSEA). She also chairs Tanzania and East Africa Fertilizers and Soil Conditioners of the Agriculture and Agrochemicals Technical Committees. She has published widely in peer-reviewed journals, conference proceedings, chapters in books, and extension manuals. Dr. Amuri is a recipient of The Fulbright scholar Award, Margaret MacNamara Memorial Foundation Award, and NORAD Sponsorship Award.

Dr. Edmond Matafu
Managing Director and CEO, Live Support Systems

Panelist

Ms. Sia Kwimbere
Consultant, DALBERG

Panelist

Sia Kwimbere is a consultant in Dalberg's Dar es Salaam office. She has supported various organizations in strategy development and opportunity assessment across different sectors, including early childhood development, education and youth employment, trade, forestry, and agriculture.

Her experience in agriculture has spanned Tanzania and Kenya. In Tanzania, she has conducted market assessments for several value chains and developed cost models for agro-processing to support increased industrialization. Sia has also helped develop

organizational strategies for agricultural-focused companies, working with various agricultural stakeholders. In Kenya, she has assessed the gendered impact of digital agricultural tools on smallholder farmers.

Sia is currently working on a project in Tanzania seeking to address soil acidity and improve agricultural productivity by building an investment case for agricultural lime.

Sia holds a Bachelor of Science degree in Applied Economics and Management from Cornell University, with a double concentration in international trade & development and strategy.

Thematic Area 4: Facilitating Water, Pasture, and Feed Availability for Livestock and Climate Resilience

Dr. Nyankomo Marwa
Senior Lecturer, University of Stellenbosch

Moderator

Dr. Marwa is a senior lecturer in development finance and econometrics at the University of Stellenbosch Business School (South Africa). Dr. Marwa has held different positions in the past, including Director for Policy Research and Planning at Tanzania Agricultural Development Bank, MITACS scholar in consumer behavior modeling at Dr. J. Herbert Smith Center of Technology Management & Entrepreneurship, University of New Brunswick, Canada, Biostatistician at Saskatchewan Population Health Research Unit in Canada, Forensic Scientist at Tanzanian Forensic Bureau and country research analyst in the social sector at TWAWEZA. He earned his Ph.D. in Development Finance from the University of Stellenbosch Business School. He attended his doctoral course work in Economics, Econometrics, and Public Policy from the University of Nebraska Lincoln (USA) and Johnson Shoyama Graduate School of Public Policy, Canada. He holds a master's degree in Agricultural Economics from the University of Nebraska, Lincoln (USA), a master's degree in Applied Statistics and Biostatistcs from Hasselt University (Belgium), and a BSc. Agricultural Economics and Agribusiness from Sokoine University of Agriculture (Tanzania).

Dr. Marwa has extensive experience in public policy advisory services, research, and teaching in Applied Econometrics, Housing Finance and Public Policy, Agricultural Finance, and Economics of Blockchain Technology. His recent research focuses on the role of

blockchain technology in financial inclusion, empirical modeling of efficiency and sustainability of financial institutions, and agricultural value chain financing. He has supervised several doctoral and master's students from several universities in South Africa.

Prof. David Nyange
Chief of Party, ASPIRES

Presenter

Professor David Nyange is a Tanzanian national and agricultural economist with over 20 years of experience in agriculture and rural development, particularly in strategic analysis, program design, portfolio management, trade, and private sector development. Prof. Nyange is currently an Associate Professor for International Development at Michigan State University, Department of Agricultural, Food and Resource Economics. In this capacity, he also serves as a Policy Advisor to the Ministry of Agriculture through the USAID-funded SERA BORA project. Until June 2013, Prof. Nyange worked for USAID as a Senior Agricultural Economist and Deputy Team Leader for Feed the Future in Tanzania. At USAID, he was instrumental in the design and rolling out of a food security and nutrition program under the Feed the Future initiative. Prof. Nyange also led efforts to design and manage programs to mitigate the impact of the 2009 Global Financial Crisis through a safety net program, policy reforms, and interventions in the financial sector. Prof Nyange holds a Ph.D. and Master's in Agricultural Economics from Kyoto University (Japan) and Cornell University (USA), respectively. He has published several journal articles and co-authored book chapters on agriculture, food security, and rural development.

Abstract

The Need for Establishing the Livestock Infrastructure Development Agency (LIDA) In Tanzania

Tanzania hosts the second-largest livestock population after Ethiopia. Moreover, the contribution of the livestock sector to the GDP is meager (7.4%) due to low productivity and underdeveloped infrastructure. As Tanzania's population is increasingly becoming urbanized, it is imperative to develop a marketing infrastructure. Tanzania has over 500 primary and 25 secondary and border markets. There are over 1,000 slaughtering facilities, including abattoirs.

Moreover, infrastructure to promote livestock productivity and support animal health systems such as cattle dips (2513) and veterinary checkpoints is inadequate. Tanzania needs a dedicated agency to oversee the development and maintenance of livestock infrastructure for sustainability and improved efficiency in the supply chain. As the impact of climate change increases, water infrastructure development and rangeland management promotion are essential.

Dr. Julius Keyyu
Director of Research Development and Coordination, Tanzania Wildlife Research Institute (TAWIRI)

Presenter

Dr. Keyyu is a Wildlife and Disease Ecologist specializing in ecosystem and population health. He obtained his Ph.D. in disease ecology from the Sokoine University of Agriculture (SUA), Morogoro, Tanzania. Dr. Keyyu has worked for several institutions, including the Livestock Helminths Project (LHP) at SUA as a research fellow and Tanzania Wildlife Research Institute (TAWIRI) as a Senior Research Officer and Acting Head of the Research Development section. Dr. Keyyu is currently the Director of Research Development and Coordination at TAWIRI. His main duties are conducting, coordinating, and supervising wildlife research in Tanzania. His research has mainly been on human-livestock-wildlife interaction/interface, ecological interactions especially range ecology, environmental impact assessment, biodiversity and socio-economic surveys, general management planning (GMP), and wildlife corridors/connectivity. Dr. Keyyu is also a member of various national, regional, and international professional bodies. He has published 79 papers in peer-reviewed journals, 55 papers in conference proceedings, three book chapters, and nine consultancy services/special assignments. He has acquired three patents for natural products on hair growth promotion/ hair loss prevention and skin lightening. Most of the publications can be accessed at PubMed

(www.ncbi.nlm.nih.gov/pubmed).

Abstract

Pasture and Rangeland Management: Lessons from the Wildlife Sector

Wildlife and livestock share common resources including pasture and water. However, pasture and rangeland management in natural wildlife rangelands is different from livestock pasture management systems. In wildlife natural ecosystems, natural ecosystem processes and functions control rangelands, wildlife population and stocking density. More importantly, wildlife migration, local and spatial-temporal movements in search of pasture and water also helps to shape pasture and rangeland in the area. Currently assessment has shown that most wildlife ecosystems are still healthy; therefore, except for pre-scribed burning, which is currently used as a rangeland management tool, there are no other human interventions for pasture and rangeland management in wildlife ecosystems, e.g., there is no use of fertilizers, herbicides, grazing management, irrigation, ploughing, mowing, resowing seeds/pasture renovation, or controlling excess wildlife. However, pasture and rangeland management in multiple land use or mixed ecosystems of wildlife and livestock has brought some challenges in recent years. The biggest challenge in mixed ecosystems is livestock incursions or illegal grazing of livestock in protected areas in search of pasture or water. Due to increased livestock density in mixed ecosystems, poor habitat quality has been increasing and that high quality habitats have been decreasing. Due to overgrazing, invasive species/ weeds have encroached/ infested most wildlife rangelands; therefore, affecting vegetation cover, diversity, and richness. Increasing invasive plants has resulted into a shift in plant species composition from desirable to less desirable species. This paper presents lessons learned from pasture and rangeland management in wildlife ecosystems and proposes sustainable pasture and rangeland management measures in mixed ecosystems including development of village land use plans, setting grazing areas, protection of rangelands and institution of mechanisms on how to deal with excess livestock or wildlife in game ranches.

Dr. Mathew Silas
Fisheries Researcher, Tanzania Fisheries Institute (TAFIRI)

Dr. Mathew Ogalo Silas is a fisheries researcher who works at the Tanzania Fisheries Research Institute in Dar es Salaam. He spent a lot of time in coastal Tanzania examining small-scale fisheries to understand how they respond to climate change and anthropogenic stressors. His doctoral research, which he defended at Stockholm University in April 2022, examined how climate change and other cumulative stressors affect fishery resources and coastal populations.

Presenter

Abstract

Impact of Climate Change on Fisheries and Aquaculture (Blue Economy) of Tanzania.

Tanzania has abundant fishery resources. Several lakes, dams, rivers, marshes, and sea waterways are spread across the country. The country's total water coverage is 346,337 km2 or 36.7% of its total land area of 945,000 km2. The total fisheries potential is 750,000 metric tons, with 100,000 metric tons coming from coastal waters and 650,000 metric tons from inland waterways. Climate change puts captive fisheries and aquaculture development at risk.

Marine ecosystems face the joint impact of overexploitation and climate change. Focusing on prawn and Indian mackerel, two economically important species in Tanzania, increased climate sensitivity emerged in the 1980s, with the growing influence of Sea Surface Temperature (SST) and reduced precipitation. Despite efforts to reduce the fishing pressure, the two stocks continue to decline due to climate change. It is argued that exogenous pressures and associated changes in stock configurations have led to the loss of resilience, resulting in the two species approaching tipping points, possibly leading to complete collapse.

For aquaculture, climate change is expected to lower the availability and increase the cost of the inputs, such as fish seed and feed ingredients required for aquaculture production.

In General, small-scale fishing communities are expected to adapt to fish catch fluctuations linked to global environmental change. Notwithstanding, impacts from severe climate events and overexploitation of fisheries resources can compromise functions and resilience of ecosystems and associated species and thereby jeopardize long-term population trend stability and fisheries productivity.

Keywords: Small-scale fisheries, Fish landings, Aquaculture, Coastal communities, Climate change, Adaptation

Prof. Anthony Sangeda
Associate Professor-Natural Resource Management, SUA

Panelist

Dr. Sangeda is an Associate Professor in Natural Resources Management. He possesses a Ph.D. in Forest Management and Governance from the Sokoine University of Agriculture and University of Life Sciences in Norway. He holds a master's degree in Forestry and Nature Conservation from Wageningen University in the Netherlands.

Dr. Sangeda has researched several topics and published over 40 articles in international journals in range management, forestry, and climate change. Currently, Dr. Sangeda works as an environmental sociologist in the Department of Animal, Aquaculture, and Range Sciences at SUA.

Prof. Martin Shem
Founder, Morogoro Fresh Meats

Panelist

Martin has demonstrated an impressive commitment to showcasing how theories learned at agricultural universities can be used to immediately help improve the living conditions and increase the productivity of smallholder farmers. Frustrated by the continued lack of practical orientation of agricultural degree programs due to dwindling operational and infrastructural development funds, Martin took early retirement in 2012 to run a successful large-scale mixed farm (http://www.mgololeagroltd.com). His dream is to help agricultural students and small and medium commercial farmers learn agriculture practically. His "Commercial Farm Hub" business model won his company a grant and an interest-free loan from the Africa Enterprise Challenge Fund (AECF). Martin's motivation in agriculture is entrenched in his belief that agricultural education institutions are best placed on preparing African students for successful agribusiness careers. Martin is currently the Executive Managing Director of Mgolole Agro-processing Company, Morogoro, Tanzania. Before then, he was a Director-General of the Rwanda Agriculture Board, and Senior Scientist at the Government of Rwanda/World Bank, Rural Sector Support Project)/Institut des Sciences Agronomiques du Rwanda (ISAR), and a Professor at the Department of Animal Science and Production, Sokoine University of Agriculture. Martin's academic qualifications include a Bachelor of Science in Agriculture, University of Dar es Salaam, Tanzania; Master's of Science in Animal Nutrition, University of Guelph, Canada and a Ph.D. in Animal Nutrition, University of Aberdeen, Scotland, UK

Thematic Area 5: Leveraging Storage, Value Addition, Markets, and Trade for Enhanced Farmers' Income and Jobs Creation

Mr. Honest Mseri
Head of Operations, ANSAF

Moderator

Mr. Mseri is the Head of Programs at the Agricultural Non-State Actors Forum (ANSAF). He has worked as the Secretary of the National Task Force Team that developed the Tanzania National Post Harvest Management Strategy (2019-2029).

Mr. Mseri also pioneered the formation of the Forum for Rural Producers in Tanzania known as JUWAVITA. Mr. Mseri previously worked with the African Fertilizer and Agribusiness Partnership (AFAP) as a Consultant in Economics and Agribusiness. Mr. Mseri holds a master's degree in Economics from the University of Dar es Salaam.

Dr. Anselm P. Moshi
Chief Executive Officer,
Cereals and Other Produce Board

Presenter

Dr. Frederick Baijukya
Farming systems agronomist at the International Institute of Tropical Agriculture (IITA)

Presenter

Frederick Baijukya is a farming systems agronomist at the International Institute of Tropical Agriculture (IITA), based at the East Africa Hub Headquarters in Dar es Salaam. For several years, Frederick's research has focused on smallholder farming systems in sub-Saharan Africa, and in particular, problems of soil fertility and the role of nitrogen fixation in tropical legumes, with emphasis on the temporal and spatial dynamics of resources within crop/livestock farming systems and their interactions. Before joining IITA, he was employed by International Centre for Tropical Agriculture (CIAT) as a Legume agronomist and coordinator of the N2Africa project ("Putting Nitrogen Fixation to Work for Smallholder Farmers in Africa" - http://www.n2africa.org/ in Kenya, Rwanda and the Democratic Republic of Congo).

Frederick has also worked at the Ministry of Agriculture, Food Security, and Cooperatives in Tanzania, rising from Agricultural Research Officer to Principal Agricultural Research Officer, leading and contributing to the development, adaptation, and dissemination of ISFM options in various agro-ecological zones of Tanzania. He obtained his Ph.D. in Production Ecology and Resource Conservation (PE&RC) at Wageningen University in The Netherlands. He has published over 45 papers in peer-reviewed journals, and he has co-supervised several graduates at master's and Ph.D. levels.

Abstract

Promotion of soybean as nutritious food, livestock feed, and edible oil in Tanzania

Recognition that climate change could negatively affect agricultural production has generated a desire to build resilience into agricultural systems. Livelihoods' diversification is a key resilience strategy to help farmers in Tanzania cope with risks associated with climate change. Cultivation of soybean is recommended among the many and varying adaptation

strategies aimed at enhancing farmers' livelihoods because of its economic, nutritional, and environmental functions. Soybean is an important legume that is a valuable source of feed for livestock and fish and a good source of protein in human diets. The bean contains around 30 percent cholesterol-free oil, 40 percent protein, and essential vitamins. Soybean can contribute to the sustainable intensification of the farming systems by increasing carbon sequestration in the soils. Their ability to fix nitrogen reduces the need for mineral nitrogen fertilizers. The soybean industry provides numerous opportunities for value chain actors, from seed and grain production to processing and marketing.

As such, the growth and modernization of the soybean sector have the potential to improve livelihoods and reduce poverty. While industrial processing and utilization of soya bean have expanded in Tanzania, domestic production (ca 15,000- -20,000 mt) has not kept up with demand (130,000 -170,000 mt), resulting in significant growth in imports. Currently, around 90% of soybeans or soybean products are imported. Average soybean crop yields are low (0.7 to 1.7) against the potential (2.5-3 mt/ha). The soybean economic opportunity has the potential to earn Tanzania up to USD 1 billion annually from soybean exports to China. Given the importance and high demand for soya beans for both human and industrial use, investments need to be targeted at promoting production through financing, increasing the availability of appropriate and affordable technologies to improve the competitiveness of its value chain, and mechanized production to increase yield. Soya bean markets in Tanzania are regionally and internationally integrated, and farmers in Tanzania could become competitive if their productivity is improved. This will, in turn, lead to an increase in national production of soya beans, import-substitution, and lower price volatility. Price stability, alongside productivity growth, should be a significant policy focus in the soya bean sub-sector. Structured trading of this commercial crop may be one way to achieve both goals.

Dr. Honest Kessy
Director of National Food Security,
Ministry of Agriculture

Panelist

Dr. Lucas Katera
Director of Collaborations and
Capacity Building, REPOA

Panelist

Dr. Katera is an Economist with practical experience in research and policy analysis, particularly in poverty, public policy, governance, service delivery, and rural development. Within rural development, Dr. Katera has worked on non-farm income-generating activities and their role in transforming agriculture. Dr. Katera was also team leader of a research team working on understanding how two agricultural policy instruments, namely the National Agricultural Input Voucher Scheme (NAIVS) and the National Food Reserve Agency (NFRA), relate on the ground. He recently worked with IFPRI on post-harvest losses and informal cross-border trade on grains. Dr. Katera is currently Director of Collaborations and Capacity Building at REPOA.

Mr. Amani Temu
General Manager, TAHA FRESH

Panelist

Amani Temu is the General Manager of TAHAFresh Handling Ltd. He is responsible for all business operations, partnerships, and the company's strategic direction. TAHAFresh is the leading integrated logistics company in Tanzania, providing air and sea freight forwarding, customs clearance, and road haulage for all types of cargo. TAHAFresh is the largest perishable logistics company in Tanzania, handling over 30,000 metric tons of flowers, fruits, vegetables, spices, herbs, and horticultural seeds per annum. As the General Manager, Mr. Temu has expanded the company's service portfolio, geographical coverage in Tanzania from three to eleven locations, and increased strategic partnerships with reputable freight forwarders in over 150 countries worldwide. Mr. Temu has led TAHAFresh to be recognized as the Valuable Contributor of the Year by KLM Cargo, the Top 100 Mid-Sized Company in 2017, 2018, and 2019 by KPMG, and the Excellence in Agribusiness Exports in 2019 by PKF. He holds an MBA from Mzumbe University.

Mr. Amanyisye Luvanda
Market Development Analyst, AMDT

Panelist

Mr. Luvanda is an accomplished agribusiness professional, M4P/DCED practitioner, and master trainer with hands-on experience in a wide range of agricultural market systems interventions, including promoting grains structured trading systems, agricultural financing, postharvest management, input supply, value addition, extension services, business development services, farmers contractual arrangements, and strategic coordination. He has several years of experience in designing and managing primary agriculture value chains, particularly in smallholder agriculture. In addition, he has experience supporting SMEs' growth through business development services. He has several years of experience in the value chain and human-centered design (HCD) approaches in project design, implementation, monitoring, and evaluation. He has worked as a technical advisor for the small-scale farmers' programs funded by EU (horticulture), ICRISAT and Syngenta Foundation (sorghum and groundnut seeds), CARE International (horticulture), and Kickstart International (irrigation technologies). He is currently working with AMDT in the capacity of Market Development Analyst, supporting the development of market systems in maize, pulses, and sunflower value chains using the M4P approach and principles.

Mr. Dharmesh Ganatra
Chief Executive Officer, iLogix Consulting Ltd

Panelist

Dharmesh runs iLogix Consulting, an international consulting business with a strong focus on trade and investments in agriculture. Having worked on various commodity chains across Africa, Dharmesh has extensive experience developing public-private partnerships and sustainable private sector-led demand-driven interventions to unlock growth potential while delivering lasting impact-driven outcomes. With a Pan-African exposure, Dharmesh brings a wealth of experience from various initiatives on the continent, having worked with farmer/producer groups, markets, development partners, and government institutions in realizing opportunities while delivering on the SDGs. Dharmesh has extensive experience in trading commodities, developing market systems and structures, and enhancing commodity chains through opportunity realization, resource mobilization, capacity building, infrastructure, policy, and innovation in ICT and last-mile engagement. Some of the commodities he has an active interest in are: soybeans, common beans, pigeon peas, green grams, chickpeas, sesame, groundnuts, potatoes, birds-eye chilies, avocados, mangoes, cashew nuts, macadamia, and horticultural crops.

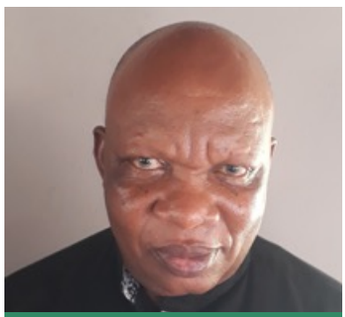
Thematic Area 6: Agricultural Diversification for Climate Resilience

Prof Isaac Minde
Regional Coordinator, MSU led USDA/USAID Project

Moderator

Isaac Minde has worked on many aspects of agricultural development in Africa through his long-term resident assignments in Rwanda, Malawi, Uganda, Zimbabwe, and South Africa. He has held positions in the Tanzanian government as a district agricultural development officer, an academic staff member at the University of Dar es Salaam and the Sokoine University of Agriculture—wherein the latter; he served as chair of the agricultural economics department.

He has worked in the sub-regional agricultural research organization (ASARECA) and the Consultative Group on International Agricultural Research (CGIAR)–IITA and later with ICRISAT as Principal Scientist and Head of the ICRISAT Diplomatic Mission in Zimbabwe. Through these engagements, Dr. Minde has the working knowledge of the regional political and economic blocs of COMESA, EAC, and SADC in eastern and southern Africa. He then joined Michigan State University (MSU), where among others, he has been the Africa Coordinator of the Modernizing Africa Food Systems Project, Deputy Chief of Party at different times for two Feed the Future projects (iAGRI and ASPIRES) in Tanzania. Dr. Minde is currently the regional coordinator of the MSU-led USDA/USAID project—Support to Applied Research and Analysis in Kenya and East Africa (SARA-KEA) and Associate Director for MSU-Alliance for African Partnership with a critical responsibility for monitoring, evaluation, learning, and impact assessment. Dr. Minde is an honorary distinguished fellow of the African Association of Agricultural Economists.



Prof. Ntengue Mdoe
Sokoine University of Agriculture

Presenter

Dr. Ntengua is a Professor of Agricultural Economics and Development at the Department of Agricultural Economics and Agribusiness, College of Economics and Business Studies, Sokoine University of Agriculture. He has three and half decades of teaching, research experience, and stakeholder engagement.

He holds a Ph.D. in Agricultural Economics from the University of Reading in the United Kingdom, MSc. (Agric. Econ.) from the University of Guelph in Canada, and BSc. (Agriculture) from the University of Dar es Salaam in Tanzania.

His areas of expertise and interest are Rural Development, Livelihood and Poverty Analysis, Value Chain Analysis and Development, Policy Analysis, and Youth in Agribusiness.

Abstract

Diversification in the Crop-Livestock Farming System in Response to Climate Change and Variability in Singida Region

Diversification is a strategy for coping with risks associated with climate change and variability among households in crop-livestock systems in semi-arid areas. This paper looks at diversification in crop-livestock farming systems of the Singida Region in semi-arid areas of central Tanzania. The paper addresses key policy-relevant questions: (i) To what extent do households diversify crops with livestock species, and (ii) What are the prominent combinations of crops and livestock practiced by different households? (iii)Does crop-livestock diversification reduce the risk of climate change and variability? (iv) Which crop-livestock combination is risk efficient? and (v) How does crop-livestock diversification affect food security and poverty?

The paper uses both secondary and primary data. Primary data were collected from 600 households selected randomly from 8 and 7 villages in Iramba and Mkalama districts, respectively. The findings show that diversification as a strategy of spreading risk associated with climate change and variability in crop-livestock farming systems of the Singida Region is undertaken by almost all households. However, diversification varies across households, but the crop and livestock enterprises that were undertaken comprise at least one crop and one livestock species. The crop-livestock combination with the lowest risk includes drought-prone enterprises (maize, cattle, and sheep) and drought-tolerant enterprises (sorghum, sunflower, goats, and chickens). Households continue to grow maize and keep cattle prone to drought because maize is a preferred staple food. In contrast, cattle are essential among agro-pastoralist because of their social identity and store of wealth. Crop-livestock diversification was found to impact household food security and poverty reduction positively. While efforts are made to promote sorghum and other drought-tolerant crops in semi-arid areas, the high preference for maize as a staple food suggests that there must be efforts to encourage the adoption of available drought-tolerant and early maturing maize varieties. This should go hand in hand with efforts in crop breeding and improvement programs to develop drought-tolerant maize varieties that meet preferences. Goats and chickens that can thrive under critical drought conditions should be promoted. However, the prominence of cattle that are less resilient to critical droughts and stressful heat urges interventions to reduce risk in cattle production. Such interventions include water harvesting and storage, as well as climate-smart breeding.

Dr. Malogo Kongola
Value Chain and Business Development Expert

Presenter

Dr. Kongola is a Value Chain & Business Development Expert with several years of experience in agricultural engineering and geo-spatial and remote sensing analysis of natural resources. For many years, Dr. Kongola has worked with public and private sector entities in identifying and developing investment opportunities across different sectors - sugar cane, tea, and horticultural crops.

He is well-versed in quantitative analytical research, particularly with ESRI ArcGIS Suite, ERDAS, ENVI, and QGIS – with advanced expertise in satellite imaging processing, land cover mapping, time-series analysis, and land use and land cover change analysis. Dr. Kongola has extensively researched and published on planning and managing land-use inventories, including soil surveys, soil and water conservation, and the application of advanced satellite remote sensing (Landsat MSS, TM & ETM+, NOAA-AVHRR, and SPOT) techniques in gold exploration, tectonic analysis, and wetlands studies.

Abstract

Promotion of Tree Crops as a REDD+ Strategy: A Case of the Cashew Nut Sector in Tanzania

Tanzania has recently become one of the ten largest producers of raw cashew nuts globally. In 2019/20, crop exports accounted for US$ 830 million (9%) of the total value of Tanzania's exports - compared to US$ 793 million in 2015, representing an increase of 5%. There are 670,000 households engaged in growing cashew nuts in the country.

The increase in intensive cashew farming combined with the problems of climate change is causing considerable degradation of natural ecosystems. Therefore, to ensure their protection, it is necessary to find a system that will combine environmental protection and carbon absorption. Thus, the general objective of this paper is to evidence how the carbon sequestration of cashew (Anacardium Occidentale L., Anacardiaceae) farms/plantations contributes to the mitigation of the effects of climate change through the capture of atmospheric carbon in Tanzania. The work evaluated the carbon stock capability of cashew plantations at different times – now, in 5, and after ten years.

The cashew plantations' carbon stocks used in our computations were 8.657 t/ha, 66.304 t/ha, and 193.32 t/ha for plantations of 4, 10, and more than ten years old cashew trees, respectively. It has been found that the expansion of cashew nut farming in Tanzania can sequestrate some 100,833,018 MT now, 351,651,300 MT after five years, and 761,603,700 MT of CO2 after ten years to the environment.

Mr. Owen Nelson
Value Chain Specialist, ANSAF

Presenter

Owen is a value chain specialist at the Agricultural Non-State Actors Forum (ANSAF), with several years of experience in agricultural value chains, project management, monitoring, evaluation, learning, agricultural policies, agricultural research, and microcomputer data handling. He has researched several topics in agriculture and has also participated in developing a training manual for farmer business skills, good agricultural practices, and good post-harvest handling. Previously Owen worked in ANSAF as a Programme Officer responsible for policy research and social accountability monitoring (SAM). Before joining ANSAF, he worked with Kilimo Trust as a Programme Officer; the International Institute of Tropical Agriculture (IITA) as a Research Associate; Archbishop Mihayo University College of Tabora (A constituent college of the St Augustine University of Tanzania) as an assistant lecturer of economics and statistics; and Tabora District Council as an agricultural officer. Owen holds a Master of Science in Agricultural Economics, a Bachelor of Science in Agricultural Economics and Agribusiness, and a diploma in crop production.

Abstract

Agroforestry in National Policies and Plans for Resilience and Sustainable Development

In Tanzania, the area under forest cover has decreased by more than 11 million ha over the past 30 years, from 57.4 million ha in 1990 to 45.7 million ha in 2020 (FAO, 2020). This is attributed to, among other factors, a growing human population that demands more land for food production, energy, and construction materials, thus, exerting more pressure on forestry. Agroforestry is increasingly considered a solution for limited available resources in response to climate change and global sustainable development due to its vast potential contribution to ecological, economic, and social sustainability. Therefore, it is essential to foster the adoption of agroforestry practices by promoting the integration of tree planting with crop and livestock production to sustain biodiversity, food security, income generation, and environmental conservation. In doing so, adherence to the country's policies, priorities, and resource allocation is essential in enhancing agroforestry. Tanzania published its first National Agroforestry Strategy (NAS) in 2014. The strategy envisioned having at least 4 million rural farming households adopting and benefiting from agroforestry interventions sustainably by 2025. However, its implementation has been constrained by several factors, including an overemphasis on monoculture production, the promotion of heavy use of industrial inputs and mechanized farming (often subsidized) on top of the agricultural commercialization agenda; inadequate understanding of the practice amongst stakeholders, particularly decision-makers, and smallholder farmers; Inadequate coordination among the multiple sectors to which it contributes; It has been scantly addressed in the national policy-making process, land-use planning and rural development programs and; its environmental benefits tend to be unrewarded, and related investment has been discouraged. It is therefore recommended to strengthen national architecture that institutionalizes the coordination, management, and administration processes of agroforestry in the country; awareness creation and capacity building across levels and scales in the country, and; creating a dedicated financial mechanism through the national budgetary means, private sector and development partners support for expanding agroforestry in the country.

Ms. Neema Mrema
Team Leader for AgResults Dairy Productivity Challenge Project

Panelist

Ms. Mrema has extensive experience working with Tanzanian agribusinesses and facilitating pay-for-performance incentives for the improved delivery of solutions that result in smallholder impact. She has several years of experience managing donor-funded projects in Dar es Salaam, Iringa, Dodoma, Arusha, Mbeya, Ruvuma, Njombe, Songwe, Pwani, Tanga, and Morogoro regions. In her professional career, Ms. Mrema has served as Chief of Party of Soya ni Pesa Project a USDA-funded project, and Technical Component Lead for USAID-Feed the Future Agroprocessing and Consumption project. In all of these capacities, Ms. Mrema has demonstrated her ability to build and maintain positive relationships with the public and private sectors and the international donor community. In project implementation, to manage diverse stakeholder committees and maintain neutrality and integrity across all dimensions of project execution. Ms. Mrema has also supported private sector initiatives in improving access to innovative approaches geared to enhance processes and access in the beef industry through her engagement with ShopRite and Tanzania Pride Meat Company.

Ms. Mrema holds a master's degree in applied microbiology from the University of Botswana.

Ms. Elizabeth Swai
Founder, AKM Glitters

Panelist

Elizabeth Swai is among a few females in the male-dominated agribusiness. She invests along the poultry value chain in Tanzania.

Ms. Swai is the CEO and Founder of AKM Glitters Company Limited (AKMG). She founded the company in 2007. AKMG deals with integrated poultry and animal feed business trading with 480 women-owned agents that support 1224 smallholder poultry farmers. She is also a founder of an Online TV station called VOICE of Agriculture (VOAG), which is launching soon.

Before venturing into the poultry business, Ms. Swai worked for 15 years with UNHCR and UNWFP. She has academic qualifications in Human Development (BA), entrepreneurship, and several diplomas in various sectors.

Ms. Swai has received various awards, including the Change Driver Award, Impact Award, Women of Achievement in Agribusiness award, Malkia wa Nguvu 2019, Agriculture Award 2019, top 100 Medium Companies Award, and African Women in Management Award. She has also been featured as one of the best women entrepreneurs in Africa and a role model to watch.

Ms. Swai is a Founding Member of the African Agribusiness Academy, Africa Women in Agribusiness, and a member of the Professional Poultry Association, Feed Mill Association, Poultry Breeders Association, and CEORT. She is also a Counselor at the Tanzania Chamber of Commerce, an Executive Board Member of the Tanzania Business Council representing the livestock sub-sector in Tanzania, and a board member of the Tanzania Meat Board and GIBRI.

Mr. Stephen Michael
Director of Production and Marketing, Ministry of Livestock and Fisheries

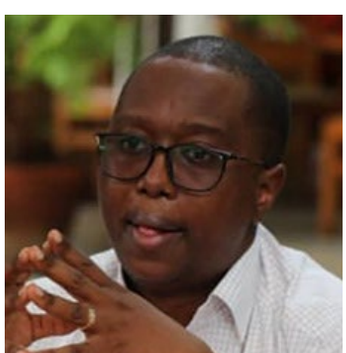
Panelist

In the last two decades, Mr. Stephen Michael has held several positions in the Ministry of Livestock and Fisheries (MLF). He is currently the Director of Production and Marketing. In this capacity, he is responsible for promoting, monitoring, and strengthening livestock products and by-products production, value addition, and distribution.

He is the Coordinator for the Private Sector Desk (PSD), recently created by the MLF. PSD acts as a bridge between the private sector and the Ministry of Livestock and Fisheries to link livestock and fishery businesses with financial institutions to access loans/capital. PSD has the task of scrutinizing business plans before they are submitted to financial institutions and negotiating and providing business advice. He was also heavily involved in designing and implementing the Agricultural Sector Development Programme (ASDP I and ASDP II).

Mr. Stephen Michael holds a BSc in Agricultural Economics and Agribusiness, Masters of Business Administration (MBA-Marketing), and an MSc in Economics and Finance for Development.

Thematic Area 7: Leveraging Technology and Financing for Climate-Smart Agriculture



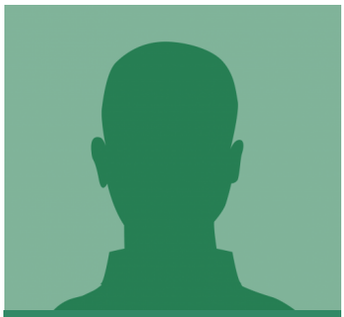
Mr. Kelvin Remen
Business Environment Manager, TAHA

Mr. Remen is a private sector development specialist with vast experience in policy analysis, advocacy, business development, partnerships, and resource mobilization.

He has more than ten years of experience working with private sector organizations in the tourism and agricultural sectors. He is currently the Business Environment Manager at TAHA, responsible for advocating for a business-enabling environment. During his tenure at TAHA, Mr. Remen has championed more than 40 reforms in policy, legal and regulatory frameworks geared toward improving the business environment in the agriculture sector.

He holds an MBA from the Eastern and Southern Africa Management Institute (ESAMI).

Moderator



Dr. Hussein Nasorro
Lecturer, IFM

Presenter

Dr. Hussein Nzao Nassoro is currently a lecturer at the Institute of Finance Management. He has worked in various capacities, including being a member of a research team playing the role of monitoring and evaluating agricultural taxation in Tanzania, a collaborative project between ASPIRES and Michigan State University. He was also part of the New Alliance for Food Security and Nutrition Initiatives by the G8 and other developing countries. He has severally been contracted by development partners (World Bank, USAID, Irish AID, JICA, and FAO) and The Tanzanian Government to assess achievements of the Agricultural Sector Development Program (ASDP) and the Return to Irrigation Development (2012/13). He has also consulted for ESRF, AGRA, UNDP, and OXFAM.

Dr. Nassoro has a Ph.D. in Economics (Collaborative Ph.D. program under the African Economic Research Consortium (AERC) and a master's in Agricultural Economics from the Sokoine University of Agriculture.

Mr. Frank Kitende
Assistant Lecturer, IFM

Presenter

Mr. Kitende is a trainer, researcher and consultant in insurance, risk management, marketing, and strategic planning at the Institute of Finance Management (IFM).

Mr. Kitende has served as head of actuarial science department, head of insurance department, and occasionally acting dean, faculty of insurance and social protection at IFM. He is associated with various bodies: a member of technical working group for National Agriculture and Livestock Insurance Scheme (NALIS) and technical working group for National Insurance Education/Awareness Strategy (NIES).

He holds a master's of science in insurance and risk management from City University of London - Cass Business School (UK), a master's of science in marketing from Mzumbe University (TZ) and an advanced diploma in insurance and risk management from the Institute of Finance Management. He is currently pursuing a PhD program at the University of Dar es Salaam, researching on "The Impact of Weather on Crop Production: A time series analysis to forecast future crop yield".

Abstract

Topic: Micro-insurance for Climate Change Mitigation in Agriculture and Livestock Sector

For decades, the agricultural sector has continued to depend on rain-fed crops and livestock production. This increases the sectors' vulnerability to climate change. The application of risk mitigation strategies in the sector has remained unexploited. This paper examines several challenges facing smallholder farmers and their corresponding mitigation strategies. A comprehensive literature review was conducted on climatic change, risk management strategies, and micro-insurance. Literature suggests a strong relationship between climate change and crop productivity, and the same applies to livestock. Smallholder farmers are likely to be affected, particularly in the absence of risk mitigation strategies. As a result, this pretense the

risk of food insecurity and poverty, mostly among smallholder farmers. Predominant risks frequently affecting the smallholder farmers are; climate change (weather risks; flood, drought, and cyclonic), human risks (death, sickness, accident, and disability), and other risks (pests and diseases, fire, and theft). The literature shows that the common mitigation strategies are farming diversification (especially for climate change), association members' contribution and family support, borrowing, selling assets, including livestock and crops before harvesting, and micro-insurance arrangement. It is evidenced that farmer's choice for well-arranged and formal risk mitigation strategies is driven by individual attributes, farm characteristics, and the availability of institutions and capital resources. It is, therefore, highly recommended to review and formulate agricultural policies that aim at increasing farming education and income to smallholder farmers, leveraging on public and private partnerships in developing agriculture insurance schemes, and promoting a savings culture to strengthen farmers' capacity to cope with climate change and other farming risks.

Mr. Malik Nkoba
Consultant, Dalberg

Presenter

Malik is a consultant based in the Dalberg's Dar es Salaam office. He has supported various organizations in strategy development and opportunity assessment across several topics, including agriculture, high-tech, SMEs growth, and climate change. His experiences in agriculture include supporting agri-based organizations to develop agricultural strategies, select countries for engagement, and prioritize and cost impactful agricultural interventions. He has worked on several Africa-wide projects and country-specific projects for countries like Tanzania, Zambia, and Uganda.

His recent experience includes supporting a large multi-national foundation to develop its inclusive agricultural transformation (IAT) partnership strategy, which involved an assessment of potential partnerships that existing regional agriculture organizations could forge to accelerate IAT.

Malik holds a master's degree in finance from INCEIF University (Malaysia) and a bachelor's degree in accounting from the International Islamic University Malaysia (IIUM). He is also an affiliate member of ACCA and CIMA.

Abstract

Promoting Clean Energy: Application of Solar Technologies in the Agricultural Sector

Using solar-based productive appliances in agriculture presents the best case for improving rural livelihoods. Promising effective appliances include irrigation pumps, refrigeration, egg incubators, and mills. Irrigation pumps are relatively technologically mature and present the strongest business case in Tanzania of all the existing appliances. We estimate that irrigation could increase crop productivity by 2 to 5 folds. While refrigeration presents some viable use cases, further R&D is needed to make it widely accessible to farmers and retailers.

Similarly, egg incubators need more R&D pioneers to perfect the technology, lower the price, and increase rural distribution. On the other hand, significant R&D is required to create a market-appropriate solar grain mill with commercial viability. More investments are needed in these solar-based productive appliances that will impact thousands of rural farmers and micro-enterprises in the country.

Mr. Maregesi Shaaban
Senior Manager in Retail Agribusiness

Panelist

Mr. Maregesi has several years of experience in banking where he has been performing several tasks, including operation duties, handling CRDB Bank's agribusiness corporate clientele and managing loan portfolio of over TZS 650 billion (USD. 320 million). Mr. Maregesi is also a commodity and trade structured finance specialist covering a wide range of agricultural commodities value chains from farmers' level to large corporates. He has worked as a relationship manager (RM), senior RM, principal RM, and manager of agribusiness in corporate banking at CRDB Bank Plc – Tanzania where he was responsible for corporate agricultural value chain projects, financing and credit management. After that, he worked as manager for agribusiness at the special assets management unit, responsible for turning around delinquent portfolios and ensuring quality loan performance before assuming his current role as senior manager in retail agribusiness focusing on increasing financial inclusion for smallholder farmers.

Mr. Maregesi has a certificate in agricultural finance from the Kenya School of Monetary Studies (KSMS) Nairobi , a bachelor of commerce degree in accounting from the University of Dar es Salaam, and a master's of science degree in finance and investment from the Institute of Finance Management (IFM), Dar es Salaam.

Mr. Peter Christopher
Specialist in Climate Financing and Sustainable Projects

Panelist

Mr. Christopher worked as a senior business development officer at CRDB Bank for several years. Before this, he worked in various banking departments such as operations, compliance, lending, marketing, and business transformation. Currently, he is working as a specialist in climate financing and sustainable projects and helping the Bank mobilize financial resources for sustainable investments and Green Projects from the Green Climate Fund and other multilateral and international organizations. He has considerable experience in grievance handling, climate change, gender mainstreaming, and environmental and social safeguards for projects and programmes.

Mr. Christopher has a bachelor's degree in environmental studies from the University of Dar es Salaam. He also has a master's degree in business administration and corporate management

Mr. Yohane Kaduma
Managing Director, PASS Trust

Panelist

Mr. Yohane Ibrahim Kaduma is the Managing Director of the Private Agricultural Sector Support Trust (PASS), founded in the year 2000 by the Governments of Tanzania and Denmark to stimulate investments and growth in the private sector, commercial agriculture, and related sectors through access to finance.

Mr. Kaduma has several years of experience in corporate banking and microfinance institutions in Tanzania, having worked in various institutions such as the Standard Chartered Bank, Citibank, Stanbic Bank, National Bank of Commerce, Commercial Bank of Africa, Letshego Bank, and VisionFund Microfinance Bank.

Professionally, Mr. Kaduma has risen through the ranks, having begun his banking career as a relationship manager, credit, sales and service, and business development, and ultimately growing to serve as Chief Executive Officer of Commercial Bank of Africa Tanzania, Letshego Bank, and VisionFund Tanzania.

A civil engineering graduate of the University of Birmingham, England, Mr. Kaduma has also served the Government of Tanzania as a Director of Resource

Mobilization and Economic Sectors within the Presidential Delivery Bureau.

Mr. Frank Nyabundege
Managing Director, Tanzania Agricultural Development Bank (TADB)

Panelist

Dr. Nyankomo Marwa
Senior Lecturer, University of Stellenbosch

Panelist

Dr. Marwa is a senior lecturer in development finance and econometrics at the University of Stellenbosch Business School (South Africa). Dr. Marwa has held different positions in the past, including Director for Policy Research and Planning at Tanzania Agricultural Development Bank, MITACS scholar in consumer behavior modeling at Dr. J. Herbert Smith Center of Technology Management & Entrepreneurship, University of New Brunswick, Canada, Biostatistician at Saskatchewan Population Health Research Unit in Canada, Forensic Scientist at Tanzanian Forensic Bureau and country research analyst in the social sector at TWAWEZA. He earned his Ph.D. in Development Finance from the University of Stellenbosch Business School. He attended his doctoral course work in Economics, Econometrics, and Public Policy from the University of Nebraska Lincoln (USA) and Johnson Shoyama Graduate School of Public Policy, Canada. He holds a master's degree in Agricultural Economics from the University of Nebraska, Lincoln (USA), a master's degree in Applied Statistics and Biostatistcs from Hasselt University (Belgium), and a BSc. Agricultural Economics and Agribusiness from Sokoine University of Agriculture (Tanzania).

Dr. Marwa has extensive experience in public policy advisory services, research, and teaching in Applied Econometrics, Housing Finance and Public Policy, Agricultural Finance, and Economics of Blockchain Technology. His recent research focuses on the role of

PRESS RELEASE

For Immediate Release

8TH AAPC: CLIMATE CHANGE ADAPTATION AND MITIGATION POLICIES IN THE CROPS, LIVESTOCK, AND FISHERIES SECTOR

Dodoma, 3 June 2022

From June 6th - 8th, 2022, development partners, policymakers from the agriculture, food security, and nutrition sectors, researchers, academia, farmers, livestock keepers, and fishermen and women will participate in the 8th Annual Agricultural Policy Conference (AAPC). Participants will have an opportunity to share research findings and assess progress in agricultural, livestock, and fisheries policy reforms. Furthermore, they will discuss the successes, lessons learned, identify key gaps and a roadmap for future reforms, and consolidate their best practices in addressing this year's AAPC theme '**Climate Change Adaptation and Mitigation Policies in the Crops, Livestock, and Fisheries Sector.'**

Taking place in Dodoma City at the Asante Estates, the 8th AAPC will also provide an opportunity for Agricultural Sector Lead Ministries (ASLMs), businesses, researchers, and development partners to identify value chain-specific policies in crops, livestock, and fisheries. The AAPC follows the 26th COP conference held in Glasgow in November 2021, which addressed issues of Climate Change and where the United Nations Framework Convention on Climate Change (UNFCCC) and its treaties were formulated. Additionally, COP 26 identified African countries' Nationally Determined Contributions (NDCs) priorities.

As the country implements the Five-Year National Development Plan (2021/22–2025/26) and the National Climate Change Response Strategy 2021- 2026, the agricultural sector is already experiencing the negative impacts of climate change.

Climate change and variability have created a ripple effect as temperatures rise due to reduced forest cover. Water resources in the country are also becoming increasingly vulnerable, impacting food security and nutrition goals. The 8th AAPC serves as a timely initiative to stimulate discussions and dialogue on climate policy-related actions within the agricultural sector.

The adaptation and mitigation measures for the agricultural sector also require greater policy attention to accelerate the uptake of existing green technologies and practices in the wake of climate change. The theme of this year's 8th AAPC is in line with the UNFCCC and NDCs.

AAPC has successfully brought together key decision-makers and influencers from Tanzania and beyond for the past eight years. The number of AAPC participants has increased from 115 in 2014 to over 400 in 2021. In cognizant of the COVID 19 pandemic, the 8th AAPC will be a hybrid event, allowing for virtual and physical attendance.

The 8th AAPC looks into climate change and the agricultural sector within five sub-themes as follows:

- Climate Change and Food and Nutrition Security
- Adaptation and Building Resilience
- Livestock Systems and Climate Change
- Innovations Toward Climate Change Mitigation
- Cross-cutting Issues

About 28 invited speakers will deliver technical presentations to address climate change in agriculture, food Security, and nutrition sectors. To supplement the presentations, there will be panel discussions by key experts and influencers to share their local and international perspectives and experiences in the five themes listed above. During the 'Questions and Answers' sessions, participants will also have the opportunity to contribute. There will also be special sessions on the impact of climate change on nutrition, youth-led agricultural businesses, and aquaculture in Tanzania.

The conference will assess Tanzania's agricultural climate change mitigation and adaptation policies in the crops, livestock, and fisheries sub-sectors and will identify key policy issues in the agricultural sector. The outcomes of the conference will be shared with the Government, private sector, and other relevant agencies for their consideration in promoting Tanzania's agricultural sector, food security, nutrition, and overall economic growth.

About AAPC

AAPC is an annual flagship event organized by the Policy Analysis Group (PAG) in collaboration with Agriculture Sector Led Ministries (ASLMs) and 15 other organizations, including NGOs, academic institutions, and private sector associations. Several development partners support the event.

For more information, contact:

AAPC Secretariat
Lorna Yoyo
ASPIRES Tanzania
Phone number +255 762 174 534
Email: secretariat@aapc.or.tz and aspirestanzania@yahoo.com
Website: https://aapc.or.tz/

AAPC Secretariat Villa 1, Mahewa Zambia Road Kenyatta Junction Oysterbay, Dar es salaam Tanzania.

CLIMATE CHANGE ADAPTATION AND
MITIGATION POLICIES IN THE CROPS, LIVESTOCK, AND FISHERIES SECTOR

POLICY ANALYSIS GROUP (PAG) MEMBERS AND PARTNERS

The United Republic of Tanzania
Agricultural Sector Lead Ministries

8TH AAPC SPONSORS

TANGAZO KWA VYOMBO VYA HABARI

LITOLEWE SASA HIVI

KONGAMANO LA NANE LA WADAU WA SEKTA YA KILIMO KUHUSU SERA PAMOJA NA KUTATHMINI SHUGHULI ZA KILIMO NCHINI

KAULI MBIU: " KUKABILIANA NA MABADILIKO YA TABIA NCHI KATIKA SEKTA YA MAZAO, MIFUGO NA UVUVI"

Dodoma, 3 Juni 2022

Kuanzia tarehe 6-8 Juni, 2022, wadau wa maendeleo, watunga sera kutoka sekta ya kilimo, uhakika wa chakula na lishe, watafiti, wanazuoni, wakulima, wafugaji na wavuvi watashiriki katika Kongamano la Nane la Mwaka la Wadau wa Sekta ya Kilimo kuhusu sera. Washiriki watapata nafasi ya kushirikishana katika matokeo ya tafiti mbalimbali zilizofanyika pamoja na kutathmini maendeleo ya maboresho ya sera mbalimbali katika sekta ya kilimo, ufugaji na uvuvi. Pia, watajadiliana juu ya mafanikio, changamoto, kubadilishana uzoefu na kubaini maeneo ambayo bado yanahitaji kufanyiwa kazi na kubuni mipango ya namna ya kufanya maboresho ya sera siku zijazo pamoja na kuweka pamoja yale waliyojifunza katika kutekeleza kauli mbiu ya mwaka huu isemayo "**KUKABILIANA NA MABADILIKO YA TABIA NCHI KATIKA SEKTA YA MAZAO, MIFUGO NA UVUVI"**

Kongamano hili litafanyika Dodoma katika maeneo ya Asante Estates, na kutoa nafasi kwa sekta zinazohusiana na kilimo (Agricultural Sector Lead Ministries), wafanyabiashara, watafiti, na wadau wa maendeleo kutambua sera husika katika minyororo ya thamani kwenye mazao, ufugaji na uvuvi. Kongamano hili linafuatia kongamano la Glasgow maarufu kama COP 26 lililofanyika Novemba, 2021 ambalo lilizungumzia juu ya mabadiliko ya tabia ya nchi ambako Umoja wa Mataifa ulitengeneza Makubaliano ya Pamoja juu ya Mabadiliko ya Tabia ya Nchi (United Nations Framework Convention on Climate Change) pamoja na mikataba yake. Vilevile, katika mkutano huo, vipaumbele vya nchi za Afrika vilibainishwa (African countries' Nationally Determined Contributions).

Katika kipindi hiki ambacho nchi yetu inatekeleza Mpango wa Taifa wa Maendeleo wa Miaka Mitano (Five-Year National Development Plan 2021/22–2025/26) pamoja na Mkakati wa Kitaifa wa Miaka Mitano wa Mwitikio wa Mabadiliko ya Tabia Nchi (National Climate Change Response Strategy 2021- 2026), tayari sekta ya kilimo imesha kumbana na athari za mabadiliko

ya tabia nchi.

Mabadiliko ya tabia nchi na kutotabirika kwake kumeshaleta ongezeko la athari kutokana na kuongezeka kwa hali ya joto kwa sababu ya ukutaji wa misitu. Upatikanaji wa maji hapa nchini pia nao uko katika hatari kubwa huku ukiathiri kwa kiasi kikubwa malengo ya uhakika wa chakula na lishe. Kongamano hili la nane, limekuja wakati muafaka ili kuongeza vuguvugu katika kuongea na kujadiliana juu ya vitendo vya kisera vya mabadiliko ya tabia ya nchi katika sekta ya kilimo.

Hatua za kukabiliana na kupunguza athari za mabadiliko ya tabia ya nchi katika sekta ya kilimo pia zinahitaji kuangalia kwa namna ya pekee sera za kuongeza kasi ya utumiaji wa teknolojia za kijani (green technologies) zilizopo na matumizi yake. Kauli mbiu ya mwaka huu ya kongamano hili la nane inahusu "**KUKABILIANA NA MABADILIKO YA TABIA NCHI KATIKA SEKTA YA MAZAO, MIFUGO NA UVUVI"** na inazingatia makubaliano ya Umoja wa Mataifa kwenye COP 26 pamoja na vipaumbele vya nchi za Afrika.

Kwa miaka minane mfululizo, kongamano hili limefanikiwa kuwalateta pamoja watoa maamuzi na watu muhimu kutoka ndani na nje ya Tanzania. Idadi ya washiriki imekuwa ikiongezeka kutoka washiriki 115 mwaka 2014 hadi 400 mwaka 2021. Kwa kuzingatia hali ya UVIKO 19, kongamano hili la nane litakuwa na washiriki wachache kwenye viwanja vya mkutano na wengine wengi kwa njia ya mtandao.

Kongamano hili la nane litaangalia mabadiliko ya tabia nchi katika sekta ya kilimo katika mada tano zifuatazo:

- Mabadiliko ya tabia nchi na uhakika wa chakula na lishe
- Kukabiliana na kujijengea udhabiti (resilience)
- Mifumo ya ufugaji na mabadiliko ya tabia nchi
- Ubunifu katika kukabiliana na mabadiliko ya tabia nchi
- Mambo mtambuka

Watoa mada wapatao 28 watatoa mawasilisho yao kuhusu kukabiliana na mabadiliko ya tabia nchi kwenye sekta ya kilimo, uhakika wa chakula na lishe. Vile vile, kutakuwa na wataalamu wabobezi na watu mashuhuri ambao watachangia katika mada hizo tano kwa kutoa uzoefu wao wa ndani na wa kimataifa. Pia, kutakuwa na nafasi ya maswali na majibu kutoka kwa washiriki na kuchangia kwenye mada hizo. Kutakuwa pia na kipindi maalumu juu ya athari za mabadiliko ya tabia nchi kwenye lishe, biashara za kilimo zinazoendeshwa na vijana na ufugaji wa samaki Tanzania.

Kongamano litatathmini sera za Tanzania kwenye mazao, mifugo na uvuvi katika kukabiliana na mabadiliko ya tabia nchi. Mwisho, mapendekezo yatakayotokana na kongamano hili yatapelekwa serikalini na pia kwa wadau wengine katika sekta binafsi na ambao wana kiu katika kuinua sekta ya kilimo hasa katika uhakika wa chakula, lishe na ukuaji wa uchumi kwa ujumla.

Kuhusu Kongamano hili (AAPC)

Kongamano hili ni la kila mwaka ambalo huandaliwa na Kikundi cha Uchambuzi wa Sera (Policy Analysis Group -PAG) kwa kushirikiana na sekta zinazohusiana na kilimo na taasisi zingine 15, zikiwemo taasisi zisizo za kiserikali, taasisi za elimu ya juu, na sekta binafsi. Kon-

gamano hili hudhaminiwa na wadau mbalimbali wa maendeleo.

Kwa Mawasiliano zaidi:

AAPC Secretariati
Lorna Yoyo
ASPIRES Tanzania
Namba ya Simu +255 762 174 534
Barua pepe: Email: secretariat@aapc.or.tz and aspirestanzania@yahoo.com
Tovuti: https://aapc.or.tz/

AAPC Secretariat Villa 1, Mahewa Zambia Road Kenyatta Junction Oysterbay, Dar es salaam Tanzania.

CLIMATE CHANGE ADAPTATION AND
MITIGATION POLICIES IN THE CROPS, LIVESTOCK, AND FISHERIES SECTOR

POLICY ANALYSIS GROUP (PAG) MEMBERS AND PARTNERS

8TH AAPC SPONSORS

JAMHURI YA MUUNGANO WA TANZANIA

WIZARA YA KILIMO

TAARIFA KWA VYOMBO VYA HABARI

KONGAMANO LA NANE LA WADAU WA SEKTA YA KILIMO KUHUSU SERA PAMOJA NA TATHMINI YA SHUGHULI ZA KILIMO NCHINI

Dodoma

Ndugu Wanahabari; Tarehe 6 hadi 8 Juni, 2022 tutakuwa na kongamano la nane la Wadau wa Sekta ya Kilimo kuhusu Sera na tathmini ya shughuli za Sekta za Kilimo Mifugo na Uvuvi ambalo litafanyika hapa mkoani Dodoma eneo la ***Asante Estate***. Mgeni Rasmi atakuwa Mh. Kassim Majaliwa, Waziri Mkuu wa Jamhuri ya Muungano wa Tanzania.
Kauli Mbiu ya Kongamano hili inasema ***"KUKABILIANA NA MABADILIKO YA TABIA NCHI KATIKA SEKTA YA MAZAO, MIFUGO NA UVUVI".***
Katika kongamano hilo Wadau watapata nafasi ya kutoa mawazo yao pia watapata nafasi ya kujadili Sera za Sekta hizi za Kilimo Mifugo na Uvuvi.
Wadau waalikwa ni pamoja Wachumi, Watafiti, Wachambuzi wa masuala ya Sera, Wakulima, Wadau wa Maendeleo wa Sekta hizi, Wanasiasa, Sekta Binafsi, Taasisi za Elimu ya Juu pamoja na Wageni wengine waalikwa ambao jumla yao inakadiriwa kuwa 800 (Hii ni pamoja na wale watakaoshiriki kongamano hili kwa njia ya mtandao).
Idadi ya washiriki katika kongamano hili imekuwa ikiongezeka mwaka hadi mwaka, kutoka washiriki 115 mwaka 2015 hadi 400 mwaka 2021. Kwa kuzingatia hali ya UVIKO 19, kongamano hili la nane litakuwa na washiriki wachache kwenye viwanja vya mkutano na wengine wengi kwa njia ya mtandao.
Ndugu Wanahabari; Kongamano hili limeandaliwa na kikundi cha Watafiti na Wachambuzi wa Sera (Policy Analysis Group - PAG) kwa kushirikiana na Wizara za Sekta ya Kilimo, Mifugo na Uvuvi pamoja na Wadau wengine wa maendeleo.
Napenda kuchukua nafasi kuwakaribisha Waalikwa wote katika kongamano hili.

Asanteni sana kwa kunisikiliza!
Jamhuri ya Muungano wa Tanzania; Kazi iendelee!

Imetolewa na: -