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Opportunities for higher education institutions to develop sustainable food systems in Africa

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An African Vice-Chancellors' Regional Food Systems Dialogue was hosted with the aim to provide a multi-stakeholder platform for stakeholders to explore various existing and emerging approaches that have the potential to deliver sustainable solutions at scale and encourage collaborative actions to directly transform Africa's agriculture and food systems. Various food system experts and leaders from policy research institutions, universities, and other stakeholders participated. A lack of coherent linkages among stakeholders, youth restlessness, and silos within and between higher education institutions were some of the challenges identified to hindering the much needed transformation. Poor links with ministries and political red tape, inadequate programme funding and capital for coping with rising input costs, as well as unsustainable resource mobilization were also reported as having a negative effect. To address these, stakeholders must embrace collaboration and transdisciplinary practices, mobilize resources, and harness partnerships for greater leverage. In addition, a systems-thinking approach to dealing with complex issues should be adopted, while partners co-design and co-create research initiatives. Information and Communications Technology (ICT) and Big Data were identified as key enablers that can ensure relevant research with appropriate translation into practice while maintaining quality and excellence. This research—together with society-relevant curriculums with emphasis on agricultural sciences and practical on-farm skills—must inform policies and practice. Higher education institutions must be committed to driving the sustainable food system transformation agenda in partnership with other stakeholders. Institutions must be at the forefront of reimagining the sector's role when it comes to transdisciplinary knowledge co-creation aimed at strengthening the continent's agro-food systems.

KEYWORDS

sustainable food systems, higher education, transdisciplinary research, agriculture, partnerships and collaborations

1. Introduction

In order to ensure sustainable food security for all, the food system must be linked to nutrition and health outcomes. Agriculture provides for the primary sources of energy and essential nutrients, while simultaneously creating sustainable livelihoods. Yet agricultural activities often face many challenges due to population growth, urbanization and climate change, which threaten the availability of water, land and other natural resources (FAO, 2017). On the other hand, current farming practices has significant impact due to agro-chemical pollution, desertification, deforestation, eutrophication, biodiversity loss, and land degradation. Many of these are linked to intensive crop monocultures and industrial-scale feedlot production. Agriculture, forestry and other land uses are responsible

for at least one-third of all global anthropogenic greenhouse gas emissions, and may be the world's greatest contributors to climate change (IPES-Food, 2016).

In 2021, nearly 2.3 billion people in the world were moderately or severely food insecure, with Africa the most vulnerable. Recent data suggest that around one in five people in Africa (20.2 percent of the population) was facing hunger in 2021 with a rising trajectory. The lingering Covid-19 pandemic and the war in Ukraine will have negative implications on food security and nutrition for many countries on the continent (FAO et al., 2022).

Transforming Africa's agriculture and food systems is an opportunity for higher education institutions to contribute to improved health and livelihoods. Sustainable and resilient food systems provide sufficient, safe, nutritious, culturally appropriate, and consumer-driven food for modern-day Africa while empowering graduates and researchers to demonstrate research excellence.

2. African Vice-Chancellors' Regional Food Systems Dialogue

An African Vice-Chancellors' Regional Food Systems Dialogue was hosted on 9–10 March 2021 by the African Universities Research Alliance (ARUA) Center of Excellence for Sustainable Food Systems (ARUA-SFS[1]) GCRF/UKRI[2] CaBFoodS-Africa[3] project under the auspices of the University of Pretoria in collaboration with the University of Nairobi and the University of Ghana, Legon. It was registered as an independent dialogue under the UN Food Systems Dialogues. The dialogue provided a platform for multiple stakeholders to explore various existing and emerging approaches that have the potential to deliver sustainable solutions at scale and encourage collaborative action to directly inform the United Nations Food Systems Summit process.

The Food Systems Dialogue program featured a plenary session and four parallel African geographical regions (Eastern, Northern, Southern and Western Africa) break-away sessions. The dialogue provided time and space for informal discussion groups, enabling participants to engage fully. Social media, including Facebook, Twitter, and YouTube, formed part of the communications strategy to promote the dialogue as well as disseminate proceedings and outcomes.

The Vice-Chancellors were joined by selected representatives of the scientific committee, food systems academics, policy experts, and the participants from the regional food systems dialogue to construct the message and shape pathways to sustainable food systems that will inform African universities' contributions to the 2021 UN Food Systems Summit.

The curators and convenors emphasized the importance of respect throughout all processes and chose prominent leaders

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1   ARUA-SFS: African Universities Research Alliance Center of Excellence for Sustainable Food Systems.

2   GCRF/UKRI: Global Challenge Research Fund/UK Research and Innovation.

3   CaBFoodS-Africa-project: Capacity Building in Food Security project.

to be the facilitators at each regional dialogue. This high-level colloquium, with 15–20 participants per region respectively, formed part of a process to synthesize the key messages from African universities to be delivered at the 2021 UN Food Systems Summit by the nominated special envoy. Official Dialogue Feedback were given to the United Nations 2021 Food Systems Summit (https://summitdialogues.org/dialogue/4137/). Various food system experts and leaders from policy research institutions, universities, farmer organizations, agribusiness, agricultural financiers, civil society, policymakers, and oversight bodies representing 247 different institutions from 62 countries participated.

The dialogue focused on key constraints, key opportunities, much needed partnerships, required skills and capabilities and governance issues of higher education institutions to play a role in the transformation of Africa's agriculture and food system.

2.1. Key constraints identified that affect transformation toward a more sustainable system

A lack of coherent linkages among stakeholders, youth restlessness, and silos within and between higher education institutions affect multi-stakeholder engagement, while poor links with ministries and political red tape regarding the redirection of food waste affect political support. Capacity building is made difficult due to the limited time or opportunities for university staff to do research, student training that is not focused on interdisciplinary skills production, and limited funding for the high-tech facilities required for skills development causing a student skills gap. Poor identification of data gaps, uncoordinated resource mobilization and poor flow of information produce an information gap, while inadequate program funding, inadequate capital for coping with rising input costs, and unsustainable resource mobilization affect resource management.

2.2. Key opportunities for transformed, sustainable food systems

Adoption of a systems thinking approach to dealing with complex issues is necessary, while co-designing and co-creating research initiatives, and embracing diversity and inclusivity. Information and Communications Technology (ICT) and Big Data must be harnessed as critical enablers, which will ensure ongoing relevance of research with appropriate translation into practice, while maintaining a continuous pursuit of quality and excellence. Guiding principles should be tested frequently against evolving issues. Invest in diversification of agricultural production and consumption to curb the double burden of malnutrition. Research must be effectively translated into informed policies and practices, society relevant curriculums with emphasis on agricultural sciences, while embracing practical on-farm skills. Cross-disciplinary training focusing on the whole food supply chain, from production to consumption, so that agricultural

extension and marketing, processing and digital innovation can be brought together.

2.3. Partnerships are needed to unlock these food system transformations

Partnerships are needed in the areas of research and innovations, with a multidisciplinary and training focus, to increase agricultural productivity, mechanization and technology-driven value chains. Partnerships should seek opportunities for research and collaboration, including local, regional and international collaboration, investing in diversification of agricultural production and consumption, and emerging structure to break silo's between institutions but also within an institution. Opportunities for funding will benefit resource mobilization, while research opportunities and capacity building will be benefitted through transdisciplinary research teams, university sharing, global nutrition summits, opportunities for business, research and collaboration, the availability of skilled and unskilled labor, linking universities, agricultural colleges, and attempting new forms of cross-disciplinary training focused on food supply chains and production systems together. Partnerships should be mutually beneficial and have equal engagement, in order to aid in unlocking the food system transformation. South-South-North partnerships and public-private partnerships with the support of governments would also be beneficial. An approach to dealing with complex issues should be adopted, while partners co-design and co-create research initiatives.

Stakeholder engagement through universities connecting with communities to address food system challenges, and with farmers in rural areas to ensure relevant research would benefit such partnerships, as well as leveraging technology to enable connection, and linking universities, extensions and end users. Implementation of food gardens at home and within communities, as well as the use of university food tunnels to feed students of the university during Covid-19 and onwards are examples of how research and infrastructure can create opportunities within communities.

2.4. Skills and capabilities that universities need to provide to its researchers and students to navigate, trigger and steward complex food system transitions

Development of networking capabilities through collaboration skills, critical thinking, problem solving and communication skills, open-mindedness and adaptability to inform change is necessary for researchers and students alike. T-shaped skills which involve knowledge, skills and collaborative workmanship, is valuable within different stakeholder groups. Entrepreneurial skills, in particular, for youth, young women and mothers, as well as co-creating innovation or solutions to respond to community needs are a more examples of skills and capabilities that the university can provide to people and communities to aid in the transition toward sustainable food systems. It is essential to build skills on how to integrate teaching, research and service to community

with a focus on applied research rather than basic research, in view of the transition we want to achieve. Digital innovation and application of technology can also be used to tackle the complex problems, helping to scale-up agricultural productivity and accelerate food security.

2.5. Challenges of traditional university governance systems to respond to the transformation of the food system

Various challenges to traditional university governance systems to respond to the transformation of the food system exists. Universities are known to be slow to respond to challenges and do not provide community solutions. Most universities are public institutions; therefore, their policies are aligned toward the political agenda of the current government, and have no absolute academic freedom. A lack of academic freedom and silos of disciplines within universities affect inclusivity. Limited funding for the high-tech facilities required for skills development, minimum effort to move toward sustainability science, limited time or opportunities for university staff research, and student training that is not focused on interdisciplinary skills production form part of the capacity building challenges.

3. Discussion

The dialogue clearly highlighted the opportunity for higher education institutions in transforming African agriculture and food systems for improved health and livelihoods with shared prosperity, and providing sufficient, safe, nutritious, culturally appropriate and consumer-driven food for 21st century Africa, while empowering graduates and researchers to demonstrate research excellence.

As universities strengthen critical thinking, teaching, and produce multidisciplinary research on sustainable agricultural practices, students, government decision-makers, and farmers will be able to make informed decisions based on reliable scientific evidence (Ferrand and Nelles, 2021). Curriculum re-design is necessary taking into account the needs of the society, but also the needs of the students and future adults. Universities have a crucial role to play in sensitizing students to think about the food systems they want to support as part of their daily food choices. Therefore, students need contextual knowledge and specific skills, such as critical and creative thinking, skills to handle complexity and change (Migliorini et al., 2020).

A long-standing problem of accurate data collection in developing countries is often cited as a challenge in achieving development goals aimed at poverty and hunger reduction. The sharing of information and data on agriculture and nutrition is supported and encouraged by the Sustainable Development Goals (SDGs), but recent research indicates knowledge gaps between agriculture and food systems, and how to translate this data into insights and action. Higher education institutions needs to invest in information, communication and technology (ICT). Harnessing big data and ICT can unleash the potential of Africa's crops,

improve African herds and provide Africa with safe, sufficient, nutritious, consumer-driven food (Sharma et al., 2020). Also, recent challenges in the monitoring of the SDGs with evidence-based solutions increased the demand to harness big data and exposed the need for new and innovative datasets to support sustainable development. The use of machine learning and computer models can facilitate the collection of poverty statistics that previously would have taken too much time and money (Burke and Lobell, 2017).

Higher education institutions must be committed to drive the sustainable food system transformation agenda in partnership with all stakeholders, as well as reimagining the role of universities for transdisciplinary knowledge co-creation. Emphasis must be placed on transformational approaches and solutions for a broader societal interest, embracing collaboration and transdisciplinary practices, protecting biodiversity and indigenous knowledge systems, mobilizing resources, and harnessing partnerships for greater leverage. There is a need to reorient the institutional capacities to better align with the change in research focus toward sustainable practices.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://summitdialogues.org/dialogue/4137.

Author contributions

BP wrote the article. HS critically reviewed the article. Both authors contributed to manuscript revision, read, and approved the submitted version.

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Conflict of interest

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