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# Editorial: New challenges and future perspectives in nutrition and sustainable diets in Africa

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## Editorial on the Research Topic

### New challenges and future perspectives in nutrition and sustainable diets in Africa

Although African countries may produce or import enough food to provide adequate average energy per person per day, energy alone does not ensure nourished individuals. A lack of diversified diets year-round and high intakes of low cost, poor nutrition value staple foods contribute to prevailing malnutrition in all its forms. Africa is confronted with the triple burden of malnutrition; it is also faced with the triple challenges of poverty, inequality and unemployment. Food affordability and access are unevenly distributed and gaps are widening even further. Increased food and fuel prices, the COVID-19 pandemic, population growth and the state of the global economy, as well as climate change, are challenges that increase the risk of food insecurity, threatening attaining nutritious and sustainable diets (FAO et al., 2021).

In many African countries, large proportions of the population rely on agriculture not only for their food, but also for their livelihoods. Transforming agricultural and food system is thus a necessary solution for addressing the double-triple challenge. To accomplish this, there is an urgent need for a far greater focus on food systems and how to make these deliver the strategic goals of the African agriculture and food security agenda - namely economic opportunities, poverty alleviation and shared prosperity. The EAT-Lancet proposed a universal healthy diet to mitigate environmental changes (Willett et al., 2019). However, such a diet needs to be adapted to take African dietary challenges of an already malnourished population into account (Tuomisto, 2019). These diets are already plant-based with a lack of animal sourced foods to provide the necessary micronutrients. This will require targeted approaches to ensure that innovation includes the use of indigenous African knowledge systems, protecting biodiversity and embracing modern sciences as enabling factors for building a knowledge economy (FAO and Alliance of Bioversity International and CIAT, 2021). There is a close linkage between food security and societal stability; however, global food security is threatened by the vulnerability of our agriculture and food systems including animal and plant health and environmental stresses. These threats are aggravated by climate change, the globalization of agriculture, and an over-reliance on non-sustainable inputs.

Fifteen quality papers, nine research articles, two reviews, two perspective articles, one systematic review, and one policy and proactive review article are published in this Research Topic. Big data and smart-tech solutions are rapidly moving into agriculture and nutrition, offering high potential for unprecedented innovation. The potential to harness twenty-first century technologies is regarded as a fundamental tool for change. The capacity to analyse and draw meaningful insights from big data through the lens of agriculture and food systems is an area in need of attention. Food and agriculture policies have the potential to influence every stakeholder involved in the food system, thereby shaping the accessibility and affordability of nutritious diets (FAO et al., 2022). Articles include the application of science, innovation and policy in the advancement toward sustainable food systems and achieving the sustainable development goals (SDGs) by 2030 (Sachs et al., 2023).

Research that intends to have an impact on food security and nutrition in Africa, needs to have an overarching vision to enable and catalyze the transformation of Africa's agriculture and food systems. The focus of the discussion by Pretorius et al. was on approaches for higher education institutions in Africa to deliver sustainable solutions at scale and encourage collaborative actions to directly transform Africa's agriculture and food systems. 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. High-quality food composition data are indispensable in many nutrition-related activities for improved decision making. With a focus on Africa, Pretorius et al. deliberates on current challenges in nutrition, while discussing new advances in food composition activities. Opportunities (such as the Internet of Things (IoT), wearable devices, natural language processing (NLP) and other machine learning techniques) to improve existing resources must be more actively explored and supported. The use of machine learning algorithms was explored by Gebeye et al. to identify important predictors of Micronutrient (MN) deficiencies, leading to childhood morbidity and mortality, among children aged 6–23 months in Ethiopia. The Random Forest algorithm outperformed other Machine Learning algorithms in predicting child MN deficiency. Umwali et al. demonstrated that a minimum acceptable diet was a good stunting predictor, with the child's gender, consumption of animal sourced foods, child underweight status and income type being other stunting risk factors. In studying the diet quality of HIV exposed children aged between 6 and 18 months in Ghana, Folson et al. highlighted the need for nutrition programs to educate HIV exposed children's caregivers on optimal feeding practices and stresses the importance of continued breastfeeding as well as dietary diversity.

After studying food and nutrition security policies, strategies and programs in Ghana, Kenya and South Africa, Sibanda et al. identified several gaps that must be addressed to ensure adequate food and nutrition security. This finding was supported by Vermeulen et al. who found that the rising cost of basic healthy eating prevents 40% of households in South Africa and Kenya from being able to afford basic healthy eating when considering current income distribution data. Bwanaisa and Hendriks concluded that without a significant change in the incomes of the poor, access to a

nutritious diet is impossible in Malawi. A radical re-benchmarking exercise is necessary if the country intends to make progress on reducing undernutrition, while several policy interventions could support improved access to affordable and nutritious meals.

Even though the African continent contains more than 400 traditional crop species, Munialo et al.'s study found that only a few crops ( $n = 15$ ) were commonly researched, with maize being the most intensively researched crop. High crop diversity has been associated with improved dietary quality and quantity. Nkwonta et al. highlights the potential of neglected and underutilized species from Uganda and Nigeria to alleviate food and nutrition insecurity due to their abundance and high nutritional value. The nutrient composition of Bambara groundnut (BGN), an underutilized, indigenous crop grown and consumed in sub-Saharan Africa was studied by Veldsman et al. This study confirm that this traditional legume can together with other commonly consumed plant-based foods (e.g., maize) form a complete protein, contributing to increased protein intake and alleviating the burden of protein-energy malnutrition. Adeosun et al. reported that to achieve an increase in diverse foods and the integration of fruits and vegetables into informal ready-to-eat food vending in Nigeria requires a change in food norms and promoting sensitization to the importance of diverse diets through training initiatives. Despite limited consumer awareness Wangithi et al. found that consumers across income groups in Kenya are willing to pay more for vitamin A enriched (biofortified) orange-fleshed sweet potato (OFSP) products. Significant determinants of willingness to pay were found. Kapulu et al. reported that wealth status and income utilization are determinants of the dietary diversity of women from farming households in Zambia rather than agricultural diversification using soybean farming as an example.

Essilfie et al. concluded that in Ghana the fruit and vegetable industry remain one of the most promising agricultural sectors, mainly owing to the heightened knowledge of the health benefits linked to their consumption. However, food safety is of ultimate concern due to the association of foodborne hazards. The study, therefore, recommends establishing a traceability system as well as appropriate measures and standards for hygienic practices.

With an African focus, we trust that this Research Topic will assist in understanding new challenges and future perspectives on nutrition and sustainable diets.

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HS: Funding acquisition, Project administration, Writing – original draft. YG: Writing – review & editing. GE: Writing – review & editing.

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