

Commentary

Re-Imagining Resilient Food Systems in the Post-COVID-19 Era in Africa

Julian May ^{1,*}  and Melody Mentz-Coetzee ²

¹ DSI-NRF Centre of Excellence in Food Security, University of the Western Cape, Cape Town 7535, South Africa

² Centre for the Advancement of Scholarship, University of Pretoria, Pretoria 0002, South Africa; melody.mentz-coetzee@up.ac.za

* Correspondence: jmay@uwc.ac.za

Abstract: The COVID-19 pandemic heightened awareness that serious illness and injury are common and important shocks that result in food insecurity, the loss of livelihoods, and unsustainable coping strategies. These have significant negative impacts on welfare, especially for the poorest, driving up health care expenditure, reducing capabilities for productive and reproductive activities, and decreasing capacity to manage climate and other changes. These negative impacts are especially pertinent for countries in Africa where the high prevalence of communicable diseases such as HIV/AIDS and malaria have resulted in repeated health shocks. Unusually, the prevalence of these illnesses results in their impact being similar to those of covariate shocks, increasing the risk of poverty for entire communities and reducing options for coping strategies. Livelihood disruptions arising from the COVID-19 pandemic may have similar consequences for African food systems. The pandemic is likely to exacerbate existing dynamics of risk and introduce new and unanticipated changes to food systems. Although the initial focus of governments has been on public health interventions, preserving and growing resilient food systems is critical if livelihoods are to be protected. This paper discusses the implications of these evolving forms of risk and uncertainty for sustainable African food systems, reflecting on lessons from other systemic shocks.

Keywords: food systems; sustainable livelihoods; health shocks; resilience; poverty



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1. Introduction

The COVID-19 pandemic of 2020 and 2021 reversed two decades of improved food and nutrition security [1]. During the latter decades, food systems had experienced rapid and significant changes, including longer food supply chains, a globalised food system, and increased consumption of packaged and processed foods [2]. Although the result was greater caloric availability, these changes place food systems, producers, and consumers at risk during the pandemic. Identifying the pathways through which this takes place is important if future mitigation strategies are to extend beyond immediate public health concerns.

Although initially less noticeable than in other regions, structural transformations in food systems have been underway in Africa [3]. On aggregate, changes in African food systems have been welfare-enhancing, as shown by declining rural poverty rates. However, food insecurity, malnutrition, and poverty remain high and are often concentrated among those involved in the production and preparation of food [2]. In addition, current trends towards capital-intensive, industrialised, and highly concentrated commercial farming and the consolidation of farmlands have resulted in smallholder farmers becoming landless and thus resorting to poorly remunerated, insecure work on commercial farms or migrating to urban centres in search of economic opportunities [4]. The spread of supermarkets further impacts the livelihoods of farmers and traders in the informal economy, while changes in diets are associated with a heightened risk of diet-related non-communicable disease

(NCD) [5,6]. These vulnerabilities in African food systems lead to heightened risk from systemic shocks, such as a pandemic [7].

This commentary describes drivers affecting food systems change in Africa using harmonised time-series data compiled from national official statistics agencies by the Food and Agriculture Organisation (FAO), United Nations Department of Economic and Social Affairs (UNDESA), and the World Bank. In most cases, these data are derived from population censuses and national accounts. Demographic and Health Surveys (DHS) provide information concerning diet and the prevalence of NCD. The conceptual framework developed by the High-Level Panel of Experts guides the discussion [8].

The purpose of the paper is to review the implications of the pandemic for African food systems and identify opportunities to leverage the pandemic's disruption to promote the transformation of food systems that are resilient to future health and climate-change-related shocks.

2. Trends in African Food Systems

In addition to the risk of further exacerbating the vulnerabilities in African food systems, the negative impacts of the pandemic on these systems are of concern. They have the potential to disrupt or undermine positive trends in food systems that were emerging prior to the pandemic—including declines in undernutrition and improvements in nutrition outcomes.

In terms of nutrition outcomes, the current global trend is towards decreasing undernutrition (having a level of food intake that is insufficient to meet dietary energy requirements). Although still present in Africa, undernutrition declined in prevalence from 33% to around 23% between 1990–1992 and 2014–2016. Nonetheless, globally the total number of undernourished people continues to increase, with an estimated 220 million in 2014–2016 compared to 175.7 million in 1990–1992. Africa had the second largest share of the world's undernourished people (36% in 2019) after Southern Asia (including India) and the highest prevalence. The continent is similarly ranked in terms of moderate to severe food insecurity, with more than half of the population in this position, compared to Southern Asia, where the prevalence is 36% [9]. Projections anticipate a more positive trend in the future, with Africa's food-security situation expected to improve in the next 10 years, albeit at a slower rate than that of other regions [10]. According to models developed before the pandemic, the number of moderate to severe food-insecure people was expected to fall, as was the share of the region's population that is food insecure [11].

There have been optimistic trends in direct measures of dietary outcomes. The number of underweight children in Africa has declined over the last two decades from 29% in 1990–1992 to 21% in 2014–2016. Stunting (defined as being under the expected height for age) has been reduced from 41% in 1990 to 35% in 2012 [12–14]. However, the experience is mixed across Africa, with greater progress achieved in some countries. In Ethiopia, the prevalence of stunting fell from 57% in 2000 to 44% in 2011. In Ghana, stunting has fallen from 35% in 2003 to 28% in 2011. However, in South Africa, despite the massive investment in an unconditional child grant programme, levels of stunting in children under five years has not decreased significantly, remaining at around 24% [15].

Many of these positive changes can be ascribed to the consistent strong economic growth of countries on the continent. In its 2020 African Economic Outlook, the African Development Bank (AfDB) noted that, after a decade of growth, the economic fundamentals of most African countries were shifting towards investments and net exports and away from private consumption and public expenditure [16]. However, coupled with the first economic downturn in a decade and aggravated by the effects of climate change, the pandemic poses a risk to the positive transformation of African food systems and the livelihoods they support [17]. Although the risk of a global pandemic has long been acknowledged, most food-security projections did not take this into account and now need to be updated (for example, [18–20]).

The first COVID-19 case in Africa was reported in Egypt (14 February 2020), and by September 2021, cases rose to almost 7.8 million. South Africa has been the hardest hit and was the first country on the continent to enter its third wave of infections in mid-2021 [21]. Although the spread of the disease in Africa was slow during 2020, this may change unless vaccination programmes are fast-tracked across the continent [22]. In addition, new variants of the virus are spreading, and the vulnerable health systems of most African countries may quickly be overwhelmed by the effects of the pandemic and by the comorbidities of other communicable and non-communicable diseases [23]. Comparatively, the disease's mortality rate has been low so far in Africa, including in South Africa [24]. Nonetheless, disruptions to the continent's economies are significant, resulting from the mitigation strategies that have been imposed and the circumstances of the poor. Left with few options, poorly resourced households are often compelled to adopt coping strategies that are unsustainable in the long term. Examples include the sale of productive assets, such as cattle; exploitation of common property, such as the collection of wild food; and the cultivation of marginal land.

3. Food System Resilience

Although a focus on the interrelationship between food and global challenges such as hunger, poverty, and climate change is not novel, the pandemic has thrown into sharp relief the need to focus on food from a systems perspective and to simultaneously consider the system's sustainability and resilience.

The food system is described as “all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes” [8] (p. 23).

Most food system frameworks propose a set of external drivers that influence the environment within which production, processing, distribution, consumption, and waste occur. These drivers, in turn, result in a set of food system outcomes. Drivers may be systems in their own right, such as the hydrological or legal system.

Food systems impact three conditions (outcomes) essential for human survival. These are food and nutrition security (FNS); rural and urban livelihoods and rural development, more specifically; and environmental sustainability—goals that are presented as a triple challenge [25]. To be sustainable, a food system requires processes that are economically sustainable (productive, efficient, and profitable), socially sustainable (inclusive, with broad-based benefits), and environmentally sustainable (positive, or at least neutral, effects on natural systems) [26]. The balance between these will vary according to context.

Resilience is an important dimension of the sustainability of food systems [27]. Although there are numerous definitions of resilience, a common point of departure refers to systems' capacity to withstand or adapt to disturbances over time, including those that are unforeseen, so as to continue to provide FNS, livelihoods, and environmental sustainability [28]. Vulnerability to disturbances can be a cause of persistent poverty, economic crisis, and environmental degradation. COVID-19, and the interventions to contain the spread of the virus, are examples of such a disturbance.

Some events, like drought, simultaneously affect many households in a community or region. This ‘covariate’ or ‘community-wide’ risk refers to the extent to which an individual, community, sub-group, structure, or territory is likely to be damaged or disrupted by a shock. Other risky events, like most illnesses, are specific to individuals or households and can be thought of as ‘idiosyncratic risk’. However, in some cases, widespread and highly infectious diseases can also produce a covariate shock, increasing the risk of poverty for entire communities and reducing options for coping strategies. HIV-AIDS is a well-documented example and includes impacts such as reduced labour availability for agricultural activities, reduced exports and increased imports, changing household structure, and risks posed to child development [29–32]. Similar impacts are likely to result

from COVID-19, although how such shocks translate into change will depend upon the underpinning drivers of food systems transformation.

4. Drivers of Food Systems Transformation in Africa

Compared to other global regions, many African food systems remain characterised by small-scale operations, short local supply chains, and market transactions based upon spot exchange. Over 60% of the population of sub-Saharan Africa continue to depend on agriculture for their livelihood and agriculture, although only about 8% of the land area is under crop cultivation [7].

Although the lowest ranked in terms of average dietary energy supply adequacy, Africa's supply was 104% and has shown an increase of nearly 32% since 1985 [6]. However, diet quality is a further challenge, with the continent ranked lowest globally in terms of average protein supply from all sources—vegetable and animal. FNS outcomes show the impact of this. The prevalence of anaemia among women of reproductive age is highest in Africa at 38%, and the prevalence of under-five stunting is second highest at 30%—just below that of Southern Asia (33%) [6].

Four food systems drivers, discussed below, affect options for more resilient African food systems in the post-pandemic era.

4.1. Population Dynamics

The first driver is the interaction between population change and the food system, both in terms of population size and, more importantly, population location. The total population of Africa, estimated to be 1.216 billion in 2016, experienced an increase of almost 50% from 2000. This is the fastest rate of change of all regions. By 2050, Africa is expected to accommodate 2.1 billion people, a dramatic increase in its share of the global population from the current 13% to over 21%. Half of the increase in population will be in five countries: Nigeria, Ethiopia, Egypt, the Democratic Republic of Congo, and Tanzania [33].

The continent's rural population will continue to grow; yet, since Africa has the fastest urban growth rate globally, two-thirds of the expansion in population numbers will occur in urban areas. At 567 million people, the urban population in Africa already accounted for almost half of the region's population in 2015 and is expected to reach 1.34 billion by 2050—almost one-fifth of the world's urban population. Africa will then have the second largest number of urban dwellers after Asia [26]. This growth is not confined only to the capital cities of the countries in Africa—three of which are already mega-cities, with a further 11 set to achieve this status by 2050. One-quarter of the 100 fastest-growing cities in the world are in Africa. In 2011, 52 secondary cities on the continent had more than one million inhabitants; this number is expected to increase to 94 cities by 2030 [34]. Smaller towns and villages are also rapidly growing.

In Africa, urbanisation has not been accompanied by industrialisation, which has declined in relative importance over several decades in most African countries [35]. Urbanisation will increasingly place pressure on basic services and the sustainable use of resources, increasing reliance on food that is produced elsewhere and, increasingly, on imported staples. For example, the AfDB expects that energy demand will increase by 93% between 2015 and 2035. Water demand is expected to quadruple, growing faster than in any other region [36,37]. By 2025, it is projected that 13 countries in sub-Saharan Africa will experience water stress and another 10 countries will suffer from water scarcity. Water-related challenges will directly impact African food systems since the agricultural sector is the biggest user of water resources, making up 88% of the total annual water withdrawals [7].

These changing population dynamics and urbanisation patterns—and the accompanying stressors on other natural systems—have wide-ranging implications for food systems' sustainability and resilience. Food demand is likely to increase, and changes in what food is in demand can be expected. Furthermore, market linkages and changes

in land-use dynamics will also be influenced [38]. The extent to which these changes contribute to or undermine sustainability and resilience is neither predetermined nor fixed. With intentionality, changing population dynamics can contribute positively to resilience and sustainability.

4.2. Prosperity and The Middle Class

The rise in the average per capita incomes of many countries previously classified as low-income countries means that more countries have graduated into middle-income status. This income growth has coincided with improvements in the business environments [39] of many countries, improvements in physical infrastructure [40], reduction in political risk [41], and the introduction of new technologies—particularly mobile phone penetration [42]. Further, a decade-long commodity boom in the early 2000s has played a significant role in increasing the value of economic activity [43]. As a result, before the pandemic, several African countries were expected to be among the fastest-growing globally over the next decade [44].

This extended period of prosperity has positively impacted extreme poverty, albeit insufficiently for the achievement of Sustainable Development Goal 1—Eradicating Extreme Poverty in all regions. Between 1993 and 2011, the extreme poverty headcount rate of sub-Saharan Africa declined from 56% to 48% of the population, compared to 5% to 1% in North Africa [45]. There has also been a growing middle class in Africa. Estimates by the AfDB of the size of the middle class on the continent are 327–355 million in 2010, or 34% of the population, and projected to reach 1.1 billion by 2060. The AfDB further estimates that consumer spending by the middle class amounts to almost one-quarter of the continent's Gross Domestic Product (GDP) [46].

The relative prosperity of this group is important for food systems change, as it provides spending power to shift from subsistence to marketed foods, will lead to changes in consumption patterns, and has potential for increasing dietary diversity. Closer analysis of the emerging middle class's expenditure patterns reveals important aspects for food systems' transformation. Between 61% and 83% of the food consumed by the middle class food is purchased (not grown), and processed food accounts for 70–80% of their food expenditure. Perishable products account for 44–55% of their food expenditure. Furthermore, 70% of all urban households in Africa purchase from vendors in the informal economy, and a significant share of this expenditure is on prepared food [47]. Some of this food is minimally processed—such as boiled maize cobs or grilled offal—but, increasingly, this includes unhealthy 'ultra-processed foods' with high fat, sugar, and salt content [48,49].

Rural diets are also moving away from reliance on subsistence production and locally produced goods towards such processed foods. Consequently, cereal consumption is growing in almost all countries at an average rate of 2% per decade (between 1981 and 2007). Ghana's consumption rate is growing the fastest at 13% per decade [50].

This trend is a potential source of vulnerability for food systems in Africa. Africa is a net importer of food, spending up to \$35 billion annually on food. Expenditure on food is projected to increase to \$110 billion by 2025 [51]. As a percentage of total merchandise exports, the value of food imports was 17% in 2015/16—the highest in the world [9]. This high dependency on imports for staple foods means that disruptions to the food system outside of Africa, such as a global pandemic, can have a significant negative effect on food systems outcomes on the continent.

4.3. Food Environments

While globalisation and economic growth may have produced a more efficient food distribution system, diets have changed in ways that have adverse nutritional outcomes. Some of these changes have been linked to an obesogenic food environment in middle-income countries [52]. An obesogenic food system contains stimuli that encourage over-consumption and excessive intake of sugar, salt, and unhealthy fats [53].

Globally, there has been an increase in the number and share of people who are overweight and obese. In Africa, 30% of the adult population are categorised as overweight or obese, of which 6% are obese. Overweight is also rising among children below five years [54].

As a middle-income country that is well advanced in its nutrition transition, South Africa is illustrative of how changes in other African countries' diets might unfold. Whereas seven million South Africans still experience chronic or more severe hunger, 21 million people are overweight or obese. Over the past 50 years, fat intake among the bulk of the population has increased from 16 to 26% of total energy, while carbohydrate intake has decreased from 69 to 62% of total energy [55]. Concurrently, salt intake exceeds recommended levels [56]. The consumption of caloric aerated beverages is another contributor [57]. For example, aerated beverages are now the third most commonly consumed food/drink item among very young urban South African children (aged 12–24 months); less frequently consumed than maize meal and brewed tea, but more often than milk [58].

These trends are also emerging elsewhere, with indications of a triple burden of malnutrition (overnutrition, undernutrition, and micronutrient deficiencies) in an increasing number of countries, and especially in the North African region [59]. The African Prosperity Report links the rise of an African middle class to expanded opportunities in the fast-food industry. For example, KFC generated \$2 billion in sales from more than 1000 franchises across the continent in 2014 [60]. Adapting to local preferences, outlets also sell fish burgers, jollof rice (vegetable fried rice), and nshima (maize meal), in addition to the ubiquitous fried chicken. Kilimanjaro, a Nigerian-owned competitor currently with 24 outlets, sells pounded yam, edikaikong (a local soup), and a catfish combo meal [61]. The aerated beverage market is also growing, with the Coca-Cola Beverages Africa Company—based in South Africa—producing and distributing 40% of all Coca-Cola beverage volumes on the continent. This plant is the tenth largest Coca-Cola bottler worldwide [62].

A consequence of this expansion of the fast-food industry in Africa is the heightened risk of diet-related NCDs. In 2000, an estimated 14 million adults in Africa aged 20–79 had diabetes, representing a regional prevalence of 2–7%. This is projected to reach 19% in 2030—an increase of 162% [63]. Africa has the highest proportion of undiagnosed diabetes, with over two-thirds of those living with diabetes being unaware they have the disease [64]. There is significant variation between and within countries in Africa. For example, while the prevalence of diabetes in Ethiopia is only 2%, it is much higher in some age groups and some regions [65].

Similar trends are noted with other NCDs—for example, the prevalence of cardiovascular disease is increasing in Africa [66]. An almost twofold increase in the number of cardiovascular diseases related deaths was reported in the period 1990 to 2013 [67]. In Ghana, hypertension, stroke, and diabetes are now listed among the top 10 causes of death [68]. The COVID-19 pandemic has demonstrated how negative health outcomes linked to the food system—such as diabetes, overweight, and hypertension—leave populations at higher vulnerability to other health-related risks. These comorbidities have been linked to a higher likelihood of severe illness from COVID-19 [69].

4.4. Climate Change

Climatic conditions in Africa already present a high degree of variability, which will be aggravated by climate change. Long-term trends (1900–2005) indicate rising temperatures in Africa as well as drying (decreased precipitation). The consequences of climate change in large parts of Africa include more intense, prolonged, and frequent periods of drought and heatwaves, while other regions are experiencing tropicalisation. Other risks include flooding and increasing sea temperatures, which, in turn, lead to greater frequency and intensity of cyclones [7].

Drought is a devastating environmental phenomenon to crop and livestock production and is exacerbated by excessively high temperatures that often accompany drought in summer crop production systems. These rapid changes affect the length of seasonal stability

compared to the norm of the climatic condition for a specific season. This instability severely impacts crop and livestock production due to unfavourable growth conditions, a higher frequency of disease breakouts, and post-harvest crop loss [70].

5. Towards a Transformed Post-COVID Food System

COVID-19 came at a time when many African countries were positioning themselves to transform their agricultural sectors, with expectations for improved food security and the generation of much-needed investment in rural areas. Several high-level continent-wide agendas have set the stage for the needed transformation. The African Union's Agenda 2063 sets out the continent's aspirations to be recognised globally as a continent respectful of its environment, ecologically conscious, and with a well-established green economy and green energy [71]. Central to this are agricultural programmes supporting adaptation to climate change and building the resilience of farmers to climate-related and other shocks. The Comprehensive Africa Agriculture Development Programme (CAADP) and the resolutions in the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods [72] contain Africa's overarching policy and action approach to food systems transformation. The Malabo Declaration is a recommitment to the critical role of agriculture in African economies and upholds the earlier commitment (made in the Maputo Declaration of 2003 [73]) to allocate at least 10% of public expenditure to agriculture. It further committed signatories to mobilising necessary institutional and financial resources to effect desirable agri-food-system transformations.

In 2017, a special edition of Food Policy focused on 'debunking myths' of African agriculture through the use of data from Living Standards Measurement Studies (LSMS) and the Integrated Surveys on Agriculture (ISA). The findings include that (i) African farmers are using modern inputs, although not always efficiently; (ii) land markets are already performing a useful role, although factor markets in general do not function well; and (iii) market participation is widespread, although agricultural commercialisation remains limited [74]. In support of this, the African Agricultural Trade Monitor (AATM) report for 2019 shows that Africa's share of world agricultural GDP increased between 2005–2017, and 31 African countries have increased their market share in world agricultural trade [75].

Markets for the continent's agricultural products have seen a shift of trading partners towards China [76]. Although the initial focus of many governments will be on public health interventions, preserving and growing the economic potential of agriculture will be critical if livelihoods are to be protected and improved in the post-pandemic era. However, the capacity to do so remains constrained given the persistent underinvestment by governments in food systems research and development, despite their rhetoric to the contrary. For example, the Alliance for a Green Revolution in Africa (AGRA) acknowledged in 2018 that the governments of more than half the countries in Africa were not on track to meet the Malabo Declaration targets for investment in agriculture to which they have subscribed [77].

Although there are some positive trends (such as increased share of GDP from agriculture and increased global market share), they will have increased the continent's exposure to the pandemic impacts elsewhere. Worldwide, the pandemic has reduced purchasing power, the capacity to produce and distribute food, and led to the intensification of care tasks. The High-Level Panel of Experts (HLPE) concluded that the pandemic led to instability in local and global food markets, disrupting food supply and availability [78]. Measures adopted by governments throughout the world included restrictions on the movement of workers and informal sector traders, changes in consumption patterns of consumers, the closure of food production and consumption facilities such as marketplaces and restaurants, restricted food trade policies, and financial pressures throughout food supply chains [79]. Critically, these disruptions have translated into food price increases for many

items, including some staples, as well increases in the costs of agro-logistics—especially air freight [80].

In addition, although enlarging and extending social protection emerged as the most commonly adopted poverty mitigation strategy by governments, some social protection programmes have also been affected. According to the World Food Programme (WFP), more than 320 million children had their primary schools closed due to the pandemic, with most losing access to school meals. This has also happened in African countries in which school feeding schemes exist [81–83].

The pandemic has presented new challenges to food systems in all countries. Food security has been primarily affected by both covariate and idiosyncratic disruptions to physical and economic access to food [84]. The former has been prompted by lockdowns restricting mobility and the latter by the loss in employment and/or income. However, there is little evidence of extreme disruptions to food availability and limited evidence on changes in the utilisation dimensions of food security. Lockdown interventions have acted as disruptors to the stability aspect of FNS. Although this suggests that some aspects of the food system are resilient even to a shock as widespread as COVID-19, this often came at the expense of smaller actors in the food system, while benefitting larger actor consolidations. For example, lockdowns meant that informal food vendors could not trade, while supermarkets were given ‘essential service’ status and made large profits during these periods [85]. This example points to the importance of understanding how policy implementation leads to varied impacts for different actors and activities in the food system, rather than only looking at impacts in the aggregate.

The pandemic is already intensifying the drivers of system change and is likely to introduce new, unanticipated, and enduring changes to food systems within Africa—exacerbating those already underway due to climate change.

Fully mitigating the pandemic’s impact requires re-imagining food systems in Africa. This re-imagining is also necessary to ensure systems are resilient to the impact of future pandemics or other global shocks. Although there are similarities between global and African food systems, there are forces and drivers influencing food systems in Africa that require specific attention.

Increased financial investment is required but, alone, not sufficient to achieve a transformation of food systems that is sustainable in Africa. Targeted and tailored interventions that are contextually relevant and adequately localised are needed to address changes and challenges in African food systems that threaten their resilience and sustainability. Interventions need to consider the complexity of food systems, the interrelated nature of the forces driving changes in food systems, and the influence these have on food systems outcomes.

Key issues that require attention include identifying and implementing strategies to (i) improve health outcomes linked to food systems across all income categories in both urban and rural contexts, (ii) eliminate inequality across food systems to promote sustainable livelihoods, (iii) radically increase the uptake of practices across food systems that do not negatively impact the environment, (iv) and develop the capabilities of actors and stakeholders across food systems to achieve the aforementioned. Strategies and interventions must include those in the policy sphere but must extend beyond policy to practical interventions that support stakeholders across food systems.

Crop and livestock production systems that increase resilience are a necessary response. These include climate-smart practices that are common in southern and northern Africa [60]. In addition, agroecological approaches are increasingly recognised as relevant solutions for ensuring sustainable and resilient food production and food security [60]. A shift towards regenerative agriculture can lead to significant savings in machinery and energy use, reduction in carbon emissions, a rise in soil organic matter content and biotic activity, increased biodiversity above and below ground, increased diversity of crops produced and thus the diversity of food consumed, less erosion, and increased crop water availability and thus resilience to shocks [60].

The inclusion of African indigenous crops in African food systems allows for diversified diets, helping these crops to regain their utilisation (and thus value) as mainstream commodities. However, because some indigenous crops have been neglected, their acceptability and knowledge of food preparations from them are limited. Indigenous crops thus offer many opportunities for processing to make new edible food products with superior nutrient value and longer shelf life [60].

6. Conclusions

While African food systems have already been negatively impacted by the COVID-19 pandemic, the full impact continues to unfold, and its implications will only be understood in months and years to come. Understanding and evaluating the pandemic's ongoing impact on food systems is an area of research interest that should receive further attention. A focus on systems analytic approaches that consider the complexity and inter-relatedness of food systems drivers, components, and outcomes is needed. This systems lens should also be applied to further investigation into how the impacts of the pandemic (positive and negative) have varied for different role-players and stakeholders. This is of particular importance to achieve future food systems transformation that is equitable and just. There is also a need to integrate and widely share evidence from across contexts on strategies and innovations that promote sustainability and resilience.

Monitoring food systems change and understanding the similarities and differences within and between contexts is fundamental to developing and implementing appropriate policies, products, and services that can contribute to desired food systems outcomes. Without this, it is unlikely that food systems changes will evolve in a way that promotes sustainability and resilience. Instead, it is likely that, as is currently the case, the trend will lead to further declines in nutrition and health outcomes, increased inequality, a continued lack of inclusivity, and adverse environmental outcomes.

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