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FOOD SECURITY SITUATION IN SOME SELECTED AFRICA COUNTRIES: INDICES OF AFFORDABILITY, AVAILABILITY, QUALITY AND SAFETY FOR YEARS 2012 THROUGH 2016

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ABSTRACT

The paper examines the food security indices for some randomly sampled countries in Africa namely Morocco, Nigeria, Tanzania and Botswana between year 2012 and 2016, to assess Africa's efforts at reducing hunger and poverty by the year 2015. Time series data were obtained from the Economist Intelligence Unit. The food security indices for the countries sampled captured affordability, availability and quality and safety of food among the populace. Amongst other observations, poor infrastructure and low incomes that make affordability of, and access to, nutritious food difficult; political risk and stability were observed to frequently compound structural difficulties in these countries, and appear to be negatively impacting food security. Weakness in sufficiency of supply and reduced public expenditure on agriculture were observed to reduce food availability. Moreover, a limited access to financing for farmers who are the primary producers of food, less diverse diets and a weaker food safety environment were the general observations among the countries sampled. Generally, the food security situation in the selected countries left much to be desired. The paper therefore recommends a well-structured policy framework with increasing focus on the agricultural sector, to somewhat address the food affordability and availability concerns. The reinforcement of agricultural production, farming methods, structural infrastructure and the operating environment are key areas for focus. Moreover, proper regulations, market reforms, including effective import and export regulation systems, stable political environments are vital key strategies that will reduce the likelihood of food loss, improve supply and enhance affordability, and food quality and safety.

Keywords: Food Security Indices; Affordability; Availability; Quality and Safety; Africa

INTRODUCTION

The Food and Agriculture Organization, FAO, have conceptualized food security to exist when "all people at all times have access to safe nutritious food to maintain a healthy and active life" (FAO, 1996), but again (FAO, 2015) in her serial publication on global

food security called, The State of Food Insecurity in the World (SOFI), revealed that, some 795 million people in the world do not have enough food to lead a healthy active life. That's about one in nine people on earth. The vast majority of these hungry people are said to be living in developing countries, where 12.9% of the population is undernourished, and Sub-Saharan Africa is the region with the highest prevalence (percentage of population) of hunger, as one person in four there is undernourished. The Lancet in 2013 also added a shocking statistic that, poor nutrition is the chief cause of nearly half (45%) of deaths in children under five - 3.1 million children each year. This is despite the United Nations Millennium Declaration, signed in September 2000 committing world leaders to combat poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. Of course, the number one goal is to eradicate extreme poverty and hunger. Many African countries were enthusiastic signatories to the MDGs and have claimed to pursue them vigorously since then, though with varying degrees of success.

According to the 2016 Global Hunger Index (GHI), the developing world has made substantial progress in reducing hunger, falling by 29 percent since 2000, a period of 16 years. However, progress has been uneven and there are significant disparities at the regional, national, and subnational levels. The report highlights that Africa South of the Sahara and South Asia, despite achieving the largest absolute reductions (from 44.4 to 30.1 and 38.2 to 29 points respectively), still have the highest GHI scores and progress needs to accelerate in these regions in order to achieve Zero Hunger by 2030 (International Food Policy Research Institute, IFPRI, 2016). Furthermore, the report added that the smallest absolute reductions have been achieved in the Near East and North Africa (from 18.3 points to 11.7 points) (IFPRI, 2016). Researches have also shown that the vast majority of hungry and malnourished people in developing countries, under sub-standard life-living conditions are over half a billion of the global population, suffering from chronic food security (Dilrukshi, *et al.*, 2013).

Food security in its basic form is defined as the access by all people, to the food needed for a healthy life at all times (Ojo and Adebayo, 2012). Food security exists when "all people at all times have access to safe nutritious food to maintain a healthy and active life" (FAO, 1996). Food security essentially entails ensuring sustainable access, availability and affordability of adequate quantity and quality food to all citizens to meet up with their physiological requirements (Okuneye, 2014).

How Africa faired at the expiration year of the MDGs, 2015, ought to be examined in quantitative terms so as to better understand the dynamics of the inter-continental food security, a basis for monitoring future progress and assessing the impacts of various intervention programmes, projects and policies, in other to forge new and appropriate policy framework to addressing biting hunger issues. Reliable information on food security indices, which are the parameters of measurements of food affordability, availability, and quality and safety of food among the populace, is a pre-requisite for accurate and effective design, monitoring and development of policies and interventions.

This study hopes to examine the food indices in Africa’s recent years to see how it has feared with regards to her commitment to the MDG goal one, with the need to re-focus food and agricultural policies to developing its agricultural food baskets and address a wide range of issues in meeting the food market product and utilization demands.

MATERIALS AND METHODS

Study Area

Africa is the world's second-largest and second-most-populous continent. At about 30.3 million km² (11.7 million square miles) including adjacent islands, it covers 6% of Earth's total surface area and 20.4 % of its total land area (Sayre, 1999). With 1.2 billion people as of 2016, it accounts for about 16% of the world's human population (Kaneda and Bietsch, 2016). It contains 54 fully recognized sovereign states (countries), nine territories and two de facto independent states with limited or no recognition.

Africa's population is the youngest amongst all the continents (Harry, 2013); the median age in 2012 was 19.7, when the worldwide median age was 30.4 (Abdoulie, 2012). Algeria is Africa's largest country by area, and Nigeria by population. Africa hosts a large diversity of ethnicities, cultures and languages. In the late 19th century European countries colonized most of Africa. Although it has abundant natural resources, Africa remains the world's poorest and most underdeveloped continent, the result of a variety of causes that may include corrupt governments that have often committed serious human rights violations, failed central planning, high levels of illiteracy, lack of access to foreign capital, and frequent tribal and military conflict (ranging from guerrilla warfare to genocide) (Sandbrook, 1985). According to the United Nations' Human Development Report in 2003, the bottom 24 ranked nations (151st to 175th) were all African (United Nations, UN, 2017). Poverty, illiteracy, malnutrition and inadequate water supply and sanitation, as well as poor health, affect a large proportion of the people who reside in the African continent. In August 2008, the World Bank announced revised global poverty estimates based on a new international poverty line of $1.25 per day (versus the previous measure of $1.00). 80.5% of the Sub-Saharan Africa population was living on less than $2.50 (PPP) per day in 2005, compared with 85.7% for India.

Africa is divided into four sub regions namely North Africa, West Africa, East and South Africa. One country out of each of these regions was randomly sampled for consideration and they include Morocco, Nigeria, Tanzania and Botswana. The demographic characteristics of these countries are as presented in Table 1.

Table 1: Demographic characteristics of sampled countries for consideration as at 2015

Country	Population (Million)	Land Area (km^2)	GPD (Current US$)	GDP Share of Agric. (%)	Agric. Labour Employment (%)
Morocco	33.8	446,550	100.36	14	40-45
Nigeria	182.2	910,770	481.07	35	60-65
Tanzania	53.5	885,800	44.90	24.5	50-55
Botswana	2.26	566,730	15.81	2.7	75-80

Source: Online countries profile.

Indices Measurement and Analysis Methods

Table 2: Indicator definitions and construction of food security indices

1. Affordability	Indicator definitions and construction
1.1 Food	A measure of the percentage of household expenditure that is spent on food at a national

consumption as a share of household expenditure	level.
1.2 Proportion of population under global poverty line	A measure of the prevalence of poverty, calculated as the percentage of the population living on less than US$2/day in purchasing power parity.
1.3 Gross domestic product per capita (PPP)	A measure of individual income and, hence, affordability of food, calculated in US dollars at purchasing power parity.
1.4 Agricultural import tariffs	Measured as the average applied most-favoured nation (MFN) tariff on all agricultural imports.
1.5 Presence of food safety net programmes	A measure of public initiatives to protect the poor from food-related shocks. This indicator considers food safety net programmes, including in-kind food transfers, conditional cash transfers (i.e., food vouchers), and the existence of school feeding programmes by the government, NGOs or the multilateral sector. Measured on a 0-4 scale based on the prevalence and depth of food safety net programmes: 0=Minimal evidence of food safety net programmes or programmes run only by NGOs or multilaterals. Emergency food aid programmes funded by multilaterals are not considered; 1=Moderate presence of food safety net programmes, but mainly run by NGOs or multilaterals. Depth and/or prevalence is inadequate; 2=Moderate prevalence and depth of food safety net programmes run by the government, multilaterals, or NGOs; 3=National coverage, with very broad, but not deep coverage of food safety net programmes; 4=National government-run provision of food safety net programmes. Depth indicates the quantity of funds available to recipients. Breadth indicates the range of services available.
1.6 Access to financing for farmers	A measure of the availability of financing to farmers from the public sector. Measured on a 0-4 scale based on the depth and range of farmer financing: 0=No access to government or multilateral farmer financing programmes (typically, but not necessarily a developing economy); 1=Limited multilateral or government farmer financing programmes (typically, but not necessarily a developing economy); 2= Some multilateral or government financing (typically, but not necessarily an emerging-market economy; 3= Broad, not deep farmer financing (typically, but not necessarily a developed economy) OR well-developed multilateral farmer financing programmes (typically, but not necessarily an emerging market economy; 4=Access to deep farmer financing (typically, but not necessarily an advanced economy) Depth indicates the quantity of funds available. Range covers credit and insurance.
2. Availability	
2.1 Sufficiency of supply	A composite indicator that measures the availability of food. It is comprised of the following sub-indicators: • Average food supply in kcal/capita/day • Dependency on chronic food aid
2.1.1 Average food supply	An estimate of the per-capita amount of food available for human consumption in kilocalories/ capita/day.
2.1.2 Dependency on chronic food aid	Measures whether a country is a recipient of chronic food aid. For the purpose of this index, chronic aid recipients are defined as those countries that have received non-

	emergency food aid over a five-year time span. It is measured on a 0-2 scale: 0=Received chronic food aid on an increasing basis over the last five years; 1=Received chronic food aid on a decreasing basis over the last five years; 2=Receives little to no food aid or only on an emergency basis
2.2 Agricultural infrastructure	This is a composite indicator that measures the ability to store and transport crops to market. Sub-indicators include: • Existence of adequate crop storage facilities • Road infrastructure • Port infrastructure
2.2.1 Existence of adequate crop storage facilities	This binary indicator assesses the presence of sufficient crop storage facilities based on size of agricultural sector and population. It is measured on a 0-1 scale:
2.2.2 Road infrastructure	This qualitative indicator measures the quality of road infrastructure and is measured on a 0-4 scale, where 4=best.
2.2.3 Port infrastructure	This qualitative indicator measures the quality of port infrastructure and is measured on a 0-4 scale, where 4=best.
2.3 Volatility of agricultural production	This indicator measures the standard deviation of the growth of agricultural production over the most recent 20-year period for which data are available.
2.4 Political stability risk	A measure of general political instability. Political instability has the potential to disrupt access to food through such avenues as transport blocks or reduced food aid commitments.
2.5 Urban absorption capacity	This indicator measures the capacity of a country to absorb the stresses placed on it by urban growth and still ensure food security. It does so by evaluating a country's resources (real GDP) against the stress of urbanization (urban growth rate). It is calculated as the percentage of real change in GDP minus the urban growth rate.
2.6 Food loss	A measure of post-harvest and pre-consumer food loss as a ratio of the domestic supply (production, net imports and stock changes) of crops, livestock and fish commodities (in tonnes).
3. Quality and Safety	
3.1 Diet diversification	A measure of the share of non-starchy foods (all but cereals, roots and tubers) in total dietary energy consumption. A larger share of non-starchy foods signifies a greater diversity of food groups in the diet. This is a composite indicator that measures government commitment to increasing nutritional standards. It is comprised of the following binary sub-indicators: • National dietary guidelines • National nutrition plan or strategy • Nutrition monitoring and surveillance
3.2.1 National dietary guidelines	This is a binary indicator that measures whether the government has published guidelines for a balanced and nutritious diet: 0=No 1=Yes
3.2.2 Nutrition plan or strategy	This is a binary indicator that measures whether the government has published a national strategy to improve nutrition: 0=No 1=Yes
3.2.3 Nutrition monitoring and surveillance	This is a binary indicator that measures whether the government monitors the nutritional status of the general population. Examples of monitoring and surveillance include the collection of data on undernourishment, nutrition-related deficiencies, etc. 0=No

	1=Yes
3.3 Micronutrient availability	A composite indicator that measures the availability of micronutrients in the food supply. Sub-indicators include: • Dietary availability of vitamin A • Dietary availability of animal iron • Dietary availability of vegetal iron
3.3.1 Dietary availability of vitamin A	The dietary availability of vitamin A is calculated by converting the amount of food available for human consumption (as estimated by the FAO Food Balance Sheets) into the equivalent of vitamin A. This indicator is expressed in micrograms of retinol activity equivalent/capita/day on a 0-2 scale. 0= less than 300 mcg RAE/capita/day; 1= 300-600 mcg RAE/capita/day; 2= more than 600 mcg RAE/capita/day
3.3.2 Dietary availability of animal iron	The dietary availability of iron is calculated by converting the amount of food available for human consumption (as estimated by the FAO Food Balance Sheets) into the equivalent of iron. Animal iron is obtained from products such as meat, milk, fish, animal fats, eggs. This indicator is expressed in mg/capita/day.
3.3.3 Dietary availability of vegetal iron	The dietary availability of iron is calculated by converting the amount of food available for human consumption (as estimated by the FAO Food Balance Sheets) into the equivalent of iron. Vegetal iron is obtained from products such as cereals, pulses, roots and tubers, vegetable oils, fruits, vegetables, etc. This indicator is expressed in mg/capita/day.
3.4 Protein quality	This indicator measures the grams of quality protein using the methodology of the Protein Digestibility Corrected Amino Acid Score (PDCAAS). The PDCAAS methodology assesses the presence of nine essential amino acids in the average national diet. The inputs of this calculation include: the amino acid profile, protein digestibility value and the average grams consumed of each food item that contributes a minimum of 2% to protein consumption.
3.5 Food safety	This is a composite indicator that measures the enabling environment for food safety. Sub-indicators include: • Agency to ensure the safety and health of food • Percentage of population with access to potable water • Presence of formal grocery sector
3.5.1 Agency to ensure the safety and health of food	Binary indicator that measures the existence of a regulatory or administrative agency to ensure the health and safety of food: 0=No 1=Yes
3.5.2 Percentage of population with access to potable water	Access to potable water is the proportion of people using improved drinking water sources: household connection; public standpipe; borehole; protected dug well; protected spring; rainwater.
3.5.3 Presence of formal grocery sector	Qualitative indicator measuring the prevalence of a formal grocery sector measured on a 0-2 scale: 0=Minimal presence; 1=Moderate presence; 2=Widespread presence

Source: Economist Intelligence Unit (2014) pp 17-25; 58-61

RESULTS AND DISCUSSION

Affordability Indices

Affordability is measured across six indicators as presented in Table 3. The capacity to afford quality food without undue stress is a crucial aspect of food security. Affordability is seen principally from two perspectives—whether an average individual in a country has sufficient means to purchase food, and the public structures that have been established to respond to personal or societal shocks. This index attempts to capture the relative importance of food in household budgets. The lower the relative household expenditure on food, the easier it is for a household to respond to price increases and shocks. The Batswana population seems to be doing better than the others as only an average of 21.8% of the family budget is committed to expenditure on food. This is still a far cry from the western (developed) world average of 6-10%. The Nigerian experience is actually worse of, as an average 51.8% of family budget is expended on food. Morocco however has the least number of people living under the global poverty line at an average 15.5% of total population, and again Nigeria has an average 75.6% of its people living under the global poverty line. These translate to 5.24 million, 138.5 million, 40.7 million and 0.81 million people in Morocco, Nigeria, Tanzania and Botswana respectively living on less than US$2/day in purchasing power parity. Also, Index 1.6 presents in Table 3, a limited access to financing for farmers who are the primary producers of food. This index provides another perspective on food costs. It is a feature that will undoubtedly hamper food production and pricing, and invariably, food affordability by the populace. Only recently in Morocco (2015/16) does the 40% farmers' population in the country access finances for farmers on a 3 point scale of 4 levels. In both Nigeria and Tanzania however, a1/4 scale access subsists, depicting a limited multilateral or government farmer financing programmes and week farming enterprise.

Availability Indices

This category assesses factors that influence the supply of food and the ease of access within the country. It examines the structural aspects determining the capacity within the country to produce and distribute food, and explores elements that might create bottlenecks or risks to robust availability. Affordable food has minimal value if access is difficult, volatile or uncertain (Economist Intelligence Unit, 2014). As can be seen in the Table 4, the sufficiency of supply, which is a composite indicator that examines the average food supply and the dependency on chronic food aid to assess the core question of availability: Is there enough food?; averages only about 50%. The Sufficiency of supply and Average food supply for Tanzania were observed to be worse of among the sampled country, averaging about 23% and 24% respectively over the years. Moreover, the index for agricultural infrastructure, which examines crop storage facilities necessary to minimize food loss, facilitate the movement of goods and provide buffers in case of shocks to the food supply, were noted to be barely above 40% for both Nigeria and Tanzania, and particularly on the decline over the years in Nigeria since the year 2015. It has been noted in the Economist Intelligence Unit (2014), that the domestic food supply also is partially determined by the volatility of agricultural production. Highly volatile output can have detrimental effects on food security by making it difficult to manage food supply. Higher

volatility can potentially create unneeded surpluses or shortages that severely impact food availability. While volatility of agricultural production reflects potential problems at the beginning of the food supply chain, food loss examines the share of food that is lost post-harvest and before it gets to the consumer. Volatility was found to be higher for Nigeria, Tanzania and Morocco (in decreasing order) while that of Botswana was found to be low but gained a sharp increase in 2015/16. Also, a high share of food that is lost during processing, production, transport and storage often indicates meaningful structural problems within the supply chain. The share of food loss is being observed to be between 50-89% (See Table 4). Very poor road infrastructure, that would have aided a better food access, improving supply, pervades the sampled countries. On a scale of 0-4, only Botswana scored 3, Morocco 2, while Nigeria and Tanzania scored 1 each. Furthermore, high political stability risk can limit access to food through such avenues as transport blockages or reduced international food aid commitments. It can also create interruptions in the supply chain, as uncertainty or outright conflict diminishes the ability and willingness of individuals to supply food products (Economist Intelligence Unit 2014). Botswana had the highest risk for political instability followed by Nigeria and Tanzania; all well over 50% risk. Morocco had the least risk of political instability.

Quality and Safety of Food Indices

Food quality and safety is measured across five indicators as presented in Table 5. The section explores the nutritional quality of average diets and the food safety environment within the countries. The first, diet diversification, measures the share of non-starchy foods in total dietary energy consumption. Diets that consist of higher percentages of non-starchy foods, which include all but cereals, roots and tubers, tend to be more nutritious, given the prevalence of vegetables, dairy and meat products. The rating averagely ranged between 28-56%, with Nigeria coming least and Botswana rated highest. Unsurprisingly, there are tremendous differences in diets across regions and among countries (Akinyele, 2009; Kushwaha *et al.* 2007). Essentially, the Quality and Safety category separates the concept of food security from more traditional welfare metrics, such as poverty, which are often linked to considerations of access. From Table 5, the Quality and Safety overall rating saw Morocco coming first with an average of 55% rating, while Tanzania comes least averaging about 31%. Further indices considering the micronutrient composite indicators like vitamin A, animal iron and vegetal iron are also presented in Table 5. Protein quality is the final nutrition-focused indicator. It measures the grams of quality protein consumed, based on the presence of nine essential amino acids. As with diet diversification, the Economist Intelligence Unit (2014), have noted that there is a strong relationship between income level and protein quality. This index as presented in Table 5 noted that Tanzania has got the least protein quality intake, rated averagely at about 22%. Morocco that averaged about 45%, the highest, itself falls short grossly against the developed world's 80-90% rating of quality protein intake. And in addition, the percentage figures for population that have access to portable water are equally presented in Table 5. Notably, about 93% of the population in Botswana, 71% in Morocco, 35% in Nigeria and 14% in Tanzania are presented as having access to portable water.

Table 3: Food affordability indices for sampled countries

	MOROCCO					NIGERIA					TANZANIA					BOSTWANA				
Scored/100	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
1. AFFORDABILITY	47.5	47.5	47.7	50.5	52.2	21.4	20.8	24.5	24.5	24.2	28.7	28.1	28.1	28.1	27.8	50.4	50.1	53.3	53.4	53.3
1.1 Food consumption as a share of household expenditure (%)	41.5	41.5	41.5	41.5	41.5	51.8	51.8	51.8	51.8	51.8	38.5	38.5	38.5	38.5	38.5	21.8	21.8	21.8	21.8	21.8
1.2 Proportion of population under global poverty line (%)	15.5	15.5	15.5	15.5	15.5	76.5	76.5	76.5	76.5	76.5	76.1	76.1	76.1	76.1	76.1	35.7	35.7	35.7	35.7	35.7
1.3 Gross domestic product per capita (US$ PPP)	6,869	7,082	7,423	7,615	7,980	5,231	5,405	5,628	5,920	6,010	2,143	2,222	2,343	2,464	2,580	14,333	15,080	16,499	17,591	17,570
1.4 Agricultural import tariffs	42.0	41.2	40.7	40.7	27.4	15.5	15.5	15.5	15.6	15.6	19.7	19.7	20.0	20.0	20.3	9.1	9.2	8.5	8.6	8.5
1.5 Presence of food safety net	3	3	3	3	3	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2

programmes (0-4)																				
1.6 Access to financing for farmers (Scored on a scale 0-4)	2	2	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2

Source: Economist Intelligence Unit (2016).

Table 4: Food availability indices of sampled countries

	MOROCCO					NIGERIA					TANZANIA					BOSTWANA				
Scored/100	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
2. AVAILABILITY	58.1	57.8	57.7	57.9	58.3	49.3	48.4	48.3	45.4	49.4	42.0	42.2	42.5	45.2	46.5	61.0	59.6	58.4	66.7	64.6
2.1 Sufficiency of supply	80.7	82.1	82.1	84.6	84.1	64.3	63.6	63.6	50.9	48.7	14.1	17.8	17.8	32.2	31.7	48.5	45.4	45.4	49.5	47.7
2.1.1 Average food supply	73.7	75.6	75.6	79.0	78.3	51.3	50.4	50.4	51.2	48.3	19.3	24.3	24.3	25.7	25.0	29.8	25.5	25.5	31.1	28.6
2.1.2 Dependency on chronic food aid (Scored on a scale 0-2)	2	2	2	1	1	2	2	2	1	1	0	0	0	1	1	2	2	1	1	1
2.2 Agricultural infrastructure	70.4	70.4	70.4	70.4	70.4	41.7	41.7	41.7	32.4	32.4	41.7	41.7	41.7	41.7	41.7	71.3	71.3	71.3	71.3	71.3
2.2.1 Existence of adequate crop storage facilities (A binary score of scale 0-1)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.2.2 Road infrastructure	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	3	3	3	3	3

(Scored on a scale 0-4)																				
2.2.3 Port infrastructure	3	3	3	3	3	1	1	1	0	0	1	1	1	1	1	2	2	2	2	2
2.3 Volatility of agricultural production	57.7	57.7	58.0	45.7	44.8	90.3	90.3	91.7	89.5	88.0	78.8	78.8	78.8	72.2	72.0	7.5	7.5	7.0	53.7	53.0
2.4 Political stability risk (1-100)	33.3	33.3	33.3	33.3	33.3	65.0	65.0	65.0	65.0	55.0	50.0	50.0	50.0	50.0	44.4	66.7	66.7	66.7	66.7	66.7
2.5 Food loss (1-100)	68	68	68	85.1	85.1	49.7	49.7	49.7	70.0	70.6	65.0	65.0	65.0	71.2	76.0	80.7	80.7	80.7	89.2	89.2

Source: Economist Intelligence Unit (2016).

Table 5: Food quality and safety indices of sampled countries

	MOROCCO					NIGERIA					TANZANIA					BOSTWANA				
Scored/100	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
3. QUALITY AND SAFETY	54.7	54.2	56.2	56.4	56.4	47.7	48.0	49.6	49.8	49.9	30.0	31.1	27.9	33.6	33.6	50.3	48.6	49.8	50.1	50.1
3.1 Diet diversification	31.6	31.6	35.7	33.9	33.9	29.8	29.8	26.8	26.8	25.0	31.6	31.6	37.5	41.1	41.1	56.1	56.1	57.1	55.4	55.4
3.2 Nutritional standards (0-100 Rating)	65.4	65.4	65.4	65.4	65.4	100	100	100	100	100	30.8	30.8	30.8	65.4	65.4	34.6	34.6	34.6	34.6	34.6
3.2.1 National dietary guidelines (A binary score of scale 0-1)	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
3.2.2 National nutrition plan or strategy (A binary score of scale 0-1)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
3.2.3 Nutrition monitoring and surveillance (A binary	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1

score of scale 0-1)																				
3.3 Micronutrient availability	56.0	56.0	56.0	56.0	56.0	44.3	44.3	44.3	44.3	44.3	34.6	34.6	18.0	18.0	18.0	37.6	37.6	37.6	37.6	37.6
3.3.1 Dietary availability of vitamin A (Scored on a scale 0-2)	2	2	2	2	2	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1
3.3.2 Dietary availability of animal iron	15.3	15.3	15.3	15.3	15.3	7.1	7.1	7.1	7.1	7.1	5.9	5.9	5.9	5.9	5.9	23.5	23.5	23.5	23.5	23.5
3.3.3 Dietary availability of vegetal iron	52.6	52.6	52.6	52.6	52.6	75.7	75.7	75.7	75.7	75.7	48.0	48.0	48.0	48.0	48.0	39.3	39.3	39.3	39.3	39.3
3.4 Protein quality	43.9	41.8	46.1	48.5	48.5	38.1	38.7	38.8	39.3	40.5	17.3	21.9	21.5	22.9	22.9	43.5	36.5	40.4	43.5	43.5
3.5 Food safety	86.9	87.4	87.7	87.7	87.7	46.0	46.7	59.9	60.5	61.0	38.5	38.4	38.1	37.9	37.7	84.2	84.3	84.4	84.3	84.3
3.5.1 Agency to ensure the safety and health of food (A binary score of scale 0-1)	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1
3.5.2 Percentage of population with access to potable water	69.5	70.5	71.2	71.4	71.4	32.4	33.9	35.5	37.0	38.2	14.9	14.6	13.9	13.4	12.9	92.4	92.5	92.7	92.6	92.5
3.5.3 Presence of formal grocery sector (Scored on a scale 0-2)	2	2	2	2	2	0	0	1	1	1	0	0	0	0	0	1	1	1	2	2

Source: Economist Intelligence Unit (2016).

CONCLUSION

Food insecurity is a complex phenomenon that interacts with many other determinants of wellbeing. Its drivers are often inter-related, necessitating analysis from many viewpoints. The indices afore presented have shown that not much has been achieved to answer the food security concerns of Africa. Developing countries often struggle with basic infrastructure and low incomes that make affordability of, and access to, nutritious food difficult. Political risk and stability frequently compound structural difficulties in these countries and appear to be negatively impacting food security in many regions in Africa. Weakness in sufficiency of supply and reduced public expenditure on agricultural were most important in reducing food availability. Furthermore, less diverse diets and a weaker food safety environment were observed. A well-structured policy framework with increasing focus on the agricultural sector, to somewhat bolster food affordability and availability is required to address these concerned observations. Market reforms with more efficient marketing and renewed reinforcement of agricultural production, farming methods, structural infrastructure and the operating environment are key sectors for focus, expectedly to support rural incomes and productivity gains. Moreover, proper regulations, including effective import and export regulation systems, stable political environments are vital key strategies that will reduce the likelihood of food loss, improve supply and enhance affordability, and food utilization.

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