# Economics of Food Security in Sub-Saharan Africa: Implication for Sustainable Development

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***Abstract***
*Food insecurity has been increasing recently in sub-Saharan Africa (SSA) and is a source of growing concern to African governments especially those emerging from political crisis and natural disaster – drought, desertification, famine, flood etc. Chronic food insecurity in sub-Saharan Africa stems from decades of poor governance, obsolete farming techniques and rapid growing population. SSA has continued to struggle with high malnourishment among children, women and vulnerable groups. This paper examines the economics of food poverty and food security in SSA and its implication for sustainable development. The concept of food security is examined in details with the aid of graphs and charts in buttressing pertinent argument. The main findings of the paper show that a greater population of SSA will be food insecure if quick measures are not put in place to salvage the situation. The paper recommended among other things that ensuring political stability among SSA countries and diversifying the existing agriculture production mix is key in sustaining economic development and food productivity.*

***Key words:*** *Sub-Saharan African, food poverty, food security, population growth, undernourishment*
***JEL Classification:*** Q18, O55, O13, I38.

**Introduction**

Over the past three decades, there has been growing concerns over hunger and food insecurity in Sub- Saharan Africa (SSA) (Demeke, Marcantonio and Morales-Opazo 2013). Nearly 240 million people in sub-Saharan Africa, or one person in every four (1:4), are in lack of adequate food for a healthy and active life, and incidence of rising food prices and extended drought are pushing more people in the region into poverty and hunger (UN, 2010). Incidences of severe malnutrition, chronic undernourishment and high infant mortality are widespread among conflict countries - often endowed with abundant mineral resources - while the situation in other countries have in general improved, although unevenly and at a very slow rate (FAO, 2002; Lobell *et al*. 2008). For instance, about 33% and 31% of people in sub-Saharan Africa were undernourished during 1990-92 and 2001-2003 respectively (FAO, 2007b) with 32% of children under five years of age characterized as underweight (FAO, 2002).

Food poverty is the inability to afford, or to have access to, food to make up a healthy diet. It is about the quality of food as well as quantity. It is not just about hunger, but also about being appropriately nourished to attain and maintain health (Christina *et al*. 2013). The battle to end poverty must be fought also in rural areas, where people depend directly or indirectly on farming, fisheries or forestry for incomes as well as food. Hunger is no longer an issue of insufficient global supplies, but mainly of lack of access to the means to produce or purchase food. Food and nutrition security is of particular importance in the case of SSA where human capital gain will engender and sustainably consolidate economic growth and, consequently, development.

Three conditions must thus be satisfied to ensure food security: food must be available through domestic production and imports; food must be accessible or people must have adequate resources to acquire the appropriate foods; and food must be utilized in conjunction with adequate water, sanitation and health to meet nutritional needs (Ehui *et al*. 2002). Often, food security is discussed with reference to grains only. However, this can be misleading especially for countries that are primarily dependent on livestock as sources of food other than grains. In fact, livestock have a very important role in achieving food security in SSA (Ehui *et al*. 1998; Ehui 1999).

This paper looks at the factors affecting the core components of sub-Saharan Africa's food security (availability, access and use) and on the factors that aggravate the challenges, including instability in food systems and in the environment in which these systems function. Challenges and opportunities for meeting the food security of the poor vulnerable groups in SSA will be

examined too. The paper will seek to showcase the relationship between food security and food poverty in SSA. The use of charts, graphs and tables are employed in the paper to further buttress arguments. The paper is divided into five sections. Section 1 provides a brief background on the food poverty and food security in SSA. Section 2 highlights food poverty while 3 discusses food security and its dimensions. Section 4 examines the economics of food security, implication for sustainable development and trends in food prices in SSA while policy recommendations and conclusions are discussed in section 5.

## Food Poverty in SSA – The Menace

### *Food Poverty*

Food poverty has been defined and operationalised for measurement in several ways. Dowler (2003) defined food poverty as the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so. According to Rose and Charlton (2001), a household is defined to be in food poverty when monthly food spending is less than the cost of a nutritionally adequate very low-cost diet. The measures include absolute quantitative measures, such as poverty lines based on calories (Dowler, 1998) relative quantitative measures, such as percentage of money spent on food Oxfam (2011); and qualitative measures, such as the definition raised at a Food Partnership workshop:

> *"when food ceases to be a pleasure and social tool for a family, and becomes a source of stress and ill-health" (2012b). The most inclusive definition has been supplied by Dowler and O'Connor, which incorporates qualitative and quantitative measures. They define food poverty as "the inability to acquire or eat an adequate quality of sufficient quantity of food in socially acceptable ways (or the uncertainty of being able to do so)" (2011).*

Many of those that suffer from food poverty belong to the most vulnerable communities: members of black and ethnic minority communities, people with disabilities, older people, households with dependent children (especially single parents) and low income and unemployed people (Dowler and O'Connor 2012; Holmes 2007). In addition to these, there is a new group at risk – the working poor who are insecurely employed and low-waged (Dowler and O'Connor 2012).

Sociologist have used many different approaches to analyse food poverty, including social geography of food deserts (Caraher, Lang and Carr-Hill 1998) social class analysis (Molcho *et al* 2006), applied social

policy research (Lambie-Mumford 2013), phenomenology (Dibsdall *et al* 2002) and social psychology (Carter *et al* 2011). The findings of these studies vary widely depending on whether a quantitative or qualitative approach was taken.

In quantitative data, the experience of food poverty is framed in terms of **barriers** to food security, of employing **coping strategies** and of **ill-health**. Barriers to food security include food deserts, an area devoid of outlets with fresh foods (Caraher and Lang 1998; Dowler and O'Connor 2012), lacking knowledge about nutrition and budgeting or cooking skills (Caraher, Lang and Carr-Hill 1998), storing food and transport (Caraher, Lang and Carr-Hill 1998; Dowler 1998) as public transport may be unreliable, expensive or absent altogether.

Coping strategies include parental buffering (Dowler 1998; Holmes 2007), skipping meals (Holmes 2007) and buying lower quality food at cheaper outlets (Caraher, Lang and Carr-Hill 1998; Holmes 2007). People in food poverty have worse nutritional outcomes (Holmes 2007), resulting in higher risk of somatic and mental symptoms (Molcho *et al* 2006). This has a knock-on effect in other areas, such as drops in educational attainment (Speight, Holmes and Wells 2007).

### *Food Poverty in SSA*

For almost half a century, Sub-Saharan Africa (SSA) has been struggling, in one form or another, with food poverty. The UN Food and Agriculture Organization estimates that 239 million people in sub-Saharan Africa were hungry/undernourished in 2010 (its most recent estimate). 925 million people were hungry worldwide. Africa was the continent with the second largest number of hungry people, as Asia and the Pacific had 578 million, principally due to the much larger population of Asia when compared to sub-Saharan Africa. Sub-Saharan Africa actually had the largest proportion of its population undernourished; an estimated 30 percent in 2010, compared to 16 percent in Asia and the Pacific (FAO, 2010). Thus almost one in three people who live in sub-Saharan Africa were hungry, far higher than any other region of the world, with the exception of South Asia. In 2008, 47 percent of the population of sub-Saharan Africa lived on $1.25 a day or less (United Nations, 2012). Rose and Charlton (2001) found that food poverty rates were highest among households headed by Africans, followed by coloureds, Indians and whites. Also, higher food poverty rates were found with decreasing income, increasing household size, and among households in rural areas or those headed by females.

This ongoing condition has been caused by a number of factors including distribution obstacles, global climate change, a lack of successful local agriculture, and an inability or disinterest to act by local officials

(Rademacher, 2012). The situation has been further complicated by an inefficient and disorganized international response to the crisis. Although most would agree that each of these factors carries at least some validity, there is far less international consensus on the best remedy to the crisis. Does the answer to African food poverty/insecurity lie within scientific and supply-based solutions? This would require a reliance on global market forces and genetically modified (GM) crops to feed the hungry. Or will success be more attainable through a combination of methods such as weather prediction, climate change solutions, and foreign monetary aid? By examining the successes and failures in food aid policy, can the global community create a plan that will truly end hunger in SSA in years to come?

Ever since food aid to Africa began in the late 1950s, the crisis has been characterized as a supply issue. A lack of successful and widespread agriculture in SSA led to the failure of local governments to provide enough food for their populations. In reaction, Western governments and aid organizations have sought to provide foreign food aid to SSA, in the form of imported crops from wealthy and developed countries worldwide. Commonly held conceptions of the crisis as a "shortage" dictated these reactions. In more recent years, these tactics have been repeatedly implemented, and have expanded to include support for new and improved technologies to advance agriculture and food supply systems within Africa. These methods include the exportation of better farming equipment, the use of more pesticides and herbicides, and the widespread use of GM seeds used to grow crops in large quantities.

Supply-based solutions to food poverty/insecurity such as these may have been acceptable in the early years of the aid movement, yet presently there is a global push for more comprehensive solutions to deal with the modern pressures compounding the situation. No longer can the plight of Africa be based simply on the idea of a "shortage." The problem is not a lack of food but an inability on the part of both local and international actors to distribute food where it is most needed in a timely and cost effective manner. Furthermore, recent stresses like climate change and economic crises are adding more pressure to an already complicated situation (Rademacher, 2012). The global community needs to think outside the supply-based box and find a solution that will combine innovative modern methods to solve the many problems that contribute to food poverty/insecurity. To achieve this goal we need to answer the following three questions: Which solutions have been successful in the past? Which ones have failed? And what combination could be the most successful in the future? The concept of food poverty is hinged on five cardinal outlooks as summarized in table 1 below:

| | |
|---|---|
| **Availability** | • **Is there sufficient food?**<br>• **Can we depend on supplies?**<br>• **Where does our food come from?** |
| **Access** | • Can everyone in our population obtain food?<br>• Do they have skills and facilities to make best use of available food? |
| **Affordability** | • Can low-income individuals and families afford to buy healthy food? |
| **Nutrition and quality** | • Do people consume the right type of food, in the right quantities, for their physical needs? |
| **Sustainability** | • Can we rely on continued access to food?<br>• Will everyone always be able to afford food? |

Source: Adopted from Christina *et al*. 2013.

## Food Security in SSA- Conceptual Outlook

Almost two third of the population of SSA are undernourished and remain vulnerable to food crises and hunger which are easily exacerbated by the slightest invasion of pest, drought and/or conflicts (FAO, 2012). The world Food Summit held in Rome 1996 provides a standing platform for conceptualizing food security. A generally accepted definition of food security is that put forward by (FAO, 2001):

> Food security is attained when all people, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

Two major concepts come to play in understanding food security. First, is per caput food supplies which shows the trend of *world distribution of food supplies* and what part of the global population lives in countries or regions with given levels of per caput food supplies for consumption. While the second concept is concerned with the distribution of the food supplies within each country.

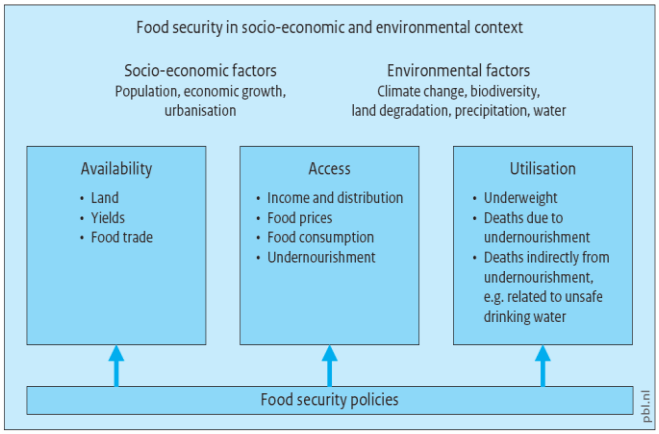
UNEP 2002 suggests three dimensions of food security:

- availability of sufficient quantities of food of appropriate quality, supplied through domestic production and imports ;
- access by households and individuals to appropriate foods for a nutritious diet ; and
- optimal uptake of nourishment, thanks to a sustaining diet, clean water and adequate sanitation, together with healthcare.

The above dimensions are necessary for the study as it places emphasis on three key indicators of food security – access, availability and utilization. Figure 1 shows a simple conceptualization of

these indicators and would be discussed in details in the succeeding subsections.

Fig 1: Conceptual model to analyse food security



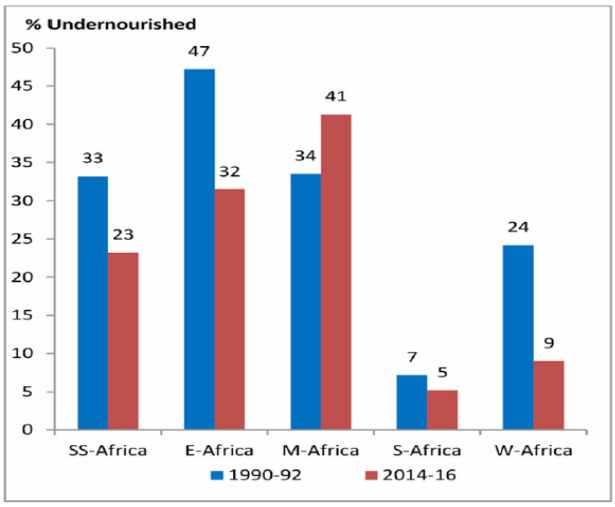

Source: Hilderink, H *et. al*, 2012.

### *Access to Food*

Access to food is ensured when all households and all individuals within those households have sufficient resources for acquiring the appropriate foods that make up a nutritious diet. The achievement of food access depends on the level of household resources (capital, labour and knowledge), food prices and the presence of social safety net. And most important is the ability of households to generate sufficient income which, together with own production, can be used for meeting their nutritional needs (Hilderink, H. *et. al*, 2012). It is logical to think that greater access to food will down-play and reduce undernourishment/food insecurity in SSA. Figure 2 shows the trend/prevalence of undernourishment in SSA (1990-92 and 2014-16).

Western Africa has achieved the milestone of halving the proportion of its people suffering from hunger, which is not too far from greater access to food. Other regions are yet to achieve this target. Since 1990-92, approximately 42 million people were added to the total number of undernourished people in SSA, with an estimated 217.8 million in 2014-16 compared to 176 million in 1990-92 (FAO, 2015). This seems to undermine efforts being made to tackle hunger. With the increase in SSA population from 175.5 million between (1990-92) and 217.8 million between (2014-16), there

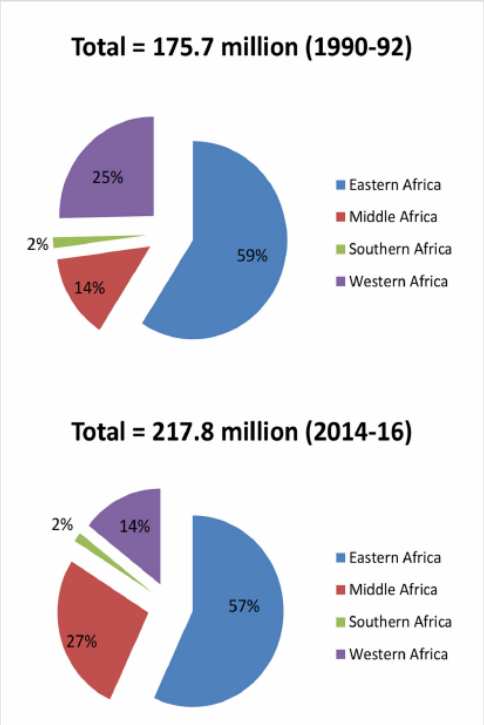
Fig 2. Trend/prevalence of undernourishment in SSA




Source: FAO 2015

hasn't been an absolute reduction in share of undernourished person.

Fig 3. Share of undernourished people by sub-region (1990-1992 and 2014-16)




Source: FAO, 2015

Table 2. Number of undernourished (millions), 1990-92 and 2014-16

| Sub-region | Number of undernourished (millions) | | Change so far (%) |
|---|---|---|---|
| | 1990-92 | 2014-16 | |
| | | | |
| Eastern Africa | 103.9 | 124.2 | 19.6 |
| Middle Africa | 24.2 | 58.9 | 143.7 |
| Southern Africa | 3.1 | 3.2 | 2.3 |
| Western Africa | 44.6 | 31.5 | -29.4 |
| **SS-Africa** | **175.7** | **217.8** | **23.9** |

Source: FAO, 2015.

The number of undernourished persons in the sub-region has increased by 42.1 million alongside the increase in population except for western Africa where percentage changes were negative. More worrisome is the large number of persons undernourished in Eastern Africa where access to food is relatively low.

Table. 3 below shows food accessibility indicators across countries of SSA with emphasis on food consumption.

**Table 3: ACCESS TO FOOD IN SSA**

| POVERTY HEADCOUNT RATIO | | | | | | | |
|---|---|---|---|---|---|---|---|
| **AT PPP=$1.25 A DAY** | **AT NATIONAL POVERTY LINE** | **POVERTY GAP AT PPP=$1.25 A DAY** | **INCOME INEQUALITY** | **FOOD CONSUMPTION EXPENDITURE** | **ROAD NETWORK DENSITY** | **PAVED ROAD LENGTH** | **FOOD PRICE INDEX** |
| % of population | % | Gini index | % of total household expenditure | metres per capita | % of total roads | 100 = 2005 | |

| Countries | 2000–2009 | 2000–2009 | 2000–2009 | 2000–2010 | 2000–2010 | 1999–2008 | 2000–2008 | 2010 |
|---|---|---|---|---|---|---|---|---|
| Angola | 54.3 | .. | 29.9 | 58.6 | .. | 3.7 | 10.4 | 219.7 |
| Benin | 47.3 | 39.0 | 15.7 | 38.6 | .. | 2.6 | 9.5 | 127.9 |
| Botswana | .. | 30.6 | .. | .. | 35.4 | 13.8 | 32.6 | 178.3 |
| Burkina Faso | 56.5 | 46.4 | 20.3 | 39.6 | 48.8 | 6.7 | 4.2 | 134.2 |
| Burundi | 81.3 | 66.9 | 36.4 | 33.3 | .. | 1.8 | 10.4 | 170.1 |
| Cameroon | 9.6 | 39.9 | 1.2 | 38.9 | .. | 3.0 | 8.4 | 126.4 |
| Cape Verde | 21.0 | 26.6 | 6.1 | 50.5 | 41.0 | 3.1 | 69.0 | 127.1 |
| Central African | 62.8 | 62.0 | 31.3 | 56.3 | .. | 6.6 | .. | 127.4 |
| Chad | 61.9 | 55.0 | 25.6 | 39.8 | 68.0 | 4.0 | 0.8 | .. |
| Comoros | 46.1 | 44.8 | 20.8 | 64.3 | .. | 1.6 | 76.5 | 109.2 |
| Congo, Democratic | 59.2 | 71.3 | 25.3 | 44.4 | 70.0 | 2.8 | 1.8 | 309.4 |
| Congo, Republic of | 54.1 | 50.1 | 22.8 | 47.3 | .. | 4.7 | 7.1 | 98.3 |
| Côte d'Ivoire | 23.8 | 42.7 | 7.5 | 41.5 | .. | 4.4 | 7.9 | 131.0 |
| Equatorial Guinea | .. | .. | .. | .. | .. | 5.5 | .. | .. |
| Eritrea | .. | .. | .. | .. | .. | 1.1 | 21.8 | .. |
| Ethiopia | 39.0 | 38.9 | 9.6 | 29.8 | 50.8 | 0.6 | 13.7 | 234.6 |
| Gabon | 4.8 | 32.7 | 0.9 | 41.5 | .. | 6.8 | 10.2 | .. |
| Gambia | 34.3 | 58.0 | 12.1 | 47.3 | .. | 2.6 | 19.3 | 130.8 |
| Ghana | 30.0 | 28.5 | 10.5 | 42.8 | 51.0 | 2.7 | 14.9 | 166.0 |
| Guinea | 43.3 | 53.0 | 15.0 | 39.4 | .. | 5.1 | 9.8 | 300.2 |
| Guinea-Bissau | 48.8 | 64.7 | 16.5 | 35.5 | .. | 2.7 | 27.9 | .. |
| Kenya | 19.7 | 45.9 | 6.1 | 47.7 | 45.8 | 1.8 | 14.1 | 168.7 |
| Lesotho | 43.4 | 56.6 | 20.8 | 52.5 | 44.3 | 3.0 | 18.3 | 161.6 |
| Liberia | 83.7 | 63.8 | 40.8 | 38.2 | .. | 3.7 | 6.2 | .. |
| Madagascar | 67.8 | 68.7 | 26.5 | 47.2 | .. | 3.2 | 11.6 | 152.1 |
| Malawi | 73.9 | 52.4 | 32.3 | 39.0 | 65.5 | 1.3 | 45.0 | 148.2 |
| Mali | 51.4 | 47.4 | 18.8 | 39.0 | 66.5 | 1.4 | 19.0 | 124.1 |
| Mauritania | 21.2 | 46.3 | 5.7 | 39.0 | .. | 3.4 | 26.8 | .. |
| Mauritius | .. | .. | .. | .. | 37.8 | 1.6 | 98.0 | 160.1 |
| Mozambique | 59.6 | 54.7 | 25.1 | 45.7 | 54.5 | 1.4 | 20.8 | 182.6 |
| Namibia | .. | 38.0 | .. | .. | 24.3 | 35.1 | 12.8 | 159.9 |
| Niger | 43.1 | 59.5 | 11.9 | 34.0 | 29.7 | 1.3 | 20.7 | 129.8 |
| Nigeria | 64.4 | 54.7 | 29.6 | 42.9 | .. | 1.4 | 15.0 | 164.5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rwanda | 76.8 | 58.5 | 40.9 | 53.1 | 71.7 | 1.6 | 19.0 | 162.9 |
| São Tomé and Príncipe | 29.7 | 53.8 | 8.5 | 50.8 | .. | 2.3 | 68.1 | 303.2 |
| Senegal | 33.5 | 50.8 | 10.8 | 39.2 | 54.2 | 1.3 | 29.3 | 121.0 |
| Seychelles | 0.3 | .. | 0.1 | 65.8 | 32.7 | 5.9 | 96.5 | 207.7 |
| Sierra Leone | 53.4 | 66.4 | 20.3 | 42.5 | 49.3 | 2.5 | 8.0 | 193.1 |
| South Africa | 17.4 | 23.0 | 3.3 | 67.4 | 17.8 | 8.1 | 17.3 | 148.8 |
| South Sudan | .. | .. | .. | .. | .. | .. | .. | .. |
| Swaziland | 62.9 | 69.2 | 29.4 | 50.7 | .. | 3.3 | 30.0 | 166.7 |
| Tanzania | 67.9 | 33.4 | 28.1 | 37.6 | 62.7 | 2.1 | 7.4 | 163.2 |
| Togo | 38.7 | 61.7 | 11.4 | 34.4 | 63.7 | 2.1 | 21.0 | 133.6 |
| Uganda | 37.7 | 24.5 | 12.1 | 44.3 | 45.0 | 2.7 | 23.0 | 165.4 |
| Zambia | .. | 59.3 | .. | 50.7 | 64.0 | 6.5 | 22.0 | 151.0 |
| Zimbabwe | .. | 72.0 | .. | .. | .. | 7.7 | 19.0 | .. |
| **sub-saharan** | **47.5**[b] | **..** | **20.6**[b] | **..** | **49.8**[c] | **2.8** | **23.8**[c] | **166.5**[c] |

Source: UNDP 2012

***Food Availability***

The quantity, quality and diversity of food is what is captured by this indicator (FAO, 2015). It addresses the supply side of the food security. According to UNDP (2012), two factors majorly affect the availability of food in SSA – misalignment of food production where they are most needed and secondly increases in food production driven by land expansion rather than by increases in land and labour productivity are unlikely to generate the inclusive social and economic progress essential for food security and human development. Explosive population growth evident in SSA, which is responsible for a population increase of around 70% over the period 1990-2012, has led to a modest increase in the average per capita value of food production, estimated at 13% over the same period (UNESCO, 2015).

Agro-ecological conditions determine the patterns of food production. Cereals, together with roots and tubers, are the main food staples in sub-Saharan Africa (UNESCO, 2015). The quantity and quality of food produced in SSA is greatly influenced and determined by the availability of land size, water and climate, while the quality depends on the level of technology employed in the farming process as seen in table 4 below.

Table 4. Harvested area for main crop groups in sub-Saharan Africa, 2008–2010 average

| CROP | SUB-SAHARAN AFRICA | EAST AFRICA | WEST AFRICA | CENTRAL AFRICA | SOUTHERN AFRICA |
|---|---|---|---|---|---|
| *Area harvested (millions of hectares)* | | | | | |
| Cereals | 83 | 29 | 43 | 8 | 4 |
| Oilcrops, primary | 25 | 7 | 14 | 3 | 1 |
| Roots and tubers | 23 | 7 | 12 | 4 | <1 |
| Pulses | 20 | 7 | 11 | 2 | <1 |
| Fibre crops, primary | 4 | 2 | 2 | <1 | <1 |
| Fruit | 9 | 4 | 3 | 1 | <1 |
| Vegetables[a] | 5 | 2 | 2 | 1 | <1 |
| *Hectares harvested per 100 hectares of cereal* | | | | | |
| Cereals | 100 | 100 | 100 | 100 | 100 |
| Oilcrops, primary | 30 | 24 | 34 | 39 | 22 |
| Roots and tubers | 28 | 23 | 28 | 55 | 4 |
| Pulses | 24 | 26 | 25 | 21 | 3 |
| Fruit | 11 | 14 | 8 | 13 | 8 |
| Vegetables[a] | 6 | 5 | 6 | 8 | 4 |
| Fibre crops, primary | 5 | 6 | 4 | 5 | <1 |

a. Includes melons.

Source: UNDP, 2012.

Overall, the analysis of food availability trends in Africa indicates improvement, though quite modest, the matter that suggests that observed food insecurity is primarily caused by the other dimensions of food security. This is further shown in table 5 below for SSA countries.

**Table 5: Food Availability in SSA**

| | CEREAL PRODUCTION | | | | | | |
|---|---|---|---|---|---|---|---|
| FOOD SUPPLY | YIELD | PER CAPITA | SHARE OF SUB- SAHARAN AFRICA TOTAL | AGRICULTURE VALUEADDED | NET CEREAL IMPORTS | FOODAID DELIVERIES | NET FOOD PRODUCTION INDEX |
| kcal per capita per day | kg per hectare | kg | % | % of GDP | kg per capita | Thousand Tonnes | 100 = 1999–2001 |

| Countries | 2005/2007 | 2008/2010 | 2008/2010 | 2008/2010 | 2005–2010 | 2007/2009 | 2009 | 2007/2009 |
|---|---|---|---|---|---|---|---|---|
| Angola | 1,949.3 | 644.8 | 50.2 | 0.81 | 10.0 | 34 | 0.03 | 174.3 |
| Benin | 2,512.3 | 1,327.6 | 167.6 | 1.25 | 32.2 | 25 | 18.44 | 112.7 |
| Botswana | 2,235.0 | 492.2 | 25.6 | 0.04 | 2.9 | 84 | 0.00 | 113.0 |
| Burkina Faso | 2,669.0 | 1,032.0 | 260.8 | 3.60 | 33.3 | 15 | 28.24 | 129.0 |
| Burundi | 1,679.7 | 1,327.9 | 36.9 | 0.26 | 34.8 | 7 | 62.05 | 111.0 |
| Cameroon | 2,259.0 | 1,684.5 | 135.7 | 2.25 | 19.5 | 40 | 10.02 | 119.3 |
| Cape Verde | 2,549.3 | 260.7 | 18.0 | 0.01 | 8.9 | 214 | 18.07 | 115.0 |
| Central African Republic | 1,956.0 | 1,120.2 | 56.0 | 0.21 | 56.5 | 8 | 22.79 | 121.0 |
| Chad | 2,040.0 | 816.4 | 186.7 | 1.76 | 13.6 | 14 | 109.84 | 120.0 |
| Comoros | 1,857.3 | 1,170.5 | 35.4 | 0.02 | 46.3 | 62 | 7.50 | 112.0 |
| Congo, Democratic Republic of | 1,585.3 | 771.6 | 23.8 | 1.32 | 42.9 | 10 | 179.64 | 97.7 |
| Congo, Republic of | 2,512.7 | 786.1 | 6.1 | 0.02 | 3.9 | 18 | 6.99 | 121.7 |
| Côte d'Ivoire | 2,514.7 | 1,721.5 | 74.0 | 1.24 | 22.9 | 61 | 25.59 | 119.0 |
| Equatorial Guinea | .. | .. | .. | .. | 3.2 | .. | 0.00 | 91.3 |
| Eritrea | 1,586.7 | 429.4 | 37.7 | 0.17 | 14.5 | 27 | 0.01 | 125.7 |
| Ethiopia | 1,951.7 | 1,615.5 | 181.1 | 12.71 | 47.7 | 17 | 978.54 | 143.3 |
| Gabon | 2,730.0 | 2,017.2 | 28.0 | 0.04 | 4.4 | 81 | 0.00 | 103.0 |
| Gambia | 2,345.3 | 1,050.9 | 179.7 | 0.26 | 26.9 | 100 | 12.69 | 94.7 |
| Ghana | 2,849.0 | 1,690.7 | 109.1 | 2.25 | 30.2 | 32 | 30.46 | 143.7 |
| Guinea | 2,529.3 | 1,475.4 | 297.4 | 2.51 | 13.0 | 37 | 15.54 | 129.7 |
| Guinea-Bissau | 2,288.0 | 1,555.0 | 150.7 | 0.19 | .. | 22 | 2.40 | 121.7 |
| Kenya | 2,060.0 | 1,424.3 | 83.1 | 2.84 | 19.4 | 38 | 269.36 | 130.0 |
| Lesotho | 2,468.3 | 573.3 | 49.9 | 0.09 | 7.9 | 116 | 7.57 | 78.7 |
| Liberia | 2,163.3 | 1,305.2 | 77.1 | 0.25 | 61.3 | 56 | 26.06 | 127.7 |
| Madagascar | 2,132.7 | 2,869.8 | 239.8 | 4.17 | 29.1 | 13 | 22.23 | 113.3 |
| Malawi | 2,127.0 | 1,976.2 | 246.0 | 3.08 | 30.5 | 3 | 96.95 | 130.0 |
| Mali | 2,579.3 | 1,533.5 | 391.8 | 5.06 | 36.5 | 16 | 30.17 | 165.0 |
| Mauritania | 2,822.7 | 810.4 | 62.8 | 0.18 | 20.2 | .. | 26.89 | 114.7 |
| Mauritius | 2,935.7 | 8,733.9 | 0.7 | 0.00 | 4.2 | 208 | 0.00 | 102.7 |
| Mozambique | 2,071.0 | 954.6 | 96.7 | 1.91 | 31.9 | 29 | 160.38 | 101.7 |
| Namibia | 2,349.0 | 411.0 | 50.5 | 0.10 | 7.5 | 58 | 0.36 | 101.3 |
| Niger | 2,306.0 | 449.4 | 298.3 | 3.86 | .. | 14 | 47.51 | 173.3 |
| Nigeria | 2,708.0 | 1,513.1 | 153.2 | 20.35 | 32.7 | 29 | 0.00 | 130.7 |

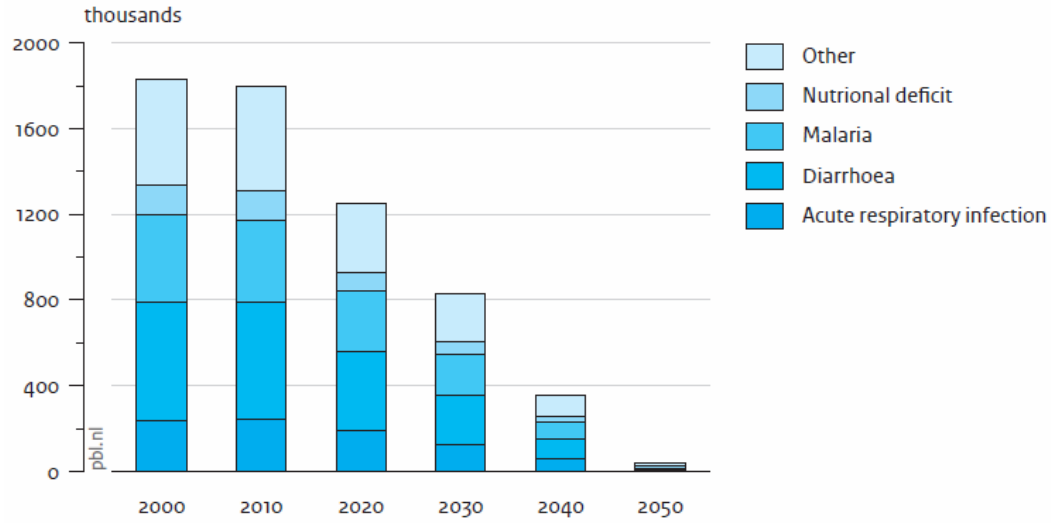
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rwanda | 2,054.0 | 1,679.1 | 60.0 | 0.54 | 33.9 | 9 | 28.98 | 132.7 |
| São Tomé and Príncipe | 2,662.3 | 3,407.8 | 22.4 | 0.00 | 16.8 | 89 | 6.10 | 110.3 |
| Senegal | 2,317.7 | 1,168.4 | 148.0 | 1.55 | 16.7 | 108 | 15.69 | 112.3 |
| Seychelles | 2,426.0 | .. | .. | .. | 1.9 | 217 | 0.00 | 41.0 |
| Sierra Leone | 2,127.7 | 1,429.5 | 152.3 | 0.76 | 49.0 | 24 | 17.06 | 201.0 |
| South Africa | 2,985.7 | 4,212.0 | 299.3 | 12.85 | 3.0 | 30 | 0.00 | 118.0 |
| South Sudan | .. | .. | .. | .. | .. | .. | .. | .. |
| Swaziland | 2,307.3 | 1,176.5 | 55.7 | 0.06 | 7.5 | 143 | 2.53 | 114.7 |
| Tanzania | 2,017.0 | 1,240.0 | 141.4 | 5.32 | 28.1 | 13 | 29.31 | 133.3 |
| Togo | 2,146.3 | 1,191.6 | 171.7 | 0.88 | 43.5 | 29 | 25.24 | 129.7 |
| Uganda | 2,247.3 | 1,566.4 | 87.7 | 2.45 | 24.2 | 11 | 111.67 | 110.0 |
| Zambia | 1,885.3 | 2,266.8 | 174.0 | 1.93 | 9.2 | –9 | 15.21 | 123.7 |
| Zimbabwe | 2,207.3 | 503.5 | 81.0 | 0.88 | 17.4 | 64 | 220.45 | 84.3 |
| **Sub-Saharan Africa** | **2,292.5** | **1,395.0**[a] | **148.1** | **100.00**[b] | **9.2**[c] | **26** | **2,688.35**[b] | **120.0**[d] |

Source: UNDP 2012.

***Food Utilization***

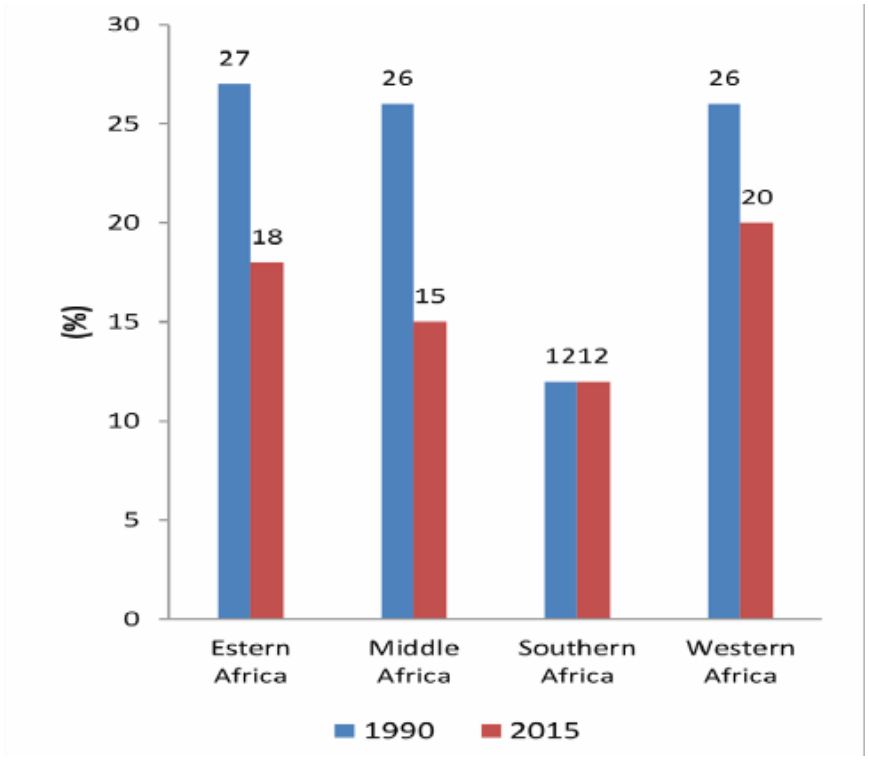
According to UNESCO (2015), food use is measured by the percentage of the population that has access to essential services such as improved water sources and sanitation facilities and electricity. The outcomes of food utilisation can be assessed through anthropometric measurements - underweight, stunting and wasting are usually the main nutritional disorders assessed. Appropriate food intake (balanced and micronutrient-rich food) for young children and mothers is very important for nutritional status. This demands, not just having adequate diet but a combination of the later and healthy environment, clean drinking water, sufficient sanitary facilities (UNEP 2002). According to Hilderink, *et al.* (2012), the number of underweight children in 2010 stood at 33 million, however the study projects a decline in that number by 2030- figure 4. Some countries (Ethiopia- Eastern Africa, Senegal and Ghana- Western Africa) within the region have maintained consistency in reducing stunting in the last 10 years- figure 5 below.

Figure 4: **Child deaths due to malnourishment in sub-Saharan Africa**




Source: Hilderink, et al. (2012)

Fig 5. Trend in the prevalence of underweight children in SSA




Source: FAO, 2015

According to (WHO, 1997), Underweight in children – expressed as 'low weight for age' (wasting) – is the result of chronic undernourishment which can lead to 'small height for age' (stunting). This implies that the underutilization of food among children in SSA paves way for various health challenges as shown below.

**Table 6. FOOD USE in SSA - Summary**

| | UNDER-FIVE NUTRITION | | | MORTALITY | | UNDER-NOURISHMENT PREVALENCE | DEPTH OF HUNGER (AVERAGE FOOD DEFICIT OF UNDER-NOURISHED POPULATION) | ANAEMIA PREVALENCE | VITAMIN A DEFICIENCY PREVALENCE |
|---|---|---|---|---|---|---|---|---|---|
| | WASTING | STUNTING | UNDERWEIGHT | INFANT | UNDER-FIVE | | | | |
| | % of children under age five | | | Deaths per 1,000 live births | | % of population | Kilocalories per capita per day | % of population | |
| ***Countries*** | ***2000–2010*** | ***2000–2010*** | ***2000–2010*** | ***2010*** | ***2010*** | ***2006–2008*** | ***2006–2008*** | ***1993–2005*** | ***1995–2005*** |
| Angola | 8.2 | 29.2 | 15.6 | 97.9 | 160.5 | 41 | 320 | 30 | 64 |
| Benin | 8.4 | 44.7 | 20.2 | 73.2 | 115.4 | 12 | 210 | 82 | 71 |
| Botswana | 7.2 | 31.4 | 11.2 | 36.1 | 47.7 | 25 | 240 | 38 | 26 |
| Burkina Faso | 11.3 | 35.1 | 26.0 | 92.6 | 176.2 | 8 | 200 | 92 | 54 |
| Burundi | 8.2 | 63.1 | 38.9 | 87.8 | 141.9 | 62 | 390 | 56 | 28 |
| Cameroon | 7.3 | 36.4 | 16.6 | 84.4 | 136.2 | 22 | 230 | 68 | 39 |
| Cape Verde | .. | .. | .. | 29.2 | 35.6 | 11 | 190 | 40 | 2 |
| Central African | 10.5 | 44.6 | 21.8 | 106.0 | 158.8 | 40 | 300 | 84 | 68 |
| Chad | 16.1 | 44.8 | 33.9 | 98.9 | 173.4 | 39 | 320 | 71 | 50 |
| Comoros | 13.3 | 46.9 | 25.0 | 62.8 | 85.6 | 47 | 300 | 65 | 22 |
| Congo, Democratic | 14.0 | 45.8 | 28.2 | 111.7 | 169.9 | .. | .. | 71 | 61 |
| Congo, Republic of | 8.0 | 31.2 | 11.8 | 60.8 | 93.4 | 13 | 230 | 66 | 25 |
| Côte d'Ivoire | 14.0 | 39.0 | 29.4 | 85.9 | 123.0 | 14 | 230 | 69 | 57 |
| Equatorial Guinea | 2.8 | 35.0 | 10.6 | 80.5 | 120.8 | .. | .. | 41 | 14 |
| Eritrea | 14.9 | 43.7 | 34.5 | 42.3 | 60.8 | 65 | 350 | 70 | 21 |
| Ethiopia | 12.3 | 50.7 | 34.6 | 67.8 | 105.9 | 41 | 320 | 75 | 46 |
| Gabon | 4.3 | 26.3 | 8.8 | 54.4 | 73.5 | .. | 140 | 45 | 17 |
| Gambia | 7.4 | 27.6 | 15.8 | 56.9 | 98.1 | 19 | 240 | 79 | 64 |
| Ghana | 8.7 | 28.6 | 14.3 | 50.0 | 74.4 | 5 | 180 | 76 | 76 |
| Guinea | 10.8 | 39.3 | 22.5 | 81.2 | 129.9 | 16 | 260 | 79 | 46 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Guinea-Bissau | 5.6 | 28.1 | 17.2 | 92.0 | 149.5 | 22 | | 250 | 75 | 55 |
| Kenya | 7.0 | 35.2 | 16.4 | 55.1 | 84.7 | 33 | | 260 | 69 | 84 |
| Lesotho | 5.6 | 45.2 | 16.6 | 64.6 | 85.0 | 14 | | 220 | 49 | 33 |
| Liberia | 7.8 | 39.4 | 20.4 | 73.6 | 102.6 | 32 | | 330 | 87 | 53 |
| Madagascar | 15.2 | 52.8 | 36.8 | 43.1 | 62.1 | 25 | | 250 | 68 | 42 |
| Malawi | 4.2 | 53.2 | 15.5 | 58.1 | 92.1 | 27 | | 280 | 73 | 59 |
| Mali | 15.3 | 38.5 | 27.9 | 99.2 | 178.1 | 12 | | 220 | 83 | 59 |
| Mauritania | 8.1 | 23.0 | 15.9 | 75.3 | 111.2 | 8 | | 210 | 68 | 48 |
| Mauritius | .. | .. | .. | 13.0 | 15.1 | 5 | | 180 | 17 | 9 |
| Mozambique | 4.2 | 43.7 | 18.3 | 92.2 | 135.0 | 38 | | 330 | 75 | 69 |
| Namibia | 7.5 | 29.6 | 17.5 | 29.3 | 40.1 | 18 | 220 | 41 | 18 | |
| Niger | 12.4 | 54.8 | 39.9 | 72.5 | 143.3 | 16 | 240 | 81 | 67 | |
| Nigeria | 14.4 | 41.0 | 26.7 | 88.4 | 142.9 | 6 | 180 | 76 | 30 | |
| Rwanda | 4.8 | 51.7 | 18.0 | 59.1 | 91.1 | 32 | 300 | 42 | 6 | |
| São Tomé and Príncipe | 11.2 | 31.6 | 14.4 | 53.1 | 79.9 | .. | 160 | 37 | 96 | |
| Senegal | 8.7 | 20.1 | 14.5 | 49.8 | 75.2 | 19 | 220 | 70 | 37 | |
| Seychelles | .. | .. | .. | 11.7 | 13.5 | 8 | 150 | 24 | 8 | |
| Sierra Leone | 10.5 | 37.4 | 21.3 | 113.7 | 174.0 | 35 | 340 | 83 | 75 | |
| South Africa | 4.7 | 23.9 | 8.7 | 40.7 | 56.6 | .. | 150 | 24 | 17 | |
| South Sudan | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| Swaziland | 1.1 | 40.4 | 7.3 | 55.1 | 77.7 | 19 | 220 | 47 | 45 | |
| Tanzania | 4.9 | 42.5 | 16.2 | 50.0 | 75.8 | 34 | 280 | 72 | 24 | |
| Togo | 6.0 | 26.9 | 20.5 | 66.0 | 103.4 | 30 | 280 | 52 | 35 | |
| Uganda | 6.3 | 38.7 | 16.4 | 63.0 | 98.9 | 22 | 240 | 64 | 28 | |
| Zambia | 5.6 | 45.8 | 14.9 | 68.9 | 111.0 | 44 | 320 | 53 | 54 | |
| Zimbabwe | 7.3 | 35.8 | 14.0 | 50.9 | 79.8 | 30 | 300 | 19 | 36 | |
| **Sub-Saharan** | **9.9**[a] | **41.1**[a] | **21.3**[a] | **76.0**[b] | **121.0**[b] | **27**[c] | **243** | **67** | **67** | |

Source: UNDP 2012

## Economics of food security- Implication for sustainable development.

### *Sustainable development and population growth*

In development economics literature, emphasis is gradually spreading from economic development as a societal goal to sustainable development. While the former looks at economic growth measured in terms of GDP and its distributional dimensions, the latter concerns itself with development that meets the needs of the present without

compromising the ability of future generations to meet their own needs (Defined by the Brundtland Report and cited in OECD, 2000). According to Todaro and Smith (2012), economic development further assesses how levels and rates of growth of "real" per capita gross national income (GNI) (monetary growth of GNI per capita minus the rate of inflation) are then used to affect the overall economic well-being of a population — how much of real goods and services is available to the average citizen for consumption and investment. Sustainable development focuses on maintaining a delicate balance between the human need to improve lifestyles and feeling of well-being on one hand, and preserving natural resources and ecosystems, on which we and future generations depend (Okeke, Izueke and Nzekwe, 2014 and SD, 2014).

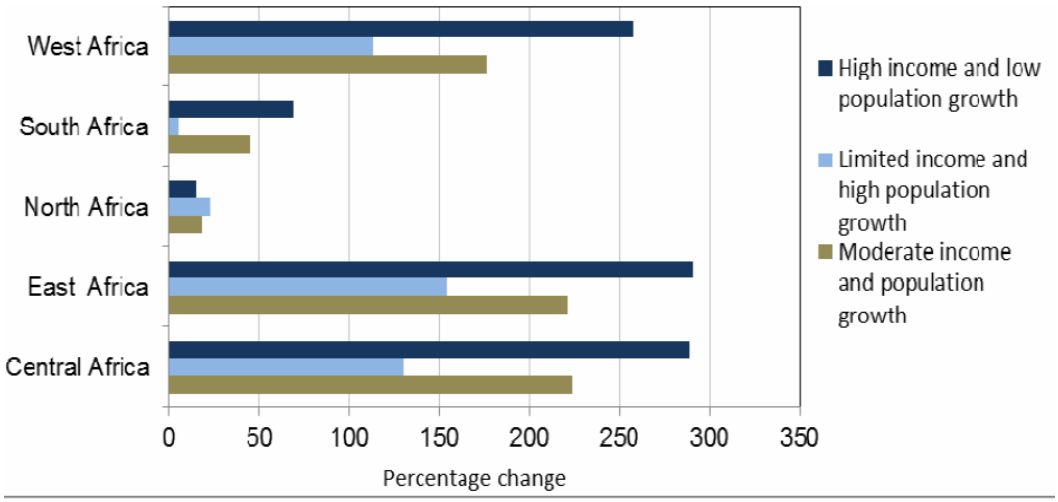
The Sustainable Development Goals is evidence of the international recognition given to sustainable development issues; otherwise known as the Global Goals, it builds on the Millennium Development Goals (MDGs) the world committed to achieving by 2015. The MDGs, adopted in 2000, aimed at an array of issues that included slashing poverty, hunger, disease, gender inequality, and access to water and sanitation. Enormous progress was made on the MDGs, showing the value of a unifying agenda underpinned by goals and targets. Despite this success, the SGDs is the broader sustainability agenda, going much further than the MDGs, to address the root causes of poverty and the universal need for development that works for all people (UNDP, 2015).

Growing food insecurity amidst increasing SSA population has further evidenced the consequence of overpopulation on food security. Population growth and economic development contribute somewhat to price increases (Hendrix, 2011). With increases in prices, suffixed by increasing population, poor households may find it increasingly difficult to keep up with daily dietary needs and thereby increasing the percentage of the unsecured. The common argument too many mouths are chasing too few calories, and that our capacity to meet our food needs is bumping up against significant structural constraints has become more pronounced in majority of SSA countries especially those bedeviled with political crisis or emerging from civil wars.

According to UNDP (2010), SSA annual population growth rate is expected to range from between 1.6% to slightly more than 2.4% between 2010 and 2050. Within Africa, significant variations in demographic change are expected to occur across geographic regions. In East and West Africa, which have Africa's fastest growth rates, projected growth between 2010 and 2050 is expected to occur at rate of about 2.2% per year, according to the UN's medium growth rate assumptions. In a study by Conway and Toenneissen (2003), there are evidences that despite expected

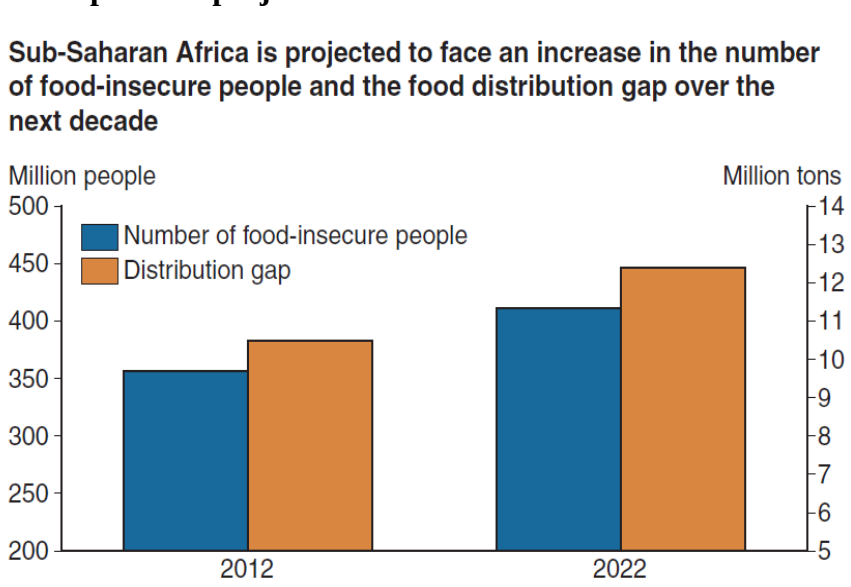
increases in food production in Africa, rapid population growth will lead to notable increases in the size of its population living in food insecurity. With projections for increase in SSA population, Long *et al* 2006; Muller et. al. (2011), have argued that trends in its food supply will considerably lag behind those found in other developing regions.

**Fig 6. Projected changes in food demand for rice between 2010 and 2050**




Source: Thomas and Zuberi, 2012.

**Fig 7. SSA Population projection 2012 and 2022**



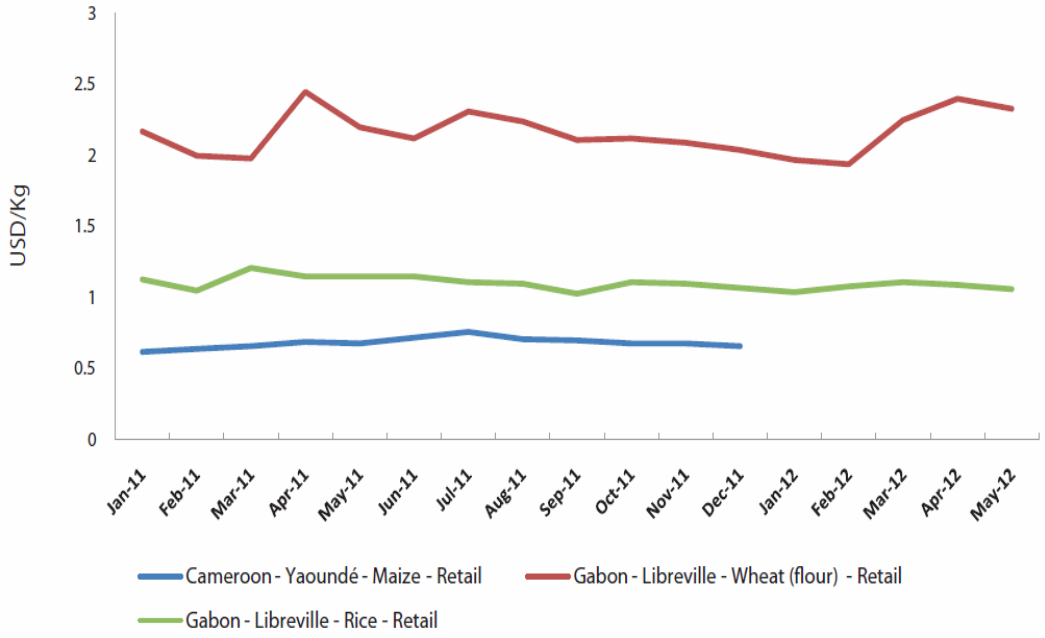

Source: Rosen and Shapouri, 2012.

Prices of food commodities on world markets have recently been on the rise with high level of fluctuation. The persistent instability led to increased concern over the ability of the world food economy to adequately feed billions of people, now and in the future. While it is not possible to know with certainty the extent of future increases in either the level or volatility of prices, the risks of higher prices and greater volatility are sufficiently large to warrant serious efforts to understand what can be done to reduce the likelihood of increased prices or greater volatility, or to manage the consequences when these are unavoidable. In considering the most appropriate options to counter high and/ or volatile prices, however, it is important to remember that the level and volatility of prices are the outcome of various forces that affect supply and demand (FAO, 2014b).

**Trends in Food Prices in SSA**

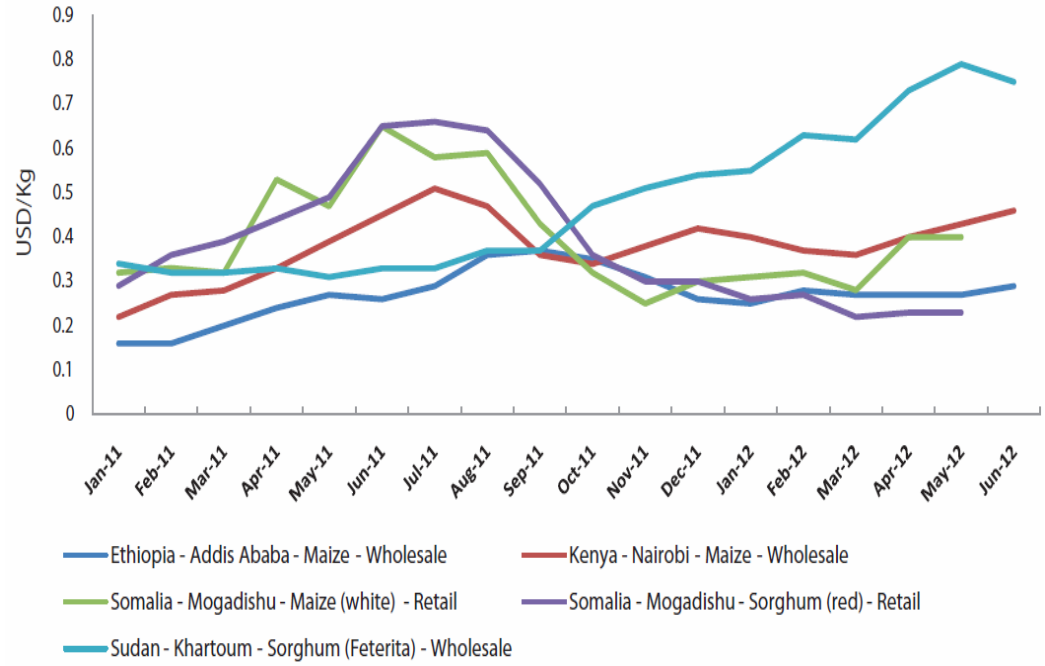
To tackle the severe food deficit in some areas of SSA, the distribution pattern of food products between surplus and deficit areas needs to be improved. However it becomes even more difficult to achieve food security in poor regions with rising food prices. AfDB brief (2012), provides a summary of price trends for selected SSA countries. With a close observation on fig 8 through fig 11, one can observe absolute increase in the prices of food produce even though slightly.

**Fig 8. Prices of cereals in 3 selected Central African countries**



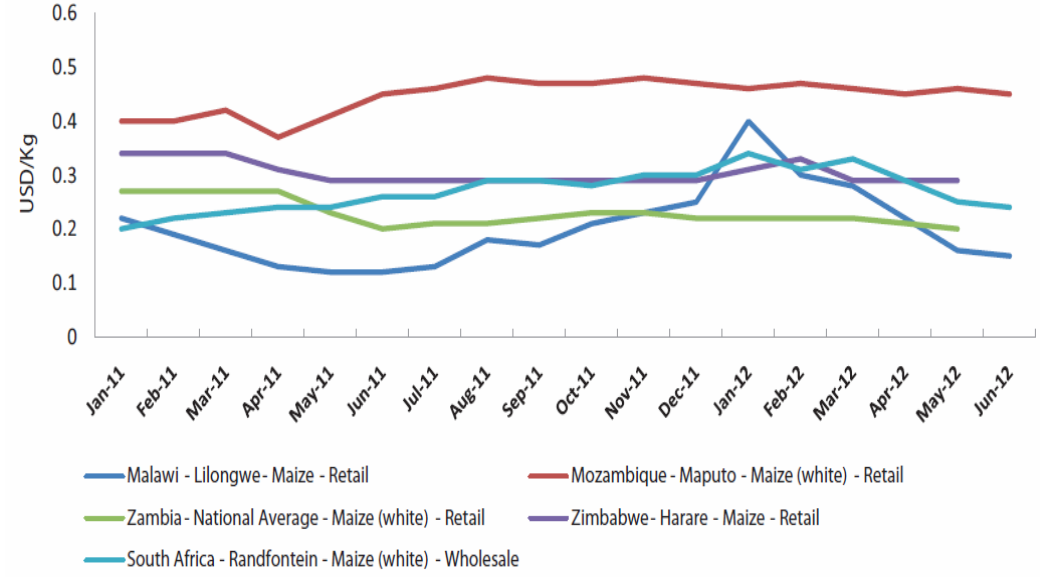

Source: AfDB Brief, 2012

**Fig 9. Prices of cereals in 5 selected Eastern African countries**



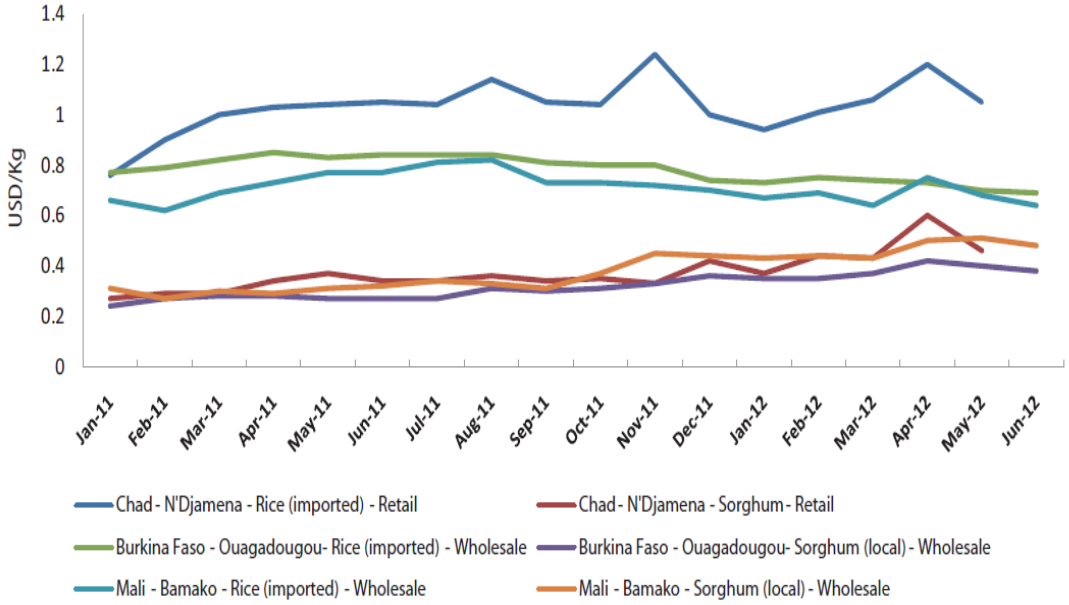

Source: AfDB Brief, 2012

**Fig 10. Prices of cereals in selected Southern African countries**




Source: AfDB Brief, 2012

**Fig 11. Prices of cereals in selected Western African countries**




Source: AfDB Brief, 2012

With rising prices, growing population and deficit food output, it is becoming increasingly difficult for SSA countries to sustain food security. Also, frequent political and economic disturbances have further undermined efforts made toward attaining food security in SSA. Economic development is directly related to the quality and quantity of labour available. Thus the quality and quantity of food intake by labour plays a major role in determining the speed of development within a country. With growing hunger incidence and increasing number of malnourished persons in the region, the poles of underdevelopment and development may become wider. African leaders, especially those within the SSA must quickly marshal out realistic roadmaps and strategies to counter the growing menace of hunger and food insecurity among her populace.

**Way Forward**

Hendrix, (2011) has argued that the most pressing challenges to current food security, and providing food security for future generations, are political and economic, rather than Malthusian. However the thoughts of the foremost economist cannot be entirely pushed aside. Some of the issues bordering around food insecurity can be addressed in the short term while the others will need longer time. The diversity and complexity of various countries within the region makes it somewhat difficult to push forward single-general policy for the entire region but some suggestion can be made that would affect the region while others can be country specify.

Some proactive actions are required to address food insecurity in SSA countries;

**Speed-up sustainable agricultural growth**

The region is challenged to engender and generate sustained and broad-based economic growth to rapidly reduce extreme hunger. Even though countries within the region have made remarkable growth over the years, economic growth is increasingly taking place outside the agricultural sector on which paradoxically most of the population live and derive their livelihoods. This growth should be agriculture based as it has proved to be more effective in reducing poverty and especially hunger.

**Improve Trade Corridors**

Establish regional agricultural trade cooperation, in the fields of investment, technology transfer, and commodities trade, within Regional Economic Communities (RECs and among RECs). This implies a win-win situation, whereby on one side a country or a sub-region can benefit from the high technology, capital surplus and huge food export market possessed by the other countries/sub-region(s), which in turn will each benefit from stable, consistent, relatively cheap food supplies derived from the extra food surplus to be realized in the other complementary producing countries/sub-region(s).

**Increase Labour Productivity (Agricultural value added per worker- AVAW)**

The low level of AVAW reflects low profitability in the agricultural sector and is a key factor in rural poverty. This is because the quality of agricultural output depends on the quality of input, existing technology and quality of labour. Increasing returns to farming in SSA would require efficiency improvements at every level of the agricultural sector, from production to marketing. Modernizing agriculture would require government investment in education, infrastructure, dissemination of new technologies and inputs, and the promotion of producer marketing organizations that can link small farmers to consumers.

**Proper Policy Alignment**

Better understanding of production systems including the role of markets, infrastructure and livestock is needed. SSA countries should roll out policies geared towards modernizing Livestock farming with priorities given to hybrid species and areas prone to drought and famine. Also, policies and programs that ensure sustainable increased yields through improved technologies for management of water and land and effective property rights to natural resources is important.

**Stable polity**

No meaning development can soar amidst political crisis and conflicts. Therefore it behooves on SSA

governments to ensure that peace and political calm ensues within and across their countries as this will increase investor confidence and production output and stability.

**Conclusion**

Food insecurity remains a major development challenge for SSA, with war torn countries scoring high in food insecurity. Efforts to address the chronically high levels of hunger and malnutrition in many parts of Africa have been much slower to get off the ground. It is important, therefore, that food security remains high on the continent's development agenda.

**References**

AfDB Brief (2012). Africa Food Security Quarterly Bulletin Chief Economist Complex Issue 3.

Carraher M, Dixon P, Lang T and Car-Hill R (1998). Access to healthy foods (Part One): Barriers to accessing healthy foods: Differentials by gender, social class, income and mode of transport. Health Education Journal 57(1).

Christina, M., Raffle, A., Marriott, S., and Smith, N. (2013). Food Poverty Report. Bristol City Council. July 2013.

Conway, G., and Toenniessen, G. 2003. Science for African Food Security Gordon Conway and Gary Toenniessen Science New Series, 299: 1187-1188.

Cooper, N., & Dumpleton, S. (2013). Walking the breadline: The scandal of food poverty in 21st Century Britain, Oxfam and Church Action on Poverty.

Dartmouth Publishing Company Limited, International Association of Agricultural Economists, Oxford, UK. 444-463

Demeke, M., Di Marcantonio, F. and Morales-Opazo, C. (2013). Understanding the performance of food production in sub-Saharan Africa and its implications for food security. Journal of Development and Agricultural Economics

Dibsdall, L., Lambert, N., Bobbin, R. *et al* (2003). Low-income consumers' attitudes and behaviour towards access, availability and motivation to eat fruit and vegetables. Public Health Nutr. 6:159–168.

Dowler, E. (1998). Food poverty and food policy. IDS Bulletin, 29(1), 58-65.

Dowler, E. (2003). Food and Poverty: insights from the 'north'. Development Policy Review, 21(5-6), 569-580.

Dowler, E. A., & O'Connor, D. (2012). Rights-based approaches to addressing food poverty and food insecurity in Ireland and UK. Social science & medicine, 74(1), 44-51.

Ehui S. (1999). A review of the contribution of livestock to food security, poverty

alleviation and environmental sustainability in sub-Saharan Africa. UNEP Industry and Environment. 37-40.

Ehui S., Li-Pun H., Mares V. and Shapiro B. (1998). The role of livestock in food security and environmental protection. Outlook on Agriculture 27(2):81-87.

Ehui, S., Benin, S., Williams, T and Meijer, S. (2002). Food security in sub-Saharan Africa to 2020 Socio-economics and Policy Research Working Paper 49. International Livestock Research Institute, Nairobi, Kenya.

Ehui S., Williams T. and Swallow B. (1995). Economic factors and policies encouraging environmentally detrimental land use practices in sub-Saharan Africa. In: Agricultural competitiveness: Market forces and policy choice. The eastern and southern Africa session. Proceedings of an international conference.

FAO, (2015). Regional overview of food insecurity: African food security prospects brighter than ever. Accra, FAO.

FAO (2010). The State of Food Insecurity in the World—Addressing Food Insecurity in Protracted Crises (Rome: Food and Agriculture Organization of the United States).

FAO (Food and Agriculture Organization of the United Nations). 2001. The state of food and agriculture. Part II Regional Review. FAO, Rome, Italy. htw-://www.fao.ore/docreip/003/ x9800e/ x9800e08.30

FAO, (2007a). SARD and agricultural biodiversity. Policy brief 16. FAO, Rome.

FAO. (2002). The state of agricultural biodiversity in the livestock sector: Threats to livestock genetic diversity. FAO, Rome.

FAO. (2007b). Women and sustainable food security. SD dimensions. http://www.fao.org/sd/fsdirect/fbdirect/fsp001.htm. FAO, Rome.

Grófová, Š., and Srnec, K. (2012). Food crisis, food production and poverty Institute of Tropics and Subtropics, Czech University of Life Sciences, Prague, Czech Republic

Hendrix, C. S. 2011. Markets vs. Malthus: Food security and the global economy. Peter G. Peterson Institute for International Economics

Hilderink, H., Brons, J., Ordoñez, J., Akinyoade, A., Leliveld, A., Lucas, P., and Kok, M. (2012). Food security in sub-Saharan Africa: An explorative study, The Hague/Bilthoven: PBL Netherlands Environmental Assessment Agency.

Holmes, B. M. Nelson, B. Erens, B. Bates, S. Church, & T.

Boshier. (2007). Food security. In, Low income diet and nutrition survey, Vol. 3 (pp. 201e220). London: TSO.

Lambie-Mumford, H. 2013. Every town should have one: Emergency food banking in the UK. Journal of Social Policy, 42: 73-89

Lobell, D., Burke, M., Tebaldi, C., Mastrandrea, M., Falcon, W., and Taylor, R. (2008). Prioritizing climate change adaptation needs for food security. Science, 319: 607-610

Long, S.P., Ainsworth, E.A., Leakey, A.D.B., Nosberger, J., and Ort, D.R. (2006). Food for Thought: Lower-Than-Expected Crop Yield Stimulation with Rising CO2 Concentrations. Science 312, 1918-1921

Mueller, C., Cramer, W., Hare, W.L., Lotze-Campen, H. (2011). Climate change risks for African agriculture. Proceedings of the National Academy of Sciences of the United States of America 108(11): 4313-4315

Okeke, R.C., Izueke, E.M.C and Nzekwe, F.I (2014). Energy security and sustainable development in Nigeria. Arabian Journal of Business and Management Review, 4 (3)

Oxfam. 2011. How fertiliser subsidies have transformed Malawi http://www.oxfamblogs.org/fp2p/?p=4187

Rademacher, A. (2012). Food Insecurity in Sub-Saharan Africa. Published: October, 26, 2012.

Rose, D., & Charlton, K. E. (2001). Prevalence of household food poverty in South Africa: results from a large, nationally representative survey. Public Health Nutrition, 5(03), 383-389.

Rosen, S and Shapouri, S. (2012). Factors affecting food production growth in Sub-Saharan Africa. Amber Waves. www.ers.usda.gov/amber-waves . Economic Research Service/USDA

SD (2014). Sustainable Development: Meaning and measurement http://www. gdrc.org/sustdev/definitions.html

Todaro, M.P., and Smith, S.C (2012). Economic development (11th ed.) Delhi: Pearson U.N. 2011. World Population Prospects: The 2010 Revision, UN, New York.

UN Population Division, World Population Prospects: The 2010 Revision.

UNDP (2015). Sustainable development goals. Retrieved from http://www.undp.org/content/undp/en/home/sdgoverview/post-2015-development-agenda.html

UNDP, (2012). Towards a food secure future. Africa Human Development Report. 2012

UNEP (2002). Global environmental outlook 3, United Nations Environmental Programme, EarthScan, London, 416

UNESCO/ECA (2015). Status of food security in Africa. Ninth Session of the Committee on Regional Cooperation and Integration. Addis Ababa, Ethiopia.

United Nations. (2012). The future we want. Outcome document of the Rio+20 United Nations Conference on Sustainable Development (available at http://www.un. org/en/sustainablefuture/).

WHO (1997). WHO global database on child growth and malnutrition, Geneva.

Zuberi T. and Thomas, K.J. A. (2012). Demographic change, the impact model, and food security in Sub-Saharan Africa. Working paper, United Nations Development Program, Regional Bureau for Africa.

*Okosa, N. U.; Ekesiobi, C. S.; Oguanobi, C. R. & Ifebi, O. E. (2017); Economics of Food Security in Sub-Saharan Africa: Implication for Sustainable Development, ANSU Journal of Arts and Social Sciences, 5 (2): 1-26*