

SIWI REPORT

Virtual Jobs

*African Smallholder Farmers and
Food Imports*



This document has been written on behalf of the Transforming Investments in African Rainfed Agriculture (TIARA) initiative, which is led by the Stockholm International Water Institute (SIWI). Contributions have been made by: Tony Allan (King's College London), Anton Earle (SIWI), Moustapha Gueye (ILO), Katherine Madden (SIWI), Maria Teresa Gutierrez (ILO), Marek Harsdorff (ILO), Robert Mangani (SIWI), Kevin Urama (African Development Bank) and Stuart Worsley (Green Economy Coalition).

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Foreword

Every tonne of food imported into Africa is food that could have been grown in Africa. Each tonne of imported food represents a whole range of on-farm and off-farm jobs that could have supported the livelihoods of African families. Instead, hundreds of millions of smallholder rainfed farmers in Africa struggle to make a viable livelihood for themselves and their families. What would it take to reverse these trends? What would it take to substitute imports with African-produced food? What would it take to empower Africa's smallholder rainfed farmers to increase their crop yields, meet world standards and enter the agricultural value chain?

The answers are complex. Africa's smallholder farms represent a super-nexus where a range of issues come together, including livelihoods, jobs, food, agriculture, climate change and natural resource management. Millions of rainfed small farms are scattered throughout the sub-continent, and the majority of the African population depend on them. Africa's smallholder farmers do not exist in a vacuum. They exist in an increasingly globalized context that is marked by the increasing disparity in monetary and technical wealth between nations and continents. Africa, which has 60 per cent of the world's unused arable land and the lowest levels of on-farm productivity, imports increasing quantities of food from global markets.

The primary issue facing the smallholder in rainfed farming is water. Water availability issues, particularly the variation in rainfall and high water losses, limit productivity. With the growing reality of climate change, rainwater and soil-moisture management is even more important. With only 5.5 per cent of cultivable land in Africa being irrigable, improved green water storage and high water-use efficiency on rainfed farms must be strengthened. Increasingly, all over Africa, new farming practices, based on scientific research and traditional wisdom, are being tried out. These include climate-smart agriculture, conservation agriculture, agroecology and regenerative agriculture practices. But these practices require attention and investment.

Investing in green water management and smallholder farmers, supporting them to increase their productivity and enter the agricultural value chain, is the best way to support the building of viable rural economies and ensure that Africa is more resilient in the face of a changing climate.

Kevin Urama

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African Development Bank Group.

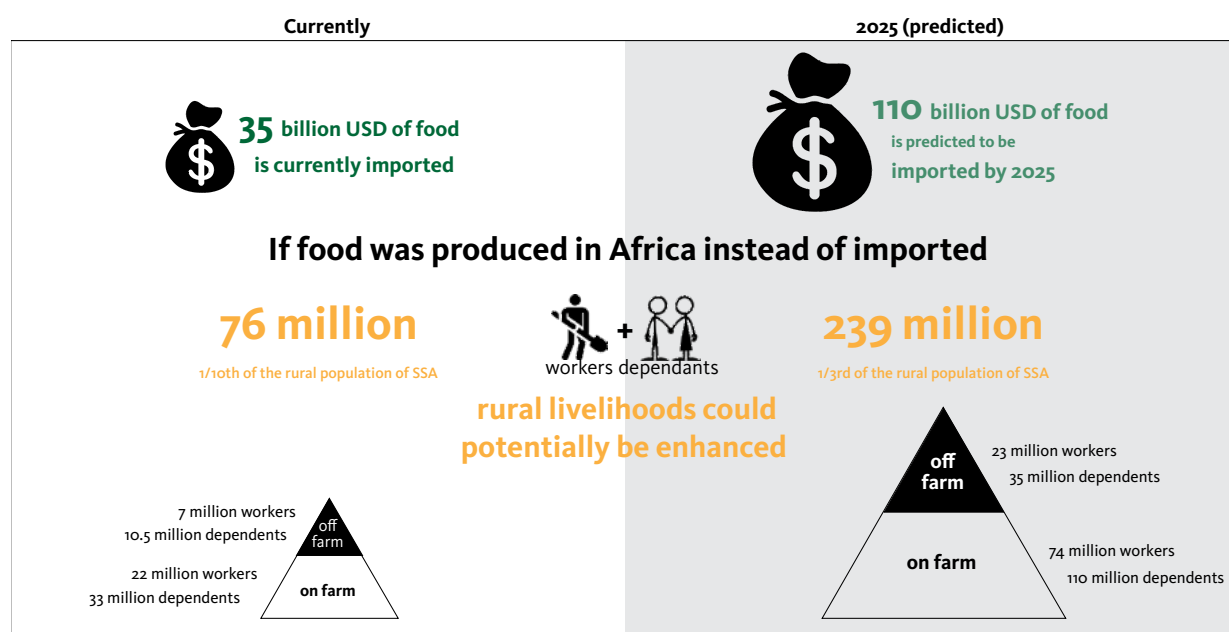
Summary

Virtual jobs refers to the equivalent income and livelihoods that would be earned and enjoyed in SSA if the food imported into the region was cultivated, processed and marketed locally instead of being imported. It represents the on-farm and off-farm opportunity cost to SSA, primarily borne by the rural poor, of importing food from the highly distorted global market. Food imports directly impact the livelihoods of 2.17 million people.

Crop yields in the rainfed areas of SSA are the lowest in the world and only 5.5 per cent of the cultivable land area is irrigable (“irrigable” refers to cultivable land where irrigation is possible in terms of topographical factors, soil characteristics and water availability). Currently about 31 per cent of irrigable land is equipped. Public expenditure to support agriculture is also the lowest in the world and has been declining in per-capita terms.

SSA governments have recognized the importance of agriculture and pledged to reverse the trend of under-investment in agriculture, as illustrated by the 2003 Maputo Declaration on Agriculture and Food Security in Africa.¹ In the Declaration, commitments were made to allocate at least 10 per cent of national budgeted expenditure to agriculture and raise the annual growth rate of the agricultural sector to 6 per cent. However, since then, only four countries have achieved the 10 per cent expenditure target.

As a result of these circumstances, the number of people who are malnourished in SSA increased by 44 million to 218 million between 1992 and 2016. SSA has begun importing large quantities of food to meet the deficit: it is currently importing USD 35–43 billion worth of basic food each year. This amount is expected to increase to USD 110 billion by 2025,² in spite of SSA having 60 per cent of the world’s unused cultivable land.



The equivalent livelihoods impacted by food imports.

Importing food requires SSA governments to engage in the world food market, where the disparities between rich and poor economies are highlighted. The combined economies of all 46 SSA countries are equal to just 3.4 per cent of the OECD countries (of which there are 36). The combined agriculture-sector subsidies of the OECD countries are larger than the total economies of the 28 poorest SSA countries put together. As a result of those subsidies, food produced in SSA has to compete with imported food on the local market. SSA is not able to produce sufficient food to meet its needs. A growing number of its people are undernourished and living in poverty, especially amongst the rural population.

While low global food prices may assist SSA to feed its growing population with imported food, this practice is highly vulnerable to global food price fluctuations (for example, the maize price fluctuated by over 440 per cent between 2000 and 2012.³ Using scarce financial resources to buy food on the global market – which is a sunk cost – further reduces public funds that could otherwise have been invested in the domestic agricultural sector to both provide jobs and increase domestic food security. If, as predicted, SSA's increasing food requirements are met by increasing food imports, a highly unsustainable spiral emerges: foreign expenditure increases and domestic investments in agriculture decrease. This will result in increasing rural poverty, unemployment, insecurity, and economic migration pressures.

Investing in SSA smallholder rainfed farmers would regenerate rural economies across the sub-continent through both on-farm and off-farm economic activity. Farmers could meet Africa's food needs and create value through agricultural products and food processing,

Each USD 1 billion dollars spent on food imports is equivalent to the annual income of **334,000 farming households** representing **670,000 on-farm jobs** and **200,000 off-farm jobs**. The addition of the dependants of these households means that each billion dollars of food imports directly impact the livelihoods of **2.17 million people**.

which would in turn revitalize the whole economy of each country. The equivalent virtual jobs associated with food imports have been broadly calculated as follows:

How might it be possible to turn this negative spiral round? The key lies, ironically, in the low productivity of SSA smallholder rainfed agriculture. Current rainfed yields in SSA are the lowest in the world, less than 2 tonnes per hectare. Cereal yield rates are estimated to be as low as 20 per cent of their potential rates, providing enormous scope for increasing yields. With support provided to smallholder farmers to engage in improved rainfed farming practices, based on applying soil and moisture conservation techniques, current yield rates could be at least doubled. This, together with the simultaneous support of the public and private sectors to enable smallholder farmers to market their produce, would both generate income and contribute towards national food requirements in each country.

It is important to stress that improving agricultural labour efficiency does not mean requiring farmers to increase their daily labour burden. It means increasing the output for the same labour input, thereby making the farmers' current efforts more profitable. It is also important to stress that food demands should not be met by increasing the cultivated area but by increasing yields on existing cultivated lands.

There are 728 million ha of land in SSA suitable for rainfed agriculture, of which nearly 69 per cent is currently being used. The smallholder sector makes up 80 per cent of all farms in SSA. Although there is potential to expand irrigated agriculture, this would still be insufficient to ensure food security and provide the broad-based rural economic regeneration that SSA requires.

Agriculture plays the dominant role in influencing the size and structure of rural employment as it is the largest generator of income and the largest employer in rural areas. Historically this sector has played a key role in expanding the economic base of rural areas through clear linkages between productivity and economic growth. Developing rural economies is likely to benefit the whole economy, particularly as the tax base is expanded. Typically, a USD 1 increase in agricultural value, initially driven by greater productivity, results in a USD 0.3–0.5 rise in rural non-farm incomes.⁴

Increasing rural productivity, and thereby both increasing national food security and creating employment in on-farm and off-farm rural economic activity, is only possible with political commitment. Political commitment is required to increase agricultural public expenditure, develop a farmer-centric enabling policy

environment, and promote the existence of a stable and accessible marketplace that meets producers' and consumers' needs.

Working to achieve greater smallholder productivity through improved rainfed farming techniques focused on soil-water management will enable SSA to substitute food imports with locally produced food. At the same time,

productive income-generating employment will be provided and millions of people will be lifted out of poverty. Better soil and soil-moisture management, coupled with rainwater retention and harvesting, slows the movement of water through the landscape, reducing soil erosion and increasing the infiltration of groundwater, leading to more water of better quality in the catchment.

Africa faces a stark set of circumstances, which are summarized below and are focussed mainly on sub-Saharan Africa (SSA):

Current realities facing sub-Saharan Africa	
Natural circumstances	
land and water	5.5% of cultivable land in Africa is irrigable, of which about 31% is currently equipped. 94.5% of cultivable land is therefore rainfed. 82% of drylands in SSA are estimated to be in a poor state of degradation.
rainfall	58% of land south of the Sahara is arid, semi-arid or dry sub-humid with highly variable annual rainfall.
climate change	Increasing temperatures and occurrence of extreme events – floods and droughts.
demographics	Total population 1.05 billion Rural population 60%
farming	65% of the population is employed directly or indirectly in agriculture. 80% of all agricultural activity is on smallholder rainfed farms.
Human-created circumstances	
productivity	Agricultural productivity is the lowest in the world.
agriculture growth	Although agricultural growth has been about 3.5% per year, it has been achieved through expansion rather than intensification, leading to land shortages.
public expenditure	Agriculture: public expenditure on agriculture is less than 3%. SSA is the only region in the world where expenditure per capita declined between 1989 and 2012. Water: public water sector expenditure to support for rainfed agriculture is estimated to be less than 5% of water sector expenditure.
nutrition	218 million people are estimated to be undernourished (2016).
food imports	USD 35 billion worth of food is imported annually.
GDP disparity	The combined economies of SSA are equivalent to 3.4% of the combined economies of the countries of the Organisation for Economic Co-operation and Development (OECD).
OECD agricultural subsidies	The combined value of OECD agricultural subsidies exceeds the combined economies of the 28 poorest SSA countries.
global food market dysfunctionality	Under-priced food on global markets due to subsidies, exclusion of full costs of inputs such as water, and the long-term costs of ecosystem degradation in producer countries.
Trends	
population	SSA's population will grow from 1.3 billion now to 2.49 billion by 2050.
employment	15 million young people a year will enter the labour market for the next ten years.
nutrition	Number of undernourished people in Africa grew by 44 million in the past 25 years.
food imports	Food imports are projected to grow to USD 110 billion per year by 2025.

Introduction

The Stockholm International Water Institute (SIWI) is working on an emerging advocacy effort to scale up green water (soil moisture) management and enhance rainfed agriculture across SSA through financial investments and political leadership. The initiative is called Transforming Investments in African Rainfed Agriculture (TIARA).

The objective of this paper is to investigate the complexities of food security in Africa, concentrating primarily on SSA. The focus of the paper is on the increasing level of food being imported into SSA to meet the shortfall in food supply within the region and how this impacts on and exacerbates the difficulties faced by the rural population.

The paper begins with a summary of the current situation facing smallholder rainfed agriculture in SSA, including both the natural endowment of the sub-continent and the factors that impact smallholder food productivity. The concept of virtual jobs is explored (Section 4) as a means of quantifying the income and employment opportunities lost when food is imported.

This section includes a brief analysis of the global food trade context and the uneven playing field on which SSA smallholder farmers compete.

The following section outlines trends in world food trade and the importation of food into SSA. The section outlines the disparities in global food trade and areas of concern in SSA food trade policy.

A key focus is the potential to increase the productivity of rainfed smallholder farmers to provide sufficient food to offset or substitute imported food. This would not only address the food security requirements of SSA but also provide income and meet the livelihood requirements of the farmers and their families, while providing a route to rural economic regeneration throughout Africa. The key to increasing productivity in smallholder rainfed agriculture is a combination of on-farm practices focusing on water and soil, an enabling public policy environment and a fully engaged private sector.



Maize in a local market in Busia, Uganda (The East African, August 2018).

Background – realities in sub-Saharan Africa

Introduction

The following section highlights the conditions faced by the people of SSA. These conditions, when combined, create what may appear to be an insurmountable challenge that consigns the bulk of the population of this very large part of the world to long-term poverty and the African continent as a whole to a continued low-income status.

Some of the conditions that face SSA are part of the natural resource endowment of the sub-continent, such as the land and water characteristics. Others, the demographics, agricultural productivity, public policy (including public expenditure) and international trade conditions, are the result of human decisions. Together they make a perfect storm that generates a classic vicious cycle that is predicted to worsen in coming years, particularly in the face of climate change.

World		
total population	7 632 819 000	
rural	44%	
Africa		
total population	1 287 920 518	
urban	547 602 182	(43%)
rural	740 318 336	(57%)
Sub-Saharan Africa		
population	1 050 135 841	
urban	423 958 015	(40%)
rural	626,177,826	(60%)

Table 1: Population figures

Demographics of agriculture in Africa

Africa is currently home to approximately 13 per cent of the global population (Table 1), which is predicted to increase to 22 per cent by 2050, with over 2.49 billion people. Although the proportion of the population that suffers from undernourishment in SSA has decreased from 33 per cent in 1990–1992 to 23 per cent in 2014–2016, because of population growth of 2.7 per cent per year, the absolute number of undernourished people increased by 44 million to 218 million over this period.

Across SSA, agriculture contributes 15 per cent of total gross domestic product (GDP) although this varies significantly between countries, from less than 3 per cent in South Africa and Botswana to over 50 per cent in Chad. (Note that most food produced for own

consumption is not measured in GDP, which leads to an underestimate of its contribution to GDP.) Agriculture employs over 65 per cent of the total labour force. Smallholder farming provides the bulk of livelihoods in agriculture and makes up some 80 per cent of all farms in SSA, directly employing about 175 million people, of which at least half are women. Most farmers engage in a variety of on-farm and off-farm activities to supplement their income.

Over the next decade, 17 million young people will be entering the labour force per year, less than half of which will be absorbed into non-agricultural employment. This will result in family farming remaining the single largest source of employment.⁵

Total land area in Africa	2 970 316 800 ha	
Cultivated area...	210 673 190 ha	
that is irrigated	13 444 875 ha	6.4%
Cultivable area...	771 335 050 ha	
that is irrigable		5.5%
currently irrigated		1.7%
that is rainfed	728 830 680 ha	94.5%
currently under cultivation		27%
Irrigable area...	42 504 370 ha	
under irrigation		32%
60% of the world's uncultivated cultivable land is in Africa		

Table 2. Cultivable land area (hectare)

Land and water

Irrigation and rainfed potential | Table 2 and Figure 1 summarize the cultivable land in Africa. A key reality is that Africa has very limited irrigation potential. Only 5.5 per cent of arable land in Africa is irrigable.⁶ This is due to a combination of availability of sufficient water and suitable land. This reality has two primary consequences: where irrigation is possible, it needs to be undertaken efficiently and strategically; and the vast majority of agriculture is rainfed.

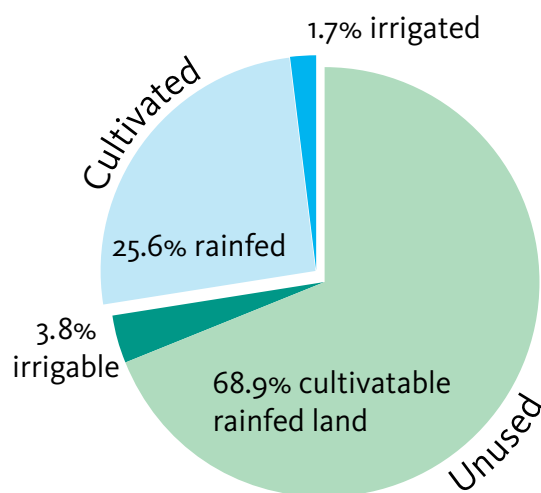


Figure 1. Types and use of cultivable land in Africa.

Rainfall | Rainfall across the continent varies substantially, with much of the continent being classified as semi-arid or arid. The distribution of rainfall has clear impacts on the practice of rainfed agriculture (Figure 2).

Soil degradation | Soils in semi-arid regions have frequently been degraded by historical land use, resulting in low soil organic carbon content and poor structure. Ultimately this leads to soil erosion, sedimentation of watercourses and reduced infiltration of water underground. Major threats to soils in semi-arid regions include erosion, salinity, and degradation due to human activities. These processes are linked to a decline in soil structure, a resultant loss of soil water-storage capacity and the emission of atmospheric greenhouse gases.

Land degradation | Land degradation reduces the productive capacity of land and agricultural output. This in turn increases poverty, forcing people into short-term coping strategies such as deforestation. A recent study of the Zambezi River basin, which is shared by eight countries,⁷ determined that 51 per cent of land in the basin is moderately degraded and 14 per cent is highly degraded. Overall, 82 per cent of the drylands of SSA are rated as poor status or as barelands by the Food and Agriculture Organization (FAO).⁸

Climate change

Climate change is predicted to impact SSA in a number of ways, and the evidence for these is already present. The impact will be varied across the sub-continent. The primary effects will be:

- Heat extremes;
- Changes in precipitation leading to more extreme droughts and floods;
- Sea-level rise impacting coastal regions; and
- Decreases in water availability, especially green water, due to changes in precipitation and increased evaporation due to temperature change.

These changes will have amplifying impacts on the difficulties already facing SSA, such as low food productivity, hunger, malnutrition and overall poverty levels. It is also anticipated that increasing competition for scarce resources will result in heightened conflict and security threats, leading to greater refugee and displaced populations, which will in turn lead to greater migration pressures.⁹

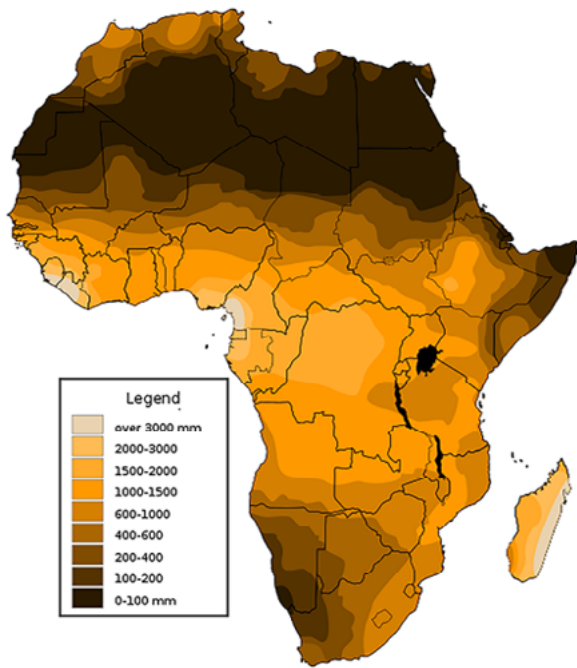


Figure 2. Precipitation levels across Africa [Delphi234 (Africa Precipitation Map-sr.svg)].

Smallholder farmers as SSA’s frontline water and soil managers | In the vast rural hinterlands of SSA, home to two-thirds of the sub-continent’s population, the majority of whom are engaged in agriculture, smallholder farmers are in fact the frontline managers of natural resources, chiefly water and soil.

A range of factors result in severe and extensive soil and land degradation as highlighted above. These include:

- Poor farming methods;
- Lack of public investment in education, extension service support, research and infrastructure; and
- Poverty-driven coping strategies such as deforestation, charcoaling, wetland cultivation, mineral prospecting, slash-and-burn extension of farmlands when degraded soils become infertile etc.

Soil and land degradation in turn impact water resources in river basins, lakes and wetlands as a result of erosion and sedimentation. This widespread degradation increases climate-related vulnerability, which results in a vicious cycle of further poverty and degradation.

Equipping small farmers with the skills and abilities to improve their farming methods would both improve their management of soil and water, and increase yields, thereby reversing the poverty–degradation cycle. Improving on-farm practices by introducing conservation agriculture, climate-smart agriculture, regenerative agriculture and agroecology at scale across the sub-continent could potentially reverse the current trends, as they have done in other parts of the world. In Brazil, over 50 per cent of the annual crop area has been converted to zero-tillage conservation agriculture (ZT/CA), which has reversed the devastating effects of soil erosion that were threatening the entire agricultural industry (Figure 3).¹⁰

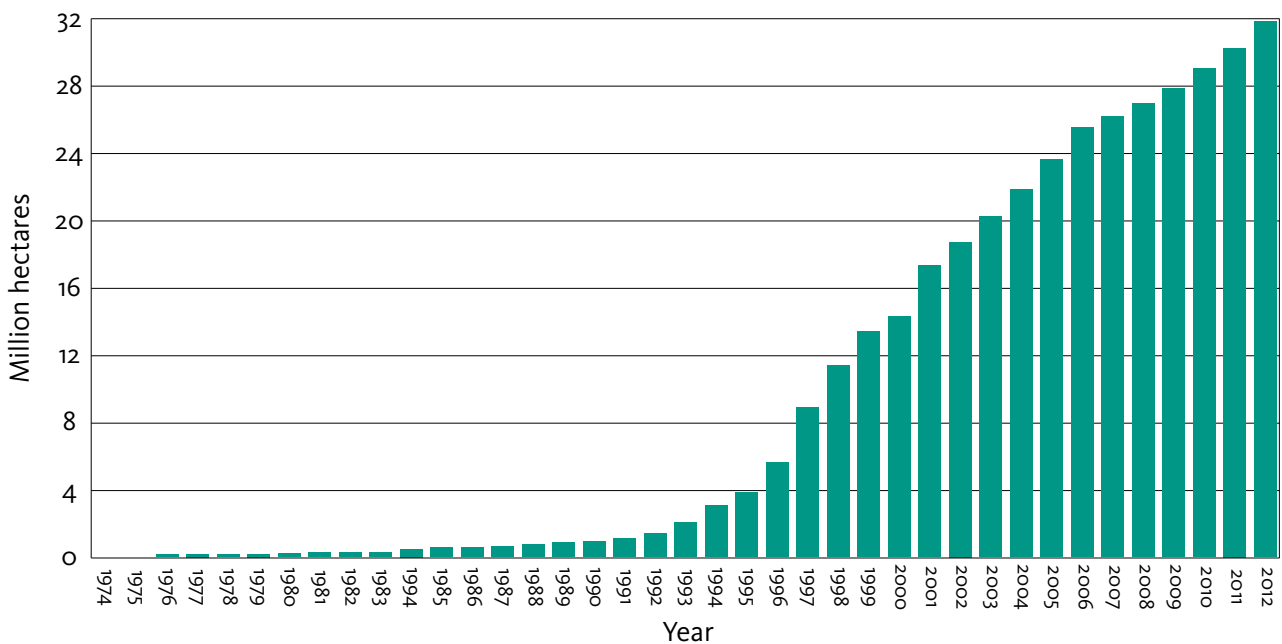


Figure 3. Evolution of ZT/CA management systems in Brazil. (De Freitas and Landers, 2014).

Virtual jobs

The concept

The virtual jobs concept aims to quantify the employment implications of replacing food imports, particularly cereals, with home-grown crops. This approach is the food and agriculture equivalent of the local resource-based approaches to infrastructure investment advocated by the UN International Labour Organisation (ILO) in developing economies.¹¹

Current crop yields in SSA are very low (Section 5), so the potential for increasing yields are high, with the smallholder sector having the greatest scope for substantially improving productivity. Greater on-farm productivity, which has been widely shown to provide a stimulus for off-farm rural economic activity, constitutes the foundation on which rural economies can be built.

Calculating the number of jobs that could be created by replacing imports is complex. For example, when importing a tonne of food from an OECD country, the value of subsidies that enabled the production of that tonne and all the associated indirect jobs involved in the product's value chain are also imported (Section 5.3).

Virtual jobs and virtual water

The concept of virtual jobs borrows from the concept of virtual water developed by Professor Tony Allan of King's College London. Virtual water is the water that has been used in the production of imported food by the country of origin.

In the case of virtual jobs, all the benefits of employment and growth accrue to the country of origin rather than the importing country. The discussion of virtual jobs is about the equivalent income and livelihoods that would be earned if the food imported into SSA were cultivated, processed and marketed in SSA, instead of being imported. It represents the on-farm and off-farm opportunity cost to SSA, primarily borne by the rural poor, of importing food from the distorted global market.

These may or may not be present in local markets or at the same scale. The value in terms of jobs per tonne of maize, for example, or the value of one tonne to a farmer will also be highly context specific, depending on where and how that tonne is produced. For a smallholder in SSA, an additional tonne produced per hectare will represent a doubling of productivity and have a high proportional value.

Because the economic conditions are so vastly different between a farmer in an OECD country and a smallholder in and SSA country, it is not helpful to equate them as having jobs of similar value. Therefore the concept of virtual jobs is framed in terms of the job opportunities associated with substituting imports as opposed to jobs based on the total cost of production of imports in the country of origin; or, drawing from the virtual water concept, the jobs that are imported with every tonne of food imported into the region.

The authors are aware that the calculation of a single figure representing the equivalent number of jobs that food imports represent, based on aggregated figures from across SSA, is useful for illustration purposes only. The issue is very complex, as the different variables and circumstances vary widely across the 46 countries of SSA. However, the concept has value in highlighting the lost opportunities of importing food rather than producing it in the region.

Quantifying virtual jobs

To quantify the number of jobs, substitutions are made using figures available in the literature that apply to SSA in general. Available survey data on smallholders in SSA refers to households rather than individual incomes. Therefore the calculations are in terms of the numbers of households that could be provided with an income (or where existing income could be enhanced) from which the number of jobs is then extrapolated, based on the average number of working adults per smallholder household. Due to food price fluctuations per tonne (Section 6.3), the calculations are based on the monetary

Key figures in demonstrating food import substitution in sub-Saharan Africa (2014)	
Average smallholder household income	US \$ 2,989*
Average off-farm household income	US \$ 4,991
Total food imports	US \$ 35 billion
Maize production in 2017	72 million tonnes
Maize imports in 2017	20 million tonnes
Cost of maize imports	US \$ 4 billion (US \$ 200/t)
Average maize price	US \$ 200/t
Average smallholder cereal production	1.5 t/ha
Average household composition	Two working adults and three dependants

value of imports, not the quantity or tonnage of imports. The key numbers used to show the impact of replacing imports with locally grown food are:

The value of imports in terms of smallholder household incomes | The total value of imported food into SSA – currently USD 35 billion – is equivalent to the household income derived from 11.7 million smallholder farms based on the average rural farm household income of USD 2,989 (which is equivalent to USD 4.09 per working adult per day; an average household has two working adults and three dependants).¹² This is equivalent to the annual incomes of 23.4 million working adults supporting over 35 million dependants. This illustrates how far-reaching the impacts of substituting food imports could be.

The price of imports includes the full costs of production and associated costs such as transport from the point of production to markets in SSA, offset by the value of agricultural subsidies provided by the country of origin. The price of locally produced food is likely to fairly accurately reflect the local production costs (if the price has not been altered by government policy), especially as

there is no effective agricultural subsidy mechanism in most of SSA.

Replacing imports by increasing rainfed smallholder productivity would release the expenditure made on food imports for other purposes, including investment in the smallholder agriculture sector. The benefits of this will be particularly apparent to those countries spending the greatest percentage of GDP on basic food imports.

Maize production and import substitution | Replacing the quantity of maize imported into SSA would require a doubling of yield on 8 million smallholder farms – with an average farm size of 1 ha. Beyond raising incomes, the rise in maize productivity would retain USD 4 billion in economies across SSA. Yield gaps are substantial across SSA (Section 5.1), with rainfed maize production averaging less than 1.5 t/ha. Therefore a doubling of yields is realistically possible, given the correct support.

The income benefit to a smallholder of an additional tonne of yield needs to be accurately calculated. Net income per tonne will rise as yield rises due to improved labour efficiency. It is important to stress that improving labour efficiency does not mean requiring farmers to increase their daily labour burden, it means increasing the output for the same labour input, thereby making the farmers' current efforts more profitable. Neither does it mean increasing the area of land under cultivation.

The focus should be on intensification rather than extensification (increasing the area under cultivation). Increasing gross yield production through extensification may not help replace imports as new smallholder farms will still need to exceed a subsistence threshold before producing yield for the market. By intensifying production on existing farms, excess yield is more likely to become available for selling off-farm.

Off-farm jobs from import substitution | If agricultural output increases in value by USD 4 billion to replace maize imports, and using the claim that USD 1 growth in agricultural value results in USD 0.3–0.5 growth for the non-farm sector, USD 1.2–2 billion of additional value could be created for the off-farm sector.



Figure 4. Potential livelihood and job enhancement for each US \$ 1 billion worth of food imported into SSA.

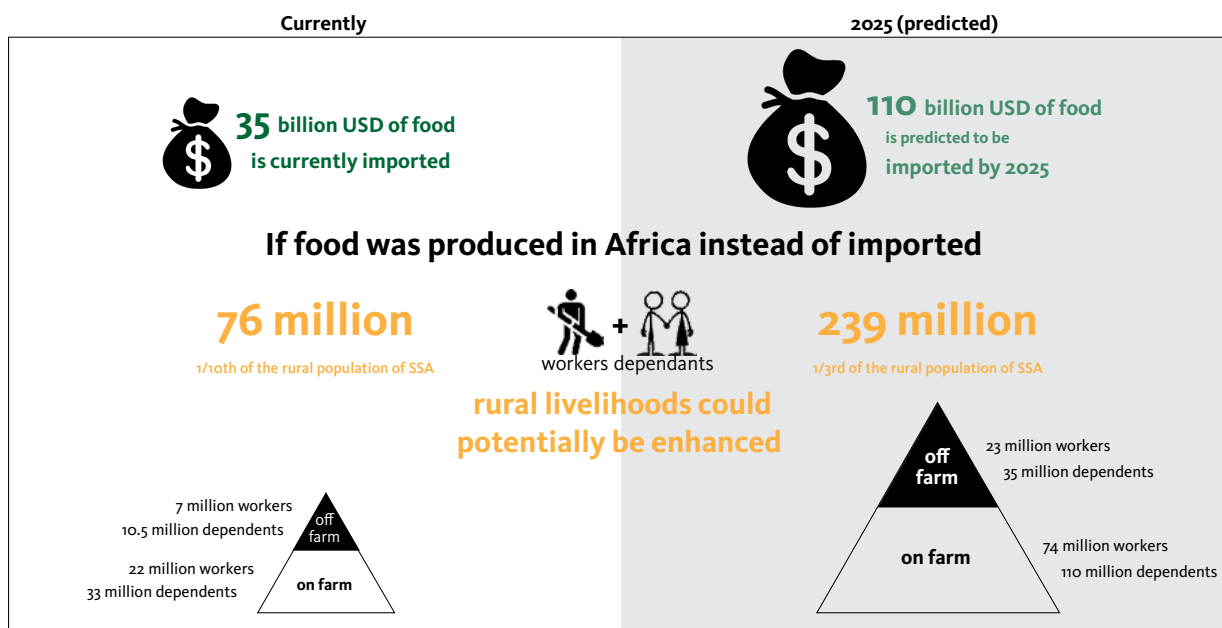


Figure 5. Infographic of the equivalent livelihoods impacted by food imports.

Using the figure for average off-farm household income (USD 4,991), an additional 240,000–400,000 off-farm households could be provided with an income related to maize productivity increases alone.

If the same calculation is applied to the total value of imports, a USD 35 billion rise in the value of agricultural outputs could result in USD 10.5–17.5 billion of additional value in the off-farm rural sector, creating an average income (see 4.2.1 / USD 2,989) for 2.1–3.5 million households supporting 10–18 million individuals.

The proportion of potential off-farm job creation in rural areas needs further in-depth assessment but it is probable, and desirable, that this is where the majority of job creation could take place.

Virtual jobs and actual job-creation opportunities

Based on the figures above and acknowledging the limitations in the data in terms of aggregation across the entire sub-Saharan region of Africa, as a guideline figure, each USD 1 billion worth of basic food imports into the region represents the equivalent of 868,570 rural jobs impacting the livelihoods of 2.17 million rural people.

Figure 4 provides indicative figures related to the impact per USD 1 billion of food imports. The current level of food imports into SSA is USD 35–48 billion per year, which is predicted to increase to USD 110 billion by 2025. Table 3 provides a summary of the impact of increasing productivity in SSA rainfed smallholder agriculture to the point where food imports are replaced by food produced in SSA. Substituting the current levels of USD 35 billion food imports could result in benefits potentially accruing to the livelihoods of 76 million rural

Total basic food imports	USD 35 billion (current)			USD 110 billion (by 2025)		
	On-farm	Off-farm	Total	On-farm	Off-farm	Total
Direct and indirect benefits (accrued on- or off-farm)						
Rural households benefited by substituting food imports*	12 m	3.5 m	16 m	37 m	11 m	48 m
Number of jobs potentially created/enhanced	23 m	7.0 m	30 m	74 m	22 m	96 m
Rural dependants benefited by substituting food imports	35 m	10.5 m	46 m	110 m	33 m	143 m
Rural livelihoods benefited by substituting food imports**	58 m	17.5 m	76 m	184 m	55 m	239 m
% of SSA rural population			10.3%			32.3%

* Average household comprises two working adults and three dependants

** Rural livelihoods includes the lives of working adults plus the lives of their dependants

Table 3. Potential benefits in substituting food imports with smallholder production in SSA.

inhabitants, enhancing the jobs of 23 million farmers and 7 million off-farm workers. This could increase substantially if the projected food imports increase to USD 110 billion, potentially improving the livelihoods of 239 million people through enhancing or creating 96 million jobs rather than importing food to the value of USD 110 billion.

It is therefore clear that there is a job cost to importing food. The reasons why imports have become necessary include:

- Increased demand due to population increase
- Low productivity
- Poor infrastructure
- Weak institutions and policy
- Under-priced food on the global market due to heavy agricultural subsidies in developed exporting countries, and the exclusion of the full costs of water and long-term ecosystem degradation in producer countries

Improving productivity to meet the demands of growing populations could potentially create millions of jobs across SSA in the food and agriculture value chain and improve the livelihoods of small farmers. If yields are improved sustainably, on-farm incomes will rise and the cycles of poverty in which many millions of rural people are trapped will be broken. Intensification and greater productivity can improve the labour efficiency of current farmers but there is also potential to attract new farmers. This scenario could have significant implications for further reducing rural unemployment and urban migration.

With greater on-farm yields come greater off-farm rural economic activity and opportunities for extensive job creation across the value chain and through supporting services and industry. By meeting food requirements through local production, not only is there the potential for extensive job creation, but also for the retention of the funds used to buy foreign food imports in local economies. The purchase of foreign food represents a sunk cost for the purchasing economy, whereas retained funds can be invested in the local economy to create growth and prosperity. Retained expenditure not spent on foreign food purchases should be invested in the agricultural sector to support the development of the market alongside increasing rainfed productivity.

The general vision of SSA development, as contained in Agenda 2063: The Africa We Want, is of a time when SSA economies have all attained at least middle-income status and agriculture is primarily oriented towards mechanized agroindustrial operations and the smallholder will no longer exist – “Africa’s agriculture will be modern and productive, using science, technology, innovation and indigenous knowledge. The hand hoe will be banished by 2025 and the sector will be modern, profitable and attractive to the continent’s youths and women” (Articles 13 and 72:e of Agenda 2063, 2015).¹³ While this is a laudable aspiration, it is implausible that the existing rural population of three-quarters of a billion people in SSA, who depend largely on labour-intensive smallholder agriculture for their livelihood and food, will reach anywhere near such a target in the next five years. The problem with such statements is that they undermine improving the current productivity and livelihoods of millions of small farmers, which would enable them to enter the agriculture value chain, because their very existence is counter to future policy aspirations.

Note 1

Conventional economic wisdom holds that increasing productivity and labour efficiency results in decreasing jobs, which would appear to undermine the principal argument of this paper. However, the authors argue that, while this premise may be valid in a modern industrial system, it does not hold in an agrarian context with very low levels of productivity and labour efficiency. If methods are available to substantially increase productivity and labour efficiency without increasing the effort required, and if the fruits of that increased productivity are marketable, wealth creation and poverty reduction will result. This is not the same as incremental efficiency improvements in an already-efficient environment in an industrial economy (which may result in a decrease in jobs). The problem with under-priced, highly subsidized food imported from the global market is that it undermines the local market, providing short-term politically convenient solutions to long-term problems. It also denies the smallholder farmer the benefits of improved productivity, reducing incentives and continuing the cycles of poverty.

Note 2

Rainfed smallholder agriculture

Productivity and growth in agriculture

Africa as a whole has experienced relatively rapid growth since the mid 1990s, with growth rates in the region of 6 per cent. Over the period 1990–2013 agricultural production increased in value by 130 per cent, which was dominated by the crop sector accounting for 85 per cent of agriculture value. Increases in agricultural production have been achieved through expansion of cultivation area, rather than through intensification as has been the case in Asia – productivity per agricultural worker has improved little in Africa compared to Asia.

Although the sector employs 65 per cent of the region's workforce, it only accounts for 32 per cent of its GDP. Using global trends in cereal production as an indicator, productivity in SSA has followed a markedly different trajectory to other regions of the globe over the last half century (Figure 6).¹⁴ Between the mid 1970s and 2000, per-capita food production in SSA declined while other developing economies rapidly boosted production.

By 2010 the region had only reached the same per-capita production levels as in 1961. With yield increases barely keeping pace with population growth, the

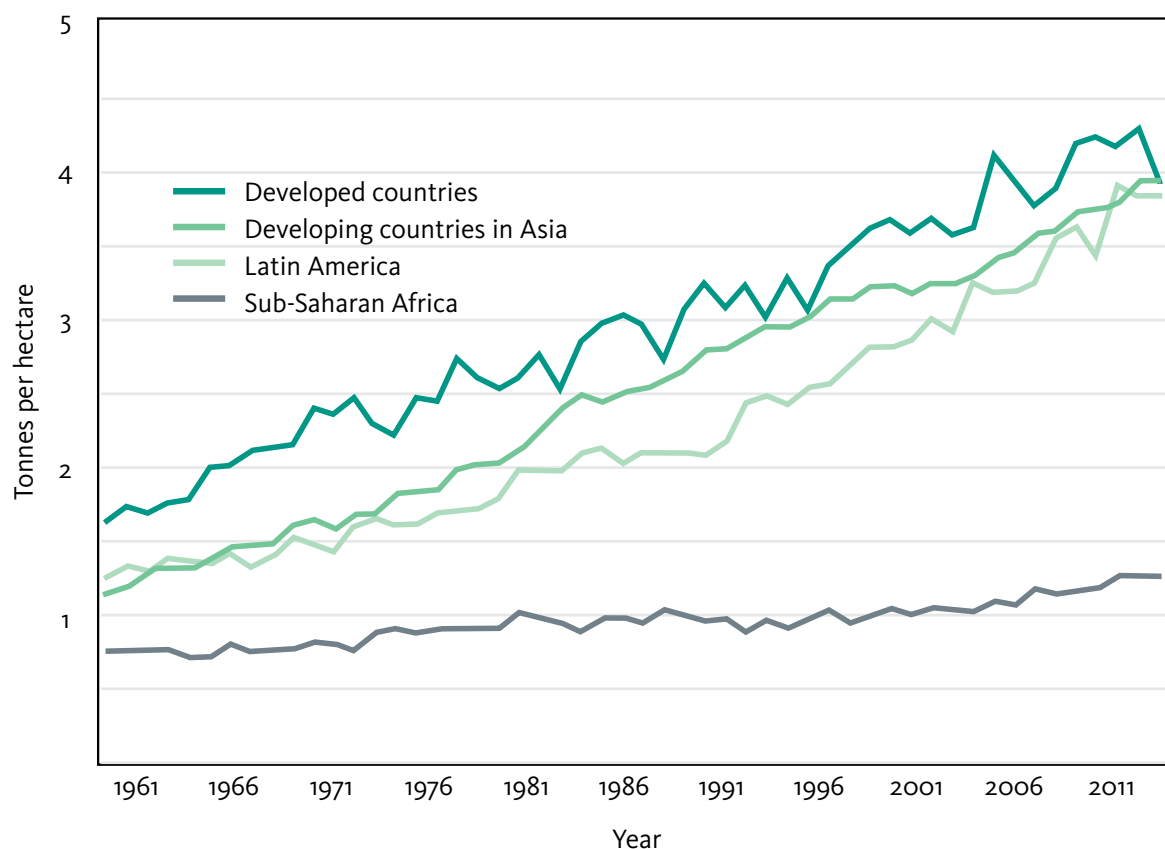


Figure 6. Cereal yields in tonnes per hectare from 1961 to 2011 (World Resources Institute, 2013). While other major cereal producing regions have doubled or tripled gross yields over this 40-year period, yields in SSA have all but stagnated.

Region/country	Water regime	On-farm yield, t/ha ⁵	Yield potential	Yield gap, %
West Africa ¹	Rainfed	1.7	10.0	83
India	Rainfed	1.6	9.3	83
East Africa ²	Rainfed	1.8	8.0	78
Brazil	Rainfed	4.7	8.7	54
East Europe ³	Rainfed	4.5	8.7	48
Bangladesh	Irrigated	5.7	10.1	43
Argentina	Rainfed	6.8	11.6	42
South Europe ⁴	Irrigated	10.2	14.8	31
USA	Rainfed	9.7	12.4	22
USA	Irrigated	11.8	14.0	16
Germany	Rainfed	9.7	11.0	12

¹ Includes in Burkina Faso, Ghana, Mali and Nigeria
² Includes Ethiopian, Kenya, Tanzania, Uganda and Zambia
³ Includes Bulgaria, Hungary, Poland, Romania and Ukraine
⁴ Includes Portugal and Spain
⁵ Estimated, based on most recent available statistics in the last ten years

Table 4. Yield potential, on-farm yield and yield gap (percentage of yield potential) for selected maize-producing countries in the Global Yield Gap Atlas (Grassini et al., 2017). East and West Africa have immense room for improving rainfed yields, with SSA underproducing maize.

resulting situation is growing undernourishment, in terms of absolute numbers since 1990, and widespread food insecurity. In the absence of serious increases in productivity, food imports will become increasingly necessary to ensure an adequate supply of food for SSA's population.¹⁵

While SSA in general has experienced relatively strong economic growth since the early 2000s (on average 4.5 per cent growth per year), this level of growth has not been felt by the agricultural sector and therefore has not benefited the 65 per cent of the population living in rural areas and working in the agricultural sector.

Agricultural productivity is primarily a measure of the yield produced per unit of labour, which is mirrored by the yield produced per unit of farmed area (the number of tonnes of maize produced per hectare, for example). The difference between the potential yield that could be produced and the yield actually produced is the yield gap (Table 4). As a result of low productivity, there is an extremely high yield gap across the SSA region. It is estimated that the largest yield gaps in the world exist in SSA for maize, for example, which is underproducing by 80 per cent on average. The current baseline of low productivity presents substantial positive opportunities for rural job creation and rural, as well as wider, economic development.¹⁶

As Jayne et al noted (2010):¹⁷ "There are virtually no examples of mass poverty reduction since 1700 that did not start with sharp rises in employment and

self-employment income due to higher productivity in small family farms". For Africa's resource-poor states this claim is particularly pertinent. Evidence suggests that most countries that are unable to launch an agricultural revolution of some kind remain characterized by poverty and economic underdevelopment. It is generally accepted that agriculture is the key developmental engine that will drive economic growth in SSA. However, without a broad-based agricultural revolution of some kind, it is unlikely that a general economic transformation in agricultural and non-agricultural sectors will take place.

mance and declining incidences of poverty, it is generally well accepted that in terms of reducing poverty, increases in agricultural productivity are more effective than equivalent productivity increases in other sectors (Figure 7).¹⁹ For example, research from India shows that a 10 per cent increase in agricultural output results in a 5 per cent rise in industrial output, with urban areas therefore enjoying greater employment opportunities as a result of greater labour productivity in rural areas.

Underpinning this relationship are the strong linkages between agriculture and other sectors of the economy and the high proportion of activity in the agricultural sector undertaken by the poor. While agriculture fosters direct economic development, it is the indirect effects on other sectors that may offer the greatest advantages.²⁰ This makes agricultural productivity the critical starting point for efforts aimed at reducing poverty and driving equitable macroeconomic development.

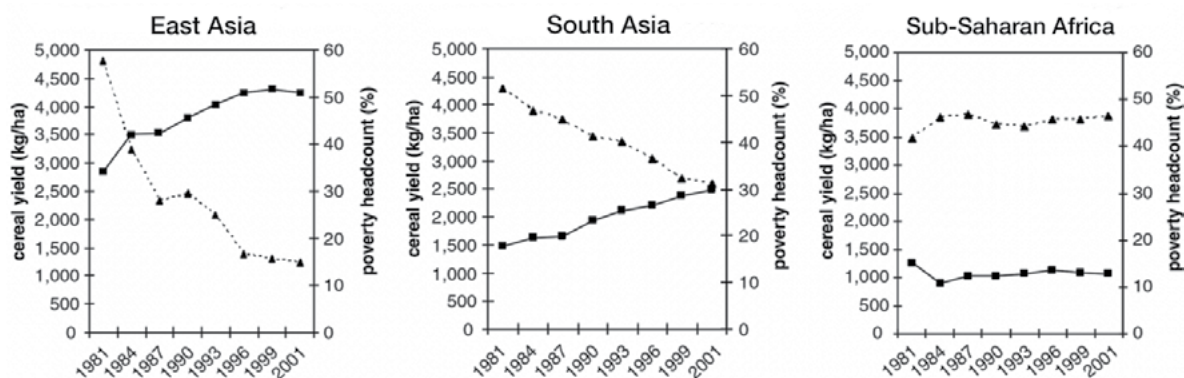


Figure 7. The evolution of cereal yields and poverty in East and South Asia and SSA, 1981–2001¹⁸ (calculations based on World Bank 2006 data). Historical trends from South and East Asia suggest that there is a relationship between increasing cereal yields and decreasing instances of poverty, a trend not seen in Africa due to stagnating yields. (Note that although the data for Africa is dated, the trend has not changed.)

Public policy and public expenditure

Public expenditure is a direct barometer of national policy and political will. Although government policy statements may provide an indication of what a government may wish to convey to public audiences as their aspirations for a particular sector, what is allocated and spent out of public funds in the sector is the real measure of public priorities and intentions (see Figure 8).

Agricultural sector expenditure | Notwithstanding the importance of agriculture in the economies of SSA and the continuing dependence of a large proportion of the working population directly or indirectly on agriculture, public expenditure in agriculture declined from 7 per cent of total public expenditure in 1989 to 3 per cent in 2012. The average per-capita expenditure declined from USD 28 to USD 19 over the same period (USD purchasing power parity 2005) – the only region in the world in which it did.²¹

The need to reverse this trend has been recognized by SSA governments, as shown by the 2003 Maputo Declaration on Agriculture and Food Security in Africa, committing to allocate at least 10 per cent of national budgeted expenditure on agriculture and raise the annual growth rate of the agricultural sector to 6 per cent. Ten years after the Maputo Declaration, four of the 47 African Union states had achieved the 10 per cent budget expenditure target; by 2016, ten had achieved the target.²²

From a political economy perspective, cheap, under-priced food available on the global market presents SSA politicians and officials with strong incentives to adopt short-term solutions through which food crises can be addressed. However, this does not address the underlying problems of widespread rural poverty, undercut local food production chains, low productivity and the general failure of rural economies across the sub-continent.

On review, public expenditure in the agricultural sector in recent years has generally been found to be targeted at areas with limited, and in some instances, negative, impacts on the sector. Public expenditure has largely focused on input subsidies and extension services. Input subsidies have, in many instances, been problematic in terms of efficient targeting; they have also undermined the role of the private sector, which may have more efficient providers. There is strong evidence that public expenditure on research and development, physical infrastructure such as roads, and extension programmes focused on improved in-field techniques in rainfed farming would substantially improve the effectiveness of public spending.

Effective public expenditure in the agricultural sector needs to be viewed against the backdrop of four important issues:

- Agricultural labour productivity and crop yields that are far below those achieved in other developing regions of the world, as noted above;
- Significantly under-priced food available on the global food market because of large subsidies, exclusion of the full costs of food production in the price of food (e.g. full cost of water) and the long-term costs to the ecosystems of producer countries through unsustainable agricultural practices;
- The expected impacts of climate change as highlighted, for example, in the FAO's focus on climate-smart agriculture; and
- The increasing requirement for food imports to SSA, to which we turn below.

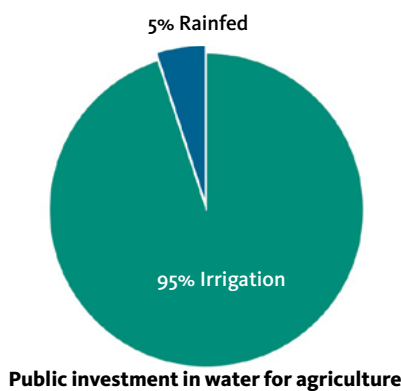
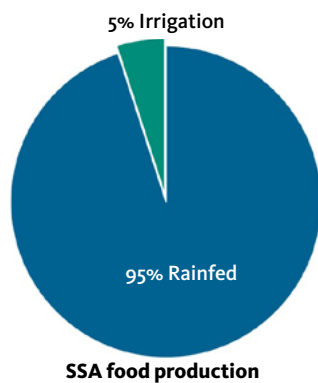


Figure 8. Allocation of public funds to water for agriculture.

Water sector expenditure | Water for agriculture accounts for 85 per cent of all water withdrawals for economic activity in SSA. Other uses are hydropower generation, industry and municipal water. The proportion of water used for direct human consumption is comparatively small, although it has very significant impacts on human health and well-being, especially on the poor.

Public expenditure on water is divided between different sectors: water for energy generation, industry, urban development and agriculture. Public expenditure on agriculture is almost exclusively related to irrigation, which includes dams for irrigation water storage, conveyance of water to irrigated land and irrigation equipment. It is generously estimated that less than 5 per cent of public-sector agricultural water expenditure is spent on water for productive purposes in rainfed rural SSA; 95 per cent of cultivable land is not irrigable and produces 85 per cent of the sub-continent's food. Public expenditure on large public irrigation schemes have not proven to be efficient with low levels of usage of equipped land and low levels of output production.²³

Focus on rainfed smallholders

The Green Revolution in Asia demonstrated that agricultural growth that focuses on the smallholder sector can transform rural economies. Although the global context has changed, the potential in SSA must be similar.

Of SSA's cultivable area, only 5.5 per cent (42 million ha) is irrigable, of which 31 per cent is currently under irrigation. Alternatively, 728 million ha of land in SSA is suitable for rainfed agriculture, of which nearly 69 per cent is currently being used (Section 3.3). Although there is potential for expansion of irrigated agriculture, even if all the irrigable land were to be efficiently irrigated and produced consistently high yields, this would still be insufficient to ensure food security and provide the broad-based agricultural revolution SSA so desperately requires. High investment costs, significant negative environmental consequences and inefficient water use, coupled with the uncertainties of climate change, have all contributed to the general consensus that irrigation expansion in SSA is both unlikely to occur and is unsuitable as a route out of poverty for the smallholder sector, which makes up 80 per cent of all farms in SSA.

To exploit SSA's yield gaps and realize the potential impact of increased productivity on poverty and general economic development, the rainfed smallholder sector must be the focal point of both increased investment and enabling policy reform. By focusing on improving yields amongst rainfed smallholders, development efforts target the most labour-intensive sector of SSA's collective economy while simultaneously targeting rural areas, which generally have far higher rates of unemployment and poverty than urban centres. The greatest potential employment gains fortunately exist in the agricultural sector, where unemployment is most prevalent, and which at present is also the sector with the lowest productivity performance.



Smallholder rainfed farm, central Zimbabwe (Len Abrams).

SUSTAINABLE DEVELOPMENT GOALS



Producing SSA's food in SSA with SSA's smallholder farmers is the only way out of poverty for SSA's rural population.



Increasing the productivity of SSA's smallholder farmers will contribute to the food needs of 218 million undernourished Africans.



USD 110 billion* worth of food imports is the equivalent of 74 million on-farm jobs and 22 million off-farm jobs.
 (* Projected food imports by 2025)



Food produced using smallholder conservation agriculture and green water has a much smaller carbon footprint than imported food.

Figure 9. The SDG benefits of supporting smallholder rainfed farmers in SSA.

Rural regeneration and wider employment

Only 10 per cent of full-time rural employment is off-farm in SSA, compared to 30 per cent in Latin America. However 35 per cent of rural incomes in SSA, compared to 50 per cent in Asia, are earned off-farm. Engaging in secondary employment is common, particularly for those farming less than 0.5 ha of land, who earn between 30 per cent and 90 per cent of their income off-farm.

Agriculture plays the dominant role in influencing the size and structure of rural employment as it is the largest generator of income and the largest employer in rural areas. Historically this sector has played a key role in expanding the economic base of rural areas through clear linkages between productivity and economic growth. Developing rural economies is likely to benefit the whole economy, particularly as the tax base is expanded at the same time.

Typically, a USD 1 increase in agricultural value, initially driven by greater productivity, results in a USD 0.3–0.5 rise in rural non-farm incomes. Agricultural surpluses increase opportunities for trade, while higher farm incomes, together with higher rates of rural savings, make capital available for investment in off-farm activities. Greater productivity allows for the development of post-harvest value chains that stimulate rural economies and create employment opportunities.

The employment creation potential of farming is high. Labour-intensive forms of agriculture that improve productivity not only generate significantly higher income per unit of on-farm labour but also increase off-farm rural employment opportunities. Enhanced smallholder farming offers greater returns in terms of poverty reduction than industrial methods of agricultural production and equivalent productivity gains in the industrial and service sectors.

Low productivity has prevented market development and hampered smallholder access to the market, resulting in the loss of potential associated indirect economic activity. Increased incomes generated by increased agricultural productivity create higher demands for non-farm goods and services. This demand tends to be locally concentrated as smallholders spend on locally produced goods and services, thereby stimulating local economies.

Agriculture therefore plays a strategic role in the generation of diversified off-farm employment in rural areas, which is critical to the process of stimulating the growth in rural economies. Reaping the rewards of higher yields is, however, predicated on the enabling environment and, as a first step, being able to get excess produce to market.

Enabling environment

SSA's growing labour force will need to be absorbed by the agricultural sector directly and indirectly. The growth of the off-farm sector is essential for long-term economic growth but it is on-farm productivity that provides the basis for this. Increasing on-farm productivity and thereby facilitating the knock-on effects in the off-farm sector requires overcoming a number of obstacles and limitations.

The primary on-farm hurdle in rainfed farming is water. Water scarcity is the main factor limiting productivity and this is driven by rainfall variability and high non-productive water losses, rather than the total amount of rainfall received during the growing season. A further important variable related to water is climate change, which makes the need for on-farm rain and soil-moisture management all the more critical. Given that only 5.5 per cent of cultivable land in SSA is irrigable, improved green water storage and high water-use efficiency on rainfed farms must be targeted. This can be achieved by modifying farming practices and considering the principles of conservation agriculture, climate-smart agriculture, regenerative agriculture and agroecology. Investments in the development and dissemination of agricultural technologies and techniques appropriate to rainfed farming in the SSA context is essential if rural economies are to be developed.²⁴ These activities, in particular the improved capture, retention and productive use of soil moisture – green water – is the focus of the TIARA initiative.

Beyond the farms themselves, the FAO cites technical, institutional and infrastructural constraints that limit agricultural productivity and changing farm size dynamics that will have implications for production efficiency. Other widely cited requirements for improving agricultural productivity include access to markets and services, safety nets, increased agricultural research, information and credit availability, and the adoption of farming practices that improve climatic resilience. Developing human capital, largely through rural education and health care, is also seen as essential if poverty alleviation is to be enduring and achieved at scale. Improved transport and communication links and electrification all improve the productive capacity of labour in rural areas.

Due to the state of agricultural productivity and growing demand, there is huge employment potential in the sector. However this will depend on the ability of the enabling environment to support growth.

Supporting smallholder rainfed farmers in SSA to provide for the sub-continent's food requirements, in preference to importing food, holds a range of benefits that contribute directly to meeting a number of the Sustainable Development Goals (Figure 9).

Global food trade and Africa

Food imports into Africa

Patterns of food consumption are changing in SSA with the growth of urban populations. The food economy of West Africa represents 38 per cent of regional GDP. This is beginning to make local food markets increasingly attractive to investors. However, against the backdrop of these changes, there exists the concerning reality that the number of undernourished people in SSA stood at 218 million in 2016 and is continuing to increase (Figure 10).

The growing incidence of undernourishment coupled with persistent low agricultural productivity has resulted in the growing need for food imports into SSA: despite being richly endowed with vast natural resources, it is not feeding itself. Rich countries with high levels of productivity can afford to manage food security through

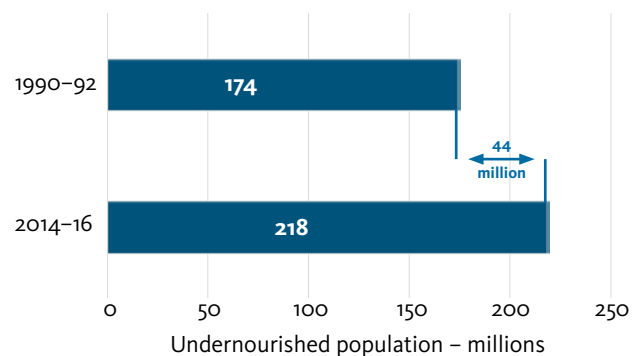


Figure 10: Growth in the number of undernourished people in SSA in 24 years.

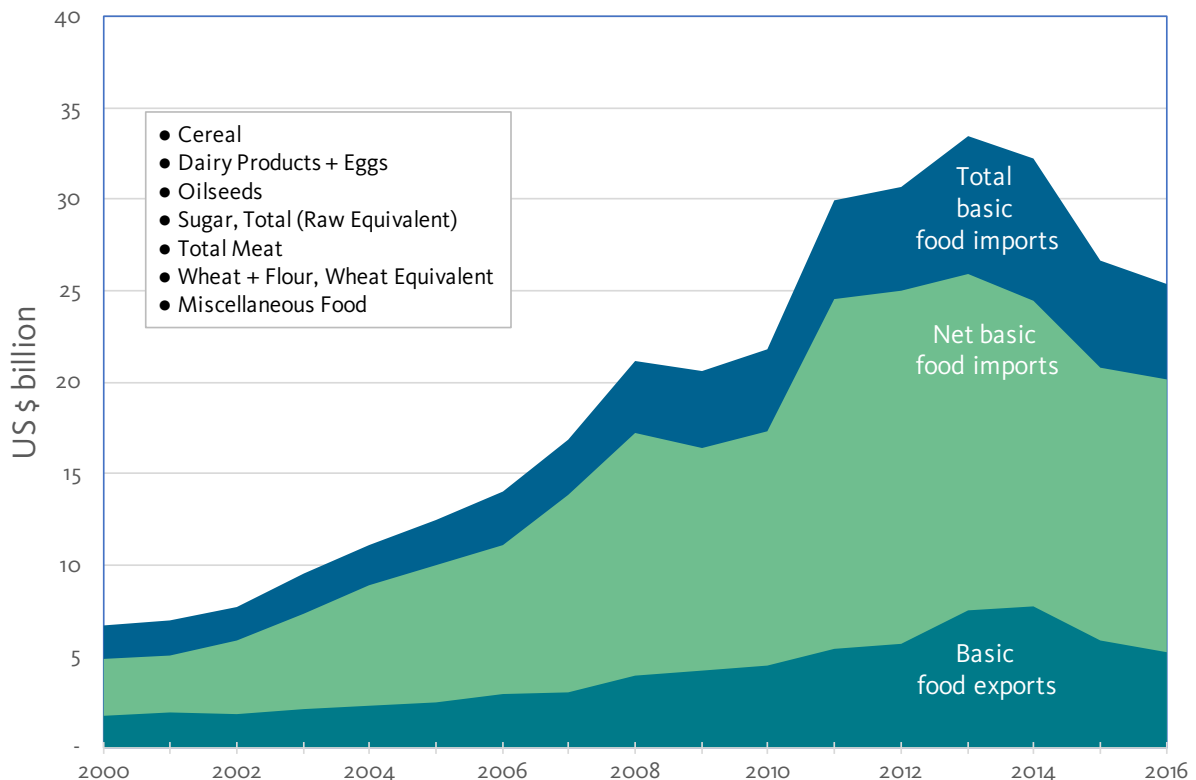


Figure 11: Basic food imports into SSA (FAOSTAT).

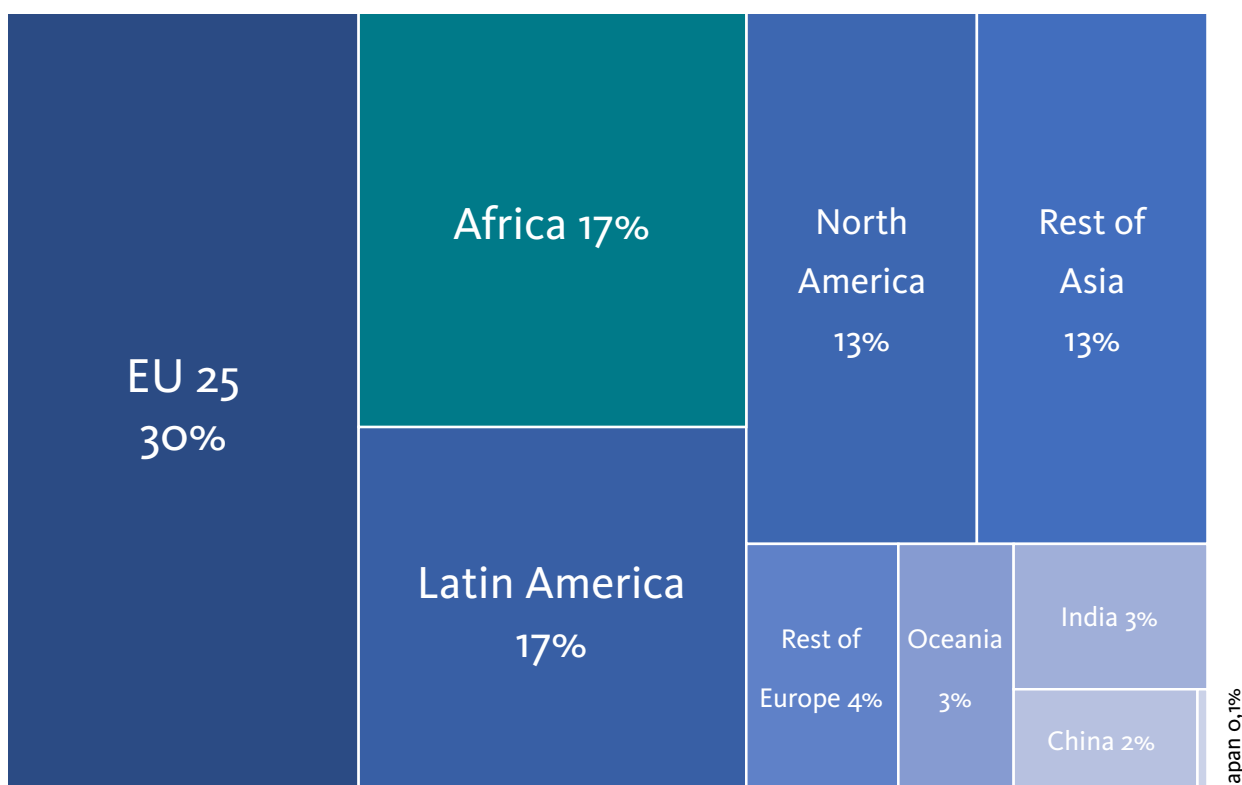


Figure 12. Agricultural imports to SSA by origin (2002-2006 average)

net food imports, but poorer countries cannot. Meeting the cost of food imports reduces the capacity for growth-oriented investments throughout the economy, resulting in negative economic trends.

Food and agricultural trade in SSA consist of both external and intra-African trade, but the latter is low compared to the total trade volume. Some 20 per cent of SSA food exports stay in SSA, whereas 83 per cent of total agricultural imports come from outside the sub-continent (Figure 12).²⁵

Global food trade – an unlevel playing field

Because SSA does not produce sufficient food to meet domestic demand, the only way of meeting the nutritional needs of the growing population is to import food from outside the region. However, entering the international food trading arena means engaging in a highly complex marketplace controlled by complex and powerful rule-making interests where low-income countries face many challenges. The poor performance of SSA agricultural trade is partially the result of high levels of external and internal barriers to trade. Trade barriers take two general forms: price barriers and technical barriers such as quality, processing, and packaging standards.

Fluctuating domestic trade and marketing policies in SSA countries also cause uncertainty in the agriculture sector (Section 6.5). Banning the export or import of produce at short notice and changing policy from year to year in an attempt to influence domestic food prices or stimulate productivity and domestic food security seldom achieve the desired results and often achieve the opposite.

SSA economies and agricultural production conditions differ starkly from the member countries of the OECD. The OECD currently has 36 member countries, which include most of developed countries. While the agricultural sector in SSA suffers from the difficulties noted above, OECD have high production and yield levels and high relative investment in agriculture and related infrastructure.

The domestic agriculture sector policies in OECD countries are aimed at ensuring domestic food security and maximising the contribution of the sector to their respective national economies. Each country, understandably, is focused primarily on their own well-being and prosperity, after which they focus on the collective well-being of the political and economic communities of countries to which they belong, such as the European Union.

The combined economies of all 46 countries in SSA (including South Africa and Nigeria) are equivalent to just 9.7 per cent of the European Union and 8.6 per cent of the USA (Figure 13). This level of disparity is especially pronounced in the international agricultural food market.

The agriculture sector in OECD countries is heavily subsidized. The support provided is described by the OECD as "... the annual monetary value of gross transfers to agriculture from consumers and taxpayers arising from government policies that support agriculture.²⁶" Together the full package of subsidies to the agriculture sector consist of producer support, consumer support and general services support.

One of the main objectives of agricultural subsidy policies is to achieve a balance between supporting both producers and consumers, while ensuring competitive access to the global marketplace. This ensures that farmers remain in business and that consumers' food prices are maintained at affordable levels. While protecting both consumers and producers at the domestic level, such policies are often accused of distorting global food prices in the international marketplace. This causes problems in other countries, particularly poor countries and net importers of food, which is the situation for most countries in SSA.

The combined total of agricultural subsidies in OECD countries is larger than the entire economies of all but the two largest economies in SSA (Figure 13). The averaged combined annual OECD agricultural subsidy between 2000 and 2016 was USD 272 billion and the combined total of the countries which export food to SSA was USD 190 billion per year.²⁷

World food price fluctuations

In the past 20 years food prices, of cereals in particular, have fluctuated significantly. For those countries importing large proportions of the food consumed locally, the situation has changed markedly since the early 2000s. The FAO has developed a food price index for the major cereals of wheat, maize and rice, based on prices in 2000. From 2000 to 2004 this price index registered below the 100 mark; at the height of the food crisis in 2011 and 2012 this figure had more than doubled to over 230. While prices have come down since these peaks, they still remain over 50 per cent higher than they were in 2004.

Fluctuations in the maize price over the last 20 years is a good example of the kind of instability importing nations face. From lows of USD 75 per tonne in mid 2000, the maize price peaked at USD 321 per tonne in October and November 2013. At present the price is hovering in the range of USD 150–160 per tonne (Figure 14).

The reasons for the spike in food prices in 2012 are debated, but the immediate causes were climatic (a dry summer in the USA and Europe), and oil price rises, which led to higher demand for biofuels. In 2012, 40 per cent of US maize production was used for ethanol fuel production. This dynamic showed that the food requirements of the developing world can be superseded by other non-dietary demands for the same product in developed nations if the price is right. High global food prices caused widespread social unrest and have been cited as a major contributing factor to the Arab Spring.²⁸ In SSA, the poor suffered the most, with malnutrition and instances of poverty rising and rural areas being the hardest hit (Figure 10). Fluctuating world prices cause uncertainty for the agricultural sector in SSA, and the wider social implications can be amplified if imports constitute a significant portion of local food consumption.

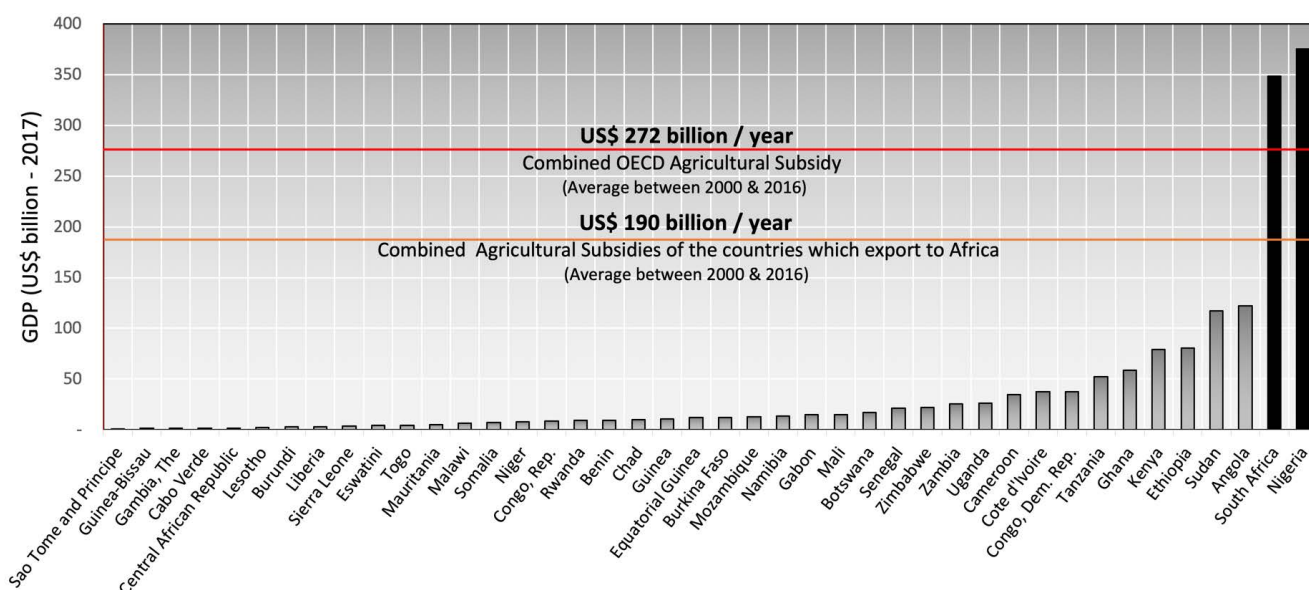


Figure 13: OECD agricultural subsidies compared to Sub-Saharan African economies.

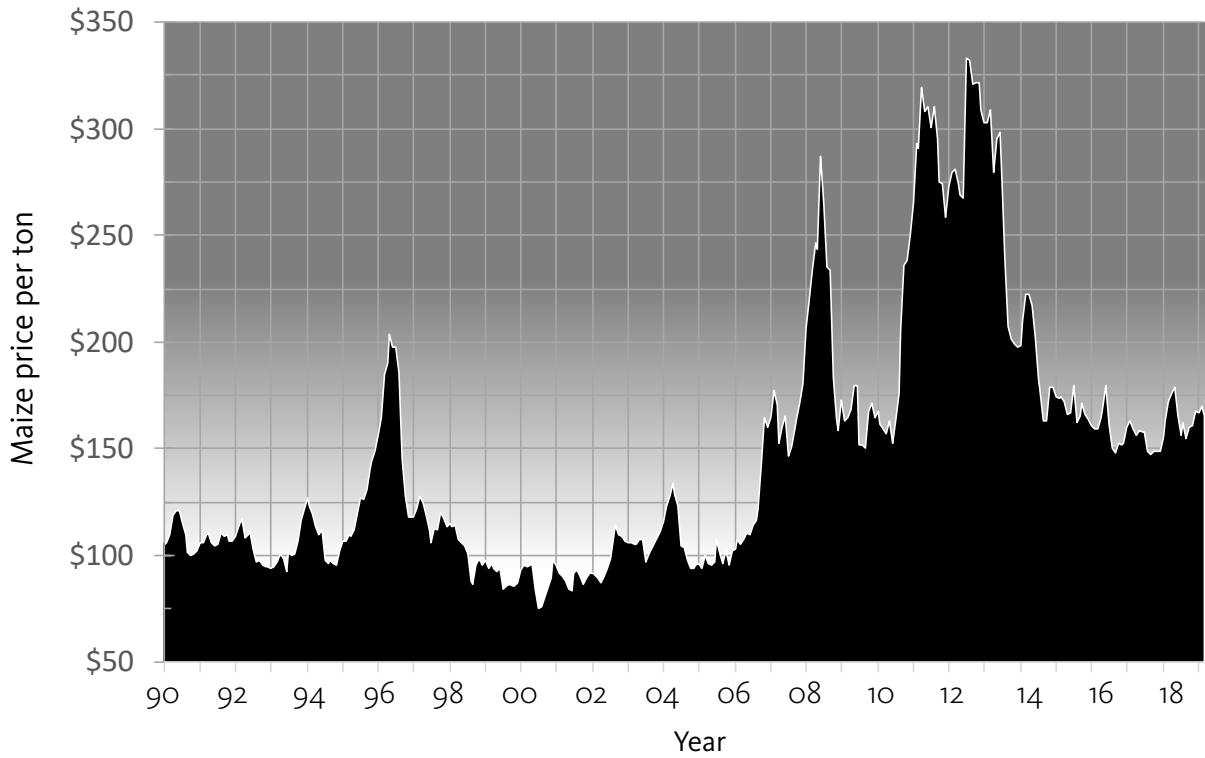


Figure 14: World maize price, 1990–2019.

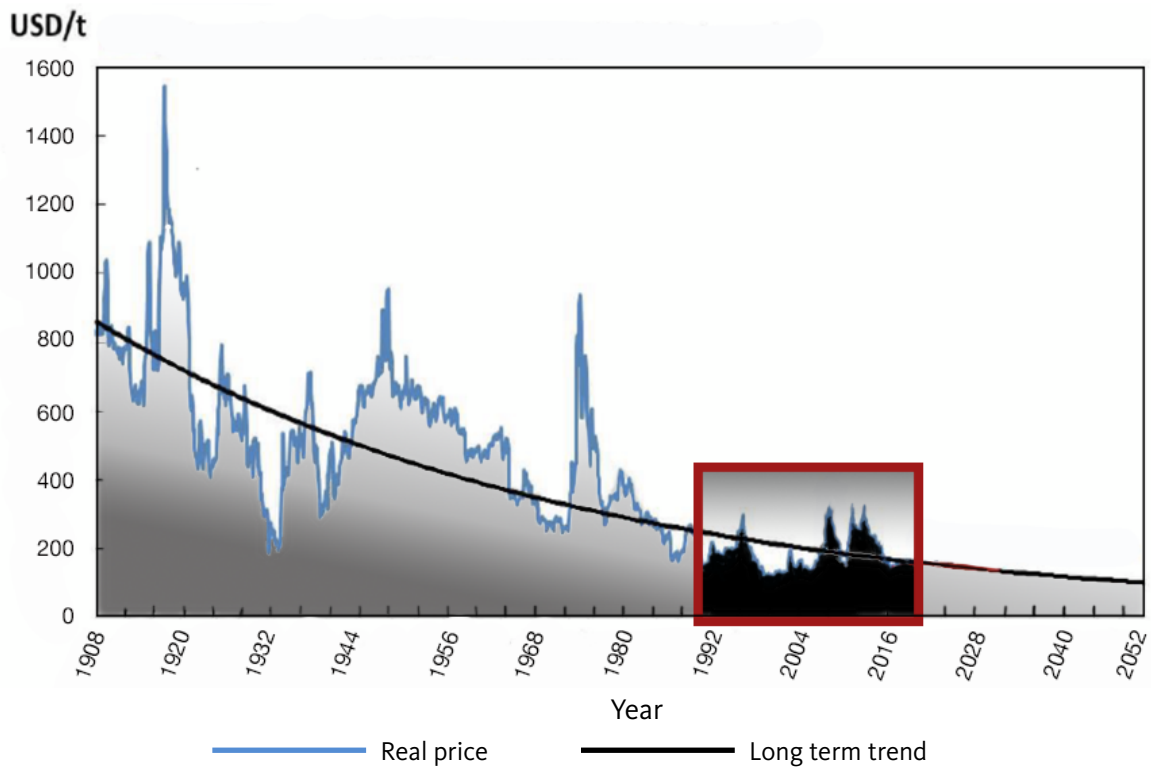


Figure 15: Long-term trends and projections of international food prices (Brooks, 2017).

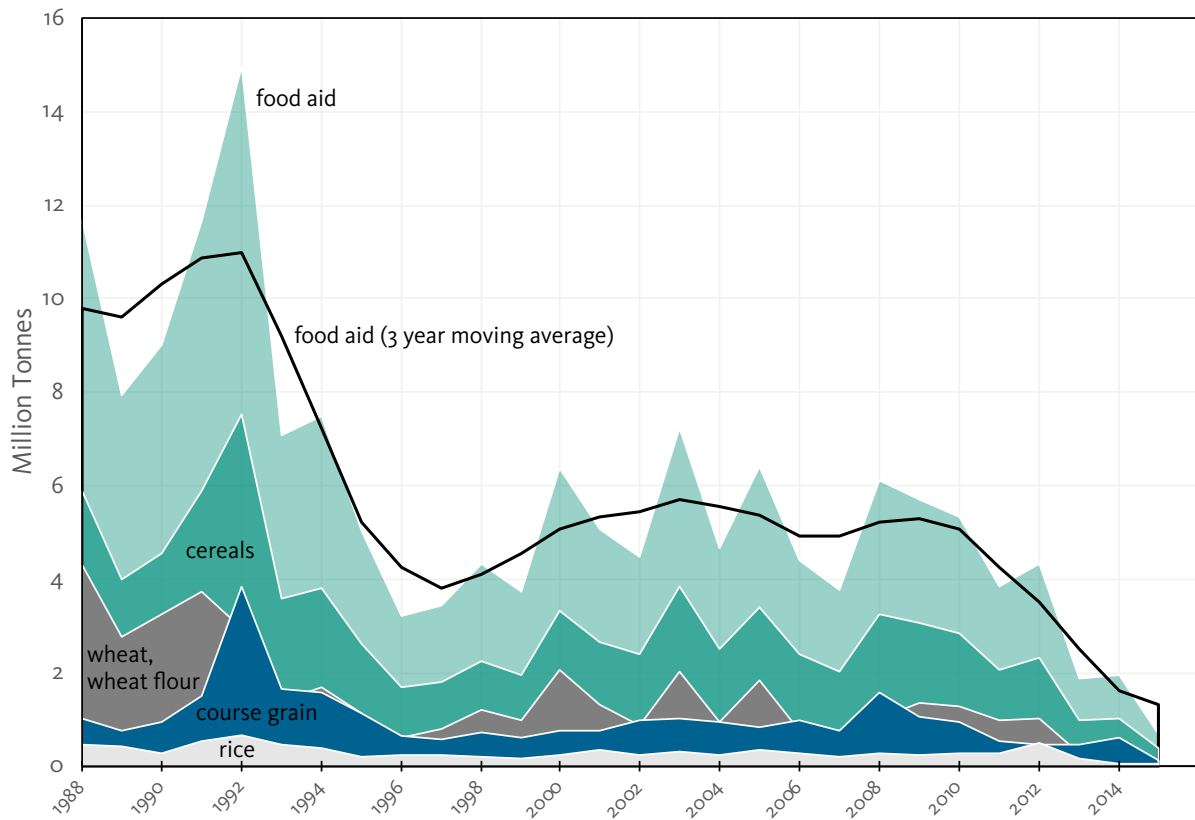


Figure 16 Annual food aid to SSA.

This needs to be seen in the context of long-term trends in global food prices. The past 30 years show substantial fluctuations in food prices and give the impression of overall food price increases. However, these need to be seen in the light of long-term trends, which indicate that global food prices have consistently decreased over the last 120 years²⁹ (Figure 15).

Food aid

The global food trade is heavily skewed in favour of developed and OECD countries. This section asks if food aid is a further factor undermining agricultural development in SSA. The impact of food aid on recipient communities and markets has been under extensive scrutiny for a number of decades. Food aid is without doubt a critical element of disaster relief responses and humanitarian aid following major natural disasters, conflict or economic crises, and in this capacity food aid makes life-saving contributions. From an economic standpoint, food aid can replace imports, thereby by making funds available for reallocation to other sectors of the economy.

However, critics argue that it creates dependencies and local disincentives (in terms of production and

agricultural investment). They also argue that, in general, food aid programmes have failed to alleviate long-term malnutrition or positively impact economic development. The motivations of donors have also been questioned.

Decline in food aid | Food aid shipments have declined steadily since the 1970s. Between 1988 and 1999 global food aid deliveries from the world's largest donors declined from 13.8 million to 5.8 million tonnes (Figure 16). However, 80 per cent of food aid transfers are tied, meaning that the donor country dictates where the food is sourced (usually its own producers) with donor country contractors procured to undertake distribution. Recently there has been an increasing shift towards untied, cash-based food aid to developing nations due to heavy criticism of the tied model. This allows food to be procured locally, regionally or from overseas.

The World Food Programme differentiates between food aid and food assistance. The former describes old-style food or monetary handouts, while the latter includes a full range of instruments, activities and platforms that aim to empower vulnerable and food-insecure people. The aim of food assistance programmes is to combat the root causes of hunger. While handouts can form an element of food assistance packages, the primary aim is a lasting impact on food security.

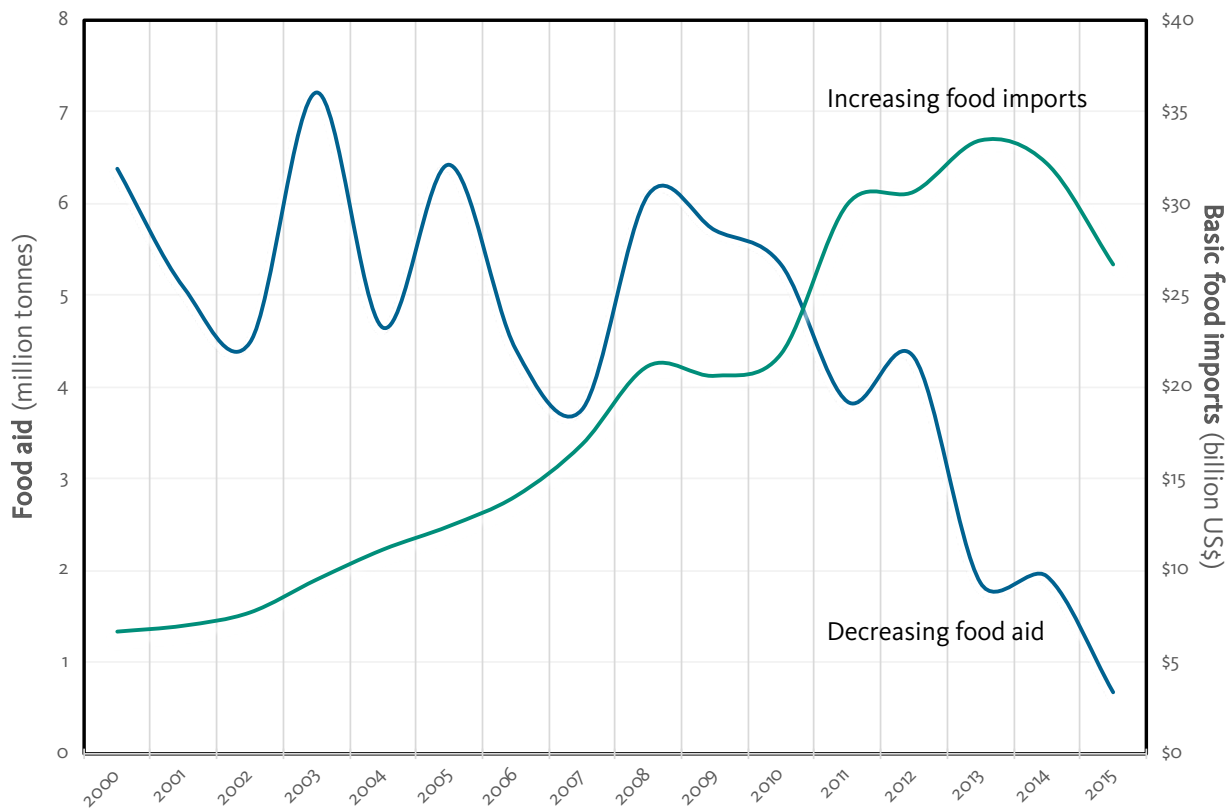


Figure 17. Food aid versus food imports.

Impact of food aid | The impact of food aid on local communities and markets has been the subject of extensive academic research that has arrived at five general conclusions:

1. Macro-level studies have found that food aid causes only limited local disincentives, while at the micro level, studies have failed to find any significant negative impact associated with food aid at the household level;
2. Food aid has no significant negative impact on labour supply or agricultural productivity if it is targeted effectively at the most food-insecure households;
3. Food aid is harmful when food is delivered or is purchased at the wrong time. Poor timing can cause sharp price adjustments and commercial market displacement;
4. Food aid can harm poor net buyers of food if procured locally, resulting in price increases. Similarly, food aid can harm net producers if aid drives down local prices and producers are not recipients of aid; and
5. Poor local market integration with wider markets can amplify the negative impacts of food aid.

These conclusions point to the timing of aid (both in terms of purchasing and delivery) and the targeting of aid as critical. If these factors are effectively considered and acted on, food aid is unlikely to have negative impacts locally. However, flows of food aid to SSA are symptomatic of larger structural and political issues. The literature points to instability and lack of resilience in agriculture due to weather-related shocks as the key drivers of food aid.

Food aid is a marginal resource. It is not adequate as a primary means of fighting hunger and attacking poverty. Rather it is symptomatic of local shortcomings in climate-change resilience, market access, transport and storage facilities, the use of appropriate farming techniques, levels of agricultural research and above all, productivity.^{30, 31, 32, 33, 34}

Food aid and food trade | While food aid has declined over the past 30 years, food imports have substantially increased (Figure 17). This cannot be accounted for on the basis that the incidence of disasters has declined during this period, whether caused by weather-related incidents or conflict, as they have not. This is illustrated by the increase in malnourishment across SSA for the same period (Figure 10). The trend from food aid to food trade requires further analysis.



Agriculture-based small town rural enterprise, Luchenza, Malawi (Len Abrams).

Agricultural marketing policies in SSA

Institutional and policy weaknesses in SSA are commonly cited as factors that disincentivize investment in agriculture. A consequence of this weakness is fluctuating government policy towards trade in agricultural products. Across SSA marketing boards have been largely abolished, with no institutions being developed to take on their role. As a result, trade and market surveillance is often lacking and fluidity in policy is a characteristic of many agricultural sectors across the region. Export bans and import barriers are often applied at short notice, resulting in local producers frequently being unable to take advantage of high international prices or being undercut by cheap imports.

These institutional failings not only create instability in local markets, but often affect neighbouring countries, thereby generating regional agricultural crises. Inappropriate trading policies result from policymakers, with little market experience, making decisions without consulting the industry and businesses that will be affected by the policy, while conflict and political instability cause structural instability that can manifest itself in unstable trading policies.

The absence of commodity exchanges and insurance markets for crops and livestock are examples of the institutional deficits that plague agriculture in SSA.

Instability created by the erratic application of policy is a barrier to development. Farmers contend with risk and uncertainty on a daily basis as a result of the climates they operate in. Fluctuating policy should not be a further element of uncertainty that farmers need to deal with. For smallholder farmers, who are largely unable to absorb shocks, a stable policy environment is all the more critical.

Determining the nature of trading policies is not at all straightforward. The debate continues as to whether trade policies are an appropriate method for promoting food security and development in the agricultural sector. Policies that either protect local producers or encourage trade liberalization are both accused of suppressing growth and efforts to combat poverty, as they can directly impact prices or prevent the appropriate allocation of resources.³⁵ It is, however, largely recognized that trade policy intervention should not be the primary tool for addressing the factors that limit productivity. But where trade policies are in place, they must be consistently applied to ensure producers have a stable trading environment.

An insecure trading environment restrains market development. Market development and improved productivity are the two elements that must develop in tandem to enable widespread agricultural development.

Conclusions

With poverty still a ubiquitous characteristic of the rural landscape in SSA and with populations growing rapidly, the need for rural job creation and economic growth is greater than ever. Agriculture is the primary occupation for approximately 400 million smallholder farmers, yet yields remain desperately low in this sector, which is 97 per cent rainfed and responsible for the majority of the region's food production. Yield underperformance, combined with population growth, poor infrastructure, weak institutions and under-investment in the small-scale rainfed agriculture sector, have resulted in the need for increasing quantities of food imports, mainly from OECD countries, which heavily subsidize their own agricultural sectors, thus creating an unbalanced international food-trading field.

Using aggregated figures across SSA, an estimate is provided of the equivalent number of on-farm and off-farm jobs that could be generated if support were to be provided to assist smallholder rainfed farmers to produce sufficient food through improved on-farm productivity and increased yields to offset food imports. Each USD 1 billion spent on food imports is equivalent to the annual income generated by 334,000 farming households. This represents 670,000 on-farm jobs and 200,000 off-farm jobs and directly impacts the livelihoods of 2.17 million people.

Fortunately, SSA is home to the world's largest crop yield gaps and therefore significant potential increases in productivity. This implies that agriculture has enormous potential, which could provide the platform for broad-based economic transformation. This document suggests that improving productivity in the rainfed sector can not only achieve food security, but can simultaneously replace food imports and redirect public expenditure inwards. Greater agriculture productivity will directly and indirectly create employment across rural economies. The impacts of improving labour efficiency and productivity on-farm could have a multiplier effect on livelihoods, well-being and human capital off-farm if market development is supported. The potential for job creation is immense if rainfed agriculture is enabled and productivity boosted to a point where imports of primary foods are no longer necessary.

Supporting smallholder farmers throughout SSA will not only reduce climate vulnerability, increase rural incomes and improve food security, it will also improve the local management of water and soil resources, and begin to reverse widespread degradation in many parts of the sub-continent.

“Poverty and its progressive degrading impacts on the catchment and watercourses throughout the basin is the largest single threat to the people the basin and to future development”.³⁶

Areas for further study: the question of the carbon footprint of locally produced food in SSA using green water conservation techniques compared to that of imported food needs investigation. Analysis should consider all factors, from cultivation to consumption, and include transport, which is likely to be significant for imported food. The long-term ecosystem degradation costs of intensive agroindustrial food production in food-exporting countries should be factored in. Conservation techniques, including minimum tillage or no-till agriculture has been shown to increase the quantity of organic matter and water in the soil, thereby sequestering an estimated average 500 kg of soil carbon per hectare annually.³⁷ It stands to reason that local production of food is significantly more climate smart than imported food. This needs greater study – local production could be argued to be more ethically justifiable and there may be a strong case for the use of carbon financing of smallholder agriculture in SSA to offset the large carbon footprint of imported food.

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Further reading

- Barrett, C. B. (2006). Food Aid's Intended and Unintended Consequences (No. ESA Working Paper NO 06-05). Rome: FAO.
- Biazin, B., Sterk, G., Temesgen, M., Abdulkedir, A., & Stroosnijder, L., (2012). Rainwater harvesting and management in rainfed agricultural systems in sub-Saharan Africa – A review. *Physics and Chemistry of the Earth, Parts A/B/C* 47–48, 139–151.
- Björklund, J., Araya, H., Edwards, S., Goncalves, A., Höök, K., Lundberg, J. & Medina, C. (2012). Ecosystem-based agriculture combining production and conservation – A viable way to feed the world in the long term? *Journal of Sustainable Agriculture*, 36, 824–855.
- Calzadilla, A., Zhu, T., Rehdanz, K., Tol, R. S. J., & Ringler, C. (2013). Economywide impacts of climate change on agriculture in sub-Saharan Africa. *Ecological Economics*, 93, 150–165.
- De Fraiture, C., Karlberg, L., & Rockström, J. (2009). Rainfed agriculture: Unlocking the potential. In Wani, S. P., Rockström, J., & Oweis, T. (Eds.), *Can rainfed agriculture feed the world? An assessment of potentials and risk* (pp. 124–132). London: CAB International.
- Dercon, S. (2009). Rural poverty: Old challenges in new contexts. *The World Bank Research Observer*, 24, 1–28.
- Diao, X., Hazell, P., & Thurlow, J. (2010). The role of agriculture in African development. *World Development*, 38, 1375–1383.
- Enfors, E. (2013). Social–ecological traps and transformations in dryland agro–ecosystems: Using water system innovations to change the trajectory of development. *Global Environmental Change*, 23, 51–60.
- FAO (Ed.) (2014). *The state of food insecurity in the world. Strengthening the enabling environment for food security and nutrition*. Rome: FAO.
- Godfray, H. C. J., Beddington, J., Crute, I. R., Haddad, L., Lawrence, D., Muir, J. F., Pretty, J., Robinson, S., Thomas, S. M., & Toulmin, C. (2010). Food security: The challenge of feeding 9 billion people. *Science*, 327, 812–818.
- Haggblade, S., Hazell, P., & Reardon, T. (2010). The rural non-farm economy: Prospects for growth and poverty reduction. *World Development*, 38, 1429–1441.
- Hanjra, M. A., Ferede, T., & Gutta, D. G., (2009). Reducing poverty in sub-Saharan Africa through investments in water and other priorities. *Agricultural Water Management*, 96, 1062–1070.
- Hazell, P., Poulton, C., Wiggins, S., & Dorward, A. (2007). *The Future of Small Farms for Poverty Reduction and Growth, 2020 Discussion Paper*. Washington, D.C.: International Food Policy Research Institute.
- Ivanic, M. (2018). Sectoral productivity growth and poverty reduction: National and global impacts. *World Development*, 11.
- Mwabu, G., & Thorbecke, E. (2004). Rural development, growth and poverty in Africa. *Journal of African Economics*, 13, 16–65.
- Radhakrishna, R. (2002). Agricultural growth, employment and poverty: A policy perspective. *Economic and Political Weekly*, 37, 8.

Endnote references

- 1 African Union (2014). Malabo declaration on accelerated agricultural growth and transformation for shared prosperity and improved livelihoods. Doc. assembly/au/2 (xxiii). Malabo, Guinea Bissau: African Union.
- 2 TRALAC (2017). Africa's Food Trade: Overview – September 2017.
- 3 Food Price Watch, Issue 19, World Bank, June 2015
- 4 Haggblade, s., Hazell, P., & Dorosh, P. (2007). Sectoral Growth Linkages between Agriculture and the Rural Nonfarm Economy, Chapter 7 in Haggblade S., Hazell P. & Reardon, T., eds (2007), Transforming the Rural Nonfarm Economy: Opportunities and Threats in the Developing World, International Food Policy Research Institute.
- 5 OECD (2016). Agriculture in Sub-Saharan Africa: Prospects and challenges for the next decade. In OECD–FAO Agricultural Outlook 2016–2025 (pp. 59–95). Paris: OECD Publishing, Paris.
- 6 Chauvin, N. D., Mulangu, F., & Porto, G. (2012). Food production and consumption trends in sub-Saharan Africa: Prospects for the transformation of the agricultural sector. New York, N.Y.: UNDP Regional Bureau for Africa.
- 7 Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe.
- 8 Cervigni, R., & Morris, M. (2015). Enhancing resilience in African drylands: toward a shared development agenda. Washington, D.C.: World Bank.
- 9 Serdeczny, O., Waters, E., & Chan, S. (2016). Non-economic loss and damage in the context of climate change (Discussion Paper, 3). Bonn: German Development Institute.
- 10 De Freitas and Landers, (2014). The transformation of agriculture in Brazil through development and adoption of Zero Tillage Conservation Agriculture. International Soil and Water Conservation Research, 2 (1), 35–46.
- 11 ILO (2010). Local resource-based approaches to infrastructure investment – Source book. Retrieved 27 February 2020 from <http://www.ilo.org/dyn/asist/docs/F1132677515/022%20-%20200491.pdf>.
- 12 Tortora, B. (2014). One in Five African Adults Work on Farms. Washington, D.C.: Gallup.
- 13 African Union Commission (2015). Agenda 2063: The Africa We Want. Addis Ababa: African Union Commission.
- 14 World Resources Institute (2013). The Global Food Challenge Explained in 18 Graphics. Washington, D.C.: World Resources Institute. Retrieved 4 August 2019 from: <https://www.wri.org/blog/2013/12/global-food-challenge-explained-18-graphics>.
- 15 FAO.FAOSTAT. License: CC BY-NC-SA 3.0 IGO. Extracted from: <http://www.fao.org/faostat/en/#data/QC>. Data of Access:05-06-2019
- 16 Grassini, P., Cassman, K., G., van Ittersum, M. (2017). Exploring maize intensification with the Global Yield Gap Atlas. Better Crops with plant food 101(2), 7-9.
- 17 Jayne, T. S., Mather, D., & Mghenyi, E. (2010). Principal challenges confronting smallholder agriculture in sub-Saharan Africa. World Development, 38, 1384–1398.
- 18 Christiaensen, Luc; Demery, Lionel. 2007. Down to earth: agriculture and poverty reduction in Africa (English). Directions in development. Washington, DC: World Bank.
- 19 Christiaensen, L. J., & Demery, L. (2007). Down to earth: Agriculture and poverty reduction in Africa. Directions in development. Washington, D.C.: World Bank.
- 20 Dzemydaite, G. (2017). Agriculture's Impact for the Economy: Inter-Industry Linkages and Multiplier Effects. Conference: Rural Development 2017: Bioeconomy Challenges
- 21 Goyal, A., & Nash, J. (2017). Reaping Richer Returns: Public Spending Priorities for African Agriculture Productivity Growth. Washington, D.C.: World Bank.
- 22 African Union (2017) Progress report to the Assembly. African Union.

- 23 Woodhouse, P. (2012). Foreign agricultural land acquisition and the visibility of water resource impacts in sub-Saharan Africa. *Water Alternatives*, 5, 208–222.
- 24 Fuglie, Keith, Madhur Gautam, Aparajita Goyal, and William F. Maloney. 2020. *Harvesting Prosperity: Technology and Productivity Growth in Agriculture*. Washington, DC: World Bank.
- 25 Rakotoarisoa, M., lafrate, M., & Paschali, M. (2011). *Why has Africa become a net food importer*. Rome: FAO.
- 26 <https://data.oecd.org/agrpolicy/agricultural-support.htm#indicator-chart>
- 27 OECD (2019). *Agricultural support (indicator)*. Retrieved 5 June 2019 from <http://data.oecd.org/agrpolicy/agricultural-support.htm>.
- 28 Perez, I. (2013). *Climate Change and Rising Food Prices Heightened Arab Spring*. *Scientific American*.
- 29 Brooks, J. (2017). *Changing trade agendas and food security*. Paris: OECD Trade and Agriculture Directorate.
- 30 Awokuse, T. O. (2011). Food aid impacts on recipient developing countries: A review of empirical methods and evidence. *Journal of International Development*, 23, 493–514.
- 31 Barrett, C. B., Christiaensen, L., Sheahan, M., & Shimeles, A. (2017). *On the Structural Transformation of Rural Africa* (No. 7938), Policy Research Working Paper. Washington, D.C.: World Bank.
- 32 Diriye, M., Nur, A., & Khalif, A. (2014). Food aid and the challenge of food security in Africa. *Development*, 56, 396–403.
- 33 Ferrière, N., & Suwa-Eisenmann, A. (2015). Does food aid disrupt local food market? Evidence from rural Ethiopia. *World Development*, 76, 114–131.
- 34 World Food Programme (2017). *World Food Assistance 2017: Taking Stock and Looking Ahead*. Rome: World Food Programme.
- 35 Rakotoarisoa, M., lafrate, M., & Paschali, M. (2011). *Why has Africa become a net food importer*. Rome: FAO.
- 36 ZAMCOM. 2019. *Strategic Plan for the Zambezi Watercourse*, Zambezi Watercourse Commission (ZAMCOM), Harare.
- 37 Hogarth, J.R., Haywood, C. and Whitley, S. (2015) *Low-Carbon Development in Sub-Saharan Africa 20 Cross-Sector Transitions*. <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9878.pdf>



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