

Borlaug LEAP Paper**The Relevance of Smallholder Farming
to African Agricultural Growth and Development****Alie Kamara^{1*}, Abdul Conteh², Edward R. Rhodes³ and Richard A. Cooke⁴****Alie Kamara**

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Abstract

Farms less than two hectares constitute most farm holdings in Africa. Most of these farms are operated by rural smallholder farmers who are dependent on agriculture for their economic livelihoods. However, they are constrained by lack of capital assets that would enable them to increase agricultural productivity, food security and income. Despite these challenges, smallholders contribute significantly to the rural economy, and play a significant role in natural resource conservation. Therefore, they represent a critical population to include in poverty reduction efforts. Recent initiatives by African leaders aim to increase public expenditures on agriculture in order to spur economic development, position smallholders to play a significant role in regional growth. To understand the relevance of smallholder farming to Africa's development agenda, this paper reviews the body of knowledge on smallholder farmers, the constraints and opportunities they face, and their use of practices which embody the tenets of ecological and climate-smart agriculture despite little public investment in this area. This paper recognizes the role of smallholder farmers and concludes that smallholder agriculture will be a driver of economic growth and development in Africa. In order to achieve this, adequate investment should be focused on eliminating the challenges faced by smallholder farmers.

Key words: Smallholder farmers, Sub-Saharan Africa, agricultural development, climate-smart agriculture, green agriculture



Introduction

Agriculture in Africa represents a major economic activity and contributes, on average, 15% of GDP, although this varies widely across the continent, from 2.5% in South Africa to 56% in Sierra Leone (World Bank, 2015a). The sector employs about 65% of the workforce (World Bank, 2013; FAOSTAT, 2010) and constitutes the primary income generating activity for many. African agriculture is, therefore, believed to have the potential to contribute to eradicating poverty and hunger, by boosting agricultural investment and trade, creating jobs, and improving livelihoods (NEPAD, 2013).

Smallholder farms are typically less than 5 hectares and very diverse, though they vary considerably across the continent (Eastwood et al., 2010). Despite facing considerable challenges in access to productive resources and advisory service delivery, smallholder farmers contribute significantly to agricultural production, food security, and biodiversity conservation across sub-Saharan Africa. They are the drivers of many economies in Africa, yet their potential is often not fully realized. There are some 500 million smallholder farms worldwide on which more than 2 billion people depend for their livelihoods (Nwanze, 2011). Small farms produce about 80% of the food consumed in sub-Saharan Africa. Despite their role and importance to household food security, the productivity of smallholder farmers is quite low and as a result poverty among African smallholder farming populations is high. Addressing challenges faced by smallholder farmers and improving the productivity of this sector has the potential to help rural populations escape poverty.

Smallholder farmers in most of sub-Saharan Africa still produce in agricultural systems characterized by low input and low outputs (DAFF, 2012). Low yield is the most critical factor affecting profitability and competitiveness of smallholder farmers. Furthermore, many smallholder farmers are unprepared to meet the complex demands of agricultural business. Many lack the skills and resources required to engage in commercialized agriculture. Over 80% of smallholder farmers still produce at the subsistence level.

Achieving agricultural development in Africa in the next decades will require a focus on smallholders. For several decades now, efforts have been directed toward improving African economic growth and development through promotion of agricultural productivity, particularly in sub-Saharan Africa. Apart from interventions by international donor agencies, there has been an African initiative from the African Union, the New Partnership for Africa Development (NEPAD) through the Comprehensive Africa Agriculture Development Programme (CAADP) to promote growth and economic development through agricultural-led development that will ensure food security and nutrition, eliminate hunger and poverty, and create wealth (NEPAD, 2013). The approach involves a Pan-African framework that defines a set of principles and strategies to establish investment opportunities with optimal impacts at the country and regional levels. Despite significant progress, smallholder farming in Africa continues to be constrained by a variety of challenges. Therefore, the objective of this paper is to provide relevant information on how a continued focus on smallholder farming systems can play a major role in achieving food security,



eradication of poverty and help to fuel economic growth and development across Africa.

Methodology and Outline

This paper is a review of the current state of knowledge on the nature of smallholder farming in Africa and the challenges and the opportunities the sector faces. The paper also discusses how smallholder farming fits into the current African agriculture development agenda (the CAADP implementation process), and finally, how climate-smart agriculture and green agriculture are relevant options for sustainable productivity in smallholder farming systems with examples of how farmers are adapting to climate change.

Smallholder farming systems in Africa

Smallholder farming systems in Africa are highly diverse due to the heterogeneous nature of Africa’s geography, agroecology, socio-economics, and demography. Consequently, definitions and characteristics of smallholder farming systems in Africa fluctuate depending on context and geographical location (Narayanan and Gulati, 2002; Dixon et al., 2003; Ortmann and King, 2006; Machingura, 2007; Chamberlin, 2008; Aidenvironment, 2013). There is no conventionally or universally accepted definition of smallholder farming systems (Morton et al., 2007) and often the term smallholder is used interchangeably with family-farmer, small-scale, resource-poor, subsistence, and low-income (DAFF, 2012; Garner and de la O Campos, 2014). Most of the existing definitions are centered on some of the common characteristics of smallholder farmers such as access to land, land size (FAO, 2002; World Bank, 2003; HLPE, 2013; AGRA, 2014; CGAP, 2014; Aidenvironment, 2013), labor (Garner and de la O Campos, 2014; Lambert et al., 2016), resource endowment or capital (OECD, 2010; Seville et al., 2011; IFAD, 2011), technology and market orientation.

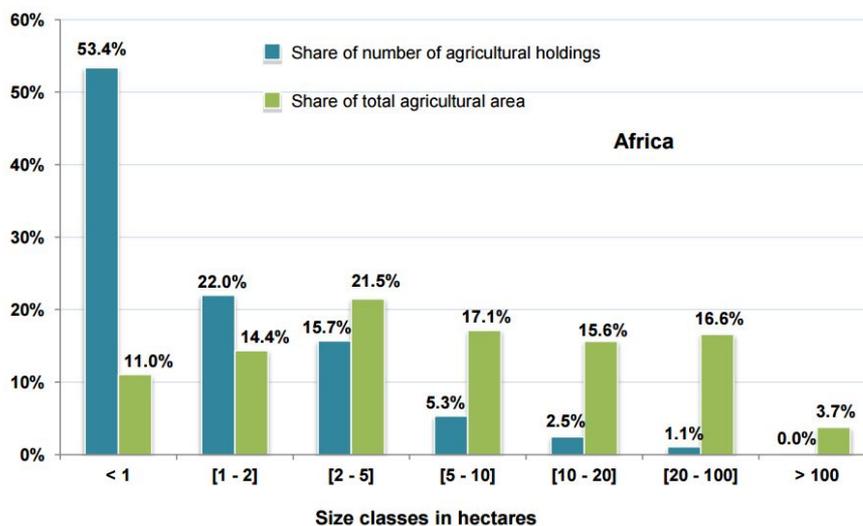


Figure 1: Distribution of the agricultural holdings and their share of total agricultural area in Africa for the 14 countries of the WCA-FAO subset of Africa (HPL, 2013)

Farm sizes less than 2ha or smallholder farms represent about 78% of the total number of farms in sub-Saharan Africa (Figure 1) (HPLA, 2013) and a substantial proportion (about 90%) of agricultural production in some countries (Wiggins and Keats, 2013). Thus, land size is a fundamental component for defining and characterizing smallholder farms. In this paper, we admit that defining smallholder farms based on land size and the use of <2ha limit by itself does not provide an adequate picture of the nature of smallholder farmers. It does not give an indication of the heterogeneity of farmers in this group in terms of land quality, productivity, and income generated from production. For example, even within the same agroecology and cropping pattern, the yield and income generated from the same piece of land (e.g. one hectare) may differ considerably depending on management (irrigated or rain-fed, fertilized or not etc.) and location (peri-urban or rural).

According to von Braun (2005), the definition of small farms should be based on assets and income and not just farm size. As a matter of fact, we argue that, the concept of small, as embedded in the term smallholder, can be extended to all facets that characterized the smallholder: labor input, capital asset (natural, physical, human, financial and social), access to markets, and market orientation. Generally, smallholder farms are considered to rely mainly on family labor (Garner and de la O Campos, 2014) although in some situations, they may be involved in labor exchange (Lambert et al., 2016; Asayehegn et al., 2011; USAID, 2009; Takane, 2008; Gockowski and Oduwale, 2002). The magnitude of operation and involvement of family labor may vary considerably between smallholders, depending on the gender of household heads (male-headed or female headed), family size, and number of males and females (Adamu, 2014). Capital asset may be low and they have limited access to market information. Despite the limitations, they face, most smallholders have a market orientation and are entrepreneurs in their own right, although they differ in their levels of market involvement. Some sell agricultural produce at the farm-gate but also participate in local market hubs (for example local market days).

In this paper, smallholder farmers can be considered, generally, as cultivating <2ha, relying mainly on family labor, with limited capital (natural, physical, social, financial, and human), low-input-technology, and having limited access to markets.

Having defined smallholder farmers above, it is important to note that there exist wide variations among that category of smallholder farmers in terms of access to land, availability and use of family labor, access to capital, financial and technological resources and markets. These disparities are even more evident when gender issues are considered. Very often, women farmers are more disadvantaged due to the existing gender inequalities in sub-Saharan Africa. Women do not have equal access to resources and opportunities as men. In cases where women have access to land, they do not own a title to it and their farmlands or plots may be less fertile with limited farm tool and equipment as compared to men (Muzari, 2016). In addition, women farmers do not get paid for their labor input on family farms (Muzari, 2016) although it may account for a good proportion of their informal employment, for example, about 20 percent in Ghana and 85 percent in Egypt (WIEGO, 2005 as reported in WEIGO, 2017).



Challenges and Opportunities for Raising Productivity in Smallholder Farmers Systems in sub-Saharan Africa

Challenges Faced by Smallholder Farmers in sub-Saharan Africa

Although the challenges faced by smallholder farmers have been the subject of several reviews and publications (IFAD, 2008; Salami et al., 2010; Nwanze, 2011; DAFF, 2012; Maass et al., 2012), there are limited reviews that have examined these challenges within the context of smallholder farmers' needs and aspirations.

Climate Change

A major challenge faced by small scale farmers across Africa is how to contend with the effects of climate change in the agriculture sector. These farmers are reporting one or more of the following hazards: high temperatures, droughts, bush fires, floods, soil salinity, and shifts in the onset and end of the rainy season. These have negative impacts on crop and livestock yields and production, food security and livelihoods of farmers (Kipkoech et al., 2015a). Thus, farmers need to develop resilience and adaptations to climate variability and shocks such as, irregular rainfall, floods, storms and droughts.

Access to capital assets for sustainable and adequate food production

Access to or ownership of capital assets is key to improving the livelihoods of smallholder farmers. Most smallholder farmers are poor and vary considerably in their productive capital assets (natural, physical, financial, and human). They are constrained by lack of natural capital such as land size and land access or land tenure. Lack of land tenure security and formal property titles make it more difficult for smallholders to invest in sustainable land management practices or use their land as collateral when attempting to access loans.

Most farmers lack physical capital (buildings, machinery, irrigation equipment, and technical equipment such as computers). Most smallholder farmers rely on the use of low-tech equipment or local tools such as hoes and machetes, and their production systems are typically rain-fed. Access to water for irrigation has been reported to reduce poverty in smallholder farming communities (Sinyolo et al., 2014).

Financial capital or cash is extremely limited, and as such, these farmers are unable to make significant investments to improve production on their farms. This factor is beyond the ability of the farmer to control. For instance, in parts of the world where there are no banks or credit unions, it is difficult for smallholder farmers to obtain the capital they need to buy fertilizer, herbicides, pesticides, and improved seeds.

Additionally, the human capital on which smallholders largely rely is limited in terms of worker education and skills. They are often illiterate with poor technological experience, which can be serious obstacles in accessing technological knowledge (Salami *et al.* 2010; DAFF, 2012). In situations where farmers are unable to invest in improving farm productivity, such as soil fertility and water management, shifting



cultivation (with shortened fallow periods) and cultivation of marginal lands become dominant practices.

Poor road network, storage, and marketing facilities

Lack of access to proper roads limit the ability of a farmer to transport inputs, produce, and to access information. Most smallholder farmers lack storage and processing facilities, and struggle to distribute and market their produce, resulting in high post-harvest losses. Where road and transport infrastructure are undeveloped, markets for agricultural inputs and outputs are often missing or delayed, becoming unreliable for smallholder farmers. This leads to inconsistency in production and supply capacity, and coupled with lack of bargaining power, from poor access to market information, they often sell their products at lower profit margins. In some situations, smallholder farmers receive even less for their products by selling them at their farm gates.

Less competitiveness

Meeting international sanitary and phytosanitary (SPS) regulations, and product quality certification standards, which are required by the modern retail system, can be major challenges for smallholders. Smallholders who have capacity to sell internationally must be able to export products that meet the minimum standards required by importing countries/enterprises and should be price-competitive in international markets. Without the assistance of private-public sector and donor agencies, it is somehow difficult for smallholders to access international markets in developed countries.

Opportunities to improve the livelihoods of smallholder farmers

The commitment by African Leaders to increase public investment in agriculture and ensure agriculture-led economic growth and development for the eradication of poverty and food insecurity offers immense opportunities for smallholder farmers in sub-Saharan Africa. The 2003 Maputo and 2014 Malabo Declarations and the CAADP implementation process, particularly the establishment of National Agricultural Investment Plans (NAIPs), provide for stakeholder participation such as farmers' organizations, thereby giving an opportunity to farmers to be involved and seek their own interest in the development planning process. There has also been a renewed interest in agricultural investment from development partners after the 2008 food price crisis. The CAADP implementation process provides a forum for mobilizing and aligning donor support in line with NAIPs. Consequently, there has been an increase in public agricultural expenditure in many African countries participating in the CAADP process. Although public and donor spending is still inadequate (ActionAid, 2014), increase in public spending particularly directed towards improving public goods in rural areas (storage and processing facilities, road networks, transportation, communication, education, health, irrigation, and safety nets) will encourage the participation of the private sector in public-private partnerships involving smallholder farmers. Some examples of public investment involving smallholders are the Smallholder Commercialization Program in Sierra Leone (World Bank, 2015b), The Purchase for Progress (P4P) program in Sierra Leone (MAFFS, 2014; WFP, 2014) and Malawi (Davies, 2013), the maize agro-forestry project in Malawi, The Shinyanga Soil Conservation Program in Kenya, The Push-Pull technology in Kenya, and The Land

Husbandry, Water Harvesting, and Hillside Irrigation (LWH) project in Rwanda (ActionAid, 2014).

Positioning Smallholder Farming in the African Agricultural Productivity and Food Security Agenda

The African Agricultural Development and Food Security Agenda

The Maputo Declaration

The 2003 Maputo declaration, committing all African States to allocate at least 10% of national budgets to agricultural development, and the establishment of the Comprehensive Africa Agriculture Development Program (CAADP) by the New Partnership for Africa's Development (NEPAD), demonstrated the commitment of the African Union to its vision of agriculture as an engine of economic development in Africa. NEPAD believed in an Agriculture-led development for reducing hunger, poverty, food insecurity, while expanding exports to pave the way for economic growth (NEPAD-CAADP, 2003).

In its first decade of implementation, CAADP played a major role in bringing agriculture to the forefront of Africa's development agenda and served as a forum for the establishment of bilateral and multilateral development partnerships, building capacity for planning, and formulation of national agricultural and food security investment programs in Africa. These efforts have resulted in an average annual increase of 7% public expenditure in agriculture (PAE) in Africa from 2003 to 2010, but there was a decline in the share of PAE due to a slower growth rate in total expenditures (Benin and Yu, 2012).

Achievement of the Maputo commitment to 10% spending on agriculture varied across countries in Africa and only 13 countries (Burundi, Burkina Faso, Republic of Congo, Ethiopia, Ghana, Guinea, Madagascar, Malawi, Mali, Niger, Senegal, Zambia, and Zimbabwe) have exceeded the CAADP 10% percent target while only seven of them (Burkina Faso, Ethiopia, Guinea, Malawi, Mali, Niger, and Senegal) have regularly exceeded the target. Among the African Union member states about forty have lunched the CAADP implementation program and out of this, about 30 have signed the CAADP compact and only 23 have completed their NIAPs.

The Malabo Declaration

In recognition of the progress made after the 2003 Maputo declaration and NEPAD-CAADP implementation in the past decade in Africa, particularly the PAE and the formation of National and Regional Agricultural and Food Security Investment Plans, African heads of state have recommitted to promoting an agriculture-led development in Africa and keeping the CAADP momentum in another declaration called the Malabo 2014 declaration. The Malabo Declaration focused on seven commitments targeted towards accelerating agricultural growth and transformation for shared prosperity and improved livelihoods (AU-Malabo, 2014). The AU's vision (Vision 2025) for Africa as embedded in the Malabo Declaration is "shared prosperity and improved livelihoods". In an effort to operationalize the 2014 Malabo Declaration which emphasizes implementation, results and impacts, CAADP developed an implementation strategy



and roadmap (IS&R) intended to translate the Vision 2025 into tangible results and impacts. To achieve the change required, the IS&Rs are organized into two objectives, IS&R1 and IS&R2, which are further divided into Strategic Action Areas with sub-actions (SAA1a-d and SAA2a-g) (Figure 2; CAADP, 2015). The roadmap consists of indicators or milestones to be achieved for each sub-action over three implementation periods: 2015, 2016 to 2020, and 2021 to 2025 (see CAADP, 2015 for more details).

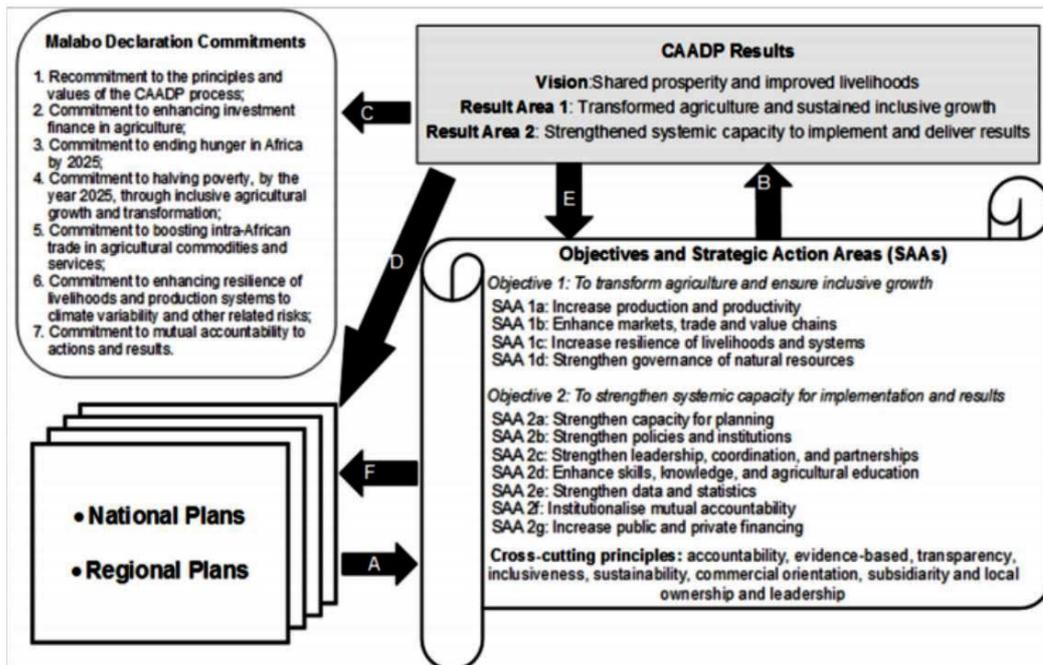


Figure 2: Summary of the linkages between Malabo Declaration, Implementation Strategy and Roadmap, and CAADP Results Framework (CAADP, 2015)

Smallholders in the Maputo, Malabo Declarations and the CAADP Framework

Both the Maputo and the Malabo Declarations underscored defining moments in Africa's Agricultural and Food Security Development and clearly demonstrated the level of commitment of African leaders to ending hunger and poverty through an agriculture-led economic growth. In both Declarations, there is a show of commitment towards improving rural livelihoods and the lives of smallholder farmers. The 2003 Maputo Declaration sets out plans for interventions that will enhance the productivity of smallholder farmers. The 2014, Malabo Declaration, acknowledging the progress and challenges of the first decade of CAADP implementation, made a recommitment to the principle and values of the CAADP momentum. Specifically, the position of the smallholder in the African development agenda is implicit in the commitments to:

- Ending hunger by 2025: doubling agricultural productivity, reducing post-harvest losses by 50%, increasing consumption of local food, and improving nutritional status
- Halving poverty by 2025: sustaining $\geq 6\%$ annual GDP growth, boosting public-private partnership with smallholder involvement in priority agricultural

- commodity value chains, creating job opportunities for at least 30% of youth in agriculture
- Increasing market access and trade opportunities at the local, regional, and international levels
 - Increasing the resilience of agricultural production systems to climate change and other shocks
 - Accountability: monitoring of progress towards achieving the targeted objectives;

The clarification of the specific position and role of the smallholder farmer should be indicated in the National Agricultural Development Plans (NAIPs).

Smallholder farmers in the National Agricultural Development Plans (NAIPs)

The NAIPs are the principal strategies that outline how African governments participating in the CAADP process will support agriculture in their countries. In answering the question of whether African governments are serious about agriculture, Benin (2012) concluded that, based on the evidence, there is sincerity about investments in agriculture, although questions remain about “what types of investment, how much of each type of investment, where should they be invested, and when should they be invested in a particular country”. These questions are relevant to understanding what quantum of agricultural investment goes to improve smallholder farming, and such questions should be addressed in the NAIPs. In an analysis of the NAIPs of five countries (Ethiopia, Tanzania, Rwanda, Burundi and Burkina Faso), in terms of their benefits to smallholder farmers, ACORD (2014) reported that Africa, through African governments, shows serious commitments to agriculture, but there is insufficient recognition of the important role of smallholder farmers in the reduction of poverty and food insecurity.

ACORD (2014) suggested five priority areas that need to be addressed if NAIPs are to benefit the smallholder and promote agriculture-led development in Africa. In another study, assessing public investment in agriculture in Ghana in support of the CAADP process, particularly investments that are directed towards strengthening smallholder agriculture for poverty reduction and food security, OXFAM (2012) concluded that despite achieving the 10% CAADP target on annual GDP growth, increased spending on agriculture has not targeted the poor farmers in the crop and livestock production sector. In a dialogue session organized by the National Association of Nigerian Traders (NANTS, 2012), participants admitted that many ECOWAS member states have not met the stipulated targets of the Maputo Declaration and the budget allocation for agriculture by the Nigerian Government falls far short of the standards set in the Declaration. Countries that have signed the Maputo Declaration were urged to implement the CAADP framework in order to overcome the challenges of poverty and food insecurity.

The position of the smallholder in Africa’s Long-Term Vision for Agricultural Development

The people of Africa have sounded their aspirations for eradicating poverty, moving toward prosperity, and the social and economic transformation of the continent in one



generation. This has been expressed in AGENDA 2063. The vision is to have a developed Africa by 2063 with modernized cities and settlements having decent housing and all the basic necessities of life, such as water, sanitation, energy, public transport, and ICT (AU, 2015).

By 2063, the vision is to have a modernized form of African agriculture, with increased productivity, food security, and prosperity for farmers and the nation: “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 youth and women.”

What will be the position of the smallholder farmer by 2063? Will 78-80% of farms in Africa still be smallholdings? In this paper, we argue that, with the current drive by African governments to achieve economic growth and development through agriculture-led development, and with increasing commitment to increases agricultural investment, Africa is on its path to prosperity. Africa has charted the way forward to prosperity in time series steps of decades (Maputo Declaration from 2003 to 2015, Malabo Declaration from 2015 to 2025). There will be a slow start, but the CAADP momentum will develop and Africa will reign. By 2063 many farms can transform into larger parcels through secure legal land holdings, with liberty to transfer or sell. There will still be smallholder farms but with a different definition, not the <2ha definition, nor the capital-incapacitated definition, but productive small farms, well managed with adequate capital, good yields, better incomes, and food security.

Options for Sustainable Agricultural Development from Smallholder Participation

Climate Smart Agriculture and Green Economy

Sub-Saharan Africa is highly vulnerable to climate change because of a combination of social, economic, and environmental factors. The considerable climate adaptation challenges in the agricultural sector compound this problem. This is so because smallholders operate in a multi-stressor environment where agricultural productivity is determined by a host of interacting factors while a farmer’s capacity to adapt to climate change is limited by poor access to technology, credit, markets, poor infrastructure, and institutional factors including land tenure and gender issues. Climate Smart Agriculture and Green Economy approaches have the potential of strengthening smallholder farming.

Climate Smart Agriculture

Africa needs to develop and implement sustainable agroecological-based approaches to food production that improve soil fertility and ensure efficient land and water use while adapting to climate change and protecting biodiversity. Africa’s response to climate change was initially to promote adaptation measures (Mapfumo et al., 2014; Ngeve et al., 2014; Rhodes et al., 2014) that build farmers’ coping strategies and resilience. Considering the seriousness of the problem, more innovative ways are required for the management of land, water, soil nutrients, and genetic resources in order to meet the challenge of food security in the face of climate change and other stresses. Climate



Smart Agriculture (CSA) has the potential of fulfilling this need. It is a combined policy, technology, and financing approach to achieve sustainable agricultural development under climate change. CSA rests on 3 key pillars of (i) enhancement of agricultural production (ii) adaptation and (iii) mitigation of greenhouse gas production. In addition, good coordination across the agricultural subsectors of crops, livestock, forestry, as well as the water, energy and infrastructure sectors is needed in order to capitalize on potential synergies, reduce trade-offs and optimize the use of natural resources and ecosystem services (FAO, 2010, 2013).

Climate Smart Agriculture Policies, Strategies, Plans and Initiatives

There are national policies, strategies, and plans dealing with adaptation to climate change in West, East, Central and Southern Africa. These include the National Programmes of Action (NAPA), the National Communications to the United Nations Framework Convention on Climate Change, National Agricultural Investment Plans (NAIPs) and Poverty Reduction Strategy Papers (PRSPs). However, there were no specific policies regarding CSA for several countries surveyed in a FARA sponsored study conducted in 2014 (Kipkoech et al., 2015b). Some countries have given high priority to climate change issues by placing climate change authorities into their government hierarchy. For example, in Ethiopia, the leading institution shaping response to climate change is in the office of the Prime Minister. In Tanzania, it is in the office of the Vice President.

Policies, strategies, and plans on adaptation to climate change and CSA have also been developed at the regional level. For example, the Economic Community of West African States (ECOWAS) has a Regional Action Programme to Reduce Vulnerability to Climate Change, the goal of which is to develop the required mechanisms, actions and capacity to provide support to governments and communities as they adapt to climate change (ECOWAS, 2009a; ECOWAS, 2009b). Other regional initiatives/activities promoting CSA (FAO, 2015) are:

- (i) the launching of the East African Sub-regional CSA Platform and the sharing of information on national CSA and CSA taskforce activities in Burundi, Ethiopia, Kenya, Rwanda, South Sudan, and Uganda;
- (ii) the development of policy and legislative instruments for the East African Community to address climate change;
- (iii) the establishment of the East African Sub-regional Platform to scale up climate smart agriculture and
- (iv) the signing of a Memorandum of Understanding between the European Union and the Intergovernmental Authority on Development (IGAD) in support of the development of an IGAD climate change strategy.

Initiatives/activities at the continental level are:

- (i) the building on the Comprehensive African Agriculture Development Programme of an AU-NEPAD Agriculture Climate Change Framework (AU-NEPAD, 2010). The framework is a guide to national and regional initiatives on programmatic approaches on knowledge generation, knowledge



- management and technology transfer and financing to upscale, based upon climate adaptation and mitigation measures,
- (ii) the endorsement by African Heads of States of CSA in the Malabo Declaration of June 2014, which set a goal of 25 million farm households practicing CSA by 2025 and
 - (iii) the creation of the Africa Climate Smart Agriculture Alliance which aims to support the uptake of CSA practices by at least 6 million households in sub-Saharan Africa by 2021 (FAO, 2015). The Alliance is coordinated by a pan African Steering Committee convened by NEPAD. Membership includes international NGO's, Consultative Group on International Agricultural Research (CGIAR) and FAO. An important development at the continental level is the due consideration given to both climate adaptation and mitigation issues.

Climate Smart Agriculture Practices

Even when national CSA policy is minimal or nonexistent, farmers are practicing components of CSA in East, Central, Southern and West Africa, which are available for scaling up (Kipkoech et al., 2015b; Nwajiuba et al., 2015; Msaki et al., 2015; Rhodes et al., 2015). This indicates that farmers do not wait for governments to develop and implement policies tied to their livelihoods and survival before they take actions. The available BEST-BETS technological options can be grouped in terms of improved crop germplasm/livestock breeds and management; integrated soil fertility management; sustainable land and water management; conservation agriculture and post-harvest technology including processing and storage.

For given socioeconomic circumstances and agroecological zones, some CSA technologies can be applicable in more than one country. For example, land and water management technologies such as stone bunds along contours and farmer assisted natural regeneration are in use in the semi-arid to sub-humid zones of Senegal and Burkina Faso. This kind of commonality permits lessons learned by smallholder farmers and other stakeholders in the agricultural sector to benefit from lessons learned in another country in the region. In addition to these technological options, participatory seasonal weather forecasting and dissemination, crop/livestock insurance schemes and safety nets for smallholders are also available. Field level work to refine BEST BETS is ongoing. Examples are the Climate Smart Villages of the Climate Change Agriculture and Food Security (CCAFS) Programme of the CGIAR in West Africa, and the FAO sponsored Mitigation of Climate Change (MICCA) project on identifying climate smart agricultural practices with smallholders in East Africa.

It is important to note that there may be gender disparity in the adoption of CSA practices across the African continent. Women in agriculture may have limited access to capital and financial resources as well as extension services (FAO, 2011) implying that men and women have different starting points (Nelson and Huyer, 2016). If the specific needs and priorities of men and women are not taken into consideration, there is the risk of women becoming more disadvantaged than men. For example, evidence from Senegal, Burkina Faso and Sierra Leone is that because climate change puts additional workload on women smallholders, there is a risk of the involvement of



women smallholders in decision-making being further reduced. Also, on-farm distribution of labor may change with the adoption of CSA. For example, Giller et al. (2009) reported that conservation agriculture, a CSA practice in which minimum tillage is critical may reduce labor requirements for land preparation (usually the responsibility of men in Sierra Leone), but weed control under minimum tillage without expensive herbicides implies shifting labor requirements from land preparation to weed control which is a task women are usually responsible for.

Green Economy with Special Reference to the Agriculture Sector

Smallholder farmers in rural Africa are strongly dependent on the environment and natural resources (forests and soils) for food security and income generation. Ensuring conservation of forests, soils, and water is therefore crucial for sustaining or improving livelihoods and creating opportunities for development. A Green Economy, defined as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2011), can contribute to sustainable development in Africa through (i) inclusive growth and poverty eradication, (ii) creation of employment and maintenance or enhancement of natural capital, (iii) improvement of food security (UNECA, 2011). Green Economy is a holistic approach implying that the productivity of the smallholder farmer is linked to the success of other sectors of national economies such as energy and transport. Many countries seem to have, at least in broad terms, welcomed the Green Economy concept (Table 1).

Table 1: Examples of Green Economy and Green Growth Initiatives in Africa (GIZ, 2013; GOSL, 2013; UNEP, 2015).

Country	Status
Morocco	The solar plan 2009-2020 aims to reduce the country's energy imports by installing 2000MW from solar power by 2020 while supporting economic growth and creating employment and to achieve industrial integration of concentrated solar power technologies
S. Africa	The Green Economy Accord of 2011 set the goal creating at least 300,000 jobs by 2020 in the green economy and activities such as recycling wastes, transport and energy generation
Ghana	The Environmental Protection Agency has developed a "Ghana Goes Green" document mainly relating to climate change
Nigeria	Green economy is mainly addressed through climate change activities. A Clean Development Mechanism project is in place
Sierra Leone	The Agenda for Prosperity (third generation PRSP) states a vision for 2013-2035 of becoming an inclusive green country
Ethiopia	A Climate Resilient Green Economy strategy was implemented in 2011
Senegal	The National Strategy for Economic and Social Development 2013-2017 specifies "promoting a green economy"
Kenya	The National Medium-Term Plan 2013-2017 endorses the development of a green economy strategy

Although there are few or no specific national policies in Africa on the Green Economy, there are recent initiatives to promote it, such as the knowledge-sharing and

learning event organized by the International Labor Organization and the United Nations University Institute for Natural Resources in Africa in Accra, Ghana (ILO, 2015).

Green Agriculture

According to (UNEP, 2015) Green Agriculture (a component of Green Economy) is characterized by ecologically sound practices such as extensive use of “organic and natural soil nutrients”, efficient use of water, appropriate tillage and integrated pest management and other practices that reduce the environmental impact of farming. Green Agriculture is compatible with Climate Smart Agriculture. Key features of a Green Agriculture are summarized in Table 2.

Table 2: Key features of a Green Agriculture (UNEP, 2011)

Investment	Fiscal Policy	Capacity Building
Resource efficient technologies	Market price premium	Training programmes on green farming
Ecological farming practices	Elimination of perverse subsidies	ICT
Post-harvest technologies	Incentives for organic agriculture	Public awareness and educational initiatives
Research and development		

It would appear that bad experiences with overuse of commercial fertilizers in Asia, Europe, and the Americas have led some agricultural development workers to frown on the use of commercial fertilizers in Africa, no matter the circumstance, even when there is empirical evidence that soils in various agroecological zones of Africa are being mined of nutrients (Crasswell et al., 2004). Efficient use of commercial fertilizers as part of integrated soil fertility management should be promoted as being consistent with Green Agriculture. Smallholder farmers are already implementing components of Green Agriculture in the form of minimum tillage and utilization of organic materials to the extent available. Table 2 illustrates, in outline, how activities relevant to smallholder farming are in line with key features of a Green Agriculture.

Creating Enabling Environments for Climate Smart Agriculture and the Green Economy

The following actions are necessary for creating the enabling environments for CSA: providing support to research; developing and implementing evidence-based multi-sector policies, strategies, and plans; building capacity to design and implement; creating incentives for farmers to adopt; mainstreaming into national agendas and strategies; facilitating gender equity in access to technologies; commitment to multilateral environmental agreements and governments and donor agencies making significant financial investments in the development of CSA and Green Economy.

Conclusion

Smallholder farmers in Africa represent a major economic group that contributes significantly to rural food security and the fight against the eradication of poverty and hunger. The nature and characteristics of smallholder farming systems in Africa are



highly diverse and there is no universally accepted definition of smallholder farming. Thus, in this paper, we defined smallholder farmers as those cultivating <2ha, relying mainly on family labour, with limited capital (natural, physical, social, financial, and human), low-input-technology, and limited access to markets. The most critical constraints farmers faced can be put under four major categories:

- (i) Inadequate Capital Assets: natural (land access and land tenure security), physical (processing and storage facilities, farm machinery, irrigation equipment and others), financial (credit facilities, collateral), and human (unskilled labor);
- (ii) Poor Market Linkages: low bargaining power, poor access to market information, and selling their products at market gate prices
- (iii) Underdeveloped Rural Infrastructure: road networks, transportation, communication, education, health, irrigation, and safety nets
- (iv) Climate Change

Improving the productive capacity of smallholders and their livelihoods require adequate investments in order to address these challenges. African Governments recognize the important role of agriculture in national economic development but fall short of adequately investing in smallholder farmers.

This paper recognizes the significant role played by smallholder farmers and concludes that, the drive towards economic growth and development in Africa, through an African-owned agriculture-led development will be meaningless if adequate investment is not focused on addressing the challenges and exploiting the opportunities faced by the smallholder farmer. In particular, gender specific roles, needs and priorities must be taken into consideration so that efforts to boost agricultural development will benefit both men and women.

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