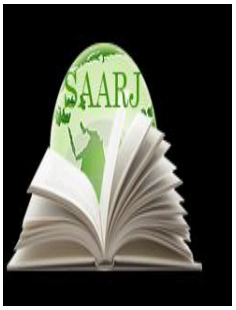

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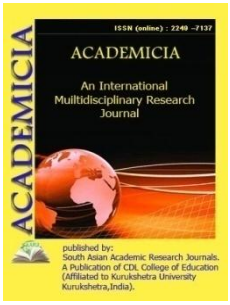

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AN OVERVIEW ON AGRICULTURE IN AFRICA

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ABSTRACT

In most developing countries, agricultural growth is at the core of poverty reduction and improved food security. However, Sub-Saharan Africa (hence referred to as Africa) is the only area in the world whose agricultural output per capita has stayed unchanged for the last 40 years. The application of customized methods and technology has revolutionized agricultural practice and production throughout Asia and Latin America, resulting in the so-called "green revolution." On the continent, no indigenous African green revolution technology have been disseminated. This chapter will argue that if adequate investments are made in key interventions such as soil fertility improvement, improved seeds, water management, market access, extension services, access to credit, and weather forecasting, Africa can achieve similar increases in productivity and food security. Where they have occurred, even in part, the results have been spectacular. However, bringing them to scale in a manner that increases agricultural production and alleviates poverty on a long-term basis would need greater investments and novel institutional structures. Thankfully, many research and development initiatives on the continent, such as the Millennium Villages Project, are giving useful information. Finally, this chapter highlights the major difficulties that remain.

KEYWORDS: *Agriculture, Africa, Security, Subsistence, Urbanisation*

1. INTRODUCTION

Many of the world's rural poor are smallholder farmers, and most of South and Southeast Asia, as well as most of Sub-Saharan Africa (hereinafter referred to as "SSA"), are smallholder farmers. Agriculture is dominated by smallholders in places like Africa. ,But why do small-scale farmers continue to be poor[1]. One such example is despite being highly efficient consumers of, the answer is that remain impoverished despite their abundant resources because most poor

nations provide them limited technological and economic possibilities to which they can react. This is especially true in Africa, the world's sole continent the globe in which agricultural output per capita is high over the last 40 years, it has stayed unchanged. This has led in food instability and an increase in reliance on food assistance and the continent's growing poverty Food insecurity is a key indicator of poverty. One of the continent's most serious challenges Africa is now experiencing a food crisis comparable to that of the United States.

In the 1960s, Asian nations were defined by Famine, chronic food insecurity, widespread poverty, fast population increase, weak institutions, corrupt governments, and Western pessimism are all factors. What factors contributed to Asia's Green Revolution's success against the backdrop of this architects claim that the Green Revolution in India, It was successful due of There have been significant technical and institutional developments. The lack of significant investments in agriculture, which is a characteristic in most African nations, was a key reason in India's agricultural output stagnation in the 1960s. when there are similarities The Green Revolution occurred as a result of investments made in Africa[2]. The spurts in the water are an example. Before and after the manufacturing that took place in Zimbabwe 6 years after independence Kenya has been independent since independence. From the 1960s through the 1970sFollowing the collapse of the Derg regime in Ethiopia,and after the banning of maize and rice in Nigeria imports.

There is a lot of evidence that smallholder farming is beneficial[1]. Can work productively in a competitive market when given the appropriate assistance this may have a negative impact. There are significant impacts on poverty alleviation. To the majority of observers, reducing poverty entails increasing smallholder agriculture. Agriculture as a source of broad-based economic growth Agricultural and non-agricultural enterprises are both growing and employing people. 8 It's also critical for lowering the continent's increasing population of undernourished people, which is projected to reach 212 million. Approximately one-third of the population. Smallholder farming is usually seen as a strategic asset. Agriculture is critical to overall development, yet expansion in impoverished rural regions may exacerbate poverty. decrease through three different methods[3].

- the direct effects of increased agricultural productivity and incomes on the rural poor,
- benefits of cheaper food for both the urban and rural poor, and
- Agriculture’s contribution to economic growth and the generation of more opportunities in the nonfarm rural sector.

Economic shift defined by a rise in the significance of the nonfarm economy and a decrease in the agriculture sector's relative importance. Smallholder agriculture is often seen as a win–win alternative for fair development in this regard[4]. Agriculture is back on the policy agenda for donors and poor nations alike, after almost two decades of neglect. Accordingly, the most significant reason for this progress is a shared awareness that economic growth is the most effective means of alleviating poverty, and that expansion in the agricultural sector, which includes smallholders, drives this growth and is critical to overall economic development. Africa has the world's most severe and persistent poverty, with more than half of the population being smallholder subsistence farmers. 12 In July 2004, former United Nations Secretary-General Kofi Annan emphasized what he called "Africa's 21st Century Green Revolution" to achieve the

Millennium Development Goals by 2015 against the backdrop of growing food insecurity and poverty, as well as the realization of agriculture's enormous potential.

He emphasized the need of paying particular attention to agricultural methods in regions that are mostly cut off from functional markets. This is true in Africa, Asia, and Latin America's distant regions. Increasing smallholder agricultural production requires scaling up a number of practical initiatives. This chapter covers the scientific foundations of the main interventions that are required. Beginning with the introduction, the chapter is split into four sections. The biophysical limitations to increased output are discussed in the next section. The third section focuses on practical ways to control soil fertility, which is increasingly being recognized as a major contributor to decreasing production. Other complementing initiatives, such as better germplasm, water management, weather forecasting extension, markets, and microfinance, are discussed in the fourth part. The last part shows how impacts may be scaled up to national levels, showcasing some of the Millennium Villages Projects' methods and outcomes. In conclusion, we stress that the knowledge foundation needed to reverse Africa's perilous food situation is accessible, and that there is space in the necessary expenditures for targeted input subsidies. One may ask why Africa is unable to feed itself, given its vast variety. There are many factors that restrict output potential, including decreasing soil fertility, insufficient utilization of enhanced germplasm, and limited irrigation[5]. Without initially addressing the issues of soil and land degradation, little progress in smallholder farming in Africa is likely to be made.

Agriculture is inappropriate for around 55 percent of Africa's land area. Only 11% of the continent, distributed across several nations, contains high-quality soil that can support more than twice the continent's present population. 14 The majority of the remaining arable land has a medium or low potential for agriculture, with at least one significant restriction. Under low-input systems, this land is at a significant risk of deterioration. Soil deterioration was projected to have impacted 500 million hectares, or 17% of Africa's land, by 1990[6]. 15 Susceptible dry regions (arid, semiarid, and subhumid aridity zones), which encompass 43 percent of Africa and impact 485 million people, are the worst-affected areas. 16 In 1990, it was projected that 65 percent of agricultural land, 31 percent of permanent pastures, and 19 percent of forest and woodland in Africa were degraded in some way[7]. The present state of affairs is unquestionably worse. Soil moisture stress limits land production on 86 percent of African soils14, but soil fertility deterioration has now added a significant human-induced constraint to productivity. Other issues frequently mentioned3 include a high human illness burden, especially HIV/AIDS; a large rural inland population; a lack of significant river basins for irrigation; insufficient regulatory frameworks (albeit improving); and markets that do not function for the poor.One method to boost agricultural yields is to utilize inorganic fertilizers. Since the mid-1960s, fertilizer usage has resulted in a 50–75 percent rise in agricultural yields in developing nations outside of Africa.

Unfortunately, only a tiny percentage of African farmers utilize fertilizers, and the quantities used are often insufficient. Each acre gets an average of less than 9 kg of nitrogen and 6 kg of phosphorus. A typical crop requires at least 60 kg of nitrogen and 30 kg of phosphorus per hectare. Africa uses approximately 10% of the world's chemical fertilizer per hectare of agriculture, which is by far the lowest. The present level of fertilizer usage in Africa is unsustainable. This causes nutrient depletion, which is exacerbated by the poor intrinsic fertility of many African soils, with over 80% of them having chemical or physical restrictions on crop

development[8]. Fertilizer usage is limited, owing to its high cost, and it contributes substantially to the unprofitable character of smallholder farming seen across Africa. Few subsistence farmers can afford fertilizers, which may cost almost four times as much in many areas of Africa as they do in North America or Europe.

Transport expenses in Africa are about seven times greater than in the United States (in tons per kilometer). By the time fertilizers reach the farmer in rural Malawi, transportation and associated expenses (import tariffs, demurrage, and a variety of levies) have more than doubled the worldwide price. Thus, smallholder farmers in Africa have not reaped the benefits of actual worldwide price reductions of approximately 38% for nitrogen and more than 50% for phosphorus over the last 25 years[9].The high expense of transportation is a major driving force behind this. For example, transporting one ton of fertilizer 1000 kilometers costs $15 in the United States, $30 in Asia, and $100 in Africa. Similarly, transporting 1 ton of corn from Iowa (USA) to Mombasa (13,600 km) costs $50, while transporting 1 ton of maize from Mombasa to Kampala (900 km) costs $100.According to estimates from the mid-1990s, every African country's soils had a negative nutrient balance, indicating that the quantity of nitrogen, phosphorous, and potassium supplied as inputs was substantially less than the amount taken at harvest or lost via erosion and leaching.

This is in stark contrast to the nutrient excess of northern hemisphere soils, which presents a significant environmental risk. It also contrasts with Asia's average fertilizer nutrient usage rates of 150 kg/ha and Latin America's average of 75 kg/ha. Fertilizer use in Africa has grown by just 0.64 percent since 1980, despite a population growth of 75%, from 345 million to 607 million people. Fertilizer consumption in the Association of Southeast Asian Nations area of Southeast Asia increased at a rate of more than 12% each year during the same time, although having a somewhat lower overall population than Africa. In Asia, production increases with better crop types are predicted to be 88 percent, but only 28 percent in Africa, due to low input usage. Nutrients and soil moisture are complimentary inputs[10]. This is especially true in Africa, where chemical fertilizer prices are expensive at the farm level and rainfall is unpredictable in many places.

High yields require a lot of fertilizer, good seeds, and other expensive inputs. Farm-level investments in fertilizers, seeds, and other inputs, on the other hand, are hazardous in regions where rainfall is unpredictable and crops often fail due to drought. A key disparity in crop productivity in Asia and Africa is explained by this dilemma, in which farmers cannot afford to apply the inputs needed to produce high yields. More than half of arable land in Asia is irrigated, and the average yearly fertilizer application is about 40 kg/ha of arable land. Irrigation is used on less than 5% of agriculture in Africa, and the average fertilizer application is less than 10 kg/ha.

Farming is subject to a wide range of meteorological conditions. Weather extremes are anticipated to become more common in certain areas as a result of long-term climate change. Improved water and fertilizer usage efficiency will need innovations in water collection and reuse, the development of small-scale irrigation techniques, and the use of water-saving irrigation systems that allow for precise nutrient delivery. Millions of small-scale farmers in Asia have benefited from low-cost irrigation technology, which have increased agricultural production, income, and family food security. In Kenya, Tanzania, Zambia, and other nations, efforts to increase groundwater usage include the distribution of low-cost treadle pumps and drip

irrigation kits. In much of Africa, surface water is now the main source of irrigation. As a result, across most of Africa, surface water storage systems are required to maximize the utilization of river water.

However, in certain locations, the expense of construction and possible environmental consequences may prevent the establishment of surface water storage. Reducing the huge yield gap between actual and prospective yields is another important element in improving agricultural production in Africa. For maize, a major food crop in many African nations, the disparity is more than 50%. Other key crops in the area, such as cassava, sorghum, and rice, are also affected. This yield gap demonstrates Africa's unrealized potential for improving agricultural output and productivity. In Africa, adoption of enhanced germplasm is usually low. Even in maize, where adoption rates are about 57 percent, the gap between research and adoption is increasing. Cassava production is increasing rapidly, but it is still below 40%. The poor adoption of the various technologies available may be attributed to a number of reasons.

The high cost of inputs (fertilizers and pesticides), the lack of liquidity and credit, and the lack of access to supplemental irrigation are all factors that contribute to farming's high risk. Furthermore, unstable land tenure rights are a major deterrent to farmers investing in soil amendments or soil and water resource conservation initiatives. Despite the fact that techniques and technology are relevant and accessible, smallholder farmers often lack access to them.As a result, extension and input distribution systems are mutually reinforcing extension contributes to agricultural productivity increase when input distribution systems are operating, and vice versa. Agricultural technology are likewise evolving at a fast pace. Farmers must be educated on which technologies are most effective, how to utilize them, and how to create effective demand for viable new technologies in order for the input distribution system to provide them.

Unfortunately, in many African nations, agricultural extension is weak and decreasing. Where agricultural extension services are available, the ratio of agricultural officers on the ground to farmers is often enormous. Retrenchments after structural adjustment programs, HIV/AIDS, conflicts, and civil wars are among causes that have led to the decline of extension services. Private extension services are disproportionately geared toward affluent areas and high-value crops. Remote regions and impoverished farmers with little marketable surplus, particularly those producing low-value commodities, are underserved. Thankfully, nonprofit private providers are increasingly focusing on these groups. Based on many multilocational research, a consensus has developed that combinations of inorganic (fertilizers) and organic (nutrients) inputs provide the greatest and most sustained production increases per unit nutrient supplied. This agreement departs from the fertilizer package strategy, which has historically failed in the area. However, this adds to the already difficult task of guaranteeing fertilizer supply, as well as the additional issue of increasing farmers' capacity to generate organic matter.

Agroforestry technologies, such as improved fallows with fast-growing leguminous trees and cover crops that mobilize atmospheric nitrogen, biomass transfer from nutrient-mobilizing plants, such as Tithoniadiversifolia, compost, crop residues, and animal manure, are all promising organic soil fertility strategies. When cattle are given leguminous tree fodder, the nutritional content of manure, particularly phosphorus, may be greatly enhanced. 3Leguminous tree technology improves soil fertility, yields, weed control, and provides fodder and fuel, as well as serving as stakes for higher-value crops like tomatoes and climbing beans. Increased

biodiversity, carbon sequestration, and watershed protection are all benefits of agroforestry technology. Mineral fertilizers, particularly phosphorus, would still be required if agroforestry and other organic fertilizers were used.

This may come from more traditional phosphorus fertilizers or finely ground phosphate rock, and Africa has numerous "reactive" rock resources that might be explored further. Agricultural research projects in western Kenya, a highly populated area with more than 1000 people per square kilometer in some places, best illustrate the benefits of this integrated approach to soil fertility management. The issue of poor and decreasing soil fertility is exemplified in this area, and the ongoing danger to land resources is exacerbated by the desire to increase food production and decrease poverty. Reversing agricultural stagnation (due largely to low and declining soil fertility), safeguarding the natural resource base, slowing population growth rates, combating the negative effects of the HIV/AIDS pandemic on the community, and reducing poverty are all intrinsically linked to achieving food security.

The World Agro forestry Centre and other partner organizations tested a low-cost integrated soil package to address this issue. Recapitalize phosphorus-deficient soils; supplement phosphorus dressings with organic manure to increase phosphorus use efficiency; use existing on-farm organic resources (including biomass transfer) to supply nitrogen to crops; use improved fallows of agro forestry species to replenish soil nitrogen and reclaim Striga-infested soils; supplement phosphorus dressings with organic manure to increase phosphorus use efficiency; supplement phosphorus dressings with organic manure to increase phosphorus use. Thousands of farmers embraced the technology, and maize (the main food crop) yields rose two to three times above normal yields of 1–2 tons/ha or less in only one growing season. The tree fallows offer numerous advantages, including in situ fuelwood production, collection of leached nitrates, recycling of other nutrients, and Striga management, in addition to nitrogen recycling at 100–200 kg/ha. Farmers were also encouraged to diversify and obtain better kinds of other crops, such as cassava, sweet potatoes, beans, sorghum, and fruits, such as mangoes, avocados, and passion fruit, as a result of the increased maize yields.

Access to lunch for school-aged children in one of the communities was a spillover effect of improved agricultural yields. Others in the area used the communities as learning centers. They also served as field laboratories for researchers and farmers to test institutional and technological advances. This significantly contributed to the project's success. The initiative, however, lasted just three years and terminated before farmers were able to maintain efforts to get the required supplies and support community-based farmer-to-farmer distribution networks. Thankfully, the Millennium Villages Project has taken up the project and is pushing the same nutrient mobilization agroforestry initiatives. However, increasing soil organic matter and nitrogen advantages takes time and may only occur when inorganic fertilizers are used to boost plant biomass development. Mulch management is one of CT's most difficult tasks. Farmers must protect the mulch by preventing animals from eating agricultural leftovers and suppressing bushfires. To achieve this, a variety of techniques are suggested, ranging from the use of green manure and leguminous tree cover crops to weed-controlling and mulch-producing cover crops to herbicide-based CT systems. CT is a knowledge-intensive system, with the farmer's actions (management) being more important than the inputs he or she uses. Spreading CT among smallholder farmers necessitates a focus on information transfer and knowledge development to

and within agricultural communities. It entails academics and extension workers collaborating with farmers and other stakeholders to create regionally tailored conservation agricultural methods. It necessitates the involvement of many partners. The African Conservation Network is pursuing this objective, and it has also given a thorough assessment of the current information base.

Through market-led procedures, Africa has a lot of potential to boost agricultural development and relieve hunger and poverty. Despite some pessimism, sufficient market possibilities exist that have yet to be completely explored and may enable more fast and sustainable agricultural development in Africa. Staple foods, for example, represent a promising domestic market opportunity, not only because Africa is a net importer of many staple foods, but also because projections show that demand for human consumption and livestock feed will double by 2015, adding an additional $50 billion per year to effective demand. Many African farmers are in a strong position to compete in these essential markets.

Furthermore, Africa's expanding urban markets are boosting demand for more varied and higher-value-added commodities, opening up new possibilities for many African farmers. Many African nations also have a competitive edge in the goods that other African countries buy. African nations may boost intraregional agricultural trade by more than 50% by lowering trade barriers in both the agricultural and non-agricultural sectors. Intra-African commerce may also help to improve food security by allowing output to be transferred from high-potential agro ecological zones to regions with structural food shortages. Intra-African commerce may be more accessible to smallholders since cross-border exports may not be subject to the same degree of rigorous quality requirements needed for foreign markets. In drought years, increased cross-border commerce in agricultural staples may also assist to stabilize food supply and prices at the sub regional level.

Farmers' competitiveness and capacity to enhance their market position is a key problem with growing market volatility and competition for smallholders. Taking use of economies of scale is one method to boost production. Small-scale farmers confront a variety of challenges, including a lack of money, inaccurate information, geographic dispersion, and inadequate infrastructure and communications. Collective marketing via rural producers' groups may be one effective method to address these challenges. The state's retreat from economic activity, along with a relatively undeveloped private sector, exacerbates these limitations. Farmers may reduce transaction costs and therefore get the advantages of collective marketing by acting collectively via farmer organizations. This is an important element in smallholder tea, coffee, and dairy producers' success in Kenya's highlands. Contract farming is another method for increasing market access that may potentially replace the state's role in supplying knowledge, inputs, and financing. The degree to which contract farming may benefit small farmers who are the focus of poverty reduction initiatives is a crucial issue. Almost all contract farming programs, according to the data thus far, exclude small farmers. 60 Weak institutions are to blame for many of the transaction expenses that prevent companies from working with smaller farmers.

Growers might, for example, directly obtain vital production information if information markets were better established, rather than depending on the company for the high fixed costs of extension services. There are many success examples in Africa that may be used to help further improve this system. Smallholder tea producers in Malawi, dairy farmers in Kenya, and

confectionery peanut growers in Senegal are just a few examples. How should smallholders react to changes in agrifood organizations, such as the global expansion of supermarkets one apparent solution is to accept these developments as a business reality and to organize around them. In practice, this entails establishing direct ties with new markets, as well as information providers, non-governmental organizations, commercial players, and the government. Small farmers must create a new generation of economic organizations that operate at greater degrees of detail, coordinate technology, and enhance scheduling as a result of their interaction with new markets. Knowledge transfer from other areas with more sophisticated connections, such as Asia and Latin America, is critical.

However, lowering the bloated marketing margins caused by transportation and processing costs must come first. Improvements in road and transportation networks, greater access to market information systems, and improved coordination and contractual agreements among farmers, dealers, and purchasers are all part of reducing these margins. These investments in rural infrastructure and market development would also enable linkages with the nonfarm sector, boosting total income and employment in both rural and urban regions and increasing demand for agricultural goods. It is essential for success in the post-reform period to define an acceptable and realistic role for the public sector. Because agricultural commodities demand is inelastic in general, and more so in the face of market failure, even modest increases in aggregate production may significantly lower output prices.

As a result, technological advancements have resulted in greater output. In that order of significance, Africa produces all of the major grains: maize, wheat, and rice. Corn is the most widely cultivated crop, being planted in almost every ecological zone. Egypt and the Indian Ocean islands of Réunion and Mauritius, where cultivation is irrigated, have the highest yields per acre. Millet and sorghum are also grown throughout the continent, although mostly in the savanna areas. Rice production and consumption have grown in importance in recent years, and they are strongly linked to regions of growing urbanization. Egypt, Guinea, Senegal, Mali, Sierra Leone, Liberia, Côte d'Ivoire, Nigeria, Tanzania, and Madagascar are the most significant rice-producing nations. Wheat production was previously limited to South Africa, North Africa, and the highland zones of Ethiopia and Kenya, but new cultivars have allowed it to be grown (with irrigation) in savanna nations like Nigeria.

Except in the subtropical regions of North Africa and the highland zones of East and Southern Africa, where pure stands of alfalfa (lucerne) are cultivated, fodder crops are not commonly planted. Berseem (a kind of clover used for fodder) is also cultivated under irrigation in Egypt and Sudan. Protein-rich legumes are extensively grown, typically in combination with other crops. Velvet beans, cowpeas, soybeans, and lablab are among them (hyacinth beans). Broad beans and vetches are also grown in North Africa. Peanuts (groundnuts) are extensively produced in Western Africa, for both local and export use. Cassava farming has exploded in popularity, especially in western and central Africa; it has replaced yam production in many regions and is no longer considered a famine reserve. Potatoes are grown at greater altitudes in nations like Ethiopia, Kenya, and Madagascar, as well as in North and South Africa's Mediterranean climatic zones. Sweet potatoes are more common in tropical and subtropical areas, while plantains are often cultivated in tropical forest zones.

2. DISCUSSION

Agriculture is Africa's most significant economic activity by a long shot. It employs about two-thirds of the continent's working population and contributes an average of 30 to 60% of gross domestic output and approximately 30% of the value of exports to each nation. Despite this, arable land and land planted with permanent crops account for just approximately 6% of Africa's total land area. Except in countries with large populations of European ancestors, such as South Africa, Zimbabwe, and Kenya, agriculture has largely been confined to subsistence farming and has been heavily reliant on the inefficient system of shifting cultivation, in which land is temporarily cultivated with simple implements until its fertility declines, then abandoned for a period to allow the soil to recover. Furthermore, arable land has been distributed throughout much of Africa via a complicated system of community tenure and ownership rather than through personally acquired title, and peasant farmers have had rights to utilize relatively small and dispersed holdings. This land ownership structure has tended to keep agricultural output intensity low and has slowed the pace at which capital has been mobilized for modernization. A number of nations have attempted to increase productivity by utilizing improved seed and planting materials, tractors and other automated equipment, and increased use of mineral fertilizers and pesticides. However, such efforts have been rather restricted, raising worries about their role in speeding up soil erosion and desertification. Land has become private rather than communal property in places where commercial crops are grown, and cultivation is intense. A lack of integration between crop production and animal husbandry is also to blame for the continuation of relatively low-productivity agricultural systems over vast swaths of the continent. Sedentary cultivators such as the Hausa in Nigeria and the Kikuyu in Kenya have traditionally lived apart from their nomadic herdsmen neighbors (the Fulani and Maasai, respectively), resulting in a lack of access to animals for draft power and manure for fertilizer across large swaths of the continent. In many places, the presence of insect pests such as the tsetse fly inhibits mixed farming.

3. CONCLUSION

The consequences of decreasing agricultural production in Africa, the region where this decrease is most visible, will increase poverty, particularly in rural and urban areas. Underperforming agriculture, on the other hand, hinders economic development and may have severe environmental effects. This chapter has emphasized some of the unique challenges that African smallholder agriculture confronts, such as decreasing soil fertility, limited adoption of improved germplasma, reliance on unpredictable rainfall, inadequate farmer extension services, and restricted market access. On the continent, the technology and ideas required to solve these issues already exist. The difficulty is to make them available to farmers at a large scale. This objective is critical for the success of the African Green Revolution, which has been long overdue. African governments and leaders have increased their efforts and are working to find answers to long-standing issues, such as providing targeted input subsidies. As Malawi's input subsidy program and the Millennium Villages Project have shown, the impacts on food security may be swift. These impacts must be scaled up, and governments must be assisted in developing the technological and institutional ability to keep them going. Identification of the kind and size of public–private partnerships required for establishing comprehensive and sustainable input and product markets will be a major issue and focus of future study. To this aim, cross-country

cooperation among developing countries may be very beneficial to this process, particularly in terms of technology transfer and market skill development.

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