

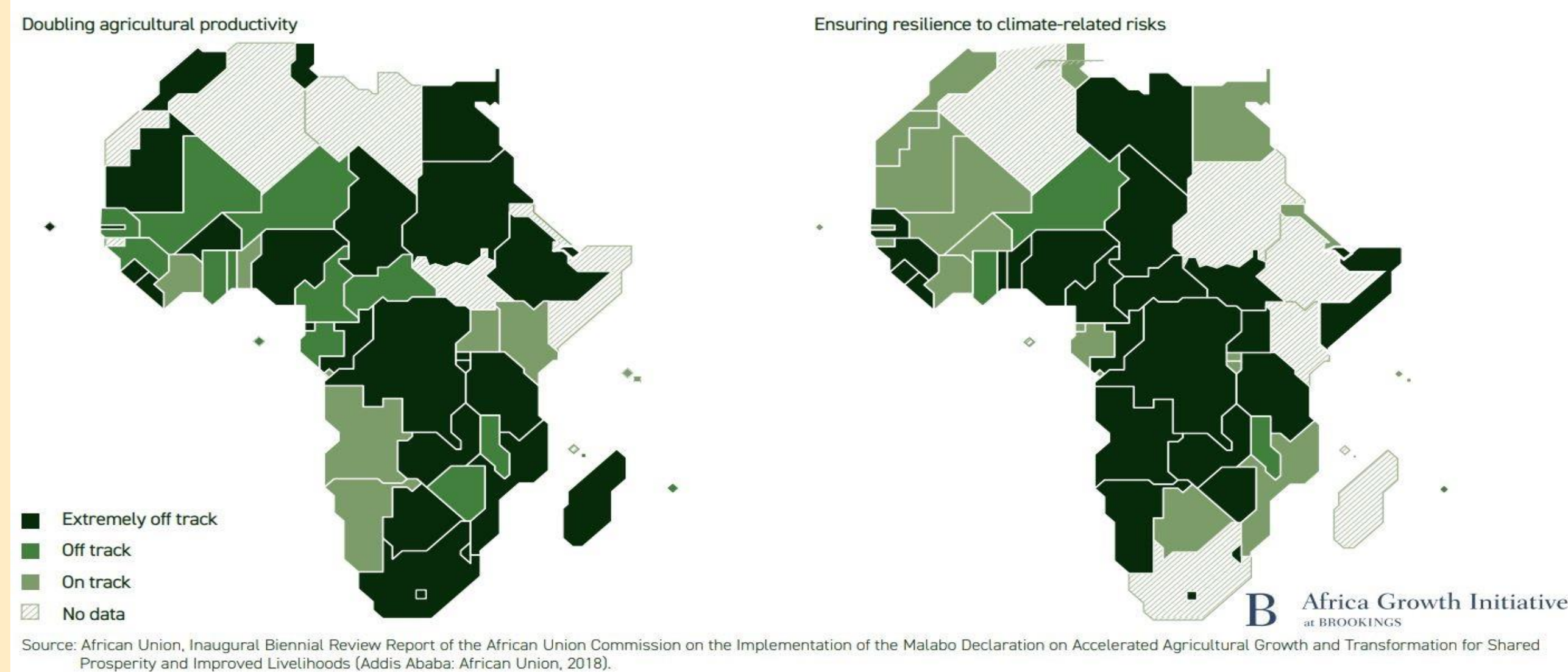
ABSTRACT

Achieving sustainable food security in Africa is one of the main challenges facing African governments and the international community. The current food crisis and ongoing chronic hunger problems clearly demonstrate that millions of people on the continent are dangerously vulnerable to economic, political and climatic shocks that threaten food availability and accessibility. Many African countries are lucky enough to be endowed with an abundant spread of natural resources that includes approximately 60% of the world's arable land, vast freshwater and marine reserves plus the significant potential for harnessing solar energy. However, resources are unevenly distributed and agro-ecological niches and biomass conditions vary widely across the continent because of constraints on water, land, infrastructure and markets. At the heart of the strategies to build resilience and tackle food insecurity is the need for effective institutional and policy frameworks that can support local innovations while taking into account the biophysical, social and economic constraints within which rural livelihoods operate. A bioeconomy is an ideal that brings together the commercial activity surrounding the use of renewable biological resources such as crops, forests, animals and micro-organisms (like bacteria) to solve challenges related to food, health, environmental protection, energy and industrial processes. In Africa, a bioeconomy has the potential to reinnovate primary production especially in agriculture, the backbone of most economies in the region, and also in sectors like aquaculture, forestry, health and industry. Therefore, adopting a bioeconomy development model, with its components of harnessing biosciences knowledge, technology generation, transfer and uptake, leading to sustainable bioinnovations and accompanying products and services. This paper collates the information on food and nutrition and support the view that for food security initiatives in Africa to be effective, they must embrace solutions that are equitable, generalizable and ecologically sound to ensure sustainability. Ultimately, to improve innovation and technology adoption, a systems approach that allows women and men, wealthy and poor farmers to engage with scientific and political elites in the design and implementation of food-related research and development initiatives must be embraced. There is also the need to develop tools and approaches that can assist smallholder farmers, researchers, policy makers and other stakeholders to share a better understanding of the multiple factors driving food insecurity and hindering the implementation of effective policies and institutions.

Key words: food, nutrition, bioeconomy, bioinnovation

Improving food and nutrition security depends on increasing agricultural productivity and resilience

Progress in agriculture and food security in Africa remains modest: Only seven countries are on track to meet the Comprehensive Africa Agriculture Development Program (CAADP) goal of doubling agricultural productivity by 2025, and only 19 are on track to ensure resilience to climate-related risks. Furthermore, only two countries—Côte d'Ivoire and Seychelles—are on track to reach both of these goals.



CONCLUSION

Following the increasing food insecurity in Africa, it is important to understand the links among bioeconomy, food security, and Sustainable Development Goals. To address this issue, governments in developing countries has adopted diverse programs and policies to achieve and sustain food security. But the food security is still faced by some challenges that include climate change, population, lack of infrastructure, poverty, and lack of education among others. Governments of both developed and developing countries have therefore engaged in bioeconomy through biotechnology processes which has led to the improvement of agricultural produce, thereby improving food security in the economy which has also helped achieving at least seven of the SDGs at the same time, while the achievement of some of the SDGs will further enhance achieving food security. This explains the links that exist among bioeconomy, food security, and SDGs. This explains how important food security is to the achievement of the SDGs.

POLICY RECOMMENDATIONS

The following recommendation is therefore suggested for the governments to adopt in order to achieve food security in the face of increase in population and other challenges while at the same time achieving SDGs. It is important that African governments focus more on policies that enhance biotechnology such as training of skilled labor in biotechnology so as to enjoy its benefits. It is also important to check the growth rate of her population so as to evade population eruption and its implications. It is therefore suggested that multiple practices should be discouraged by the government through the giving of incentives and placing of law by the legislative. Maximum number of births by families should also be controlled by the government. Good governance and proper planning are crucial to the achievement of SDGs which in turn enables the achievement and sustainability of food production. For instance, combating climate change (SDG 13) is addressed through the use of modern technology. Finally, in order to achieve food security in the presence of all the possible factors that hinder food security in any country especially the less developed countries. It is of importance for the government to invest in agriculture so as to improve farmer's plight and at the same time protect the ecosystem from degradation. Investment in agriculture will further help the farmers in the rural area to be able to resist the effect of diverse climate changes that drive the ecosystem.

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Facts: Current rates of malnutrition in Africa

- 58 million children under age 5 are too short for their age (stunted), 13.9 million weigh too little for their height (wasted), and 10.3 million are overweight. None of these children are growing healthily (UNICEF, WHO and World Bank Group, 2015).
- 163.6 million Children and women of reproductive age are anaemic (WHO, 2015a).
- 220 million people are estimated to be calorie deficient (FAO, 2015a).
- 8% of adults over 20 are obese (WHO, 2015b).
- Adult obesity is on the rise in all 54 African countries (2010–2014) (WHO, 2015c).
- 13 countries in Africa have to manage serious levels of stunting in children under five years or anaemia in women of reproductive age and adult overweight

Key Challenges and opportunities to Food and nutrition security

Rural Poverty and Hunger

Neither population growth nor climate change will present insurmountable challenges to agricultural development in Africa, if Africa seizes the opportunities it now has. and both provide opportunities. Reducing the death and suffering from diseases requires generalization of prevention, treatment and care and support in rural areas, taking advantage of agriculture in the care and support area..

Poor farming systems

Irrigation infrastructure is poorly developed. And climate change will significantly add to the technology challenge. As a consequence of these factors, Africa is less able to borrow technology from other tropical countries, and technology transfers between regions in Africa are also constrained

limited research resources

Given the heterogeneity, the poor borrowing opportunities, and the enormous challenges from pest, diseases and water stress, basic innovations at the science level are urgently needed to in a wide variety of crops and livestock diseases

Insufficient finances

Rural finance is also insufficiently developed, Farmers' organizations have made a lot of progress, but are still not able to provide much of the needed capacity. If the smallholder services, rural finance, and markets were improved, however, a number of problems will be closer to a solution: Farm profit and investments will increase, nutrition depletion will be reduced, and food insecurity associated with poor markets will be reduced.

Poor infrastructure and limited scientific work

Regional infrastructure, roads, communications, ports is critical for access to each others and external markets. Success in agriculture crucially depends on indigenous scientific capacity to generate new technology. Given the capacities of small and poor countries, this is far better done on a regional or sub regional basis in most of these areas institutional development programs have been created.

INTRODUCTION

The bio-economy is gaining increasing prominence in the policy debate, with several countries developing bio-economy strategies to decouple economic growth from dependence on fossil fuel, as well a pathway to supporting some of the UN Sustainable Development Goals (SDGs) and commitments under the Paris Climate Agreement.

Food and nutrition systems are at a turning point worldwide. With COP21 agreements and nine SDGs referring directly to food systems, food and nutrition security (FNS) is becoming a key concern for science, technology, policy and society. There is no security without food security, and no food security without nutrition security. Food and nutrition are not only at the heart of Africa's economy, they are also very much at the heart of the bio economy.

It is estimated that by 2050, nine to ten billion people will have to be fed, and it has been estimated that food production must increase by 60%. Today, there are more obese than undernourished people and yet 33% of food produced is wasted. Food systems in overall terms use 70% of freshwater resources, 30% of energy and produce 25% of GHG emissions worldwide. It is therefore crucial that we design food and nutrition systems that can endure. Both are equally important and must be dealt with together in a holistic approach. Research and innovation (R&I) must play a more central role to develop sustainable systemic responses that transform and future proof our food and nutrition systems.

RESEARCH METHODOLOGY

Data for this paper were derived from secondary sources of previous researches and analysis of scholars, government documents, newspaper as well as journal articles that are related to the subject of study.

RESULTS AND DISCUSSION

Food and nutrition security in Africa

Whereas the number of people affected by malnutrition is difficult to calculate, because a person can suffer from more than one type of malnutrition simultaneously – the scale of malnutrition in Africa is staggering. The burdens regarding human suffering, mortality and disease are large (International Food Policy Research Institute, 2016), but so too are the economic burdens (African Union *et al.*, 2014).

The 2017 Global Nutrition Report contains data compiled from secondary sources including the United Nations Children's Fund (UNICEF), World Health Organization (WHO) and the World Bank among many others. If the current rate of reduction is greater than or equal to the required rate, then the country is "on course" (shaded in green in Tables 1 and 2). If the current reduction rate is higher than zero but less than the required rate, then the country is designated as "off course but making progress" (shaded in yellow), and if the current reduction rate is less than or equal to zero (i.e. stunting rates are static or increasing), then the country is designated as "off course, no progress".