

Policy Brief

Leveraging Agricultural Opportunity for Food Sovereignty on Africa:

A Developmental Overview



September 2023

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Acknowledgments:

This policy brief is based on a working paper authored by Olivier Dubois. UNDP would like to also thank several peer-reviewers including Jennifer Clapp, Alex Awiti and Tilahun Amede.

Africa can feed itself if its soil becomes more productive. Differences in food productivity can be explained in large part by differences in Africa's soil management as well as shocks. Higher food productivity, in turn, can help achieve many SDGs, including reducing poverty and hunger, accelerating economic development, improving trade and balance of payments positions, and increasing the fiscal space available to countries in pursuing sustainable human development.

This policy brief focuses on the challenges and opportunities to improve Africa's food productivity through better soil management, reduced food imports and enhanced food production through improved soil productivity. The policy recommendations include options for improved practices both on and off the farm.

1. Food Sovereignty in Africa: *a development imperative*

Food sovereignty has moved higher on the policy agenda in on the African continent following disruptions in international food trade caused by the war in Ukraine. Discussions about food self-sufficiency are complicated by the fact that it often means different things to different people. A more recent and pragmatic definition of food self-sufficiency is domestic food production that is equal to or exceeds 100% of a country's food consumption. In this case, food self-sufficiency is defined by the ratio of food produced to food consumed at the domestic level, and therefore does not rule out trade¹. One should also consider resilience to shocks in lean times, not just the regular trend of production.

Additionally, it is important not to confuse food self-sufficiency with food security. Food self-sufficiency is not an expression of food security, although the two can interact in important ways. Food security as a concept does not distinguish whether that food is imported from abroad or grown

domestically, so long as it is available, accessible, nutritious, and that these three features are stable. Food self-sufficiency is mainly concerned with the availability (i.e., supply) dimension of food security², and focuses on the origin of food, or at least the domestic capacity of a country to produce it in sufficient quantities to meet its domestic needs.

Some countries that are more than self-sufficient in food at the country level can still have high levels of hunger and malnutrition among their population³. For instance, countries in this situation may produce more than enough of some food crops, but too little of others that are required for a healthy diet. This fact requires any analysis of food sovereignty in Africa to look at both the national dimension as well as the regional dimension.

Similarly, other countries that have a low self-sufficiency ratio may have no problem in securing adequate food supplies for their population through a reliance on international trade. High-income countries, for example, can easily afford imported food even when food prices on world markets are high and/or volatile. The extreme case

1. Clapp, J. (2017). Food self-sufficiency: Making sense of it, and when it makes sense, Food Policy, (Vol. 66).

2. FAO. (2008). An Introduction to basic Concepts of Food Security. <https://www.fao.org/3/al936e/al936e00.pdf>.

3. Clapp, J. (2017). Food self-sufficiency: Making sense of it, and when it makes sense, Food Policy, (Vol. 66).

are high-GDP countries like Singapore and Hong Kong, that do not have an agricultural sector, and have ensured their food security exclusively from food imports. Yet, other, poorer countries, with a low self-sufficiency ratio, like Niger, may find it very difficult to secure adequate food imports for their population because it would severely impact their budgets⁴.

In the end, achieving food security through self-sufficiency is a balancing act: a completely food self-sufficient country would be vulnerable to events at home like adverse weather or conflicts. Equally, too much reliance on a few specific food imports can leave a country exposed to international disruption.

2. African soils and the continent's food self-sufficiency: *Where do we stand?*

As Africa grapples with disruptions in the global supply chain caused by the Ukraine conflict, this can be seen as an opportunity for the continent to become more self-sufficient in food production. In discussing this issue, it is important to realize that African countries have fared differently and are in different situations in relation to their soil quality and food self-sufficiency. However, more recent studies show that, overall SSA's self-sufficiency for major food commodities is decreasing, due to population expansion beyond the pace of domestic supply growth⁵

4. Clapp, J. (2017). Food self-sufficiency: Making sense of it, and when it makes sense, Food Policy, (Vol. 66).

5. OECD-FAO, 2. (2022). Agricultural Outlook 2022-2031. https://books.google.it/books/about/OECD_FAO_Agricultural_Outlook_2022_2031.html?id=3_V3EAAAQBAJ&printsec=frontcover&source=kp_read_button&hl=en&newbks=1&newbks_redir=0&qboemv=1&redir_esc=y#v=onepage&q&f=false.

There is a structural vulnerability in the positive relationship between the value of a country's food Self Sufficiency Ratio⁶ :

$$\text{SSR (\%)} = \frac{\text{Production}}{(\text{Production} + \text{Imports} - \text{Exports})} \times 100$$

A food self sufficiency ratio below 1 indicates that a region does not have enough food to meet their nutritional needs and demands; it suggest that the available food supply is limited.

In other words, countries with greater ability to feed their people are also more able to keep the production – consumption balance stable in the face of internal or external pressures. The reverse, low SSR and high fluctuations - applies to countries such as Small Island Development States/SIDS. (e.g., Cape Verde, Seychelles, Mauritius), where land scarcity is a major constraint to increasing agricultural production.

Table 1 shows differences in food sufficiency among regions. For instance, Northern Africa demonstrates good performance except for soybean and wheat. Meanwhile, Southern Africa faces challenges with rice and wheat sufficiency. All regions exhibit a low sufficiency ratio for wheat, a situation worsened by the war in Ukraine.

Thus, based on the SSR equation, food self-sufficiency can be achieved through trade measures (i.e., reduced imports and increased exports) and enhanced domestic production. In that context, interesting findings emerge from a recent study⁷, which investigates the impacts by 2030 and 2050, including on food security and

6. Luan, Y., & Cui, X. F. (2013). Historical trends of food self-sufficiency in Africa. Food Security . 5(3):393-405: <https://link.springer.com/content/pdf/10.1007/s12571-013-0260-1.pdf>.

7. Janssens, C. A. (2022). A sustainable future for Africa through continental free trade and agricultural development , Nat Food . 3,608-618: <https://doi.org/10.1038/s43016-022-00572-1>.

Table 1: African Food Sufficiency Ratios by Region and Commodity

Commodity	Central Africa	Eastern Africa	Northern Africa	Southern Africa	Western Africa
Eggs	0.94	1.00	1.00	1.02	0.98
Milk	0.90	0.99	0.97	1.00	0.93
Potatoes	1.00	0.99	1.04	1.04	0.98
Rice	0.67	0.82	0.90	0.03	0.79
Soybean	0.97	1.10	0.01	0.99	1.04
Tomatoes	0.96	1.00	1.04	0.97	0.95
Wheat	0.46	0.71	0.68	0.71	0.49

GHG emissions, of Africa’s free trade and the complementary role of agricultural development along the whole food chain through increased market access for farmers and agricultural intensification:

- **Continental free trade would increase intra-African agricultural trade sixfold**, but internal trade would replace only marginally outside imports - i.e., only 6.1% by 2050 - because Africa’s agricultural production cannot compete with its outside partners. Moreover, due to its small proportion of African food consumption by 2050 (about 5% in 2050), intra-African trade would only marginally reduce undernourishment. Free trade would reduce intra-regional trade costs and would have no GHG emission impacts.
- **Agricultural development could lead to a growth of production** by more than 75%, assuming farmers’ full access to markets through significant reduction in local transport costs and in local marketing costs, together with substantial crop yield increase (on average 144%). As a result, food prices would significantly drop, and undernourishment would be almost eliminated by 2050 – minus 93%.

Two consequences of combining free trade and agricultural development would be: increased yields and reduced trade costs, which improve the competitiveness of agriculture production. This can reduce intra-trade of some food products due to reduced need for imports but also increase exports, hence stimulate intra-African trade of other products. The above shows that Africa can best capitalize on its rapidly increasing demand for food through a combination of regional trade and agricultural development. However, these African production gains will not allow for a complete substitution of outside food imports.

3. Reducing African Food Imports: *A Balancing Act*

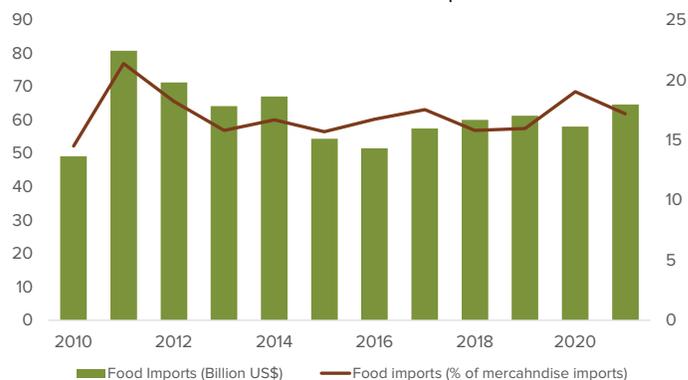
Part of Africa’s current food production challenges can be explained by its history. During colonial times, production and trade of both food and other commodities was geared towards exports to Europe, a fact which has shaped trade, infrastructure and

logistics patterns to serve foreign markets rather than domestic needs.

As a result, the productivity of agriculture aimed at domestic consumption has remained low and, coupled with dumping of imported foods on the continent, has stifled the improvement and modernization of agriculture on the continent.

Africa's high dependence on external food imports exposes the region to external shocks, including export bans and the high volatility of international agricultural markets. This is especially the case when importing countries depend on one or two suppliers (e.g., several African countries depend exclusively on Russia and Ukraine for wheat imports, and in Russia for their fertilizer imports).

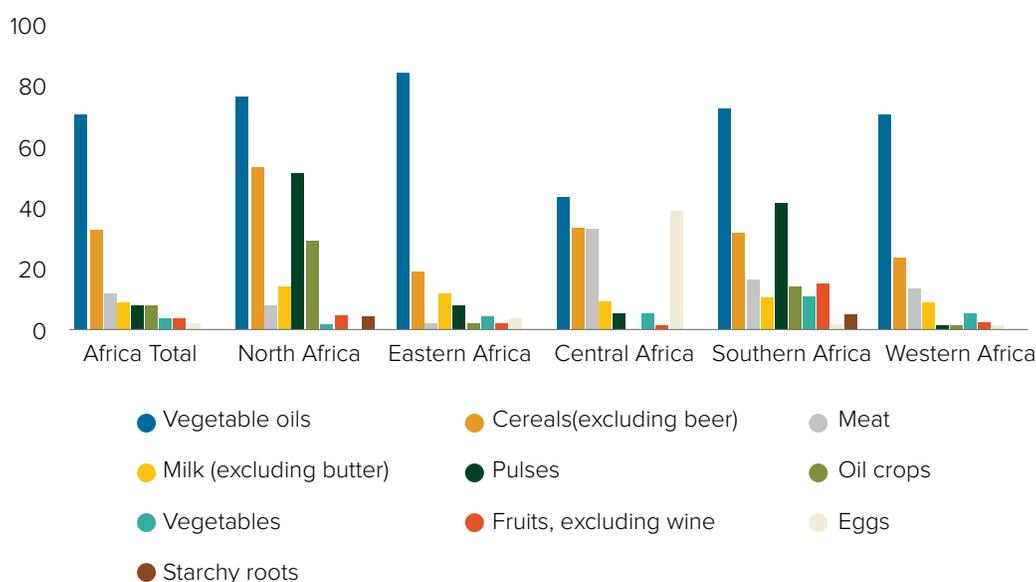
Figure 1: Food import in dollars and as % of total merchandise imports



Source: World Bank

Figure 2 summarizes the food dependency of Africa as a whole and for its different sub-regions regarding main food commodities. It shows significant difference between both commodities and sub-regions.

Figure 2: Food import dependency ratios for Africa and its sub-regions (%)



Source: FAO and AUC,2021

4. Enhancing Food Production through improved Soil Productivity

The key role of improved soil productivity in increasing food production in Africa.

Africa is a net import of food, despite having 60% of the world’s arable land. To fulfill Africa’s food needs through enhanced production, one should consider the interactions between more land expansion and crop yields.⁸

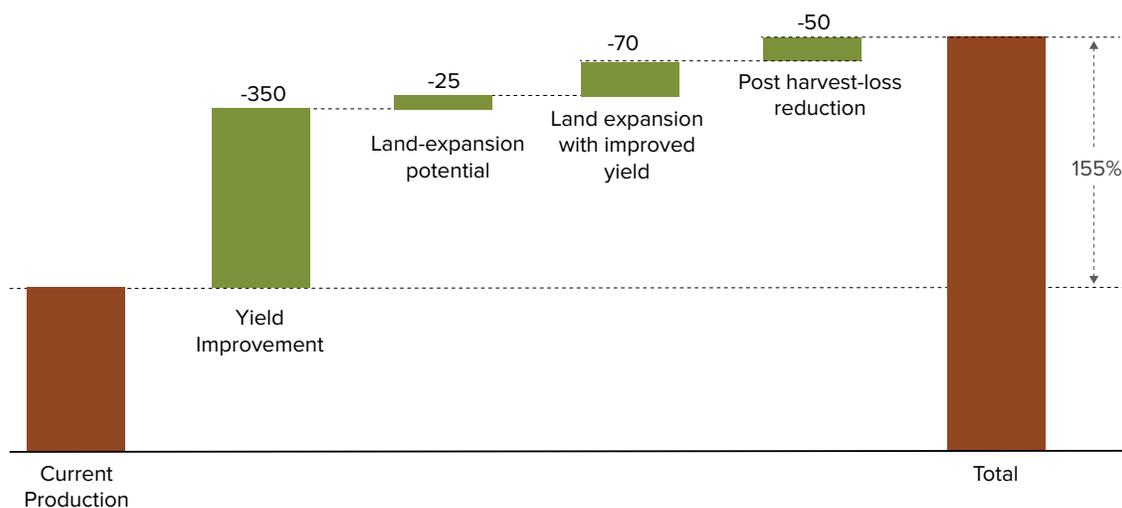
Whether through land expansion or production increase on existing agricultural land, there is ample agreement that

improving soil productivity in Africa it is a crucial, if not the main pathway to significantly enhance Africa’s overall food self-sufficiency, towards food security, as illustrated in Figure 3 regarding cereal production. The biggest contribution to increasing cereal production is through improving the yield of existing land.

Brief considerations on soil fertility and fertilizer management in Africa

One major reason for land degradation in the African region relates to ineffective soil management. An estimated 6 million hectares of productive land are lost every year caused by declining agricultural practices and land degradation.⁹ Feeding the soil thus requires both replacing nutrients and better soil management.¹⁰

Figure 3: Possible relative contributions to cereal production potential in Africa (million of tons)



Source: Adapted from Goedde et al, 2019

Notes: 1. Cereal in 2014; 2. Economic yield improvement without irrigation SSA, excluding South Africa; 3. Assumes 20-million-hectare land expansion; 4. Based on a reduction of food losses from 14 to 10%; 5. Sub-Saharan Africa less South Africa.

8. Schmidt, B., Forslund, A., Tibi, A., & Guyonard, H. D. (2021). Cooment assurer les disponibilites alimentaires du contiennt africain en 2050?INRAE. 62. Retrieved from https://www.inrae.fr/sites/default/files/pdf/INRAE_Syn-th%C3%A8se_AFRIAGRI2050_FARM_191021.pdf

9. Batiano, A., 2022. Microdosing for Soil Health, Nutrition and Food systems in Africa: Part One

10. AGRA. (2019). Feeding Agriculture status Report: A Decade of Action Building Sustainable and resilient Food systems in Africa. Retrieved from <https://repository.uneca.org/handle/10855/43479>

Numerous experiments, including in Africa, have shown the benefits of combining the two types of fertilizers – as illustrated for instance for maize in 12 African countries in Figure 4. Positive results of combining organic and inorganic fertilizers led to its inclusion as a key element of Integrated Soil Fertility Management (ISFM), which is the widely agreed way forward in terms of fertilizer management in Africa.

Fertilizer production

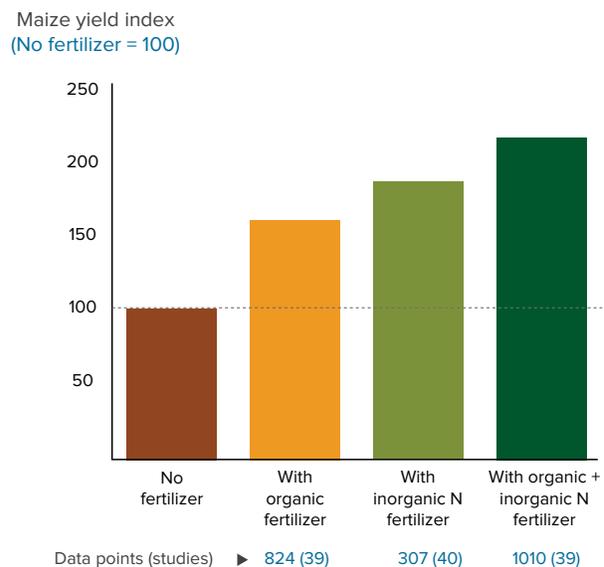
Feeding African soils requires improved ISFM, including increased availability and affordability of fertilizer. Most sub-Saharan African countries are heavily dependent on imported fertilizers, with the region as a whole importing 95% of the fertilizer it consumes¹¹. Some countries in Africa produce fertilizer or the raw materials that go into them. However, much is exported from the continent because of the limited market and weak intra-regional trade. These exports are mainly from North Africa, South Africa, and Nigeria¹². There is some fertilizer trade within Africa, mainly landlocked countries importing from and through coastal countries.

However, there is potential for higher fertilizer production in Africa. According to a recent UNDP report, actual production operates at around 15% of the region's production capacity¹³. This means that there is significant potential for more African fertilizer production.

11, 12. AGRA. (2019). Feeding Agriculture status Report: A Decade of Action Building Sustainable and resilient Food systems in Africa. Retrieved from <https://repository.uneca.org/handle/10855/43479>

13. UNDP. (September ,2022). Towards Food Security and Sovereignty in Africa , RBA Working paper . Retrieved from <https://www.undp.org/sites/g/files/zskgke326/files/2022-09/Towards%20Food%20Security%20and%20Sovereignty%20in%20Africa.pdf>

Figure 4: Maize yield responses of organic, inorganic N and a combination of these.



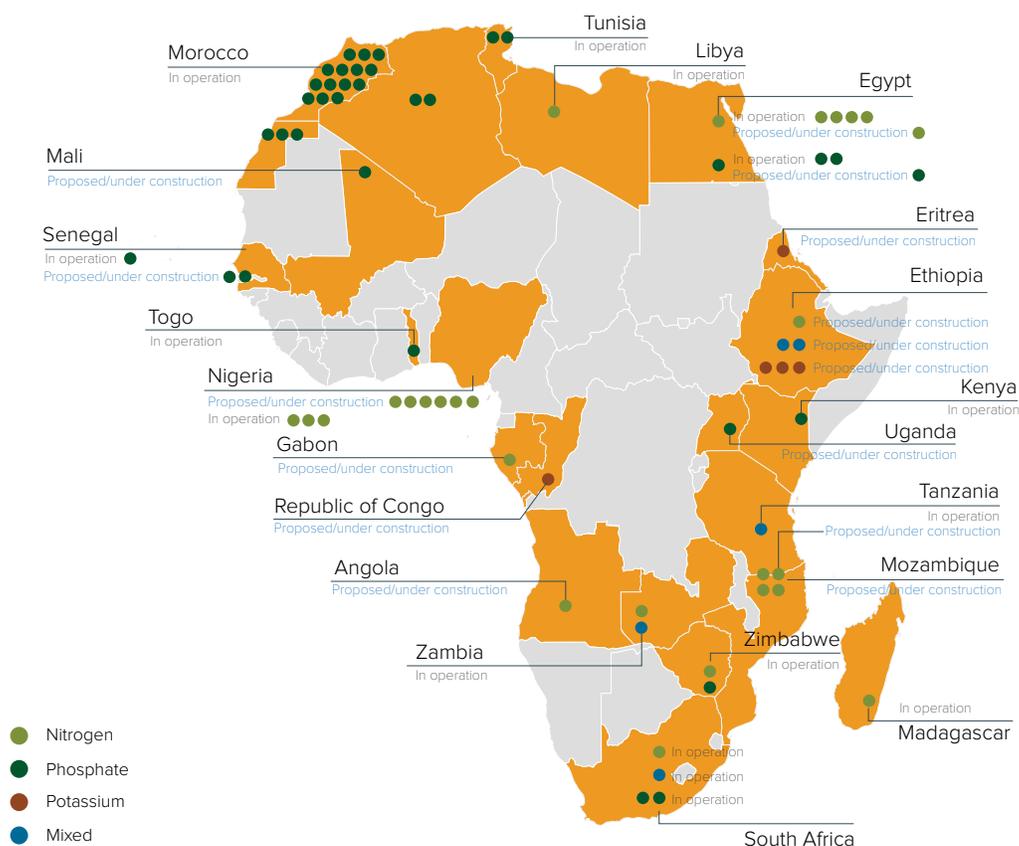
Source: AGRA, 2019

The continent is well endowed with mineral and hydrocarbon reserves that could be used to produce fertilizer or to power the facilities and infrastructure needed to get it to market. Therefore, there is significant potential for more African fertilizer production. In that context, over the past decade, major mining and fertilizer entities and smaller firms have engaged in fertilizer production in the region. In fact, the production of inorganic fertilizers in the region went up 159% between 1990 and 2020¹⁴. Figure 5 maps out the current and new projects that are proposed or under construction in Africa.

Thus, to replace external imports in a meaningful manner, African fertilizer production and trade will have to address serious current challenges. These relate to location of mineral endowment such as gas fields for nitrogen, rock phosphate for phosphate), fragmented markets, poor

14. FAO. (2008). An Introduction to basic Concepts of Food Security. <https://www.fao.org/3/al936e/al936e00.pdf>.

Figure 5: Existing and planned inorganic fertilizer plants in Africa.



Source: AGRA, 2019

infrastructure (ports, warehouses as well as rail and road systems), tariff and non-tariff barriers, economies of scale – fertilizer plants are costly and current demand for inorganic fertilizer is low and fragmented - and inappropriate policies¹⁵. The implementation of the recently launched Africa Continent Free Trade Agreement (AfCFTA) might be able to address some of these constraints, but it is too early to assess to what extent. Regional trade can unlock Africa’s potential to produce more

15. AGRA. (2019). Feeding Agriculture status Report: A Decade of Action Building Sustainable and resilient Food systems in Africa. Retrieved from <https://repository.uneca.org/handle/10855/43479>

fertilizer and raise agricultural output, but the question of affordability remains. A related issue is how to make agricultural production more profitable, either by providing subsidies or expanding markets.

Fertilizer Consumption

While data on the adoption of organic fertilizer are not available, those regarding inorganic fertilizer exist. They show for instance that their application rate in 2017 was at around 23kgs NPK/ha¹⁶, however

16. Sheahan, M. and Barrett, C. B., 2017a. Ten striking facts about agricultural input use in sub-Saharan Africa. Food Policy, 67, 12–25 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5384438/>

with wide cross-country variation¹⁷. This shows important progress compared to the 2006 rate of 8kgs/ha - when the Abuja Summit Declaration set the target of 50 kgs/ha by 2015 - but it is still about eightfold lower than in Asia, for instance. However, adoption of inorganic fertilizers itself has faced strong headwinds Improving Input Subsidy Programs (ISPs).

Input Subsidy Programs have been the main policy measure implemented in Africa to make inorganic fertilizers more affordable and boost their uptake. To date, over 20 countries have introduced fertilizer subsidies; over the last 18 years, ten African countries spent a total of roughly \$1 billion annually on subsidy programs, amounting to roughly 14-26% of their public expenditures on agriculture¹⁸. These inputs subsidies have mainly concerned maize, sometimes associated with beans, and rarely included other crops (e.g., rice, cotton, maize, millet, and sorghum in Mali and Burkina Faso)¹⁹.

Experience shows that, overall, results of ISP implementation in SSA have been mixed at best. Weaknesses include the crowding out of commercial fertilizer demand, diversion from targeted beneficiaries with associated elite capture, small and short-term yield

increase, and incentives for increased monocropping (of the targeted crop). Alternatives to subsidies include expanding regional markets and designing other ways to make production more profitable.

Subsidies are therefore not the only pathway to affordability. There is increasing agreement that funds for ISPs - at least part of them - could be better used in other ways that would act in synergy to enhanced fertilizer application. These include infrastructure improvement especially roads linking farms to input output markets, credit facilities, extension and research and development.

Productive safety nets have been another policy measure to stimulate the use of fertilizers. The most studied experience in that respect in Africa concerns Ethiopia's Productive Safety Net Program (PSNP), which was launched in 2005. A major lesson from the implementation of this program is that productive safety net programs yield best results in terms of enhanced agricultural productivity when combined with programs that provide technical support to farmers benefiting from such programs.

5. Specific Recommendations

Ensuring food sovereignty in Africa requires both national and regional efforts to increase soil productivity. If food is more widely available and affordable, African countries will be more resilient to external shocks and able to feed themselves at all times.

17. Gashaw, T.A.; Kibrom, A.; Abay, A. and Spielman, D., 2020. Fertilizer Policies and Implications for African Agriculture, International Food Policy Research Institute (IFPRI) and AKADEMIYA2063. https://doi.org/10.2499/9780896293946_04.

18. Jayne, T.S.; Mason, N.M.; Burke, W.J. and Ariga, J., 2018. Review: Taking stock of Africa's second-generation agricultural input subsidy programs, Food Policy Volume 75, Pages 1-14 - <https://doi.org/10.1016/j.foodpol.2018.01.003>

19. Thierault, V. S. (2021). The unintended consequences of the fertilizer subsidy program on crop species diversity in Mali, Food policy. 102. Retrieved from <https://doi.org/10.1016/j.foodpol.2021.102121>

At farm level:

Go beyond fertilization by:

Encouraging crop or diet diversification to enhance the key aspect of the utilization dimension of food security and support climate resilience.

Complementing agronomic performance and profitability with other sustainability and resilience indicators - and better understand farmer's decision-making process-to assess the sustainability of fertilizer use through:

A comprehensive sustainability assessment methodology that can provide good complementary indications on the likelihood for modern farm inputs and new farming practices to be adopted. Additionally, it can also help to better understand farmers decision-making process on innovations adoption.

Beyond the farm:

Ensure strong tenure rights for smallholder farmers and vulnerable groups by providing:

Protection mechanisms regarding tenure rights of small-scale farmers and vulnerable groups, especially given current changes in land markets towards more commodification of land transfers. Moreover, by linking agricultural services to recognize land rights and ensure that land registration beneficiaries have access to agricultural input and output markets.

Foster investments in adaptive and bidirectional agricultural research and development.

Agricultural R&D is especially needed in relation to the challenges posed by climate change, better approaches to fertilization that combine mineral and organic fertilizers efficiently, and beyond farming aspects, including agricultural marketing and trade

policies, as well as most efficient ways to improve road conditions and ways of financing access to fertilizers, which are briefly discussed further.

Strengthen agricultural extension services both in quantity and quality by:

Ensuring that its staff is well versed in the latest developments on what works best in good farming practices, particularly integrated fertilizer management. At the same, provision of interactive learning needed between researchers and farmers should also happen with extension workers, and it is important to combine extension services with usable weather forecasts.

Facilitate access to money to finance modern farm inputs by:

Supporting off-farm employment as a complement to farm revenues. This includes enabling farmers to use formal credit to start a business outside the farm and use part of the income from this activity to buy farm inputs.

Reduce food losses through remediation and non-remediation options by:

Enhancing food production through reductions in pre-harvest food losses while contributing to circular agriculture and bioeconomy through the reuse or recycling of food residues, which can create good business opportunities for the private sector and green job creation.

Support investments in clean energy in food chains by providing:

Information to de-risk investments to support clean energy systems for sustainable and resilient African food systems, including robust information on priority locations comprehensive cost-benefit analysis.

6. Conclusion

This policy brief highlighted the potential of Africa's food systems and indicates that multiple crises recently experienced such as persistent droughts, famine, locusts, floods the COVID-19 pandemic as well as civil and international conflicts, have significantly affected the gains made over the last two decades. Given the dire realities and prospects of climate change impacts on Africa's food systems, discussions on Africa's food self-sufficiency and ways to achieve it towards improved continental trade and enhanced soil productivity through better use of fertilizer should give due consideration to climate resilience and climate change mitigation, the latter maybe

as a co-benefit of adaptation and enhanced agricultural productivity.

Finally, while challenges to improve food self-sufficiency through enhanced soil fertility are high, the agricultural success enjoyed by Ethiopia for doing the right things regarding sustainable and resilient food-system transformation shows that 'it can be done' also by other African countries.

Feeding Africa's soil is thus a crucial step in solving these challenges, bringing countries and communities closer to achieving the SDGs. This is within reach if governments, communities, development partners and investors act together.

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