FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Innovation Lab for Food Security Policy Research, Capacity, and Influence (PRCI)

INNOVATION LAB FOR FOOD SECURITY POLICY RESEARCH, CAPACITY, AND INFLUENCE (PRCI)

Nourishing the Future: Reflections on the Follow-up to the African Fertilizer and Soil Health Summit

2nd July 2024

David Tschirley[1]

A cursory glance at the latest data on the state of Africa's food and nutrition reveals a grim reality: according to the Food and Agriculture Organization (FAO), over 282 million Africans are chronically undernourished, a number exacerbated by the back-to-back effects of the COVID-19 pandemic and the Russia-Ukraine war. The continent's food security crisis is further underscored by the fact that over a billion people cannot afford a healthy diet, with children disproportionately affected; approximately 30% of African children are stunted due to malnutrition.

Key Messages

- **Current Crisis**: Africa faces a severe food security crisis with over 282 million chronically undernourished and over a billion unable to afford a healthy diet. Poverty and inadequate and inefficient food production are both at the root of this crisis.
- **Summit Goals**: The African Fertilizer and Soil Health Summit aimed to address agricultural productivity through an Action Plan emphasizing sustainable intensification and soil health.
- **Need for Change**: Achieving progress requires deep localization in policy design and "hyper-localization" of technical recommendations, moving away from a "one-size-fits-all" approach.
- **Hyper-Localization**: Applying the "4R" nutrient management principles (right source, right rate, right time, right place) to improve fertilizer efficiency is crucial.
- **Deep Localization and Nth-Best Solutions**: Effective policies must be developed through localized processes, resulting in solutions that, while potentially far from technical "best practice", are adapted to local technical, political, and social realities and can be implemented.
- **Attitude and Behavior Changes**: Success requires changes in attitudes among governments, analysts, researchers, and donors, focusing on local information and equitable partnerships.
- **Conclusion**: A rethinking of approaches to agricultural productivity is needed, de-emphasizing "best practices" and emphasizing incorporation of local empirical data into solutions that are workable in their local context.

The fundamental driver of this crisis is the widespread poverty that makes so many unable to obtain the food they need, whether through their own production or through the market. Yet there is no question that the continent's inadequate food production, and its failure to keep up with population growth, is a major contributor to the crisis. A significant factor in this inadequate and slowing growing production capacity is low use of fertilizers and the poor health of soils across Africa. Compared to other regions, African countries use minimal amounts of fertilizer, resulting in lower crop yields and perpetuating cycles of hunger and malnutrition.

In recognition of this fact, and under the auspices of the African Union, the African continent just held a successful African Fertilizer and Soil Health Summit (AFSHS) in Nairobi. Featuring wide attendance of political and food systems leaders

[1] David Tschirley is Professor in Michigan State University's Department of Agricultural, Food, and Resource Economics (AFRE), Senior Co-Director of AFRE's Food Security Group (FSG), and Director of the Feed the Future Innovation Lab for Food Security Policy Research, Capacity, and Influence (PRCI) funded by USAID.

across the continent together with development partners, the Summit captured and fueled their commitment and enthusiasm to improve the lives of African farmers and consumers. A key contribution of the Summit was to harness this commitment to an Action Plan that provides a strong basis for addressing the continent's longstanding agricultural productivity crisis. A major reason that Summit participants emerged optimistic of progress is the specificity of the continental Action Plan and its understanding that fertilizer, if it is to drive sustainable intensification, must be integrated into a broad package of reformed policies and programs focused on soil health.

Yet we have been here before. The Abuja Declaration on Fertilizer for the African Green Revolution, signed by 14 African heads of state during the African Fertilizer Summit of 2006, set lofty goals for increased fertilizer use and productivity growth on the continent. Yet results have been disappointing at best. On the one hand, fertilizer use per hectare (ha) of arable land has grown 79% since 2006, nearly double the rate of South Asia, comparable to the rate in Latin America and the Caribbean, and vastly higher than East Asia's growth of 8%. Yet Africa's growth cannot be considered surprising since it started from an extremely low base; the result is that levels of fertilizer use in Sub-Saharan Africa today remain a small fraction of those in other regions of the world – 23 kg/ha compared to 207 kg/ha, 187 kg/ha, and 312 kg/ha, respectively, in Latin America and the Caribbean, South Asia, and East Asia (World Bank Databank). Moreover, use today is less than half the target of 50 kg/ha that the Abuja Declaration set for 2015. Regarding productivity, while cereal yields nearly doubled from 2006 to now, this growth is less than half that achieved in every other region of the developing world during this time. In other words, African agricultural productivity has fallen even further behind the rest of the world since Abuja.

The message is clear – Africa needed major catch-up growth in fertilizer use, soil management, and yields, and failed to achieve it. Partly as a result, after at least two decades of declining hunger and malnutrition, both have been on the rise on the continent in recent years.

What needs to be different this time?

A useful lesson in life and in work is that one should not expect different results while continuing to do what we've done in the past. This lesson can be hard to learn, especially for the large bureaucracies – governments, large bilateral and multilateral development partners, and even the international agricultural research community - that are central to generating a productive response to the 2024 AFSHS. So what needs to change if we want, this time, to see the transformational change that is needed for the continent to sustainably nourish its people?

This note suggests that obtaining different results this time – achieving sustained and effective action for improved fertilizer use and soil health that drives profitable increases in production to nourish Africa's population - requires a much more profound *localization* of approach, and that this localization requires important changes in how governments, their development partners, and other stakeholders behave. Specifically, we argue for two complementary approaches: *deep localization* in the process of policy and programmatic design and in how research to support that process is conceived and carried out; and what some call *hyper localization* in technical recommendations for farmer practices on their fields. These two ideas – *deep localization* and *hyper localization* - need jointly to drive the design and implementation of a new and much more effective generation of policies and programs to achieve rapid and sustained growth in African agricultural productivity

The rest of this note explains what we mean by these two ideas, why they need to go hand-in-hand in the follow-up to the AFSHS, and what they imply about how governments and development partners, including applied researchers in the global north and south, need to change the attitudes and approach they bring to their work.

Hyper Localization

Hyper-localization is a popularized term that refers to the scientific concept of "4R" in soil nutrient management – right source, right rate, right time, and right place (Fixen, 2020; Reetz et al., 2015). The message is that one needs to apply the right kind of nutrient in the right formulation, and at the right rate and at the appropriate time, *based on the specific field receiving the nutrient*. Hyper-localization thus refers to the technical aspects of nutrient use and emphasizes customization to a farmer's specific field. We offer four comments in this regard.

First, localized fertilizer recommendations are important across the world, since soil characteristics can vary quite a lot across countries, sub-regions, fields, and even within a field. The rapid rise of "precision agriculture" in industrialized countries, which varies nutrient application within a field based on a digital soil map, clearly indicates the importance of highly localized fertilizer use to farmer profitability.

Second, more locally attuned application may be especially important in Africa, since this continent seems to present substantially higher variability in soil characteristics than other regions of the world (Suri and Udry, 2022). Together with large variability over space in transport infrastructure, crop and fertilizer prices, and access to markets, this agroecological heterogeneity drives extremely large variation in returns to fertilizer (Suri, 2011; Liverpool et al., 2015; Burke et al., 2017).

Third, fertilizer policy in Africa has failed to come to terms with this heterogeneity through its decades-long "one-size-fits-all" approach. Too often, a sharply limited set of fertilizer formulations is provided nationally, often through government programs at subsidized prices. Given the heterogeneity just discussed, this is a recipe for poor profitability and low farmer adoption despite very high programmatic expenditures.

Fourth, implementing a 4R approach – enabling farmers to apply the fertilizer that *their field* needs, in the right amount and at the right time - requires that farmers have "access to knowledge, all needed fertilizers, and related services" (Reetz et al., 2015). In other words, farmers need to know what to apply, they need to be able to get it, and they need to be able to access knowledge and inputs for complementary practices such as improved seeds and organic practices crucial to sustainable use of chemical fertilizers. We see two key reasons why all but a tiny fraction of farmers in Africa do not have this kind of access. One is that, since at least the days of structural adjustment in the 1980s, African governments have dramatically under-invested in rural extension and in the soil testing and related agroecological profiling that would allow at least some evidence-based variation in fertilizer recommendations. New technologies promise to reduce the cost of generating improved and spatially disaggregated knowledge of soil characteristics, but these need to be linked to functioning research and extension systems to be put to use for African farmers (Laajaj et al., 2020).

The design of fertilizer and broader agricultural input policy in much of Africa is the second key reason that farmers don't have this kind of access. Private sector fertilizer distribution through markets in principle holds the prospect of providing farmers with greater choice in what they use, but national fertilizer policies frequently undermine these channels (Jayne et al., 2018). Heavy reliance on imported formulations exacerbates this problem, though this is beginning to change due to a large increase in domestic blending of fertilizers.

The bottom line is that moving towards more localized fertilizer recommendations and practice is crucial if Africa's productivity crisis is to be reversed. This requires greater public investment in data and data systems linked to strengthened rural extension, together with policy and programmatic reform to facilitate a flexible private sector response to farmer input needs.

Deep Localization and "nth-best solutions"

A recurring problem in Africa and many developing countries is the promotion of "showpiece" legislation and programs that mimic what outside experts consider "best practice" but that are never implemented (Pritchett, Wilcock, and Andrews, 2013). *Africa must avoid this in its follow-up to the AFSHS*. African countries need to marshal their own capacities and use their own processes to develop action plans that are actually put into action, that evolve as needed over time, and that are informed by strong, local empirical evidence.

This can happen only through a deeply localized process in which stakeholders are engaged in an iterative process of analysis, design, dialogue, negotiation and bargaining, and redesign. This process – indeed, development of workable policies and programs anywhere in the world – is an unavoidably messy social and political process. Empirical scientific input is crucial to good outcomes but is not and cannot be the main driver of what emerges. Indeed, the outcomes that emerge, based on iterative dialogue and political compromise, are typically far from what a researcher would consider "best". We refer to them as "nth-best solutions", meaning they are the best available solution given the technical, social, and political dynamics and constraints of the system one is operating in. Far from failure, the development and implementation of such nth-best solutions is a sign of progress in a country's ability to develop its own approaches that are feasible, "effective enough", and can be maintained and improved over time.

Attitudes and behavior need to change

We have argued that the follow-up at country level to the AFSHS must involve *deep localization,* that is, a determination by local stakeholders both to seek out the best technical advice and subject it to the messy bargaining and "deal making" inherent in authentic design of workable policies and programs that countries can own and take responsibility for. We have further argued that this follow-up must come to terms with Africa's huge heterogeneity in agroecology, infrastructure, and market access, and generate an approach that allows for *hyper localized* solutions. These solutions will be possible only through recommendations that are more suitable to farmers' particular fields combined with greater access by farmers to the knowledge, inputs, and services needed to pursue these recommendations and adapt them based on their own knowledge. Achieving this will require simultaneously increasing public investment and reforming policies and programs to allow greater private sector response to farmer needs through functioning markets.

If African countries are able to do this, we believe they will generate policies and programs that, while far from what might be considered technically "best", nonetheless stand a far greater chance of being implemented and adapted as needed, to impressive cumulative effect over time.

We suggest that attitudes and behavior by all parties must change to make this approach possible. African governments need to show keener interest in locally generated empirical information even as they promote a stakeholder-engaged process of policy and programmatic design that may generate outcomes far from what many may consider technically best. Local analysts need to understand and accept the social and political nature of this process and figure out how to engage with it and make their research understandable and relevant to decision makers. The international research community must commit to working in equitable partnerships that involve giving up the right to drive the research agenda. And donors need to recognize that things may take longer working this way and that countable and reportable outputs may be fewer but that outcomes – the changes that matter to people's lives – should be greater.

Change is hard. It is especially hard to admit that the way we as a global development community have approached empirically informed policy and programmatic change for many decades needs serious rethinking. But by focusing on equitable partnerships and accepting what, on any reasonable reflection, is so obvious – that policies and programs simply

must adapt to local political and social realities even while striving to be as effective and efficient and equitable as possible – this change is possible. We know how to proceed – let's get on with it!

References

Burke, W., T.S. Jayne, J.R. Black (2017). "Factors explaining the low and variable profitability of fertilizer application to maize in Zambia". Agricultural Economics, 48(1), 115-126. https://doi.org/10.1111/agec.12299.

Fixen, P. (2020). "A brief account of the genesis of 4R nutrient stewardship." Agronomy Journal, 112: 4511-4518. https://doi.org/10.1002/agj2.20315.

Jayne, T.S., NM Mason, WJ Burke, J Ariga (2018). "Taking stock of Africa's second-generation agricultural input subsidy programs". Food Policy, 75: 1-14. https://doi.org/10.1016/j.foodpol.2018.01.003.

Laajaj, R., K. Macours, C. Masso, M. Thuita & B. Vanlauwe (2020). "Reconciling yield gains in agronomic trials with returns under African smallholder conditions". Scientific Reports, 10, 14286. https://doi.org/10.1038/s41598-020-71155-y.

Liverpool-Tasie, LSO, B. Omonona, A. Sanou, W. Ogunleye, (2015). "Is Increasing Inorganic Fertilizer Use in Sub-Saharan Africa a Profitable Proposition? Evidence from Nigeria". Food Policy, 67, 41-51. https://doi.org/10.1016/j.foodpol.2016.09.011.

Pritchett, L., Woolcock, M., & Andrews, M. (2012). "Looking Like a State: Techniques of Persistent Failure in State Capability for Implementation". The Journal of Development Studies, 49(1), 1–18. https://doi.org/10.1080/00220388.2012.709614.

Reetz, H., P. Heffer and T. Bruulsema (2015). "4R nutrient stewardship: A global framework for sustainable fertilizer management", Chapter 4 in Dreschel et al., eds, "Managing Water and Fertilizer for Sustainable Agricultural Intensification", International Fertilizer Industry Association (IFA), International Water Management Institute (IWMI), International Plant Nutrition Institute (IPNI), and International Potash Institute (IPI). ISBN 979-10-92366-02-0.

Suri, T. and C. Udry (2022). "Agricultural technology in Africa." Journal of Economic Perspectives, 36(1), 33-56. DOI: 10.1257/jep.36.1.33

Suri, T. (2011). "Selection and Comparative Advantage in Technology Adoption." Econometrica, 79(1), 159-209.

This paper was prepared by the Feed the Future Innovation Lab for Food Security Policy, Research, Capacity and Influence (PRCI) with funding from the United States Agency for International Development (USAID) under Grant No. 7200AA19LE00001. The contents are the responsibility of the authors of this repor (i.e., PRCI team) and do not necessarily reflect the views of USAID, the United States Government, Michigan State University, IFPRI, Cornell University, ReNAPRI, University of Ghana, Kasetsart University, or Research and Information System for Developing Countries (RIS).