LEAD ARTICLE

SCIENCE AND AGRICULTURAL INNOVATION IN AFRICA

Sixty-three percent of the population in sub-Saharan Africa live in rural areas and are employed in agriculture-related work. Agriculture is highly labor-intensive. Given that labor is the predominant asset of the poor, agriculture is the sector where the poor can most easily benefit from sustainable growth.

The overall picture of the agricultural sector's performance in Africa is encouraging. Yet, in many countries substantial efforts are needed to sustain and accelerate agricultural development for reducing poverty and hunger. Agricultural development can come from different sources. While in the past the increased use of inputs and the expansion of agricultural land accounted for a large part of agricultural growth in Africa, improvements in productivity through innovation to increase output per unit of input will be a major driver of growth in the future.

To increase productivity in a sustainable way requires maintaining environmental quality and resources. Keeping up with increasing and changing demands from a growing population, and achieving food security remains a considerable challenge. It is essential also to prevent poverty related migration flows. Such agricultural innovations require enhanced investments in research and development and connecting social policy with labor-productivity enhancing policies, as for instance pursued in so-called productive safety net programs in Ethiopia in the context of the current drought severe problems.

African initiatives

Governments and civil society in Africa are increasingly recognizing the role of agriculture and agricultural innovation. African countries have therefore recently made major commitments to invest in this sector. The Comprehensive Africa Agriculture Development Programme (CAADP) was initiated in 2003 as the cornerstone for fostering agricultural development and was reinforced by the Malabo Declaration in 2014. With CAADP, African countries committed to spend 10 percent of their total public expenditures on agriculture to achieve an annual agricultural growth rate of 6 percent. Other African and international initiatives, like the New Alliance for Food Security, Nutrition and Feed the Future, have since been launched to support the CAADP process.

However, evidence shows that not all types of public agricultural expenditure are equally growth-inducing. Investments in agricultural innovation are especially beneficial for growth. Africa has a rapidly evolving science sector in agriculture, food security and nutrition which stimulates scientific and technological development on the continent. A major undertaking in this context is the Science Agenda for Agriculture in Africa, which was launched in 2014. It is an organizing framework for the social and economic transformation of national science and technology institutions in Africa and aims to bring about a more productive and efficient food and agricul-

tural sector. Another important initiative is the Science, Technology and Innovation Strategy for Africa 2024, which is the continental framework for accelerating Africa's transition to an innovation-led, knowledge-based economy within the overall framework of the broader and long-term Agenda 2063 of the African Union.

One world, no hunger

The German Government's Special Initiative "One World – No Hunger" is one of the most significant initiatives to improve food and nutrition security in Africa by stimulating the generation and implementation of innovations in agriculture and the food sector. This initiative includes setting up Agricultural Innovation Centers in twelve African countries. ZEF's Program of Accompanying Research for Agricultural Innovation (PARI) with a large group of African and German partners identifies promising priorities for investment and policy, and offers independent scientific advice to support these Centers, therewith contributing to sustainable agricultural growth and food security.

The two main components are: To conduct accompanying research with ex-ante impact analyses, including the development of detailed strategic analyses and visioning; modelling the direct and indirect impacts of potentially promising innovations; and an institutional analysis of the innovation centers in the context of their national agricultural innovation systems. The second objective is to steer a research-based design and assessment of technological and institutional innovation opportunities with local partners, including identification of promising ("top-down") innovations from research organizations and ("bottom-up") innovations generated by farmers and other actors in the value chains. The project fosters synergies with and links to existing innovation systems in Benin, Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Togo, Tunisia and Zambia. PARI's consortium consists of partners in Africa (the Forum for Agricultural Research in Africa – FARA with its national partners in the respective countries; the African Growth and Development Policy Modeling Consortium – AGRODEP) and in Germany (School of Life Sciences Weihenstephan at the Technical University of Munich and the University of Hohenheim).

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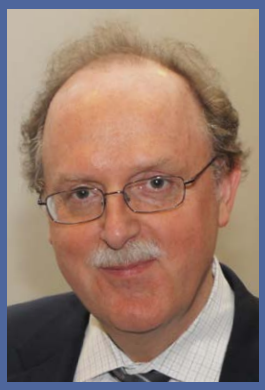
EDITORIAL: COMBINING SHORT-TERM RELIEF WITH LONG-RUN ACTIONS

Especially in Africa, complex emergencies are accelerating right now in serious ways. These emergencies are arising from extended droughts caused by El Niño in combination with political and security problems. It is therefore necessary to combine short-term relief with long-run actions for sustainable development in a smart way.



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This poses a major challenge to African governments, development partners and civil society organizations. Thus, the research community is obliged to engage in providing the evidence base on what, where, how, and when to best invest in the pathways toward a world without hunger.

Actually, the research community has started to take up this challenge with new energy. The large African science mobilization event "Next Einstein Forum" held in Dakar, Senegal, in March 2016 was first of its kind and serves as a good example. Outstanding (young) and committed African scientists presented innovative solutions for agricultural development in the presence of high-level policy makers.

The commitment of African countries to accelerate agricultural development has actually improved in recent years (see lead article). The German Government's initiative "One World – No Hunger" with setting up Innovation Centers in many African countries will make a positive contribution just at the right time. This initiative needs to be sustained over the long run.

Innovations to improve food security are at the core of ZEF's research work in the Program of Accompanying Research for Agricultural Innovation (PARI), which is contributing to sustainable agricultural growth in cooperation with African partners.