

Private-sector R&D, supply chains and the small farmer



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The United Nations Development Programme (UNDP) *Africa Human Development Report 2012* makes it starkly clear that for Africa to realise its long-term potential it must boost agricultural productivity. This essay points to some preconditions for success. Productivity growth requires the involvement of the private sector at all stages of the 'farm-to-fork' supply chain, starting with the research phase where innovations such as improved seed and other productive resources are progressed.

African agriculture has an uneven record of being able to feed its people, including farmers themselves. But I am optimistic. A decade of impressive economic growth has fostered change. Coupled with a shift in expectations, this bodes well for an agricultural transformation that could lift productivity, rural incomes and livelihoods in new ways. The burden of poverty, disease and malnutrition has not disappeared. But the prospects for agriculture, rural

development and food security have improved with greater government commitment under the New Partnership for Africa's Development (NEPAD) programmes, rising commodity prices, and a reduction in agricultural taxation relative to the past.

The picture is one of openings in my view: Africa is full of opportunities waiting to be seized by hard-working farmers and investors willing to take on primary production risks. Three features shape the scene: the productivity gap in agriculture, unprecedented domestic and international demand growth, and breakthrough technologies. Symbolic of the latter are the mobile phones and applications used productively by ever-larger numbers of Africans, including small-scale farmers.

The scope for agricultural intensification and value addition in the food supply chain is huge. I expect returns on investment in farming to rise going forward. Small family farms are included in this dynamic; many examples show how they can profit with adequate mentoring and support. Worsening physical constraints such as soil depletion and climate change need to be tackled. But the need to feed people and the prospect of rewards from commercial agriculture for domestic and foreign markets – the most powerful form of agricultural development and growth – will spur innovation to address these challenges. Adaptation, gains in resilience, intensification and diversification will all play a role.

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To see how this can work, and to understand the role of the private sector and how to nudge it forward, it helps to ask what farmers want. Irrespective of gender, age, farm size

or other characteristics, their usual answer is 'technology, services and access to markets'. The private sector supplies much of this now and will contribute more in the future.

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Technology revolves around genetics and plant breeding, soil fertility solutions, crop protection, irrigation, labour-saving devices and connectivity. *Services* include advice ('agricultural extension'), better organisation to use innovation and increase farmers' political and market clout, as well as financial services such as credit and crop insurance. *Access to markets* is about the ability to sell crops and other products and buy off-farm inputs. In good measure, this is conditioned by transport, storage infrastructure, information and logistics, which Africa must improve.

Governments have a big responsibility in agriculture. They must create supportive environments for farmers and related businesses. They should invest in capacity-building, research and the dissemination of research results. But they are generally poor at marketing farm produce and transferring inputs, services and products to farmers. These are private-sector tasks. Governments can support them through partnerships until they are viable alone. The private sector is already driving progress in key agricultural technologies, including provision of fertiliser, mechanisation, irrigation, agrochemistry and – back to mobile phones – connectivity. On the question of improved seed, please see below.

Strong links to markets are essential for investment in productivity growth on farms to make financial sense. African output markets are dynamic. Consumer demand for more and better goods is strong at home and abroad, creating opportunities for farmers and businesses along the supply chain. Kenyan

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to transform cassava from a 'subsistence' food to an income source for millions of small farmers by developing industrial markets and building supply chains. Yield-raising inputs and practices will also improve local food supply.

Crop improvement research and improved seed are both crucial to help raise farm productivity. Plant breeding is of overriding importance, but to make investment in it worthwhile, farmers must have access to the resulting seed. This requires seed systems, i.e. formal arrangements for multiplication, quality management and certification, and distribution or commercialisation. Seed systems are not yet well developed in most of Africa. Planting material is of low quality. Breeding itself is under-resourced and requires significantly increased public investment.¹

Plant breeding in Africa is largely a public-sector activity, with private breeding focusing on some hybrid (where seed cannot be saved from year to year) and high-value crops such as maize and certain vegetables. Breeding in the public sector has long been affected by funding shortfalls and institutional challenges. Breeding in Africa is intrinsically difficult because of the diversity in production patterns and the large number of different crops and agro-ecological conditions encountered there. Some progress has been made and many varieties have been released. Distribution to farmers has not worked well.

smallholders earn good money from 'flying vegetables' sold in UK supermarkets, for example. 'Cassava+', a partnership between the Dutch company DADTCO and the International Fertilizer Development Center, builds on the growing demand across Africa for cassava by-products. Cassava+ aims

Partnerships with private seed companies can greatly improve key crops. The '3G' project led by the International Potato Center with US Agency for International Development (USAID) funding, to mention but one example, has substantially increased the availability of high-quality potato seed in Kenya, Rwanda and Uganda. Viable private-sector-led seed systems have emerged in these instances, providing seed potatoes of new varieties and significantly increasing the incomes of at least 40,000 small-scale producers so far.² Tanzania is now replicating the model, largely with private investment.

The breeding and seed systems problem is in part conditioned by the 'lie of the land' in terms of capability and incentives, with the private sector displaying limited interest where hybrid technology does not apply and the public sector focusing on 'knowledge development' and 'public goods' as different from products and their dissemination to farmers. Partnerships appear again to be at least part of the answer, combining the skills and comparative advantages of private and public actors while at the same time promoting the use of state-of-the-art knowledge and technology, including molecular plant science and biotechnology. 'Molecular breeding' may be defined as the identification and use of associations between genotypic (DNA sequences) and phenotypic (plant trait attributes) variation to select and assemble traits into new crop varieties. A growing number of public breeders in Africa use molecular methods now, making this an increasingly dynamic area in conjunction with entities with genotyping capability, such as BecA (the Biosciences eastern and central Africa Hub) in Nairobi (see pp. 33–39) and public-private partnerships such as the African Orphan Crops Consortium.

The need to raise productivity in the context of food needs and growing markets will lead to an expansion of

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breeding by the private and public sectors as well as novel forms of cooperation between the two. Seed and input markets will become 'deeper', delivering value to farmers. It is a self-repeating, interactive chain: technology, services and access to markets.

References

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