

Can the supply of quality seed match demand?



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The Green Revolution in Asia was based on improved crop varieties (particularly rice and wheat) which, together with expanded use of agrochemicals and irrigation, led to dramatic yield increases. But in Africa the revolution failed, with modest increases in production over the last few decades and for very few crops only. So will renewed efforts to get high-yielding varieties widely used in Africa be successful?

Developing new crop varieties, whether by traditional or modern breeding techniques or by genetic engineering, may be the easy part. We suggest that the challenge is to provide farmers with the opportunity to select varieties they want and need and that are most suited to their local circumstances and environment, so that their investment in quality seed is worthwhile. This requires both demand- and supply-side issues to be addressed.

What farmers want

Small-scale subsistence farmers are necessarily risk-averse, and in the circumstances in which many operate, high-yielding varieties (HYVs) are associated with higher risk. To achieve a good yield from an HYV a consistent supply of water is needed, but in Africa where most crops are rain-fed and rainfall can be erratic and unpredictable (and possibly more so as the climate changes) there has been little investment in irrigation. Reaping the benefits of purchased seeds also requires the use of other inputs such as fertilisers and agrochemicals, and these are often proportionately more expensive in Africa than in other regions. Farmers manage risk in different ways; for example, in western Kenya, farmers are more likely to plant hybrid maize in the long rains when there is lower risk of crop failure, but in the short rains, when risk of failure is higher, they use self-saved seed and plant more densely so that if the rains fail at least the crop can be used as fodder for their animals. In this context it is acknowledged that hybrid seed does not breed true in the next generation of saved seed, which does not deliver yield and performance in the way that the first generation does.

Even in a good season, if output markets function poorly, the returns on investment may discourage the use of HYVs. Selling the extra yield, beyond what is needed for consumption, can be constrained by lack of market information, poor infrastructure and price distortions.

Thus farmers look for various traits beyond high potential yield. The many different contexts in which farmers grow a crop mean that within one area different farmers may require different varieties at different times, so breeders and seed supply systems must be able to respond to these different demands.

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Seed supply systems

In the past, African governments took responsibility for provision of seed. Nowadays it is accepted that the private sector must be involved, but it commonly provides a very limited range of crop seeds. Multinational seed companies bring economies of scale, but may be less inclined than local companies to meet the heterogeneity of smallholder demand. Open-pollinated varieties are less profitable for companies, as farmers can save seed and avoid the recurrent cost of seed purchase. Commercial companies that invest in breeding tend to focus on species where they can make bigger margins by producing hybrids but where there is the recurrent cost of seed purchase. Local companies rely more on public-funded research for new varieties, but government research programmes may lack experience of forging the necessary partnerships to link public research with private opportunities to take varieties to farmers.

A variety of seed systems operate side-by-side in African countries. Local seed systems of saving and exchanging farm-produced seed provide by far the majority of cropped fields. Local commercial (often farmer cooperative) seed producers may produce locally adapted or modern varieties of a range of crops. National companies commonly depend on public varieties and hybrids. Multinational companies focus on hybrid maize and cotton, and for the most part commercial crops like tobacco or flowers, the market-partners providing the seed. Each farmer may use a variety of seed systems for different crops at any time.

Not only insufficient investment in plant breeding, but limited infrastructure and a lack of efficient and cost-effective marketing are the main constraints of small seed companies. So a recommended variety that is registered and in the market may still be unavailable to many farmers. The advice of extension agents must be matched to availability, because there is no point recommending seeds that

farmers cannot afford to buy. Some methods that operate locally such as rural plant health clinics¹ or Farmer Field Schools may link to more wide-spread methods of sharing information such as radio and mobile phone, both widely used in African small-scale farming communities. For example, plant clinics operate in marketplaces and other locations readily accessible to poor farmers. Local extension staff, known as 'plant doctors', diagnose and advise on any crop with any problem. Information collected at clinics on the key problems farmers are facing can be used to develop key messages to be delivered at scale through complementary methods such as radio or mobile-phone-based systems.

In most African countries seed production and marketing is regulated, normally by the national organisation responsible for plant protection. The aim is to ensure that only high-quality seed is sold; a farmer who invests in seed that does not germinate or grow as expected may lose money and is less likely to take the risk again. But over-rigorous regulation can stifle entrepreneurship and make provision of seeds that farmers want less profitable. For the different seed systems, different regulations should apply to support and control them. Self-regulation may be allowed for some varieties of seed, on the basis that a company selling bad seed will lose business and not survive. Full certification may be valuable when sufficient resources are allocated; a Quality Declared Seed (QDS) approach may be used to allow a wider group of stakeholders to participate in seed markets, but is not accepted in all countries.

Regional harmonization of seed regulation, such as in the Common Market for Eastern and Southern Africa (COMESA), should reduce the costs of bringing new

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varieties to market. But successful implementation depends on all countries having adequate regulatory capacity, and this may not yet be the case. In the area of genetically modified crops, some countries already have their biosafety frameworks and legislation established, but others do not. The patents that are associated with GM crops commonly put such varieties beyond the reach of smaller companies . . . and their customers.

Conclusion

A Green Revolution in Africa needs multiple demand-side and supply-side constraints to be addressed simultaneously. The Green Revolution in Asia was criticised for causing environmental damage of various types. This has led to calls for a 'Doubly Green' revolution or 'sustainable intensification', which will be even harder to achieve. But this is what the Comprehensive Africa Agriculture Programme envisages.²

Hard, but with the right policies and technologies, not impossible.

References

- 1 www.plantwise.org
- 2 www.nepad-caadp.net

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