Market-led approaches to new variety design in Africa

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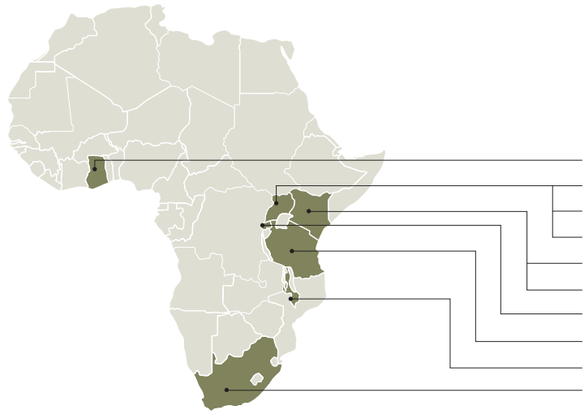

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"Demand-led plant breeding is a significant and potentially game-changing initiative for the region, especially because it is home-grown."
Professor Eric Danquah – WACCI, Ghana

"Where once African agriculture offered only subsistence and survival, now whole markets depend upon market preferences and are the positive driving force for rural economic revival."
Professor Hussein Shimelis – ACCI, South Africa

"You might have a great crop but it's no good if no one wants it at the end of the value chain. A variety that provides great yields for farmers is still is a failed variety if it is impossible to sell the product to consumers. Learning through mistakes, trial and error, has led us to demand-led breeding."
Dr Rowland Chirwa – CIAT, Malawi

"Demand-led plant breeding requires sustained and regular interactions with all the crop value chain stakeholders about the varieties being developed. It complements and goes farther than the farmers' discussions characteristic of the Participatory Rural Appraisal (PRA) taught within PhD curricula."
Professor Pangirayi Tongoona – WACCI, Ghana

"Breeding for the requirements of whole value chains requires breeders to update and review their practices. This is why we must start with education, focussing on promoting and developing African breeders with the right skills to develop new varieties for the markets. It is here that the change has to begin."
Dr Jean Claude Rubyogo – CIAT, Tanzania

The Business of Plant Breeding

Demand-led Plant Breeding

As African agriculture is transforming from subsistence farming to more market-led systems and small producers generate food surpluses to sell, products must meet market demand. Success in demand-led breeding depends on the following:

- breeding targets and quantitative goals are set that reflect clients' preferences
- new varieties reach and fulfil client expectations
- a development strategy is designed for each new variety
- a delivery investment plan is in place
- emphasis is given to the views of both farmers and consumers from rural and urban areas.

Success in demand-led plant breeding will be determined by the adoption and use of the new varieties that meet market requirements throughout crop value chains.

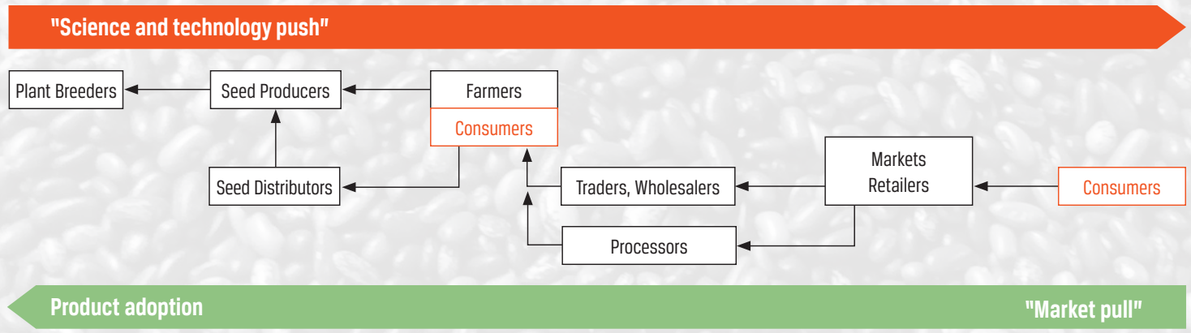
Demand-led plant breeding combines the best practices in market-led, new variety design with innovative plant breeding methods and integrates both together as a new way of approaching the business of plant breeding to deliver benefits. This approach places more emphasis on understanding and delivering client preferences than just promoting what new technology can offer (Figure 1).

There are three principles that drive success in demand-led breeding:
1. A target-driven approach
2. Demand-led variety development strategy
3. Performance indicators to measure progress towards adoption of new plant varieties by farmers and their value chains.

Target-driven approach
Demand-led breeding is target- and client-driven. Emphasis is placed on quantitative goals and target setting, to develop improved varieties for specific clients and fulfil their expectations.

Figure 1

Demand vs. supply-driven



Demand-led variety development strategy
A demand-led variety development strategy is designed for each new variety and includes all the components of "what", "why", "who", "when" and "how". The strategy contains a stage plan for line progression decisions, together with a set of development activities and an investment plan for delivery.

Performance indicators to measure success
The level of engagement and emphasis placed on the views of clients on the performance and use of new varieties is much higher in demand-led breeding than in other breeding approaches. The success of a new variety and its key performance indicators are determined by the opinions, demand and use of the new variety by farmers and their value chains.

The target-driven approach is exemplified by the following best practices in demand-led breeding:

- **Client quantification:** Numbers and types of farmers, their location, market segments and targeted clients in their value chains are quantified at the outset of the breeding project.
- **Variety design:** A detailed list of traits with quantified levels of performance required by clients is defined to enable comparison with existing varieties before line progression can take place.
- **Variety adoption:** Target levels are set for adoption by farmers and monitored for success. Variety registration is important to enable farmers to access new varieties.
- **Variety development strategy and stage plan:** A development strategy is created for each new variety. A time plan of activities to generate the data required to make line progression decisions is then prepared before the start of the breeding project (Figure 2).

Education Module
These core principles have been used to create an education module for training the next generation of plant breeders. It has been designed as an educators' manual and training materials to support: (a) postgraduate scholars in plant breeding; and (b) continuing professional development for plant breeders and their science teams already managing crop improvement programs. For more information please contact: Professor Pangirayi Tongoona (ptongoona@wacci.edu.gh) at the West Africa Centre for Crop Improvement, University of Ghana, Accra, or Dr Nasser Yao (n.yao@cgiar.org) at BecA-ILRI Hub, Nairobi, Kenya and Professor Shimelis Hussein (Shimelish@ukzn.ac.za) at the African Centre for Crop Improvement, University of KwaZulu-Natal, South Africa. Website: www.syngentafoundation.org/demand-driven-plant-variety-design.

Figure 2

Demand-led Breeding Stage Plan Line progression decisions