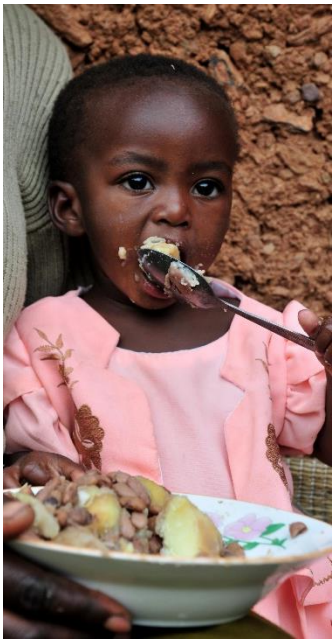

Harnessing the benefits of demand-led Breeding Approach: Reduced Cooking Time for Beans to Save USD 1.4billion for East African consumers

The region is a heavy consumer of beans and currently spends about USD ***4,182,304,058*** *per year on cooking dry beans.*

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Over the years, improvements in household incomes, a growing number of women taking up employment away from home and urbanization have caused individuals to lose skills and time for cooking food at home. As a result, there is a restructuring of human lifestyle and growing demand for convenience foods. At the same time, wood fuel in rural areas of Africa is becoming increasingly scarce and more expensive. Currently, children and women in the rural areas spend too much time gathering firewood, which becomes tiring to prepare food. There are growing concerns among researchers and policymakers of a potential malnutrition crisis as the populations may shift from traditional to convenient but probably less nutritious foods. Exposure to the smoke poses a health hazard as well.

Common bean is among traditional foods valued for its high nutritional and health benefits. The crop is also appreciated as an affordable source of protein compared with animal-based and a major source of micronutrients, such as iron and zinc. However, over 80% of common bean grain is consumed as dry, which takes longer to cook. In recognition of this challenge, bean breeders at the Alliance of Bioversity and the International Centre for Tropical Agriculture (CIAT), and national bean program partners through the Pan Africa Bean Research Alliance (PABRA) started developing varieties for faster cooking time over the past years. However, this approach proved to be slow as the cooking time of varieties currently existing in the East African markets including the Ugandan market is about 120 minutes (2 hours). Responding to the same concerns of long cooking time, bean researchers worked with the private investors and introduced pre-cooked beans that take about 15 min to cook in Uganda and other East African countries in 2017. This industrial-based solution

though exciting, has not generated tangible impacts because processed beans are expensive for the majority of the bean consumers.

To ensure that beans do not lose their place on the food menu, the Alliance-CIAT entered into collaboration with the University of Western Australia, and six East African national bean programs including the National Agricultural Research Organization (NARO) in 2019 and started to breed for short cooking beans as an affordable solution for low-income earners. The other East African countries include Burundi (ISABU), Ethiopia (EIAR), Kenya (KARLO), Rwanda (RAB) and Tanzania (TARI) with the support of the Australian Centre for International Research (ACIAR).

However, the success of this project requires that breeders have good access to information on the demand for cooking time in East Africa, and know the trait levels that match the needs of the market. Donors also need to know the potential benefits of the investment to support breeding for reduced cooking beans. Hence a market research study was commissioned in Uganda (with the understanding that the findings can be extrapolated to the other five east African countries) with the support of the Australian Centre for International Research (ACIAR); Syngenta Foundation for Sustainable Agriculture (SFSA) and Crawford Fund for a Food Secure World under the Demand Led breeding project (DLB) in 2020.

The market study used a combination of methods. We started with extensive consultations of all stakeholders along the value chains and compiled information that helped us define the cooking time at three levels (i.e. 60min, 75min, and 90 min). The trait levels were combined with levels of other traits in designing hypothetical product profiles on choice cards used for eliciting the choices of participants. About1064 male and female respondents participated. Each participant was given three options to choose from; two being hypothetical scenarios we wanted to test and one representing the status quo.

Results confirmed that all Ugandan bean consumers prefer bean varieties that take a shorter time to cook as compared with the ones they have. The utility derived from the reduced cooking trait and willingness to pay for it increase with the level of reduction in cooking time but at a decreasing rate. Results suggest that when developing product profiles, the minimum score for reduced cooking time trait should be aligned to the preferences of consumers that represent the

future market for beans—the relatively young and educated individuals, the majority of whom reside in urban areas. The consumers in this market segment will be satisfied with new varieties that take 75 min or less to cook—down from 120 min average for the varieties currently existing on the market.

The reduction in cooking time comes with economic gains in form of saving on water, fuel and time needed to supervise the process. Uganda being a heavy consumer of beans currently spends about USD 1,144,439,995 per year on cooking dry beans. Study findings reveal that the investment in breeding to reduce cooking time, has the potential to save up to USD 400.6 million per year for the consumers if the average cooking time of beans is reduced from 120 min to 75min—and if all bean varieties on the market are replaced with ones that cook for 75 minutes or less.

Table 1. demand for dry beans, cost of fuel, water and time for cooking of existing varieties and potential cost saving with faster cooking beans

Country	Population	Quantity of dry beans consumed (tons) per year	cost of cooking dry beans per year (USD)	Potential cost saved (USD) from reduced cooking time beans
Burundi	12,000,000	378,000	525,420,000	183,897,000
Kenya	53,771,296	639,878	889,431,007	311,300,852
Tanzania	59,734,218	851,213	1,183,185,523	414,114,933
Rwanda	12,952,218	316,423	439,827,533	153,939,637
Uganda	45,741,007	823,338	1,144,439,995	400,553,998
Total for five countries	**184,198,739**	**3,008,852**	**4,182,304,058**	**1,463,806,420**

Source: Authors' computations

Given the similarity in bean consumption patterns and preparation practices among populations across East Africa, our results provide perspectives for the five (Uganda, Burundi, Rwanda, Kenya and Tanzania) countries in the region that are participating in the project. Because the five East African countries are highly populous (**184,198,739**) with a high bean consumption demand (3 million tons of dry beans per year), their annual budget for cooking dry beans alone is huge, about USD 4.2 billion in total. The high cost of cooking dry beans makes the investment very relevant for East Africa as the region stands to save an equivalent of USD 1.5 billion per year with the investment in breeding to reduce cooking time by at least 30%.