



Delivery of Iron Beans in Rwanda

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Table 1. Staple Food Production & Consumption in Rwanda

Staple Food	Daily Per Capita Consumption (all age groups, grams/day) ¹	Total Annual Production (thousand metric tons) ²
Beans	80 g/d	433
Maize	46 g/d	573
Cassava	258 g/d	2,716
Irish potatoes	282 g/d	2,337
Sweet potatoes	200 g/d	1,005
	Daily Per Capita Consumption (grams/day) ³	Iron Density and Iron Intakes
Beans	Children (3-5 years): 65 g/d Women: 123 g/d	Conventional Bean: 50 parts per million (ppm) Iron Target Increment: +44 ppm Biofortified Bean Target: 94 ppm At the target level, biofortified beans provide about 60% of the Estimated Average Requirement (EAR).

¹FAO Stat 2009; ²FAO Stat 2012 ³HarvestPlus Surveys

Table 2. Current Iron Status

Prevalence of anemia (2010 DHS)	Children under five: 38% Women: 17%
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Varietal Release

To date, four first-wave varieties with more than 60 percent of the iron level and five second-wave varieties with 60–94 percent of the target have been released in Rwanda, as detailed in the chart below. In 2013, HarvestPlus began working with private farmers, cooperatives, and nongovernmental organization (NGO) partners to produce certified seed and expand seed production and marketing to up-and-coming seed companies. Currently, 500 metric tons of certified seed is produced per year through 80 registered seed multipliers.

Strategic Factors Driving Delivery

Building product acceptance is facilitated by the agronomic superiority of recently released high-iron varieties compared to older varieties currently farmed. Average bean yields in Rwanda of nonbiofortified beans are approximately 0.8 tons/hectare (bush and climbers combined); biofortified bush beans yield around 1.5 t/ha and biofortified climber beans 2–3 t/ha on farm. Furthermore, awareness and demand for iron seeds are created by educating household decision makers on the health benefits associated with consuming iron beans.

Seed Commercialization

Distribution channels for iron beans include direct marketing (mobile sales), agrodealers, cooperatives, and a payback system. For direct marketing, seed is packed into small packages of 500 grams and 1 kilogram and sold to farmers on market days. Agrodealers (farm input suppliers) are used to distribute the same sizes of small packs to farmers. Cooperatives use their organized structures to distribute seed to their farmers. In addition to seed sales, an experimental payback system was implemented in six districts of the country (Bugesera, Gatsibo, Kayanza, Kamonyi, Nyanza, and Huye) where agrodealers are not present. In this approach, governmental structures are used to distribute seed to farmers on a larger scale with larger quantities. This approach increases farmers' ability to reach household consumption levels faster than with the sales approach, as farmers often have low levels of disposable income. The distribution partners are also trained in promotion and nutrition messaging.

Table 3. Iron Bean Varieties Released in Rwanda

Name	Source	Iron Content ¹	% Target level	Agronomic Characteristics				
				Seed Color	Adaptation	Resistance ²	Tolerance ²	Yield Potential (t/ha)
<i>First Wave (fast-track): 50–60% target increment, release in 2010</i>								
RWR 2245 (Bush)	RAB	76 ppm	59%	Red mottled	Low to mid altitude	AB, AC, BCMV	ALS, RR	2.5
RWR 2154 (Bush)	RAB	71 ppm	47%	Sugar	Low to mid altitude	AB, AC, BCMV	ALS	2.0
MAC 44 (Climber)	CIAT	78 ppm	64%	Red mottled	Mid to high altitude	AC	AB,ALS, BCMV, RR	3.5
RWV 1129 (Climber)	RAB	77 ppm	61%	Salmon	Mid to high altitude	AC, BCMV, RR	AB,ALS	3.0
<i>Second wave: 80–90% target increment, released in 2012</i>								
RWV 3006	RAB	78 ppm	63%	White	Mid to high altitude	AB, AC, ALS, BCMV	-	3.8
RWV 3316	RAB	87 ppm	84%	Red	High altitude	AC, BCMV	AB,ALS	4.0
RWV 3317	RAB	74 ppm	54%	Sugar	High altitude	AC, BCMV	AB,ALS	4.0
MAC 42	CIAT	91 ppm	94%	Sugar	Low to mid altitude	AC, BCMV	AB,ALS	3.5
RWV 2887	RAB	85 ppm	80%	Dark red	High altitude	AC, BCMV	AB,ALS	3.8

¹ Average across 4 seasons, ICP and XRF data

² AB: Ascochyta blight; AC: Anthracnose; ALS: Angular leaf spot; BCMV: Bean common mosaic virus, RR: Root rot

Marketing

HarvestPlus initially focused on seed sales. With increasing market presence, HarvestPlus has now initiated demand creation for iron bean grain. Significant volumes of iron bean grain are appearing in markets in urban centers, an indication of the saturation effect noted in certain farming districts. Test markets are being used to generate diagnostic information, allowing for revision of the marketing plan. This includes testing of messages and product benefits, communication channels, brand name and specific promotional messages, activities, and advertising that resonate best with the consumers.

Stakeholders

Partnerships are extremely important to the delivery efforts in Rwanda, and HarvestPlus works closely with the Rwanda Agriculture Board (RAB), emerging private sector seed companies, agrodealers, cooperatives, and traders. Biofortification is included in Government of Rwanda policies, including in the Ministry of Agriculture’s Nutrition Action Plan.

Potential Impact

At the end of 2013, a cumulative 714,000 farming households in Rwanda had been reached with iron bean seed. HarvestPlus plans to reach about 1.2 million farming households - virtually all bean-growing farm households - in the country by 2016,. Biofortified beans will reach a market share greater than 50 percent by 2018 and will be accessible to nonproducing households in urban and rural areas.

Cost

HarvestPlus will spend an estimated total of US\$2.8 million for iron bean delivery activities in the period 2011–2016.

Delivery Challenges and Recommendations

- Quantities of basic and foundation seed remain a challenge; HarvestPlus is exploring renting additional land on which to produce seed while working hand-in-hand with RAB.
- Most farmers typically purchase grain to use as seed; purchasing iron bean seed requires a change in mindset.
- Different marketing approaches are needed to increase demand for iron bean seed and iron bean grain; to date HarvestPlus has primarily focused on seed demand.
- HarvestPlus seeks to first improve the nutritional status of farming families, but many iron bean varieties are attractive for marketing and export.