POLICY BRIEF

Shaping Demand for Nutritious Crops: Insights on Consumer Willingness to Pay for Iron-Biofortified Beans in Kenya

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Shaping Demand for Nutritious Crops: Insights on Consumer Willingness to Pay for Iron-Biofortified Beans in Kenya

Policy Analysis for Sustainable & Healthy Foods in African Retail Markets

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Key Messages

- Iron deficiency remains a serious public health challenge in Kenya, affecting 36.1% of pregnant women, 21.8% of pre-school children, and 21.3% of non-pregnant women.
- Biofortified Iron Beans (BIBs), introduced in 2017, offer a cost-effective solution to reduce iron deficiency, but adoption has been slow.
- Consumers are willing to pay about 38.5% more for BIBs than for regular beans, with rural buyers showing higher willingness to pay than urban buyers, likely because they live closer to production zones.
- Urban consumers and women should be priority target groups for promotion, as they purchase BIBs more frequently as well as respond better to health-focused messaging.
- Awareness and behavior change efforts are critical to increasing BIB uptake. However, communication should integrate health benefits with features consumers prioritize, as

awareness-only campaigns risk diminishing willingness to pay by framing BIBs as a public good.

- Processors and marketers should emphasize consumer-preferred qualities such as better taste, less flatulence, and shorter cooking time—alongside nutritional benefits to encourage wider adoption.

Context

Micronutrient deficiencies remain a major health concern in Kenya. Iron deficiency is especially serious, affecting 21.8% of pre-school children, while one in four women of reproductive age is anaemic (KNBS, 2011; KNBS and ICF, 2023). Other nutrients of public concern include vitamin A, zinc, and iodine. Biofortification provides a practical and low-cost way to improve nutrition, especially for households that cannot easily access fortified foods or supplements. Beans are widely eaten in Kenya, making them an effective option for delivering more nutrients. Biofortified Iron Beans (BIBs) contain up to 90% more iron than regular varieties and can help reduce micronutrient deficiencies while supporting national goals on nutrition, health, and food security (HarvestPlus, 2022).

What is the Issue?

Beans are a key staple in Kenya, yet per capita consumption (15 kg/year) falls below other key foods like maize, wheat rice and potato. (KNBS, 2025). This lower intake is partly linked to undesirable traits such as flatulence, poor taste, and long cooking times. Since 2017, organizations have promoted BIBs varieties (Nyota, Angaza, and Faida). However, uptake remains low and awareness is limited as only 1 in 10 Kenyans know about BIBs (CIAT, 2020). Introducing new foods BIBs requires a strong understanding of how marketing, psychology, and economics shape consumer decisions. People weigh several attributes when choosing beans, including price, nutrition, taste, colour, size, cooking time, and convenience.

Adoption also differs across social groups: women, who often make food and nutrition decisions, respond differently to health messaging, while rural and urban consumers vary in their preferences, market exposure, and familiarity with bean varieties. The findings and recommendations are based on evidence from a survey of 561 rural and urban consumers in Kenya.

Figure: BIBs Varieties in Kenya

Key Findings

Weekly bean purchases are common, especially in urban areas: Urban households are more likely to purchase beans weekly (65%) due to less storage and higher consumption rates, making urban retail markets a key channel for targeted BIB marketing and distribution.

Flatulence is a universal concern influencing varietal choice: Nearly 90% of consumers consider low flatulence an important factor when choosing beans. Since yellow beans and some BIBs have lower flatulence, this trait should be front and center in consumer messaging to drive demand.

Women drive bean choices, but economic constraints limit access: Women make most household decisions about which beans to buy and consume. However, they often earn less (KES 6,000) compared to men (KES 10,000) and have limited control over household spending. These challenges reduce their ability to purchase iron-rich, biofortified beans when prices are higher.

Biofortification attribute remains underappreciated: Only 33.5% of consumers consider biofortification an important attribute, largely due to its invisibility and low awareness. This

points to the need for stronger nutrition education and behavioral change communication linking health to tangible traits like taste and low flatulence.

Consumers show high willingness to pay, with stronger demand in rural areas: Sample consumers are willing to pay a 38.5% premium (KES 63.9) for BIBs over conventional beans, signaling strong market potential. This premium exceeds that found in neighboring Tanzania (25%, Rubyogo et al., 2019). Notably, rural consumers (KES 71.06) are willing to pay more than urban consumers (KES 60.81), likely due to greater awareness and proximity to BIB production areas. These findings highlight the need for localized promotion and targeted distribution to build on existing demand.

Men and women respond differently to nutrition messages: Men react more to messages that warn about nutritional risks, while women respond better to messages that highlight nutritional benefits. Urban consumers also respond more to risk-focused messages than rural consumers. This shows the need for simple, targeted communication that fits the needs of different groups (Obebo et al., 2025).

Awareness drives willingness to pay: Rural consumers were twice as likely to be aware of BIBs (14.68%) as urban consumers (7.12%). Also, women have higher awareness than men. To bridge this gap, targeted education and outreach campaigns – particularly in urban areas –are essential for enhancing the perceived value of BIBs (Ateka et al., 2025)

Price and taste findings are unexpected: Price and taste interact in complex ways in consumer decision-making. Higher prices do not deter purchase; instead, they often indicate premium quality, which consumers are willing to pay for. Taste preferences are influenced by associations with bean color and low flatulence. Marketing strategies for BIBs should therefore highlight both desirable sensory traits and perceived value, ensuring that health benefits are coupled with attributes that consumers can see, taste, and feel.

What Should Policy Makers Do?

Strengthen partnerships for iron-biofortified beans: There is a need to coordinate efforts between the government, private sector, and other stakeholders to boost production, marketing, and consumption. Ministries of Agriculture and Health can lead

joint programs linking production with nutrition promotion to increase adoption and impact.

Integrate BIBs county programs and public procurement: County Departments of Agriculture and Health should coordinate production and embed biofortified bean promotion into existing nutrition and public health programs to reach more households. They should also prioritize BIBs in public procurement programs, including school feeding and institutional catering, to boost adoption and maximize impact.

Promote BIBs through trade and public programs: The National Ministry of Trade and County Departments of Trade can organize and support trade fairs, food expos, and agribusiness forums to showcase the nutritional and economic benefits of biofortified beans.

Strengthen nutrition education and supply chains: Public health officers and County Health Volunteers (CHVs) should lead nutrition education, clearly communicating the health benefits of biofortified beans through schools, communities, and media. At the same time, training and supporting middlemen, marketers, and processors is essential to ensure a consistent and sustained supply, promoting wider consumption.

Empower women in nutrition decisions: Women strongly influence household food choices, including those of BIBs, but often lack financial control. County Gender Departments, in collaboration with Agriculture and Health, should empower women through resources, training, and support to strengthen their decision-making and boost BIB adoption. This gender dynamic must be recognized in the program design of all BIB promotional activities.

Conclusion

This study shows that biofortified beans have strong market potential in Kenya, with consumers willing to pay more for them. However, adoption depends on gender, location, awareness and perceptions. Men and urban consumers respond better to messages that warn about risks, while women respond more to messages that highlight benefits. People also care about traits like taste, low flatulence, and quick cooking. Urban consumers and

women are good starting points for scaling adoption, while rural and male consumers need more awareness and support. Wealth, education, and positive attitudes help increase willingness to buy, while misconceptions about BIBs reduce interest. Promoting BIBs successfully requires clear messaging, focus on popular traits, strong awareness campaigns, and links to broader nutrition and food policies to ensure lasting impact.

Sources

Ateka, J., Mwangi, C., Obebo, F., et al. (2025). Influence of knowledge and attitudes on consumption of biofortified iron beans: Evidence from Kenya [Version 1]. VeriXiv, 2, 222. https://doi.org/10.12688/verixiv.1738.1

HarvestPlus (2022) High Iron Beans: A food that can change your business and the world naturally, https://www.harvestplus.org/wp-content/uploads/2022/01/Iron-Beans.pdf

KNBS (2011), Economic Survey, Republic of Kenya

KNBS (2025). Economic Survey 2025. https://www.knbs.or.ke/wp-content/uploads/2025/05/2025-Economic-Survey.pdf

KNBS and ICF (2023) Kenya Demographic and Health Survey 2022. Key Indicators Report. Nairobi, Kenya, and Rockville, Maryland, USA: KNBS and ICF. https://www.knbs.or.ke/reports/kdhs-2022/

Obebo, F., Ateka, J., Muniu, J., et al. (2025). Consumer preferences for biofortified iron beans: Results from a willingness to pay and choice experiment in Kenya [Version 1]. VeriXiv, 2, 238. https://doi.org/10.12688/verixiv.1725.1

Rubyogo JC; Lung'aho M; Ochieng J; Binagwa P; Mdachi M; Zakayo, E; Shida N; Msaky J; Kadege E; Birachi B; Mutua M; Nyakundi F; Kalemera S. (2019). Consumer acceptance of and willingness to pay for high-iron beans in northern Tanzania. Nairobi (Kenya): International Center for Tropical Agriculture (CIAT); Tanzania Agricultural Research Institute (TARI). Arusha, Tanzania

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