



Road map for prioritized investment in Uganda coffee R&D & seed systems



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Key priorities for advancing coffee productivity and profitability in Uganda in alignment with national goals

BACKGROUND

In 2017 Uganda adopted the Uganda Coffee Roadmap, a national plan to increase coffee production to 20 million bags and export earnings to USD\$1.5-2.2 billion by 2030.¹ Uganda’s agricultural economy employs 65% of the country’s labor force² and accounts for about 1/4 of Uganda’s gross domestic product.³ Coffee is an essential part of Uganda’s rural economy and generated over USD\$1 billion in 2023/24.⁴ Uganda contains 14% of the world’s smallholder coffee farms (1.8 million farms)⁵ and is the 7th-largest exporter of coffee globally.⁶ Uganda’s success in improving coffee productivity, as outlined in the Uganda Coffee Roadmap, will have direct and meaningful effects on millions of livelihoods and on the global supply of coffee.

In support of this goal, in October and November 2024, Uganda’s national coffee organizations (NARO/NaCORI, and UCDA) alongside the research arm of the global coffee industry (World Coffee Research) held a series of meetings, including a broad stakeholder gathering, to discuss challenges and opportunities to advance initiative #7 of the Roadmap, to “improve the quality of planting material (seeds and seedlings) through strengthened research and multiplication of improved varieties” (see figures below).

These discussions led to the collaborative development of a roadmap for priority investments in coffee research and seed systems. These priorities support Uganda’s

national commitment to increase coffee production, productivity and quality, including the modernization of coffee breeding, development of seed systems that enhance farmer access to improved coffee varieties, and strengthened national coffee research through technology transfer, partnerships and capacity building. This roadmap identifies the top priorities for achieving and scaling enhanced access to quality planting material for Ugandan farmers.

Coffee Roadmap: Nine key initiatives to catalyze transformation

Initiative	
Demand & value addition	1 Build structured demand through country-to-country deals, especially with China
	2 Brand Uganda coffee to drive demand and improve value by up to 15%
	3 Support local coffee businesses for value addition, including primary processing and a soluble coffee plant
Production	4 Strengthen farmer organisations and producer co-operatives to enhance commercialization for smallholder farmers and ensure broad access to extension, inputs, finance, and aggregation
	5 Support joint ventures between middle-class owners of underutilized land and investors to develop coffee production
	6 Provide and promote concessions for coffee production on large underutilized tracts of land
Enablers	7 Improve quality of planting material (seeds and seedlings) through strengthened research and multiplication of improved varieties
	8 Improve access to quality inputs by reducing counterfeiting (fertilizer, pesticides, herbicides) from current 40-60%
	9 Develop coffee finance programme with Central Bank and Treasury to provide financing to farmer organizations (including on-lending to smallholders), coffee businesses, and investors

SOURCE: Uganda Coffee Lab, McKinsey analysis

April 2017

Sources

- <https://ugandacoffee.go.ug/coffee-roadmap>
- <https://www.agriculture.go.ug/agricultural-sector-potential>
- <https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS>
- <https://ugandacoffee.go.ug/node/1219>
- <https://carto.com/blog/enveritas-coffee-poverty-visualization>
- <https://worldcoffeeresearch.org/focus-countries/uganda>

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Section 1. Research and development

Objectives and rationale	Potential key players	Action required	What defines success
<p>Objective 1. Next-generation market-demanded and climate-resilient coffee varieties are developed, and seamlessly made available to growers</p> <p>Coffee varietal replacement strategies need to catch up to market trends and unforgiving climate-change realities mandate next-generation varieties to be urgently developed. This outcome would bring new varieties to market to support increased production goals and meet both market and farmer demand.</p>	<ul style="list-style-type: none"> • WCR • NARO 	<p>Implement:</p> <ul style="list-style-type: none"> • Innovea Arabica Global Breeding Network • Global Robusta Breeding Network 	<ul style="list-style-type: none"> • Trees in performance evaluation plots • Number of varieties officially registered • Number of trees in farmers' fields • % adoption of released varieties
<p>Objective 2. Proven soil fertility innovations for coffee are developed, validated, and scaled up in farmer's fields</p> <p>The country's soil fertility has significantly declined, now evaluated as low to medium. This highlights the urgent need for sustainable agricultural innovations. Delivering initiatives that restore and improve soil health will enhance conditions over time, boosting coffee production. This outcome focuses on soil recovery to create a more productive environment for coffee production.</p>	<ul style="list-style-type: none"> • NARO • Universities • Advanced research institutes 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • % Change in on-farm productivity • % Change in on-farm profitability • % change in on-farm productivity attributed to soil fertility deficiencies
<p>Objective 3. Tailor-made plant health innovations for coffee are developed, validated, and deployed in farmer's fields</p> <p>Climate change is increasing the threat of pests and diseases in Uganda. Therefore, it is essential to develop, validate, and implement measures to mitigate the negative impacts of these outbreaks, particularly when genetic resistance levels are low. This outcome seeks to protect local ecosystems, preserve biodiversity, and ensure the health of both the environment and communities dependent on these resources.</p>	<ul style="list-style-type: none"> • NARO • Universities • Advanced research institutes 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • % Change in on-farm productivity • % Change in on-farm profitability • % Change in nationwide pest infestation • % Change in nationwide disease incidence

Section 1. Research and Development—Objectives and rationale	Potential key players	Action required	What defines success
<p>Objective 4. Farmer-compatible agroforestry innovations are developed, validated, and scaled up in farmer’s fields</p> <p>By embracing these innovative practices, we can protect our environment while safeguarding the future of coffee farming. However, to realize this potential, supportive policies that incentivize and facilitate these essential innovations must be also put in place. This outcome serves as a vital climate change adaptation measure that not only ensures the sustainability of coffee production but also plays a crucial role in reducing greenhouse gas emissions from coffee farming and enhancing biodiversity conservation.</p>	<ul style="list-style-type: none"> • NARO • Universities • Advanced research institutes 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • % Change in on-farm productivity • % Change in on-farm profitability • % change in integrated coffee-forestry production fields or % increase in the number of farmers practicing coffee-forestry innovations
<p>Objective 5. Efficient and effective coffee breeding operations are implemented</p> <p>National breeding programs are essential in the development of varieties that meet the challenges of the twenty-first century. This outcome focuses on the implementation of established best practices in breeding operations as well as the development of new or improved techniques, tools, and methods to accelerate genetic gains in breeding operations, such as marker development, optimizing field testing networks, and retooling staff.</p>	<ul style="list-style-type: none"> • NARO • WCR 	<ul style="list-style-type: none"> • Prioritization • Concept development 	<ul style="list-style-type: none"> • Number of innovations in routine use (e.g. new tools, techniques, and methods) • % change in trait heritabilities • % change in genetic gain
<p>Objective 6. Increased short-term approaches for productivity enhancement such as grafted seedlings available to farmers.</p> <p>The productivity of most coffee gardens in Uganda is limited by the old age of the coffee trees. Top working has been identified as one of the strategies to renew the coffee gardens. This outcome ensures that shorter-term approaches such as grafting are available to provide farmers with options for investing in productivity-enhancing activities.</p>	<ul style="list-style-type: none"> • NARO • WCR • Universities • Advanced research institutes 	<ul style="list-style-type: none"> • To be co-created with donors 	<ul style="list-style-type: none"> • To be co-created with donors

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<p>Objective 7. Coffee value-addition activities are developed and scaled to support the diversification of coffee applications</p> <p>By adding value, producers and associated businesses can enhance profitability and differentiate their offerings. This outcome ensures there is a range of options to explore for Uganda, from improving coffee processing techniques to developing geographic indications to developing local coffee-based products and derivatives and linking coffee tourism to other environmental tourism. The appropriate measures will depend on the region and context.</p>	<ul style="list-style-type: none"> • NARO • Other partners to be added through co-creation with donors 	<ul style="list-style-type: none"> • To be co-created with donors 	<ul style="list-style-type: none"> • To be co-created with donors
<p>Objective 8. Establishment of a “Robusta Centre of Excellence” including multi-country engagement in select research areas.</p> <p>A Robusta Centre of Excellence offers donors efficiency in pre-competitive areas of investment among coffee-producing countries. Such pre-competitive areas can include soil fertility research, pest and disease challenges that do not respect national borders, agroforestry innovations, and grafting tools and methods. This outcome will drive innovations for Uganda’s coffee sector, promote best practices globally, create a framework for change, and support knowledge dissemination.</p>	<ul style="list-style-type: none"> • NARO • Other partners to be added through co-creation with donors 	<ul style="list-style-type: none"> • To be co-created with donors 	<ul style="list-style-type: none"> • To be co-created with donors

Section 2. Seed sector

Objectives and rationale	Potential key players	Action required	What defines success
<p>Objective 9. Efficient and effective seed propagation methods and access pathways are developed and sustained</p> <p>As demand for seeds currently exceeds supply, expansion of system capacity using known methods and new, ground-breaking solutions are currently being sought to cost-effectively eliminate these obstacles and increase quality seed production. This outcome supports functional seed systems that reduce risk for farmers and create value. Also seeks to deliver healthy, vigorous, and disease-resistant plants.</p>	<ul style="list-style-type: none"> • WCR • NARO 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • % change in market share of released varieties
<p>Objective 10. A vibrant, efficient, and well-coordinated coffee seed sector is established</p> <p>The seed sector's success depends on well-coordinated stakeholders informed by greater accuracy in demand forecasting and whose actions eliminate unnecessary redundancy and protect farmers and society. This outcome delivers an efficient sector whereby stakeholders work more efficiently, tapping into skills, knowledge, and resources that speed up innovations.</p>	<ul style="list-style-type: none"> • WCR • NARO 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • % change in market share of released varieties
<p>Objective 11. Coffee plantations are rejuvenated without significantly compromising production</p> <p>Uganda is the sixth leading producer of coffee globally, yet on-farm productivity in Uganda remains low at ~0.5 tonnes/ha per year relative to peer origins. Rejuvenating a coffee plantation can have adverse effects on production in the short term (1 year of lost production) but is essential for increasing production in the medium term (3-7 years). This outcome seeks to increase farm productivity through the propagation and grafting of relevant materials. Annual yields are typically three times higher after rejuvenation. Include propagation and grafting of relevant materials among options to expand farmer choices for increasing productivity.</p>	<ul style="list-style-type: none"> • WCR • NARO • NGOs 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • % change in the number of rejuvenated farms per unit

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<p>Objective 12. Develop a coffee traceability system and integrate quality control tools</p> <p>Traceability systems for documenting and authenticating the genetic identity and sources of coffee planting materials do not currently exist in Uganda’s coffee sector. This outcome delivers genetic quality assurance tools that can ensure that the full benefit of improved genetic materials are flowing to farmers and not “leaking out” of the genetic improvement pipeline.</p>	<ul style="list-style-type: none"> • WCR • NARO 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • A functional national coffee traceability system
<p>Objective 13. Improved knowledge and awareness of seed sector stakeholders</p> <p>Seed sector stakeholders’ knowledge and awareness of variety selection, the importance of quality planting material, and tools for stakeholder empowerment are currently very limited. This outcome will support increased access to information on the right varieties for farmers and improved knowledge, skills, and capabilities for the farmers to make informed decisions.</p>	<ul style="list-style-type: none"> • WCR • NARO • NGOs 	<ul style="list-style-type: none"> • Prioritization • Planning • Concept development 	<ul style="list-style-type: none"> • To be co-created with donors