



## SeEdQUAL: delivering genetic gains in farmers' fields

### Initiative Lead and Co-Lead

Ian Barker  
Shoba Venkatanagappa

### Primary CGIAR Action Area

Genetic Innovation

### Estimated 2022 - 2024 Budget

\$30 - \$30 M

### Challenge

In many developing countries, limited availability of, and access to quality seed and propagation material for well-adapted varieties, hinders efforts to transform agriculture and agri-food systems. The dissemination of quality seed with trait packages preferred by farmers, consumers, and other agri-food system actors is a critical mechanism through which CGIAR and its partners will deliver on its five impact areas-nutrition, poverty, gender, climate, and environment-and the second Sustainable Development Goal of zero hunger by 2030. A key step to meeting these goals is a more focused, demand-led, well-resourced, and long-term investment in CGIAR breeding programs driven by accurate market intelligence. The success of CGIAR/NARS breeding programs hinges largely on the efforts to strengthen the links between breeding and the delivery of quality seed of climate-adapted and nutritionally enriched varieties to smallholder farmers in stress-prone and low-technology adoption environments. This technology transfer process relies on functioning and equitable seed systems operating in an enabling policy environment that incentivizes varietal turnover <https://bit.ly/32xuGQ5> and integrates formal and informal seed systems to work for all. Emphasizing farmers as seed users, and the need for "market pull", is also important. Timely access to and use of quality seeds- and the genetic gains they embody - are shaped by multiple factors, including gender relations <https://bit.ly/3adoDV2> and other intersectional factors. While new investments in seed systems development provide opportunities to increase the benefits of seed access and use for women and other unreached groups, more effort is needed to address constraints <https://bit.ly/3tp0jHc> that limit their rights, choices, and capabilities.

### Objective

Building on the Crops to End Hunger Initiative (accepting the recommendations of the CtEH Seeds Group whitepaper <https://bit.ly/3tl61n6>), CGIAR Excellence in Breeding Platform (EiB), and existing initiatives, SeEdQUAL will accelerate varietal turnover <https://bit.ly/3dlk90s>, quality seed use, and realization of genetic gains (2% p.a.) in farmers' fields through a concerted effort to strengthen national seed systems in focal countries and regions. The starting point is the modernization of CGIAR's role in seed system development and particularly seed delivery driven by a renewed and clarified comparative advantage of CGIAR with respect to its NARS and other partners (working with the new AGRA CoEiSS), in national innovation systems. CGIAR-derived breeding was estimated to impact 37MM ha in SSA alone in 2015, but with an average varietal age of 14 years; <https://bit.ly/32hClfJ> the goal being to reduce this age. The process to be pursued will incorporate the latest "gold-standard" methods of stage-gating in product advancement and variety portfolio management. The initiative also addresses the functioning of seed systems, ensuring that breeding innovations reach the most disadvantaged. Additional significant benefits will accrue to women <https://bit.ly/3gbRQ6t> by increasing their access to and use of quality seeds, and also by engaging them in seed production and distribution roles. This has multiplier effects on women's empowerment. A range of evidence-based innovative mechanisms and instruments will be leveraged to "reach the unreached" at scale, through close coordination between formal and informal channels. SeEdQUAL will realize the OneCGIAR breeding investment and provide an entry point for many other initiatives across the portfolio.

### Theory of Change

This initiative aims to deliver seed of climate-resilient, market-preferred, and nutritious varieties embodying a high rate of genetic gain to farmers ensuring that women and other disadvantaged groups are reached. It will achieve this with a product-life-cycle process managed alongside the Accelerated Breeding initiative generating strong feedback loops from seed users to breeding and design teams. Product advancement processes to prioritize varieties for commercialization will be standardized, based on industry best practice, and extensive on-farm testing, working closely with the Market Intelligence initiative. SeEdQUAL will validate rapid-seed-multiplication methodologies for wider use. New models of early-generation-seed (EGS) and certified/QDS seed production will be tested through demand-led public and private partnerships. New crowdsourcing methods will make possible monitoring varietal adoption more extensively at lower cost. Practical evidence-based approaches to designing more inclusive seed systems ensuring women and disadvantaged farmers are reached will be promoted, in tandem with new metrics for inclusive seed access. Consequently, seed companies and other public seed multipliers will more routinely access new varieties from CGIAR/NARS networks of a broader range of crops matched to their market needs through novel partnerships. Seed enterprises will multiply and disseminate EGS more extensively, accelerating varietal turnover. Regulators will create an enabling environment by reducing barriers to varietal turnover. Disadvantaged farmers have more choice and access to quality seed of new varieties that meet their needs. This will lead to faster and wider adoption of new varieties and consequent improvements in income, nutrition and climate resilience.

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### Highlights

Seeds production research protocols based on industry good practice in use across CG/NARS networks to ensure new releases will be profitable and not fall outside acceptable risk parameters from a seed production (including both EGS and certified seed) point of view, promoting uptake of new varieties and accelerating turnover.

New metrics to track quality seed use by target socio-economic groups developed. The metrics will show barriers and opportunities in enhancing quality seed use for specific groups, including women, will shine a light on good practice and incentivize change for increasing seed access. Benchmarking seed indexes adopting metrics by 2023.

Driving cereal varietal availability and turnover through seed-based innovations linking from breeding to address production constraints (dry direct seeding in rice, zero tillage for wheat and barley) and supporting NARS (public and private) capacity for fast-track release of high value varieties and influencing an enabling policy

African Center of Excellence in Seed Systems for RTB crops established to strengthen African economies, delivering technologies & enhancing capacities to develop economically sustainable seed systems. With global outreach, it will build off the Roots, Tubers and Banana (RTB) CRP and link to AGRA's Center for Excellence in Seed Systems.

Expand the successful market-oriented, demand-led, multi-stakeholder models pioneered under the Pan Africa Bean Research Alliance to additional legumes and geographies. Broadening access to quality seed of improved farmer-preferred varieties through adequate EGS, adding fewer commercial crops to seed company portfolios and licensed from NARS.

### Work Packages

	Scope of Work	3-year Outcomes
Characterization, advancement and hand-over of new varieties: fewer, better varieties.	Context (crop-type, market and seed sector development) specific R4D on sustainable EGS production and business models. More effective germplasm exchange networks and expanded on-farm testing of candidate varieties. Research on demand creation and reaching the most disadvantaged ("last mile"). Production research and lowering the cost and risk of seed production.	Seed companies and other seed multipliers accessing and using quality seed of new varieties from CGIAR/NARS networks at greater scale, tailored to their needs and ensuring that women and other disadvantaged groups are reached.
Capacity-building, modernization and MEL.	Technical assistance for NARS (including seed units) and foundation seed organizations in EGS production and on-farm demonstration trialing, working through specialist partners and aligned with other planned seed investments. Development, staffing of a dedicated new OneCGIAR seed unit as recommended in the CtEH whitepaper. Tracking and reporting variety advancement and adoption. Licensing strategies.	Seed enterprises including NARS organizations adopting innovative and transformative models for accessing, multiplying and disseminating quality EGS for the full range of target focus crops in prioritized market segments following economically sustainable business models.
From intention to implementation: Policies for varietal turnover, seed quality assurance, and trade in seeds.	Evidence-based amplification of (1) policy guidance on early generation seed production and distribution, varietal release processes, quality assurance systems, and trade to encourage inclusive seed sector growth; and (2) program designs for smart input delivery, credit-linked extension, and other instruments to accelerate varietal turnover and deepen demand for quality seeds.	Robust policy implementation in 5-10 countries leading to: 50% increase in EGS production/distribution; qualitative reductions in time/effort required to release new varieties and produce quality seed; 5-10% increase in regional seed market values; and qualitative improvements in reach and impact of instruments to accelerate varietal turnover and increase seed demand.
Scaling equitable access to quality seed: reaching the unreached with quality seeds and traits.	The WP will design, test scale and track context-specific information and seed delivery channels, promote women's seed entrepreneurship, enhance access to affordable quality seed by disadvantaged socio-economic groups including women and test approaches to enhancing synergies between the formal and community-based/farmer managed systems.	Key private and public seed agencies and development organizations are using the new metrics for tracking inclusive seed access generating a robust evidence base. Key national seed innovation partner organizations are modifying or introducing new seed information-sharing and delivery mechanisms to enhance inclusive access to seed.

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### Impact Area Contributions

<b>Nutrition, health &amp; food security</b>	Increased varietal turnover will provide resilient, nutrient-dense legumes, biofortified crops, and vegetables. Distribution of diverse high-quality crop varieties with market-relevant traits, mitigates micronutrient malnutrition and facilitates NARS partners and farmers to improve crop, diet and nutrient diversity, and combat food insecurity.
<b>Poverty reduction, livelihoods &amp; jobs</b>	Increased adoption of resilient higher-yielding market-preferred varieties, and faster turnover of varieties, will increase on-farm productivity, competitiveness and improve farmer incomes. Contract seed production of hybrid cereal and vegetable varieties by smallholder farmers will create employment for women and youth in rural communities.
<b>Gender equality, youth &amp; social inclusion</b>	An increase in the use of affordable seed of market-demanded, consumer-preferred and resilient varieties by women, youth, and disadvantaged social groups will contribute to reduced gender bias and yield gaps. Empowerment through training in quality seed production, meeting standards and complying with regulations, will open up opportunities for future entrepreneurship.
<b>Climate adaptation &amp; greenhouse gas reduction</b>	Seed systems that promote increased variety turnover will help farmers adapt to a changing climate. Productive climate-resilient varieties with traits for heat, flood and drought tolerance and pest and disease resistance will provide yield stability, reduce pressure on marginal land, and reduce greenhouse gasses from agriculture.
<b>Environmental health &amp; biodiversity</b>	Increased adoption of high-yielding, climate-resilient varieties with pest and disease resistance will reduce the usage of pesticides. Diversification of crops, including vegetables and traditional vegetables, will increase agro-biodiversity. Early maturing varieties in zero-till crop rotations will improve soil health and sequester carbon.

### Impact on SDGs



### Regions

Global

### Countries



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### Innovations

Broad implementation of effective stage-gated product advancement decision-making approaches (including the Seeds2B handbook), in line with the CtEH whitepaper recommendation and in collaboration with the Market Intelligence IDT using better trait product profiles. Earlier involvement of private seed companies and other off-takers in the identification of varieties to commercialize.

Development of low-cost methods for monitoring varietal adoption (including DNA and novel crowd-sourced and image recognition tools) to monitor varietal turnover and ultimately assess the success of the seed delivery initiative (in line with the CtEH Eschborn principles).

Strategies for scalable, evidence-based approaches that leverage market, community, and digital channels, to increase access to and use of quality seeds by women, youth and other unreached groups and provide actionable information and recommendations for critical financing.

Development or refinement of EGS business models that employ novel ICT tools (such as Seed Tracker already being piloted for cassava in Nigeria, Tanzania and Brazil, and Yam in West Africa), Seed Cast in rice, and quality production protocols across crops for use by EGS producers (breeders and foundation seed)

Continued development and scaling of novel rapid seed propagation technologies for early generation seed, including SAH, aeroponics, TIBS micropropagation, rooted apical cuttings, detasseling techniques, seed treatment and good seed agronomy. These will ultimately improve the EGS business models and availability of seed and provide new opportunities for public-private partnerships.

### Key Partners

<b>Demand</b>	Government	Ministries of agriculture and Planning (input subsidy schemes), WFP, credit-linked input suppliers and other SHF aggregators
		NARS and other public seed units
	Other Public Sector	Benchmarking initiatives and indexes (such as World Bank EBA, TASAI, Access to Seeds)
	Private Sector	AATF-Qualibasic and other foundation seed companies
Selected Seed Companies (including East-West Seeds DCM- Shriram)		
<b>Innovation</b>	Academic, Training and Research	FTF Innovation labs
		WorldVeg and ICRISAT
		WUR
	Foundation	Data 2x
	Other Public Sector	AGRA
<b>Scaling</b>	Foundation	SFSA Seeds2B
	International NGO	New Market Lab
	Multilateral	SAARC/COMESA/SADC/ECOWAS/ASEAN/NAFTA (Regional economic blocs)
		[Budget based on 20MM identified and aligned W1/W2 funding and requested additional 33MM to achieve enhanced delivery]
	Other Public Sector	Harvest Plus
Private Sector	APSA/AFSTA/NSAI (Seed Trade Associations)	

# SeEdQUAL: theory of change

