

# Breeding Resources



**Breeding Resources** aims to improve the genetic, economic, social, and environmental performance of breeding programs across the CGIAR-National Agricultural Research and Extension System breeding network. It forms part of CGIAR's new Research Portfolio, delivering science and innovation to transform food, land, and water systems in a climate crisis.

## Objective

The Breeding Resources Initiative aims to ensure that breeding programs can more quickly develop and deliver the right seeds to smallholder farmers struggling with climate change, and nutritional and economic challenges, using tools and technologies such as genomic selection, quantitative genetics, high-throughput phenotyping, and bioinformatics to support data-driven, modernized breeding.



## The Challenge

Crop breeding has the potential to significantly contribute to addressing the global challenges of poverty, malnutrition, hunger, environmental degradation, and climate change. But the approaches that delivered life-saving varieties in the past are not adequate to meet those challenges today.

Across the CGIAR-NARES (National Agricultural Research and Extension Systems) network, the independent operation of breeding programs has provided autonomy, but also meant that innovations are not shared to their full potential. Costs associated with services such as bioinformatics are duplicated; data is fragmented and disparate as incompatible technologies are adopted; inconsistent standards are applied; and access to tools, technologies, and shared services varies. As a result, varieties that deliver improved nutrition, production, climate resilience, and other desired traits are taking longer than necessary to develop. In short, breeding is not efficiently and effectively achieving its potential impact.

### AT A GLANCE

**Primary CGIAR impact area:** Poverty Reduction, Livelihoods & Jobs

**CGIAR science group:** Genetic Innovation

**Focus countries:** Low- and middle-income countries, particularly in sub-Saharan Africa and South Asia

**Works towards sustainable development goals:**

No poverty; Zero hunger; Good health and well-being; Gender equality; Decent work and economic growth; Industry, innovation and infrastructure; Reduced inequalities; Responsible consumption and production; Climate action; Life on land; Peace, justice and strong institutions; and Partnerships for the goals





# Breeding

Resources supports partners to access the tools, technologies, and shared services needed to develop new crop varieties quickly and efficiently

## Activities

The Breeding Resources Initiative works with partners to help breeding programs access the tools, technologies, and shared services (TTSS) needed to develop new crop varieties quickly and efficiently. Specific areas of activity are as follows:

### Strategic Business Solutions

This work ensures CGIAR’s shared services are efficient and effective, and supports the establishment and management of CGIAR’s Shared Service Center (SSC). The Initiative will establish cost centers, cost models, and cost recovery strategies for each of the services provided by the SSC. It also supports leveraging already established units in CGIAR Centers and NARES that could potentially become service suppliers.

### Cost-effective shared services

Coordinating shared, centralized services such as genotyping, sequencing, high-throughput phenotyping, biochemical testing, biometrics, and bioinformatics helps to reduce costs, creating efficiencies and boosting CGIAR’s bargaining power in purchasing or contracting equipment, software, and services. It also enables the generation of consistent, high-quality data across the breeding network, and supports the coordination of analytics expertise.

### Performance Management of Consistent, Connected Operations

New cross-Center and cross-crop Process Teams will design and deliver breeding support services. The Teams work with breeders, operations staff and data experts to describe, harmonize and adopt standard operating protocols, workflows and quality controls across the breeding networks. Outputs include: standardized protocols, accessible via a common system; harmonized operations enabling consistent data generation; wide adoption of high-quality management systems; and the establishment of a Breeding Pipeline Improvement Monitoring System (BPIMS) to track key indicators and outcomes of operational and breeding performance.

### Smarter use of more data

The Initiative supports systems that share data to create larger, more powerful datasets that can be readily analyzed and interpreted for decision-making. One key focus is the development and deployment of the Enterprise Breeding System (EBS), a reliable, responsive, and future-looking data management system that can include standardized data in larger, more powerful data sets used to support routine and strategic decision-making. EBS enables the collection, curation, and analysis of data, facilitating meta-analysis and the creation of structure documentation for institutional memory. An on-the-ground user support network supports better data management and encourages adoption of the system.

### Innovation Development and Research Exchange (IDare)

The Initiative provides change management support to increase global adoption of modernized breeding across the CGIAR-NARES network. This includes supporting partners to develop change management plans, promoting regionalized capacity-building efforts, and providing project management support to integrate capacity-building into local operations. This area of work also aims to guide the ongoing cultural shift that is transforming the role of breeders into leaders of dynamic, expert-based multidisciplinary teams.



We help partners develop change management plans, promote regionalized capacity-building efforts, and provide project management support





## Outcomes

Proposed three-year outcomes include:

- Varieties are developed 30 percent quicker for 70 percent of targeted breeding programs.
- Shared services reduce costs by 25 percent in a majority of target programs, making modernized breeding more accessible across the global CGIAR-NARES networks.
- 70 percent of targeted breeding programs make data-driven decisions using genomic, phenotypic, and environmental data at more than one major decision point.
- CGIAR-NARES leadership on impact areas is demonstrated by improvement of 70 percent of the Initiative's targeted breeding programs in at least 50 percent of impact area tracking indicators.
- Capacity is increased in at least 15 different NARES institutions, demonstrated by increased access to TTSS (more than one type of service) more than once a year.
- Continuous breeding program improvement, with at least 70 percent of the Initiative's targeted breeding programs increasing or adding at least one target to their modernization plan.

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CGIAR is a global research partnership for a food-secure future. CGIAR science is dedicated to transforming food, land, and water systems in a climate crisis. Its research is carried out by 13 CGIAR Centers/Alliances in close collaboration with hundreds of partners, including national and regional research institutes, civil society organizations, academia, development organizations and the private sector. [www.cgiar.org](http://www.cgiar.org)

**We would like to thank all funders who support this research through their contributions to the CGIAR Trust Fund:** [www.cgiar.org/funders](http://www.cgiar.org/funders).

To learn more about this Initiative, please visit [on.cgiar.org/BreedingResources](http://on.cgiar.org/BreedingResources)

To learn more about this and other **Initiatives in the CGIAR Research Portfolio**, please visit [www.cgiar.org/cgiar-portfolio](http://www.cgiar.org/cgiar-portfolio)

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