

Conservation and Use of Genetic Resources (Genebanks)

An attempt to present ToC

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Participation: Genebanks community

Genebanks for the future

- will be part of a rational, efficient and effective system in which genebanks work in close partnerships with each other ensuring that the benefits of innovation reach those who most need them.
- will meet the needs of immediate users more accurately and efficiently, including those needing both material and in-depth genomic information.
- will achieve this by using a wide range of technological advances and by interacting more closely with the user community, to ensure that it conserves the right genetic resources in the right way, and closely matches resources to the needs of users.

The ability to ensure delivery of the right material to users will vastly increase the Return on Investment in genebanks



CGIAR-Crop Trust System Level Review of Genebank Costs and Operations (GCO)


Report
October 2020

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Theory of change - Genebanks

Challenge

- **Loss of biodiversity**
underpinning food systems to provide adequate and more nutritious and diverse diets
 - **Climate change** creating new challenges to crops and causing failure of food systems
 - **Limited capacities of national systems** to share conservation responsibilities
 - **Reluctance of key actors to share plant genetic resources**
impeding research
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Work Packages

- **Guarantee availability of diversity in perpetuity** through actively curated collections in compliance with international laws and standards
- **Futureproofing collections & exchange** to increase efficiency and effectiveness
- **Supporting breeding programs and increasing value and use of collections**
- **Strengthening the Global System** by enhancing capacity building and partnerships with NARES

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Impact areas

Nutrition, health and food security: more diverse, resilient and nutritionally diverse agrifood systems

Poverty reduction, livelihoods and jobs: higher yielding crops increase farmers' employment and income

Gender equality, youth and social inclusion: varieties with adaptive traits respond to men, women and youth preferences

Climate mitigation and adaptation: climate proofed varieties with novel traits from genebanks increase resilience

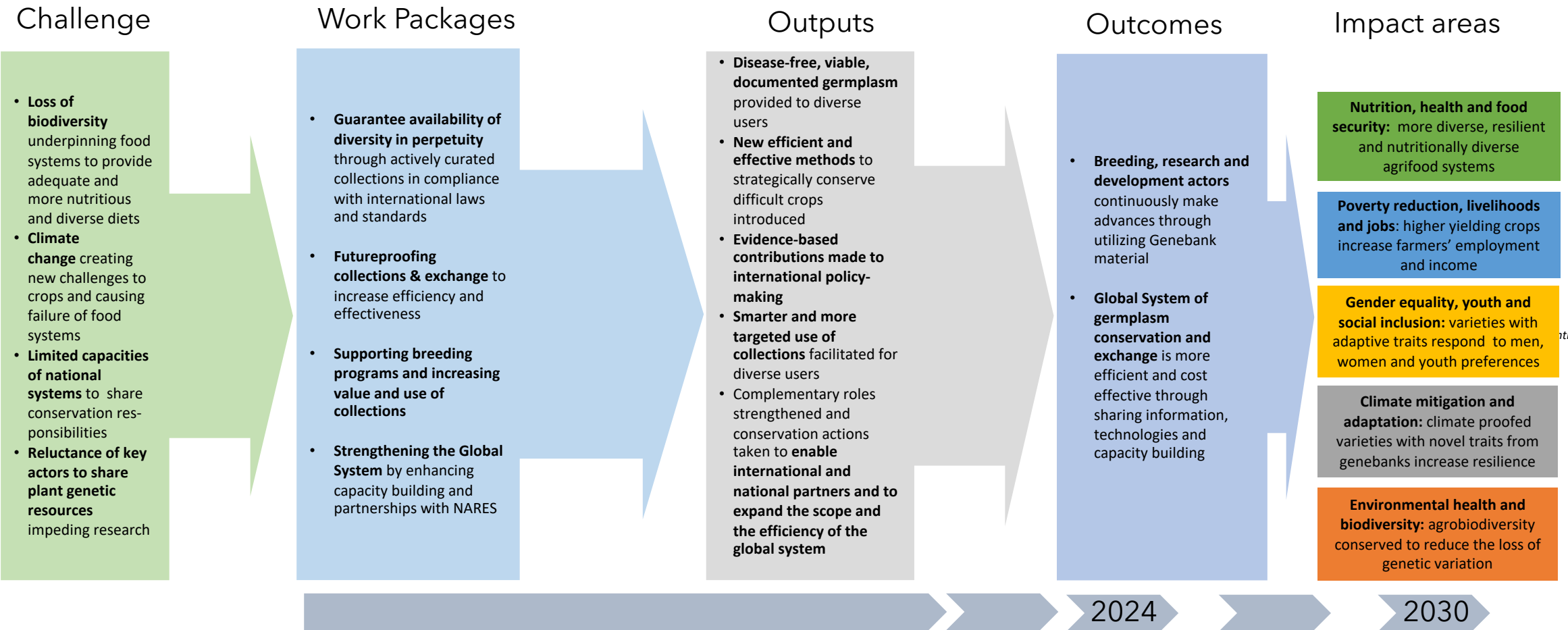
Environmental health and biodiversity: agrobiodiversity conserved to reduce the loss of genetic variation

contributing to

SUSTAINABLE DEVELOPMENT GOALS

2030

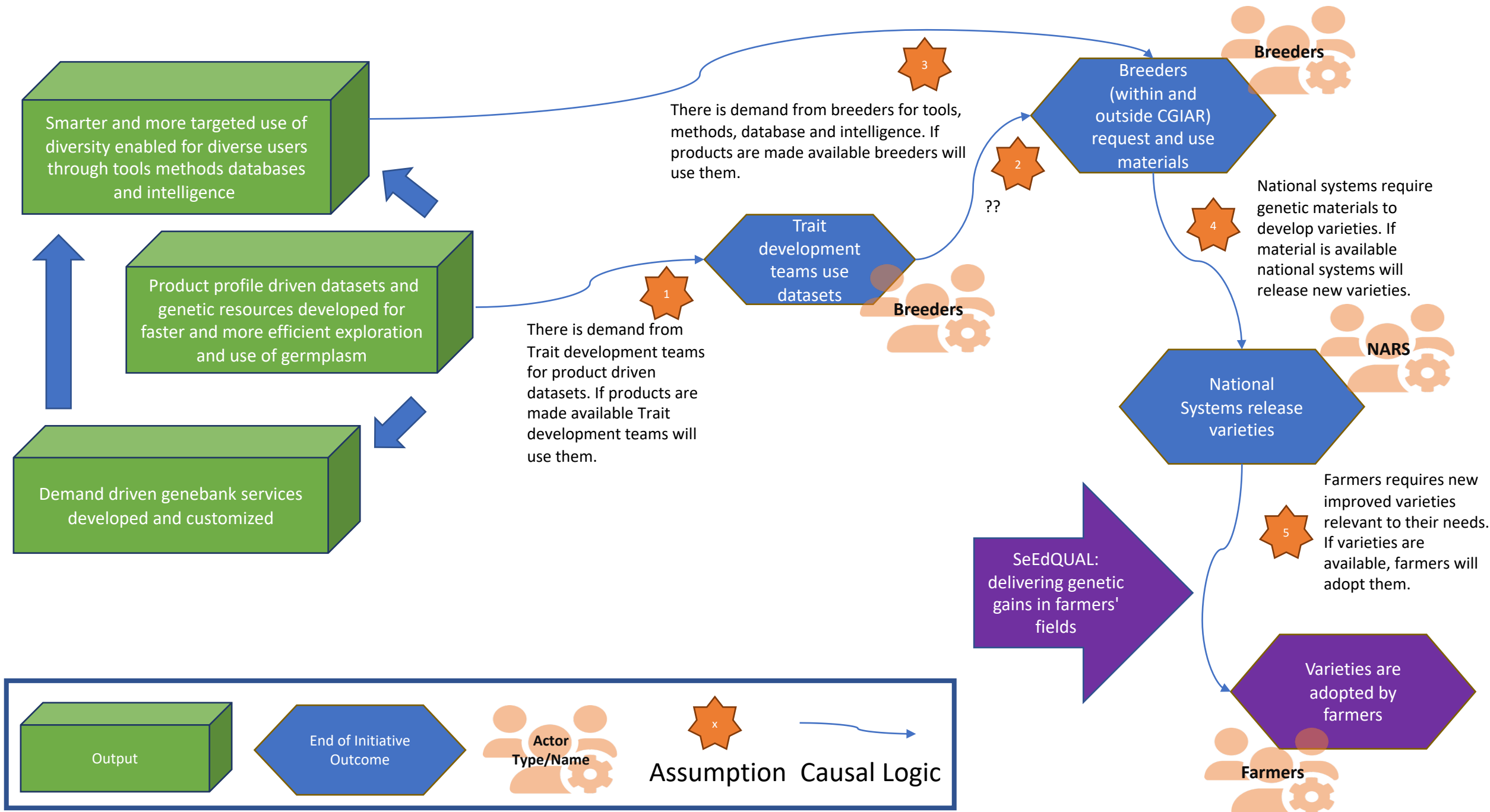
Theory of change - Genebanks



What is the Genebank delivering? Germplasm for breeders

Tangible products, technologies, services and institutional arrangements

- novel genetic resources/populations capturing key genomic diversity in an elite genomic background for breeders and trait development researchers, that support pre-breeding work by removing the most time-consuming and expensive stages of trait development.
- high-density genotyping information (sequencing or high-density fingerprints) of genebank material to accelerate allele mining and gene discovery efforts and improve conservation efforts by highlighting genetic diversity of accessions.
- Online portal to advertise and visualize discovery-ready genetic materials for trait development.



What is the Genebank delivering?

Tangible products, technologies, services and institutional arrangements

Germplasm for Direct Use – restoration, reconstruction of agricultural systems, strengthening informal seed sector, etc..

- Multiplication of perennial species or species with long life cycle, forages, crop landraces for direct use by farmers, NGOs, Development Agents, Government agencies and scientists.

Germplasm use by (other than breeders) researchers:

Taxonomy, phylogenetics, molecular biology, physiology, anatomy, etc

What is the Genebank delivering? Knowledge: Protocols for Genebanks community:

Tangible products, technologies, services and institutional arrangements

- Cryopreservation protocols, standards and procedures for reliable long-term storage of crops diversity (clones, recalcitrant seeds and pollen) in base collections and safety back-up, for training the entire Genebank international community.
- Updated protocols for the improved management of seed collections of wild species (inc. forages, trees, CWR) to ensure effective conservation and thence availability of biodiversity to users for One CG genebank curators and the wider genebank and user communities
- Cryotherapy protocols for efficient elimination of intracellular pathogens for safe conservation and distribution of clonal crops for their use by Genebank staff
- Conservation toolbox serving as a knowledge resource base to effectively and efficiently conserve genetic resources in national genebanks

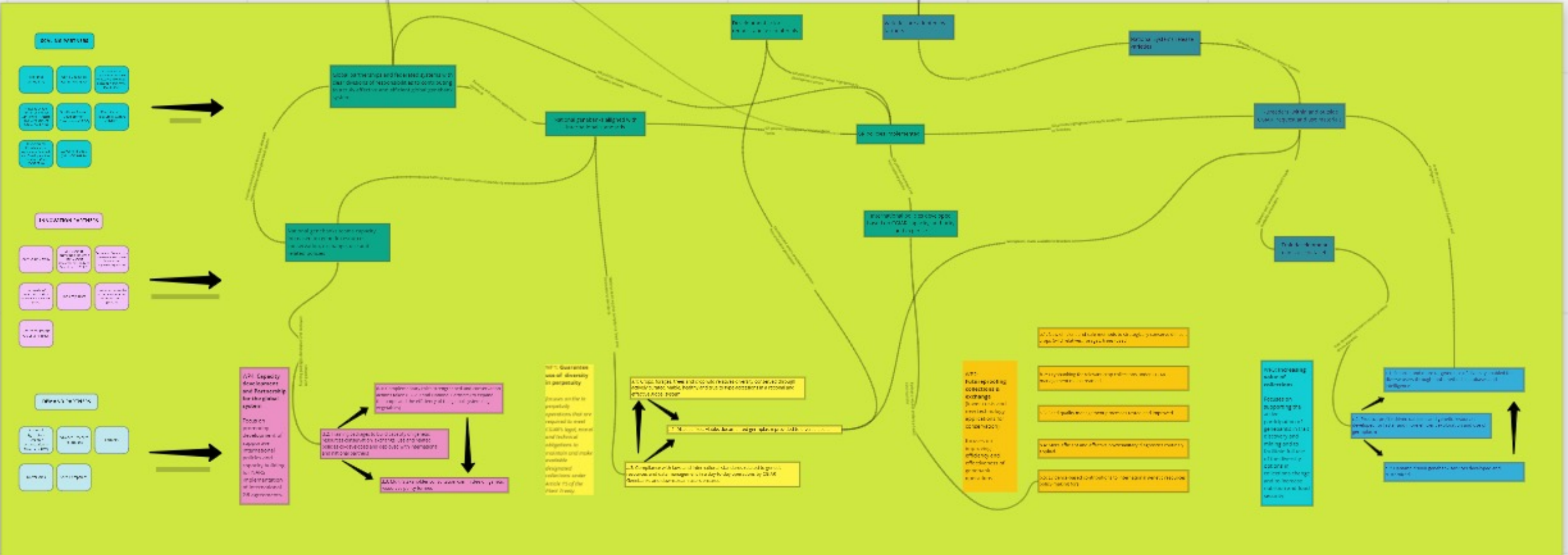
What is the Genebank delivering? Institutional arrangements:

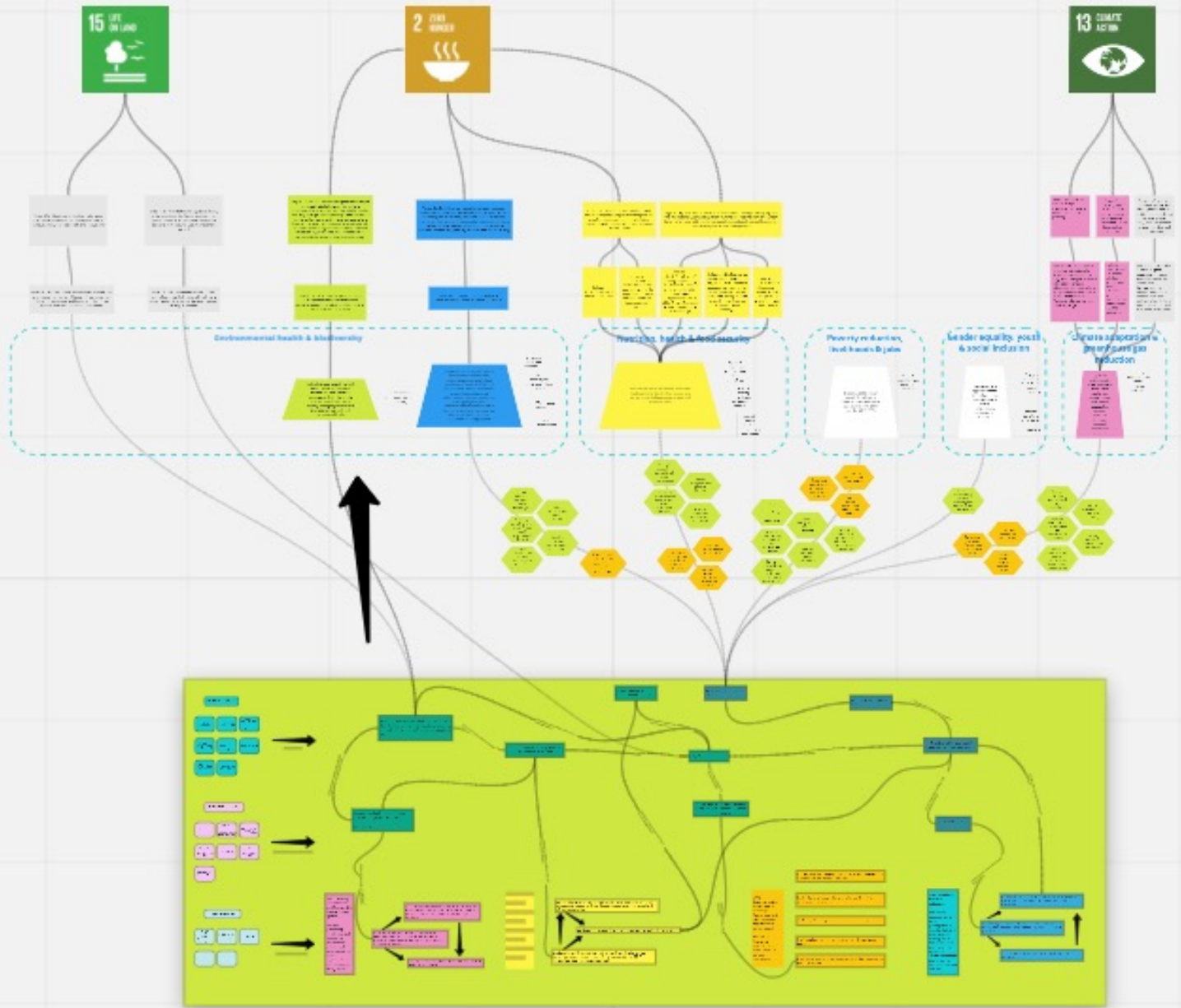
Tangible products, technologies, services and institutional arrangements

- A strategy for CGIAR Initiatives to maximize availability of genetic resources and genomic information including harmonized CGIAR policies, policy instruments and best practices for operating under existing international legal agreements, and proposals for improving international policy support from the Plant Treaty and CBD.
- A one-stop, centralized service/ helpdesk providing information, resources, one-on-one feedback for OneCGIAR scientists to ensure compliance with Centers' Article 15 Agreements under the Plant Treaty, national access and benefit-sharing laws, phytosanitary regulations, and applicable CGIAR policies
- Dashboard on germplasm distribution to track the international exchange of plant genetic resources and monitor the demand for germplasm by different types of users in partner countries, including outreach and donor engagement

Who are the users/partners?

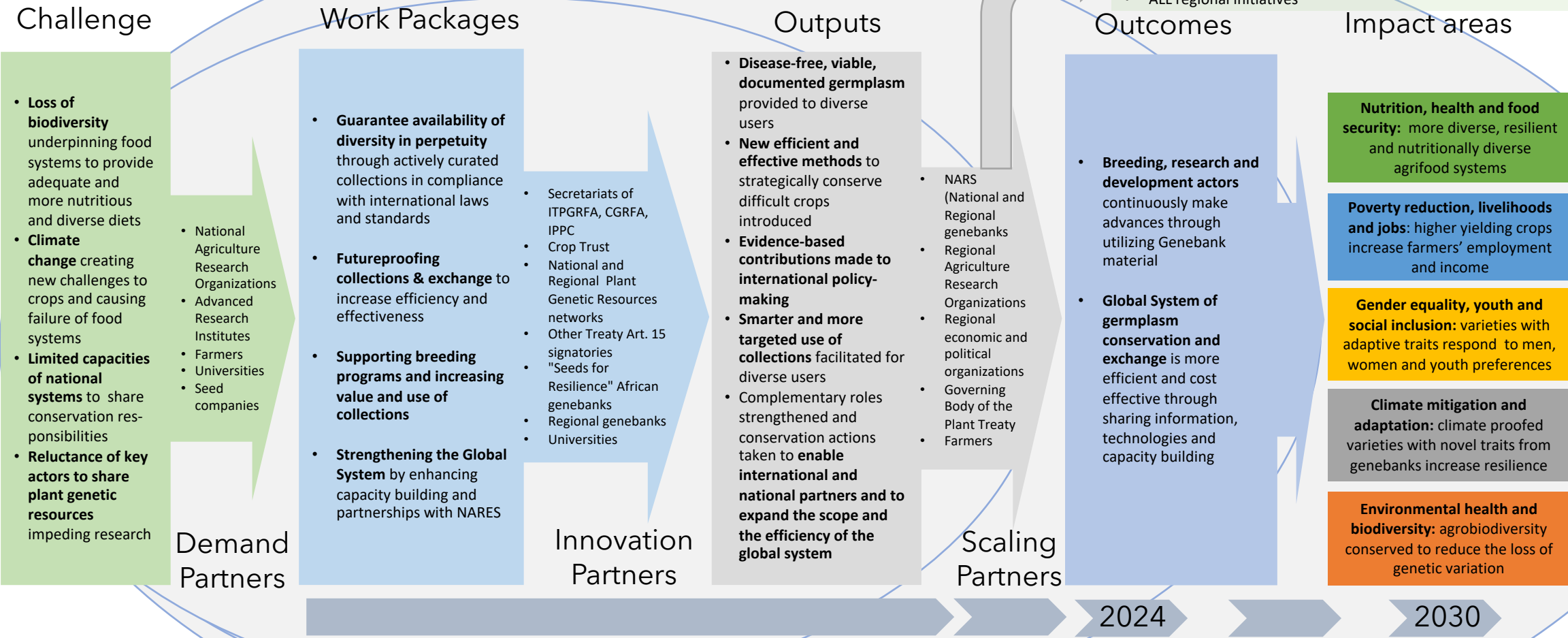
- National and regional Agriculture Research Organizations
- NARS (National and Regional genebanks)
- Advanced Research Institutes
- Universities
- Seed companies
- Secretariats of ITPGRFA, CGRFA, IPPC
- Crop Trust
- National and Regional Plant Genetic Resources networks
- Other Treaty Art. 15 signatories
- Regional economic and political organizations
- Governing Body of the Plant Treaty
- Farmers





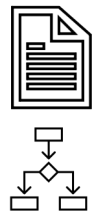
Theory of change - Genebanks

- CGIAR Initiatives:
- Accelerated Breeding: Meeting Farmers needs with Nutritious, Climate-Resilient Crops
 - Accelerating crop improvement through precision genetic technologies
 - Market Intelligence for More Equitable and Impactful Genetic Innovation
 - ASPIRE - agri-silvo-pastoral food systems resilience
 - SeEdQUAL: delivering genetic gains in farmers' fields
 - Plant Health and rapid response to protect Food and Livelihood Security
 - ALL regional initiatives



contributing to

SUSTAINABLE DEVELOPMENT GOALS



[Participatory process](#)

[Extended ToC](#)

sphere of influence

sphere of interest

Thank you and stay safe