

Theory of Change for Germplasm Development, Agrobiodiversity, and Seed Systems

The Diagnosis

Existing breeding programs often:

- Focus on on-station yield, which is not representative of smallholder farm conditions.
- Work with a narrow genetic base; insufficient creation of new, useful genetic variation to enhance gains from selection.
- Have insufficient analysis of and accounting for farmer knowledge and preferences.
- Lack access to modern breeding tools, especially those for underutilized crops.
- Are siloed by crops instead of focused on systems and landscapes.

Lack of context specific varietal choices with AEI and gender specific breeding and production priorities.

Formal and informal seed systems co-exist.

Non-existent or inappropriate rules for variety release.

Farmers have a crucial role in improving seed varieties and enhancing agricultural biodiversity, a role they have played throughout the history of agriculture.

In-situ varietal management is essential for responding to emerging contexts and needs.

CCRP Response

Breeding program

- Characterize agrobiodiversity
- Develop multi-environment trial methodologies and protocols
- Support modern breeding tools

Breeding criteria

- Capacity strengthening in PPB approaches
- Systems oriented breeding
- Nutrition informed breeding

Seed Systems

- Understand and strengthen farmer seed + information networks
- Include smallholder farmers in discussion of local seed policy
- Support farmers to conserve varietal and species diversity
- Varietal testing and seed production capacity building for farmers
- Promote seed policies that encourage cultivars for specific niches
- Share information on varieties and seed quality
- Support in-situ conservation

Pathways to Change

Availability of characterized diversity for target crops and environments from existing inter/national collections; choice of parents to combine specific traits.

Achieve detectable, heritable variation for traits of interest among progeny generated.

Informed decision-making regarding selection environment (direct vs. indirect).

Suit of crop and non-crop plants developed together to maintain optimum landscape functioning.

Stakeholder (especially vulnerable and poor) participation in priority setting

Understanding local preferences and knowledge

Multi-functional varieties: inter-cropping, nutrient-efficient, weed suppressing, nutritious, taste, culinary

Farmer managed seed production and dissemination

More appropriate variety testing and release systems that test varieties under targeted conditions

Dynamic gene pools that can adapt to a changing climate.

Farmer access to high quality, diverse seed

Leverage and create networks to circulate high quality seeds

Contextualized Outcomes that provide evidence for potential at scale

Optimally designed breeding program based on locations, years, replications, and budget

More relevant varieties

More diverse options for various contexts available to farmers

More resilient and productive farming systems

Farmers are not limited in their ability to access, exchange and improve quality seed.