

The McKnight Foundation Collaborative Crop Research Program

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COLLABORATIVE
CROP RESEARCH
PROGRAM

McKNIGHT FOUNDATION



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Previously:



The Collaborative Crop Research Program (CCRP)

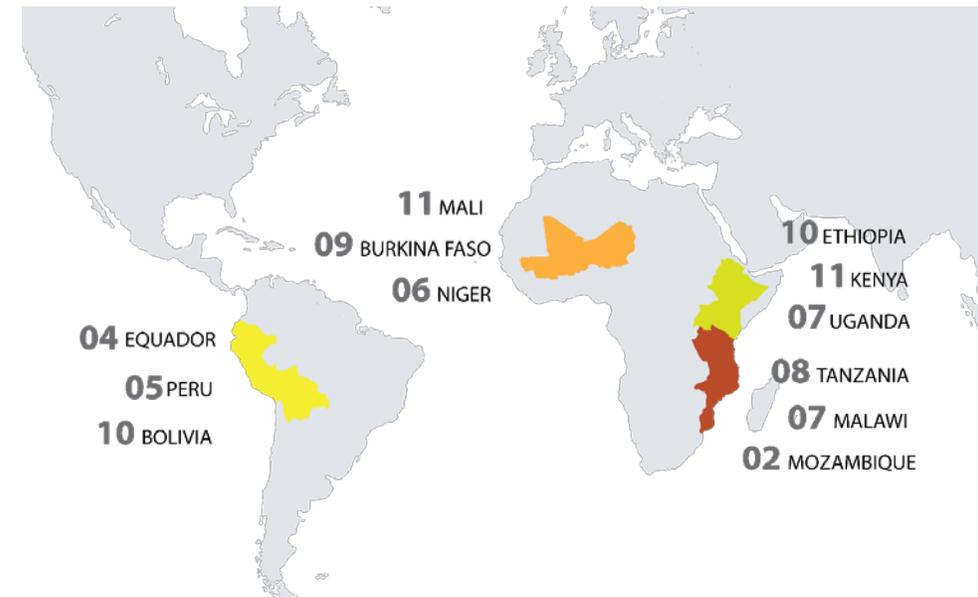
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- **Vision:** CCRP seeks to contribute to a world where all have access to nutritious food that is sustainably produced by local people.
- **Mission:** We do this through collaborative agro-ecological systems research and knowledge-sharing that strengthen the capacities of smallholder farmers, research institutions and development organizations.

- Presently: 4 Communities of Practice (CoPs), 12 countries
- West Africa CoP since 2006 on sorghum- & pearl millet-based systems in Niger, Burkina Faso and Mali

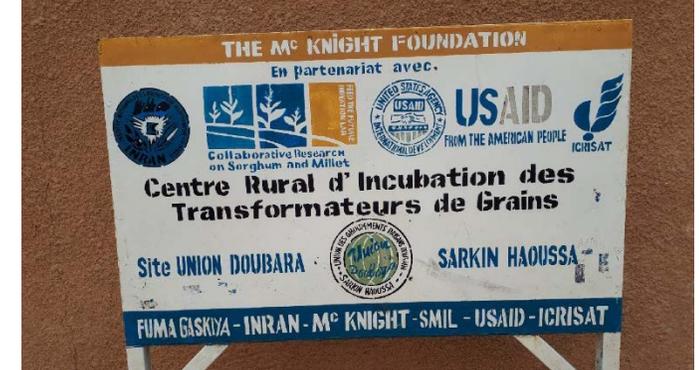
Target countries & N of CCRP projects:



Previous and current activities within CCRP involving pearl millet

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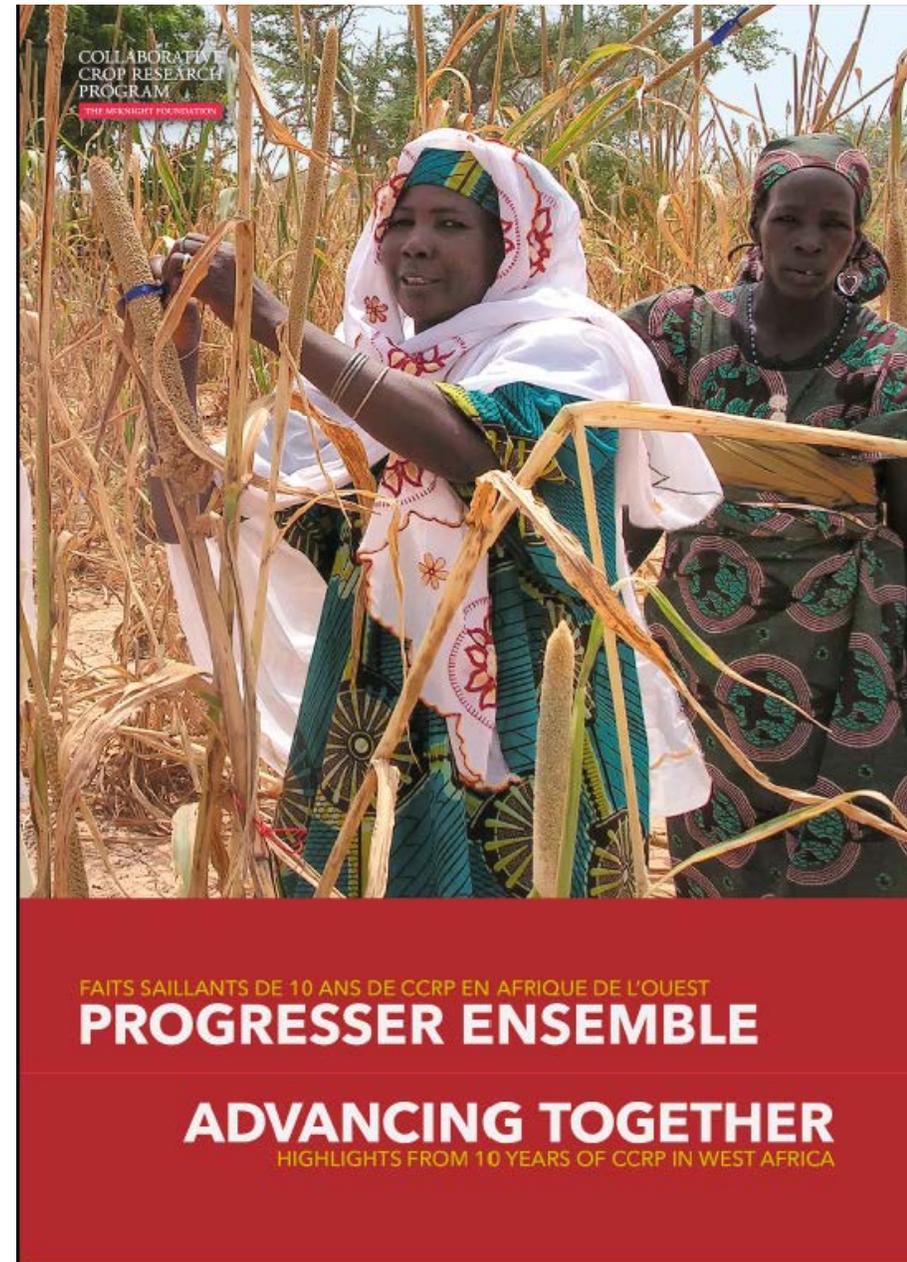
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- **Participatory pearl millet breeding** in Niger and Mali (2006-2014)
- Strengthening **farmer-managed seed cooperatives** in Niger, Burkina Faso, Mali (since 2006)
- **Biological pearl millet head miner control** in Niger, Burkina Faso and Mali (2006-2018)/ Integrated pest management in the Sahel (starting)
- **Cereal-legume processing** by urban & rural women (since 2009)
- **Agro-ecological intensification** of pearl millet-based systems (since 2012)
- **Farmer Research Network approach** (Nelson et al. 2016, Hausmann & Aminou 2016) to increase research relevance via large-scale farmer participation in research and linkage between local and global knowledge (since 2015)
- Improving **child nutrition** with fortified millet flour (since 2016)

Key Achievements/Outputs

- **Striga-resistant pearl millet genepool** (Kountche et al. 2013), four derived varieties for Niger
- **Three PPB-derived pearl millet cultivars** for Niger
- **Regular variety testing, seed production & marketing** by farmer-managed seed cooperatives in Niger, Burkina Faso and Mali
- **Effective biological headminer control option available and disseminated** by community-based private units
- **Rural transformation centers** in Niger and Burkina Faso, transforming pearl millet into easy-to-cook or fortified products (income generation for women, empowerment, impact on nutrition)
- **Initial methodology for large-N farmer-managed field trials** established with farmer federation FUMA Gaskiya in Niger
- **Principles** defined to guide CCRP work



Activities & outputs from the work at Hohenheim University & ICRISAT with INRAN, INERA, IER, ISRA, and LCRI

- **Breeding strategies for adaptation to climate variability** (Hausmann et al. 2012)
- **Characterization of West & Central African pearl millet landrace accessions** (Pucher et al. 2015; Sattler et al. 2017)
- **Potential for biofortification breeding in West African pearl millets** (Pucher et al. 2014)
- **Strategy for enhancing pearl millet adaptation to low soil phosphorus conditions** (Gemenet et al. 2016, 2015, 2015a, 2015b, 2014)
- **Combining ability patterns and potential for hybrid breeding in West African pearl millets** (Pucher et al. 2016; Sattler et al., submitted)
- **Mapping of a fertility restoration (Rf) gene in A4 cytoplasm** (Pucher et al. 2018)

Future goals

- **Short term (<2 years):**

- Refining the Farmer Research Network idea as research approach
- Recognition of Farmers as partners in R4D (and not as passive “beneficiaries”)
- Leadership training for pearl millet scientists and farmers (ongoing)

- **Long term (>3 years):**

- **Higher pearl millet yield level and stability via agro-ecological intensification** (pearl millet-legume-tree-livestock integration) and adapted population and hybrid varieties
- **Integrated pest management** in the Sahel (Stemborer, Fall army worm)
- **Enhanced smallholder farmers access to improved quality seed** via sustainable farmer-managed seed cooperatives
- Transforming Rural Communities in West Africa through **Grain Processing, Market-led Nutrition and Social Innovation**

Constraints

- **Key constraints in achieving future goals**
 - **High human population growth and malnutrition** in West Africa
 - **High Inter-annual rainfall variability** and increasing frequency of extreme rains
 - Partially **poor crop and soil management** practices
 - **Lack of real “game changers”** and clear trajectories out of poverty for pearl millet farmers
- **Specific priorities that might address these constraints**
 - **Agro-ecological intensification** including IPM
 - Investigate role of **mechanization of selected pearl millet production steps?**
 - **Systems-oriented and nutrition-informed breeding**
 - **Sustainable pearl millet hybrid breeding** based on heterotic groups
 - **More holistic approaches?**

Partnership/Acknowledgements

- **McKnight Foundation CCRP**
- **German Ministry for Economic Cooperation and Development (BMZ)**
- **B&M Gates Foundation**
- **Global trust**
- **Harvest Plus CP**
- **SMIL**

- **CCRP West Africa CoP**
- **ICRISAT, INRAN, INERA, IER, ISRA, LCRI, FUMA Gaskiya, Mooriben, Cornell University, Hohenheim University**
- **PhD students: Dorcus Gemenet, Anna Pucher, Felix Sattler**

Publications from collaborative research at ICRISAT and Hohenheim

(pdfs available with Bettina)

- Gemenet et al. 2014. Pearl millet inbred and testcross performance under low phosphorus in West Africa. *Crop Sci.* 54: 2574-2585. doi:10.2135/cropsci2014.04.0277
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- Nelson, Ret al. 2016. Farmer research networks as a strategy for matching diverse options and contexts in smallholder agriculture. *Experimental Agriculture*, doi:10.1017/S001447971600045 (open access)
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- Pucher et al. 2015. Diversity and agro-morphological characterization of West and Central African pearl millet accessions. *Crop Science*, 55: 737–748. doi: 10.2135/cropsci2014.06.0450
- Pucher et al. 2016. Combining ability patterns among West African pearl millet landraces and prospects for pearl millet hybrid breeding, *Field Crops Research* 195: 9-20, Doi: 10.1016/j.fcr.2016.04.035
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