The McKnight Foundation
Collaborative Crop Research Program

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The Collaborative Crop Research Program (CCRP)

• **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

http://www.ccrp.org/
Previous and current activities within CCRP involving pearl millet

- **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, Haussmann & 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

39 Highlights; http://tinyurl.com/ccrp-westafrica
Activities & outputs from the work at Hohenheim University & ICRISAT with INRAN, INERA, IER, ISRA, and LCRI

- Breeding strategies for adaptation to climate variability (Haussmann 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?
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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)


