Africa RISING in Ethiopia
Creating Sustainable Systems for Agriculture

Outcomes

Technologies validated: 17
Farmers worked with to validate technologies: 2,000
Long-term trainings: 8 PhD’s & 25 MScs
Number of development partnerships: 20

Research-in-development scope

1. Cropping systems
   - Varieties
   - Cropping systems management
2. Livestock systems
   - Feeding
   - Feed processing/formulation
3. Natural resource management (NRM)
   - Soil & water conservation
   - Water lifting, harvesting and delivery
4. Human condition
   - Nutrition
   - Gender equity
5. Mechanization
   - Post-harvest handling
   - Field preparation

*Appropriate technologies are integrated within and across the components above.

Multiple sustainable intensification domains in an enabling policy environment result in long-term equity and viability

Africa RISING’s theory of change

Demand-driven research identifies, adapts, validates and deploys sustainable intensification innovations
Better efficiency increases production
So rural households get more from the same amount of land – without compromising the needs of future generations to enhanced livelihood outcomes
Providing a range of options increases system sustainability
And improved income flow means better household nutrition and increased human capacity, leading to enhanced livelihood outcomes
Cropping systems

- Varieties
  - Cereal evaluation for bread wheat, durum wheat, food barley, and malt barley. A total of 113 varieties were validated and promised ones selected by farmers through participatory varietal selection (PVS). Each of the improved varieties (for each crop) selected by farmers yields at least double the national average grain yield.
  - Pulse variety evaluation including faba bean, field pea, lentil, and chickpea. A total of 45 varieties were evaluated and promising ones selected by farmers through participatory varietal selection (PVS). Each of the improved varieties (for each crop) selected by farmers yields at least double the national average grain yield.
  - Variety evaluation for potato. Over 30 potato varieties were evaluated, and improved varieties selected by farmers gave yield 3-7 times higher than the local varieties (25-65 t/ha vs 8-10 t/ha) under good agricultural practices. They are also early maturing (60 vs 120 days) and are tolerant to late blight.
  - High value fruit trees. 6 varieties of improved avocado (Persea americana) and improved apple (Malus domestica Borkh) varieties have been introduced to Africa RISING sites.

- Cropping systems management
  - The project identified soil-specific best fertilizer blends and rates for wheat in eight research kebeles. New recommendations boost yields 2-3 times, even in previously “non-responsive” soils. A decision support tool for appropriate fertilizer recommendations to support fertilizer blending plants and regional governments has been produced.
  - Supplementary forage from rain-fed/irrigated oat–vetch mixture to dairy cows has a potential to give 1.5-2 energy/kg DM. Supplementation of 1-2 kg DM oat-vetch mixture to dairy cows is also shown to improve milk yield and milk fat content. Oat forage is intercropped with faba bean, it is possible to obtain about 2.6 tons of good quality forage DM/ha (10%) without significantly affecting the grain yield of the faba bean. Economic analysis of this practice also showed that intercropping significantly improves whole plot productivity.
  - Intercropping forage with faba bean: Intercropping improved forage with food crops like faba bean showed that farmers can harvest quality forage from their crop fields during critical feed shortage times while maintaining the balance between grain and fodder. In the Africa RISING sites, field trials showed that when oat forage is intercropped with faba bean, it is possible to obtain about 2.6 tons of good quality forage DM/ha (10%) without significantly affecting the grain yield of the faba bean. Economic analysis of this practice also showed that intercropping significantly improves whole plot productivity.

Livestock systems

- Feeding
  - Intercropping forage with faba bean: Intercropping improved forage with food crops like faba bean showed that farmers can harvest quality forage from their crop fields during critical feed shortage times while maintaining the balance between grain and fodder. In the Africa RISING sites, field trials showed that when oat forage is intercropped with faba bean, it is possible to obtain about 2.6 tons of good quality forage DM/ha (10%) without significantly affecting the grain yield of the faba bean. Economic analysis of this practice also showed that intercropping significantly improves whole plot productivity.
  - Supplementary forage from rain-fed/irrigated oat-vetch mixtures: The intercropped fodder yielded 11–19 tons/ha dry matter (DM) under rain-fed conditions, with 13% crude protein (CP) and 9.5 megajoules of metabolizable energy/kg DM. Supplementation of 1-2 kg DM oat-vetch mixture to dairy cows has a potential to give 1.5-2 liters of extra milk to farmers.

- Feed processing/formulation
  - Africa RISING has worked with farmers to develop rations for mixing crop residues with oat-vetch mixtures and lucerne leaves to improve the utilization of available feed resources and increase livestock productivity based on nutritional composition of feeds.

Natural resource management (NRM)

- Soil & water conservation
  - Hydrological stations were established at landscapes treated with and without soils and water conservation measures. These areas are managed with integrated SWC practices that have reduced soil loss by over 80%. At plot level, management practices implemented on cultivated fields reduced soil loss by 87% compared to non-treated plots.
  - Water lifting, harvesting and delivery
    - Improved water lifting technologies enhanced farmers ability to irrigate high value crops and improve household nutrition. Irrigated fodder biomass increased dry weight by 14% when farmers were guided in their irrigation practice by wetting front detectors.

Human condition

- Nutrition
  - Results from an Africa RISING survey of 240 mothers with children under five revealed that malnutrition is a significant problem in Africa RISING intervention households with rates of stunting, underweight and wasting at 37%, 12% and 6% respectively in Basona, Worena and Sinana districts.
  - Gender equity
    - Africa RISING gender studies in Ethiopia have shown that: there is a relative equitable land distribution, equity is yet to be achieved in decision-making and asset control, women have limited access to resources for soil fertility management. In the Africa RISING sites, field trials showed that, there is relative equitable land distribution, equity is yet to be achieved in decision-making and asset control, women have limited access to resources for soil fertility management. In the Africa RISING sites, field trials showed that, in the face of climate change.

Mechanization

- Postharvest handling
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  - The project has worked with farmers to develop improved feed troughs and storage structures which reduce feed wastage during utilization and storage by about 30–50%.
  - Dynasty light stores (DLS) introduced by Africa RISING increased the capacity of farmers to store potato by 240 tons thereby reducing postharvest losses greatly thereby allowing farmers to earn income by selling as seed or use the material themselves.

- Field preparation
  - Multipurpose two-wheel drive tractors (2 WT) that can be used for wheat and maize planting, wheat harvesting, maize shelling, wheat threshing, water pumping, and as trailers have also been introduced to farmers. The 2 WT shellers reduce shelling costs by up to 50% and is able to process three tons of maize grain per hour. Introduction of the 2 WT has seen some farmers transform into 2 WT service providers within their communities. This offers promising adaptation strategies and resilience options in the face of climate change.