Africa RISING in Tanzania

Creating Sustainable Systems for Agriculture

Country brief - March 2019

Outcomes

Technologies validated	53
Farmers worked with to validate technologies	8466
Long-term trainings	4 PhD's & 11 MScs
Number of development partnerships	52

Research-in-development scope

1. **Cropping systems**
   - Varieties
   - Cropping systems management
2. **Livestock systems**
   - Feeding
   - Housing
3. **Natural resource management [NRM]**
   - Soil & water management
   - Fertilizers
4. **Human condition**
   - Nutrition
5. **Mechanization**
   - Post-harvest handling
   - Geospatial models

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

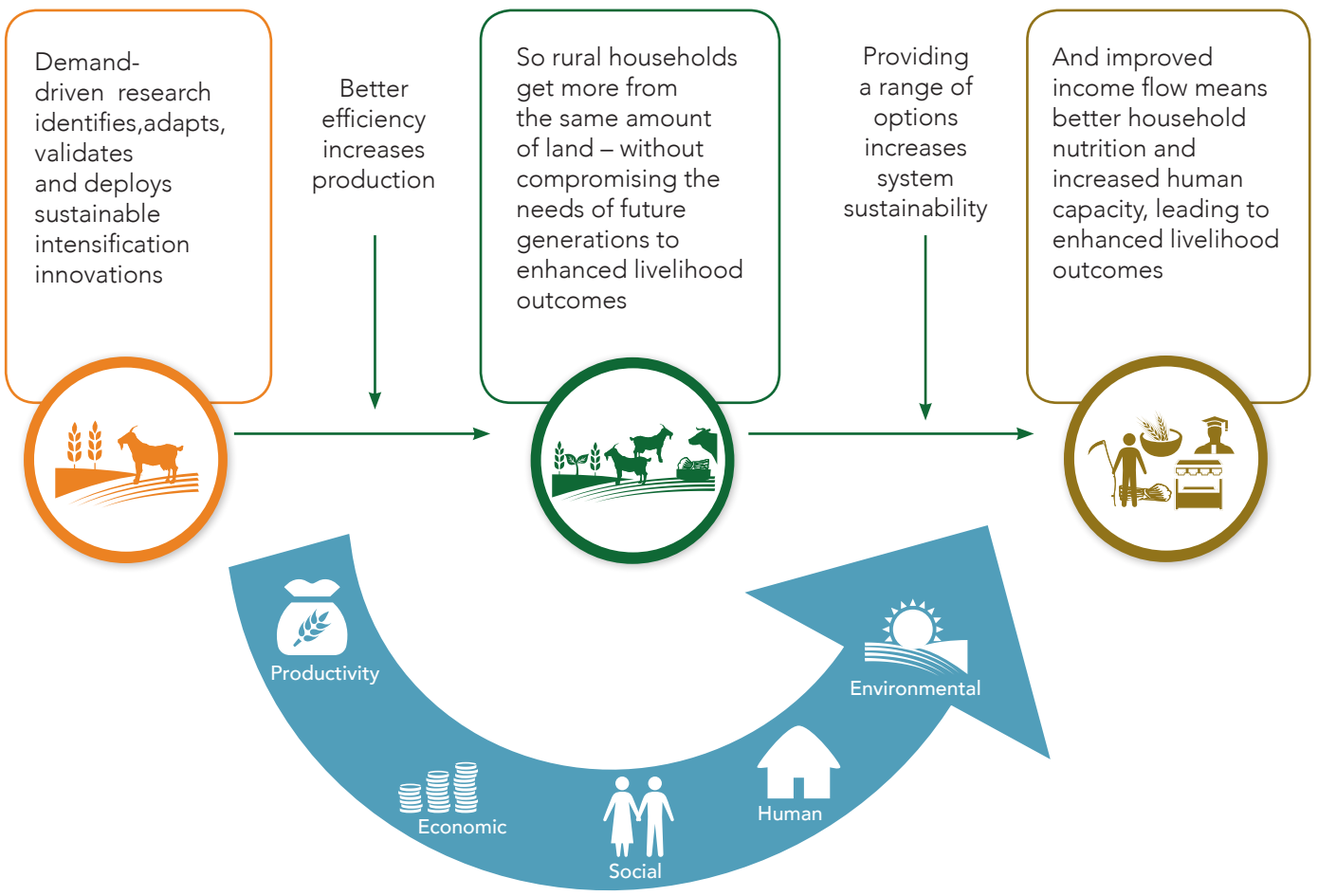
Technology delivery

Sustainable intensification domains
- Productivity
- Environment
- Economic
- Human condition
- Social

Collaboration
- CGIAR centers
- NARS
- Farmers
- Private sector
- Universities
- Extension services
- Government agencies

Capacity building
- Short term training
- Post-graduate training [MSc, PhD]
- Exchange visits
- Farmer field days

Africa RISING's theory of change



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

1 Cropping systems

➢ Varieties

o A stress-resilient and early-maturing groundnut variety - Nalinje 2015 that has a yield advantage of 63.8% and a gross margin benefit of 51% compared to landraces was released and can now be accessed by farmers. Three other varieties (Kongwa 724, Kongwa 560, and Kongwa 319) which have a yield advantage of 64 - 120% over the most common commercial variety (Mnanje) have also been proposed for commercialization.

o Sorghum varieties Gambella 1107, IESV 23010 DL, and IESV 92028 DL with average grain yield advantage ranging from 304 – 561 kg/ha over commercial variety controls have been proposed for commercialization.

o Three highly nutritive and drought-tolerant quality protein maize varieties that offer a grain yield advantage of 20-40% under random drought conditions over the local varieties have been recommended for release.

o Of the 80 hybrids evaluated for tolerance to Maize Lethal Necrosis (MLN), 8 hybrids had over a 100% yield advantage under natural MLN conditions compared to commercially farmer-favored hybrid checks.

o Through Community Seed Banks (CSBs), 3532 farmers have been reached with improved seed for newly released varieties of pigeonpea, pearl millet, and sorghum.

➢ Cropping systems management

o Good agricultural practices (GAP) in vegetables ensured farmers had a yield advantage of 128%, a gross margin advantage of 131%, and a 75% reduction in pesticide use.

o Maize–gliricidia–pigeon pea intercropping improved grain yield by 33–50% and gross margins were 4 times higher than maize monoculture.

o Planting groundnut rosette disease varieties (GRD) hedged by aphid and GRD tolerant varieties helped farmers in reducing disease pressure by up to 30%.

2 Livestock systems

➢ Feeding

o A vegetable leaf-based chicken feed ration validated with farmers increased survival rate of chicks by 12.5%, growth rate by 47%, egg production intensity by 26.7%. Feed costs were also reduced by 50% and the profit margin was 3 times higher when compared to free-range chickens.

o Introduction of improved Napier grass varieties (ILRI -16835 and Kakamega 2) increased biomass yields by 33–80% and feed quality (crude protein) by 43–45%.

o A crop residue-based feed ration validated with farmers increased milk production by 2–3 liters per day.

➢ Housing

o Improved housing structure prototypes for chickens validated with farmers increased the survival rate of chicks by 3.5%.

3 Natural resource management (NRM)

➢ Soil & water management

o In situ rainwater harvesting methods like ripping and tied ridges, helps farmers in semi-arid areas to reduce runoff by more than 11%, get better their yield by 86 - 160% and as a result have higher gross margins between 14–21 times higher than conventional tillage.

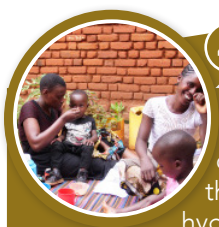
o Planting fodder grass and legume fodder like Napier, Desmodium or Lablab on contours in an 1100 mm rainfall ecology reduced soil erosion on farmer's fields by between 20 – 60%, increased maize yields by 15 – 25%, and increased moisture storage by between 31 – 58%.

o Introducing Napier, Napier + Desmodium, and Napier + Lablab on contours in maize fields in a 1100 mm rainfall ecology increased maize yield by 15, 22, and 25%, respectively; reduced erosion by 25, 45, and 60%, respectively; increased moisture storage by 31, 57, and 58%, respectively; and resulted in net income increases of 10, 15, and 30%, respectively.

➢ Fertilizers

o Farmers who were mineral fertilizer skeptics, have had a change of heart after results showed that that correct application guaranteed a maize grain yield increase ranging from 22 – 444% (depending on agro-ecology) and better gross margins of between 102 – 1435 USD/ha.

o Correct application of farmyard manure by farmers resulted in a maize grain yield increase of between 46 - 65% with gross margins ranging from 12 - 388 USD/ha. Combining manure (3 t) and P (10 kg/ha) as Minjingu Mazao increased maize grain yield by 123–283% in the highlands, 33–181% in the mid-altitudes, and 24–199% in the lowlands of northern Tanzania.



4 Human condition

➢ Nutrition

o Introduction of an integrated nutrition package that addresses health (breast feeding, personal hygiene, food safety) and nutrition practices (food groups, food preparation) led to a 75% decline in diarrhea in children by day 21 of the regime, reduced their exposure to aflatoxin by 82%, completely eliminated wasting, and increased dietary diversity by 150%.

o Traditional vegetable recipes introduced to communities resulted in a 119% increase in per capita vegetable consumption and a 60% increase in vegetable consumption diversity.

5 Mechanization

➢ Postharvest handling

o By using diesel-driven and mechanical maize shellers, farmers shell 690 kg per hour compared to 69 kg per hour through manual shelling techniques.

o Use of Grainpro™ collapsible dryer envelopes by farmers cut grain losses by about 32 kg/ton, reduced quantity of impurities and moldy grain by 30% and 42% respectively, reduced grain damage by 44% and cut downthe drying period for grain by 28%.

o Hermetic storage using PICs bags reduced grain loss by more than 85%.

➢ Geospatial models

o Application of 2 geospatial models - Impact based Spatial Targeting Index (IBSTI) and the Extrapolation Suitability Index (ESI), helped the project team in identifying areas with high potential impact for scaling out specific technology options and to visualize potential risks associated with scaling-out beyond the environmental conditions encountered in the trial sites.

CGIAR

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The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative. Through action research and development partnerships, Africa RISING is creating opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.The three projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads an associated project on monitoring, evaluation and impact assessment.

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