Approaches and Interventions to Make SI Function in the Ethiopian Highlands: Africa RISING Experience

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Discussion points

1. Introduction

2. Focusses, targets and operational areas

3. Approaches

4. SI interventions

5. Achievements

5. Lessons

1. Background

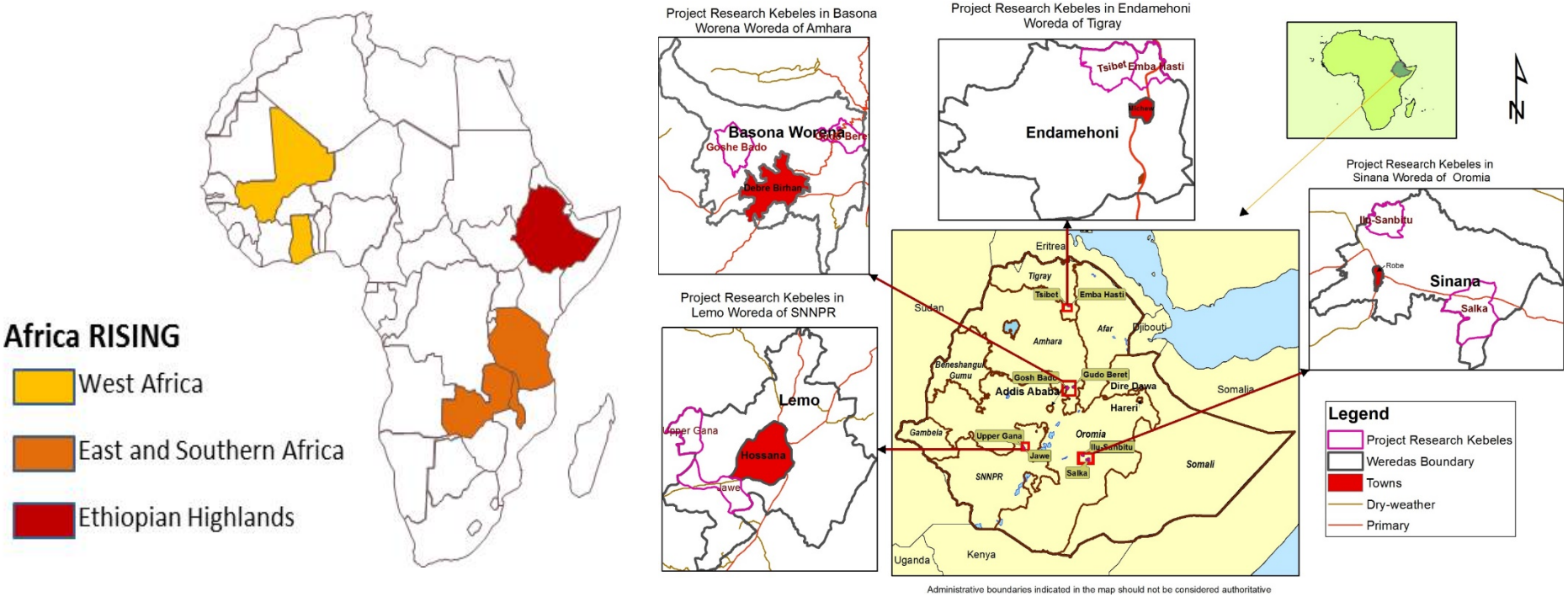
Africa RISING- Africa **R**esearch **I**n **S**ustainable **I**ntensification for the **N**ext **G**eneration

- One Program - four Projects.
  - Mixed Cereal-Legume-Livestock systems in West Africa
  - Mixed Cereal-Legume-Livestock systems in East/Southern Africa
  - Crop-Livestock systems in the Ethiopian Highlands
  - M&E and data management
- Funded by USAID BFS through the FtF initiatives.
- Duration: 2012- Sept 2016 (Phase I) and Oct 2016-2021 (Phase II).

2. Focusses, targets and operational areas

- Focus on SI of mixed farming systems to contribute to:
  - climate smart development- food security
  - gender equitable development
  - improved nutrition
  - income diversification
  - human and institutional capacity development
- Conduct *multi-disciplinary action research* for development.
- Facilitate scaling through development partnership arrangements.
- Preliminary targets: 0.7 million direct beneficiary hhs with the potential to scale to a further 3.4 million hhs.

- The Africa RISING program operates in six countries in Africa (Ethiopia, Tanzania, Malawi, Zambia, Ghana and Mali).
- The project in Ethiopia operates in four regions (Amhara, Tigray, Oromia and SNNPR) in the highlands of Ethiopia.



Approaches

- Multiple tools and methods (> 10) *applied* to understand systems and key issues.
- Integrated and systems oriented thematic areas (7) *formed* based on priority issues.
- Crop-livestock-NRM interventions (17) *developed* to address priority issues.
- Action research approach *followed* to validate interventions together with CGIAR and local partners.
- Development partnership *created* to facilitate scaling of validated technologies.
- Multi-stakeholder platforms *used* at different levels to engage researchers, farmers, extension experts, decision makers, private service providers etc.
- Human and institutional capacities *developed* at various levels to enhance knowledge and skills of the project partners.

SI interventions

- Livestock feed and forage management and utilization practices
- Improved crop varieties and management practices- cereals, food legumes and oil crops
- High value horticultural crops (HVFTs)- fruits and vegetables
- Small-scale mechanizations – 2-WD tractor with water pump, trailer, thresher and other accessories
- Fertilizer blends
- Water lifting, delivery and application
- Landscape restoration/ SWC

a) Livestock feed and forage management and utilization practices

Oat-vetch mixture provides high biomass yields (12 t ha^{-1} of DM). It is a balanced diet in terms of protein and energy. Milk yield improvement as a result of supplementation: oat-vetch >50%

Stepwise intensification; comparing traditional and improved practices, screening competition tolerant varieties, intercropping selected **faba bean varieties with improved forage crops**. The intervention provides both grain for the hh and feed for the hh's

Sweet lupin: yields up to 3 t ha^{-1} of grain and 8 t ha^{-1} of haulm. Supplementation of 200 g of sweet lupine grain daily to fattening sheep results in a daily body weight gain of about 75 g.

Alfalfa: biomass yield of 20 t DM ha^{-1} can be obtained from 6 to 8 cuts under farmers' fields and management conditions.

Tree Lucerne: produce more than 7 t ha^{-1} of dry biomass $year^{-1}$. A 1 kg supplement of dried TL leaf feed to a lactating dairy cow can give up to 1.2 litres of extra milk

Brachiaria: produce 8.5 -10 t ha^{-1} DM. Propagated by seed, cuttings and root split.

Desho grass: produce 4-5.5 t ha^{-1} DM, harvesting can be done 3-4 times per year depending on the environment.

Fodder beet: high biomass yield= 20.2±5.26 t DM ha^{-1}. Milk yield improvement as a result of supplementation: up to

Feed trough and feed shed: reduce wastage (30-50 %), save 10-20% of labor time for feeding.


Feed
shed

b) Improved crop varieties and management practices

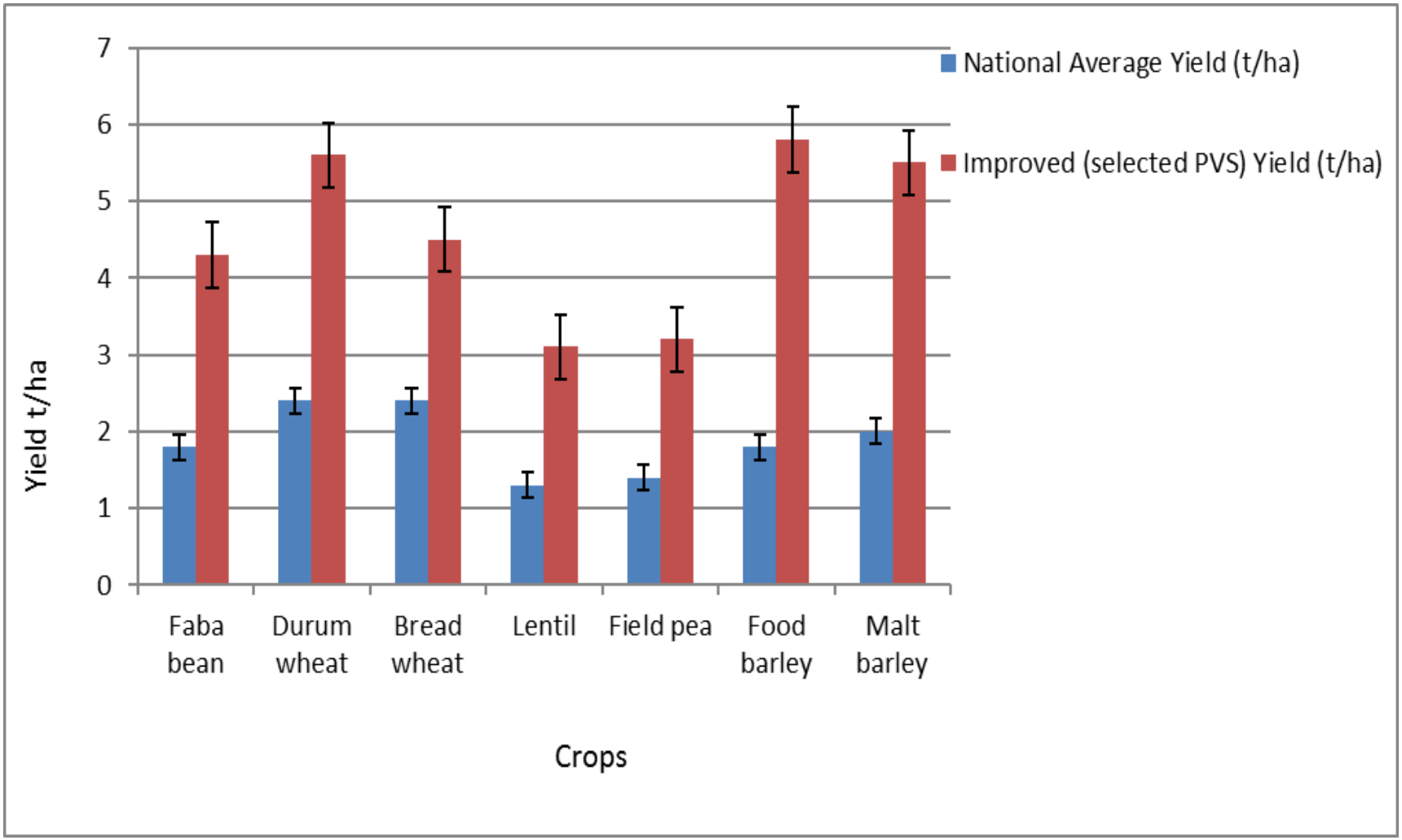


Figure 1. Mean productivity of farmer selected crop varieties across the four Africa RISING sites.

Improved varieties of potato: Belete, Gudane, Jalene and Gorebella yielded 3 to 7 times higher than local varieties (25-65 t ha^{-1} vs 8-10 t ha^{-1}) in the Ethiopian highlands.

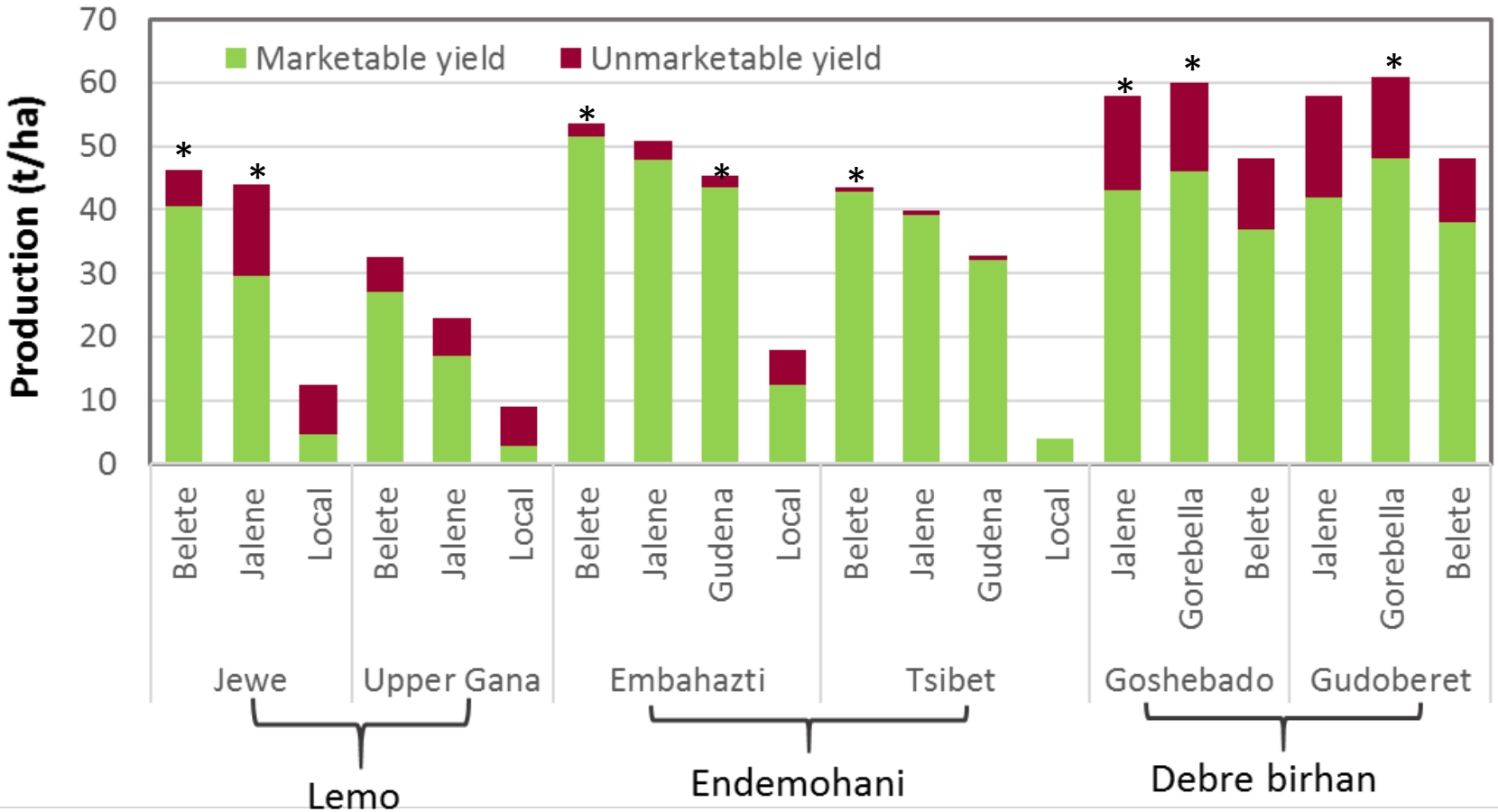


Figure 2. Yield effect of improved Potato Varieties in Africa RISING sites of the Ethiopian highlands.

PVS on faba bean. The same approach has been applied for other major cereal , oil and tuber crops.

Community seed multiplication of potato. The same approach has been applied for other major cereal, oil and pulse crops.

Improved wheat seed multiplication using cluster approach. The same approach has been applied for other major cereal, tuber and

- Enset is high value and food security crop for more than 20 million people in the south and central parts of Ethiopia.

- **Bacterial wilt tolerant Enset clones** multiplied for more production

c) High value fruit trees production and utilization

Improved avocado varieties:

- Set fruits within two years period
- Dwarf and easy for harvesting
- Fleshy and export quality
- Fruit yield per avocado tree ranges from 25 to 150 kg.

- Apple fruit trees play a potential role to moderate the effects of climate change.

Improved apple varieties: useful to improve nutrition and diversify incomes of smallholder farmers in the Ethiopian highlands.

d) Water harvesting, lifting and saving - ponds, rope and washer and solar pumps- Irrigation of high value crops: vegetables, fruit trees and irrigated fodder.

e) Small-scale mechanization

Service provision approach to generate income through services provision – land preparation, planting, shelling and threshing, water pumping for irrigating and transportation of

f) Land reclamation through biological and physical means at model watershed/landscape scale

Landscape management- evidence generation and tools

5. Achievements

Scaling:

- The project has managed to reach and benefit more than 206,535 hhs with its validated technologies. This equates to a land area of 92160 ha.
- Geographical and administrative coverage of the project has increased from four to 31 woredas (districts) and four to nine zones.

Capacity development:

- Attached more than 37 postgraduate students for their thesis and dissertation research in the last seven years.
- More than 19,959 partners have been enrolled in training and knowledge-sharing forums within three years.

Publications/ products:

- Produced 177 products in the last three years.

6. Lessons

- Farmers prefer to test one or two SI technologies at a time to assess workability and the benefits that they derive from them. This observation entails that intensification is stepwise.
- SI solutions (in terms of combinations of technologies) can be found, using the approaches taken by Africa RISING, that meet the needs of very different farmers' situations.
- Flexibility for modification and suitability to different agro-ecologies enhanced wider acceptability and adoption of SI technologies- e.g: feeding trough.
- Development partnership (DP) is crucial to speed up technology dissemination and reach and benefit many farmers. However, DPs become effective so long us there is commitment from projects to allocate some resources for capacity development activities (demonstration, trainings, starter seeds for those which are not accessible).

CGIAR Partners:

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

CIAT
International Center for Tropical Agriculture
Since 1967 / Science to cultivate change

ICRISAT
Science with a human face

CIMMYT

ICARDA
Science for Better Livelihoods in Dry Areas

IFPRI

World Agroforestry Centre

CENTRO INTERNACIONAL DE LA PAPA
CIP

IWMI
International Water Management Institute

Africa RISING Scaling Development Partners in the Different Sites/Regions (Phase II)- Examples

InterAide France

Send-a-Cow

Ethiopian Catholic Church

World Vision

REST-GRAD

Raya Brewery

Dashen Brewery

Habesha Brewery

Oromia Seed Enterprise (OSE)

Hundie
Saint Mary College
Michew ATEVT College

Wachemo University

Mekelle University

Madda Walabu University

Debre Birhan University

Hawassa University

Amhara Region Agricultural Research Institute (ARARI)

South Agricultural Research Institute (SARI)

Sunarma

Tigray Agricultural Research Institute (TARI)

SOS Sahel Ethiopia

Oromia Agricultural Research Institute (OARI)
Ethiopian Agricultural Transformation Agency (ATA)

Ethiopian Institute of Agricultural Research (EIAR)

Offices of Agriculture and Natural Resources:	**Endamekoni (Tigray)**	**Basona Worena (Amhara)**	**Lemo (SNNRP)**	**Sinana (Oromia)**
Innovation laboratories:	**SIIL**	**ILSSI**	**PHIL**	**LSIL**

Africa RISING communication tools

- Website: http://africa-rising.net/
- Documents and out puts : http://cgspace.cgiar.org/handle/10568/16498
- Presentation : http://www.slideshare.net/africa-rising
- Flickr: https://www.flickr.com/photos/africa-rising/sets
- Wiki space: http://africa-rising.wikispaces.com/events

Thank You

Africa Research in Sustainable Intensification for the Next Generation

africa-rising.net