Pulses in Systems: SIMLESA
Sustainable intensification of maize-legume systems for Food Security in eastern and southern Africa

A major farming systems project for Africa funded by ACIAR (2009-2018)

Bruce Pengelly

Presentation adapted from slides kindly made available by Dr Mulugetta Mekuria, CIMMYT, Harare
Where are the target countries?

Major maize growing agro-ecologies across 5 core countries:

• Ethiopia
• Kenya
• Tanzania
• Malawi
• Mozambique

Plus lean activities in 3 spillover countries

• Botswana
• Rwanda
• Uganda

Partners include the NARs and the CGIAR (CIMMYT, ILRI, CIAT)

QAAFI is the main Australian partner agency. Project is coordinated by CIMMYT.
Sustainable Intensification

**Sustainability**
- Conserve the natural resource base (Godfray et al., 2010; Pretty et al., 2011; Tilman et al., 2011)
- Ecologically and technically sound (e.g., soil quality degradation through erosion, fertility decline)
- Socially and Culturally acceptable (Do the technologies fit local farming systems?)
- Economically viable (Does it make economic sense?)

**Intensification**
- Increased yield or outputs per unit area/inputs (Enhance productivity)
- Diversification from maize for diet diversification and improved incomes
- Integration of crops & livestock
- Improved resilience to market shocks and climate risks
- Improved efficiency per unit input (e.g., water, labour, capital, inputs)

Improved food security and livelihoods

From M. Mekuria 2016
System integration: Diversification through Cereal (Maize)-Legume and livestock integration

- Increase soil fertility
- Improved nutrition
- Supply cash

**Cereal (Maize)**
- Increased productivity
  - Ensured food security
  - Income security

- Increase productivity
- Increase profitability
- Reduce down side risk

**Forage**
- Alternative of cattle feeding (residue management)
- Improved animal nutrition

**PULSES**
- Increase soil fertility
- Improved nutrition
- Supply cash

From M. Mekuria 2016
Integration across objectives
Crop-livestock integration
Greater focus on interactions among varieties and CA-based technologies: incl. intercropping, disease, drought and N-stress tolerance,
Farm scale studies

Scaling in final years is the major focus

Objective 4: Outscaling & Innovation Systems
30% yield risk reduction + 30% productivity increase among 650,000 farms by 2023

- 43 maize varieties across all countries selected and their accelerated
- 50 legume (pulse) varieties across all countries selected and availability accelerated:
  - Groundnuts
  - Beans
  - Cowpeas
  - Pigeon peas
  - Soybeans

Increased focus on sustainable intensification, integration and impact.

SIMLESA-2: 2014-2018

Adapted from M. Mekuria 2016
Role of QAAFI (Queensland Alliance of Agriculture and Food Innovation)

- Modeling of typologies of households to determine who might be able to adopt technologies, and lead change in practice
- Crop modeling especially implications of new farming systems practices and efficient use of nitrogen and water
- Provision of the key modelling tool (APSIM and derivatives such as APSFarm)
- QAAFI researchers based in Harare and Addis Ababa
Maximum impact through adoption of suites of technologies

Additional income from adoption of multiple Sustainable Intensification Practices (SIP) in Ethiopia [in USD/ha]

Note: V-Improved maize varieties; D-Crop diversification (legume-maize intercropping & rotation), T-Minimum tillage (zero/one pass).

Adapted from M. Mekuria 2016
Capacity building: to increase the efficiency of agricultural research today and in the future

Central to SIMLESA

1. Long term academic support of NARs young scientists
   • A total of 65 SIMLESA (42 MSc and 23 PhD) students were supported

2. Short term trainings were carried out mainly by CIMMYT, QAAFI, ARC and ASARECA –
   Seed systems, research management extension and scaling out and M&E

3. Farmer trainings e.g. field days, exchange visits, field tours, field visits

Adapted from M. Mekuria 2016
Thank You