

# Intensification of Maize-Legume Based Systems to Improve Farm Productivity and Conserve Natural Resources in Semiarid Tanzania

## Development Context

Rural and farming communities of the semiarid zones of central Tanzania are some of the poorest and most vulnerable communities to frequent crop failure and food insecurity. These agropastoral communities live in agroecologies characterized by:

- Low productivity of crops and livestock subsectors
- Fragile and poorly developed production-to-market systems
- High vulnerability of farming systems and communities to climate change and natural disasters
- High levels of poverty and malnutrition

## The Initiative

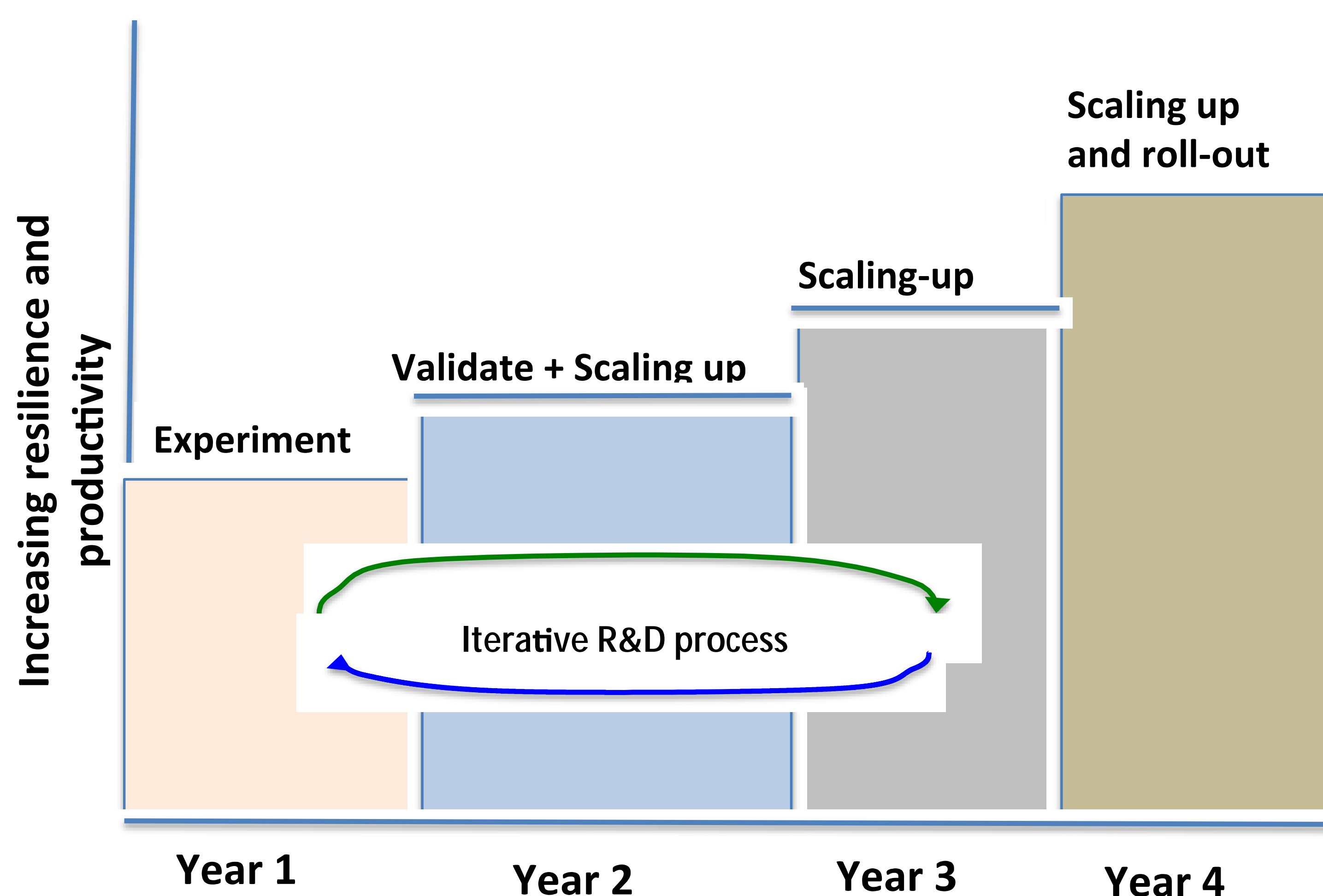
### Goal

To evaluate and scale up diverse options to increase production and productivity of major cereals and legumes within the agropastoral farming systems. Mutually reinforcing innovations supported by cross-cutting socio-institutional issues that influence technology adoption are being introduced to provide pathways out of hunger, poverty, and malnutrition to local communities.

### Objectives

1. Introduce and evaluate improved maize varieties against reaction to leaf lethal necrosis and adaptability for intercropping with grain and/or fodder legumes
2. Evaluate integrated soil fertility management (ISFM) options to improve crop yields and agroecosystems resilience
3. Improve nutrition, safety, and market competitiveness by addressing postharvest handling and utilization problems.

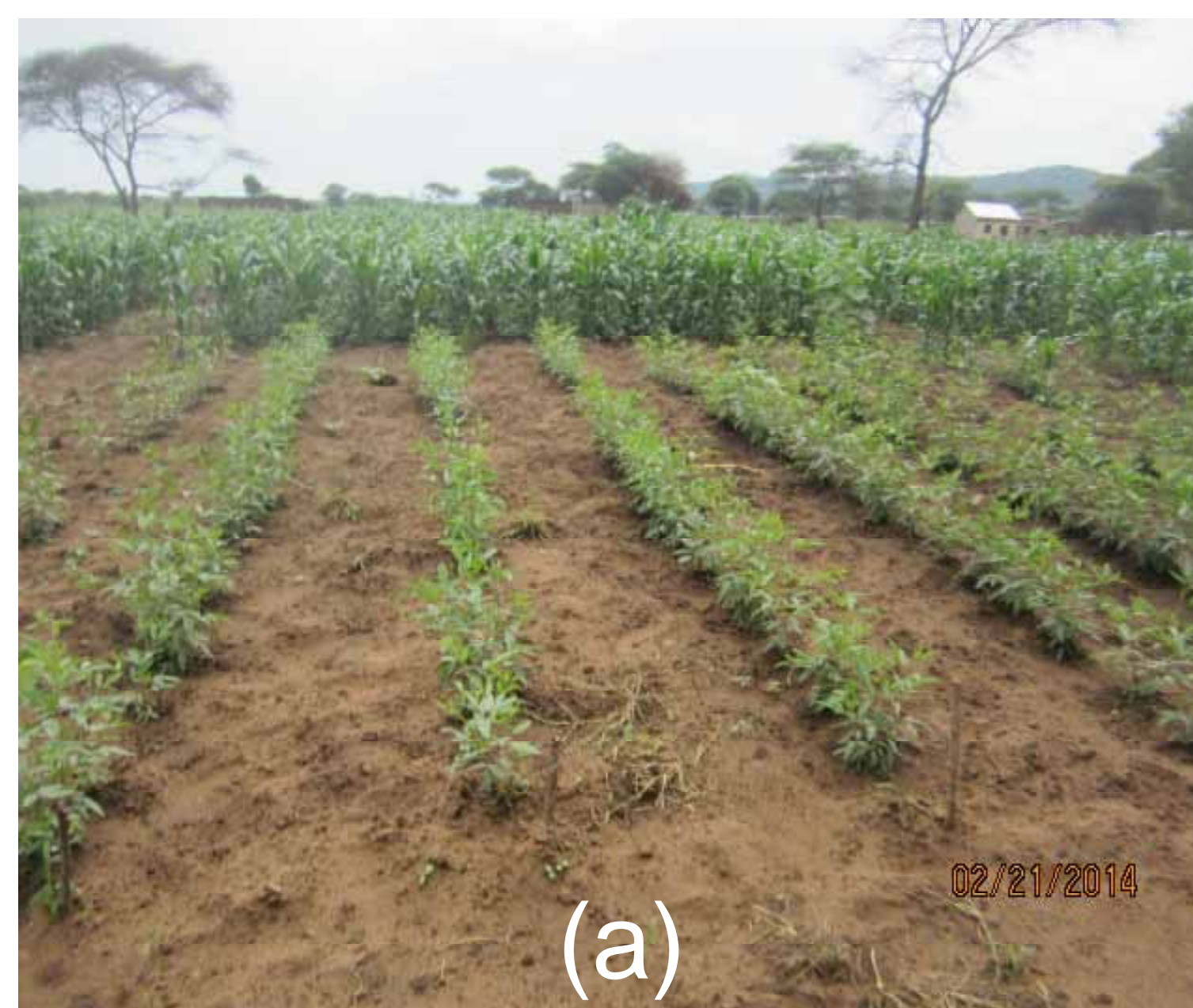
## Research Approach



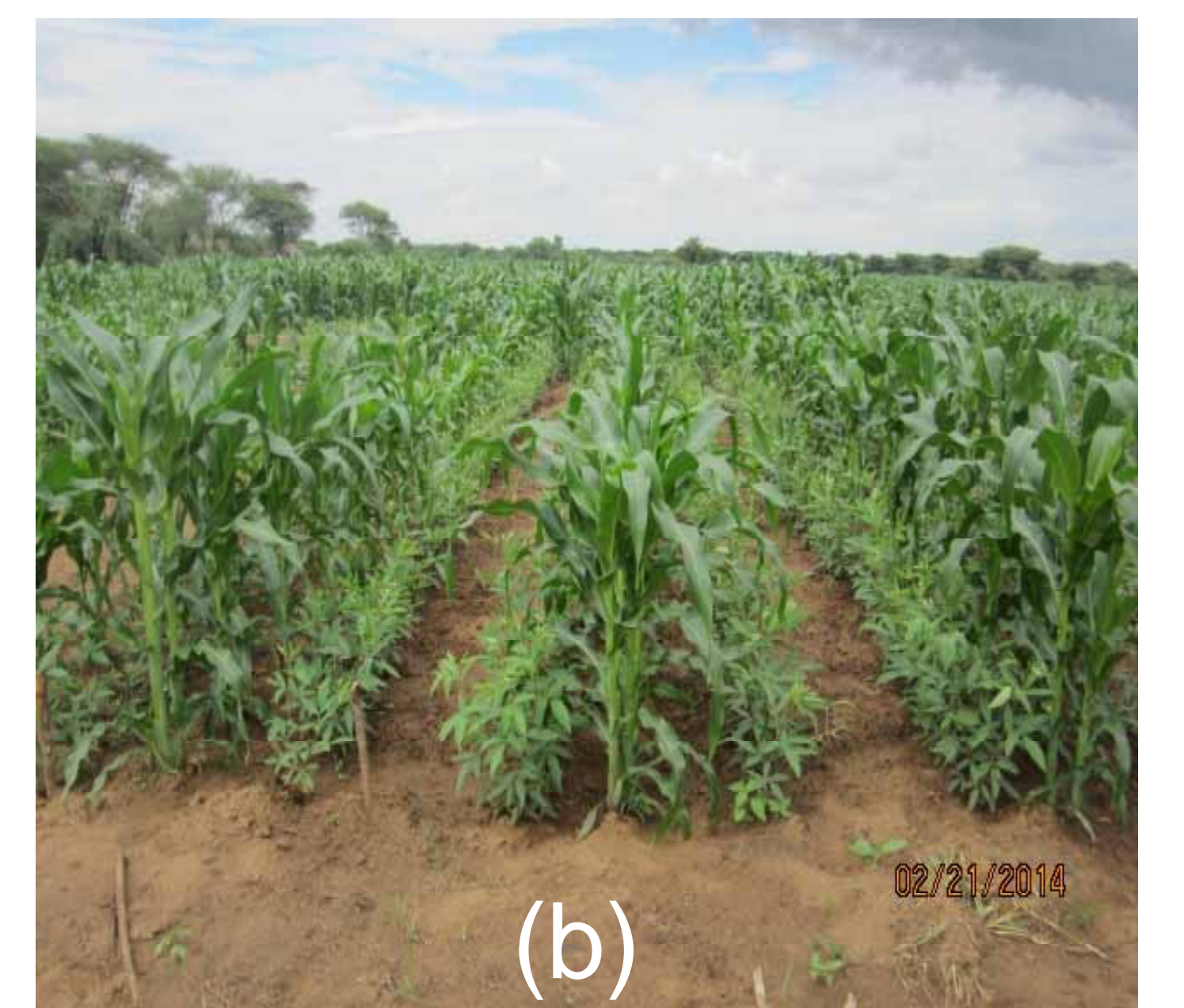
**Figure 1:** Stepwise approach towards sustainable intensification of farming systems from experimentation and validation of proven technologies, integration of lessons learned through the R&D process to scaling out technologies

## Technologies under Validation

1. New grain legume (groundnuts and pigeonpea) that close the current yield gap of (30%) have been identified and are being tested for intercropping purposes (Fig. 2a).
2. Multi-story and multi-purpose cropping systems are being evaluated to provide food and feed, and improve soil fertility. Legume trees/shrubs, cereal, and grain legumes are being validated (Fig. 2b).
3. Integrated nutrient and water management options for improved crop productivity and erosion control are being tested and validated for scaling up and out (Fig. 3).
4. Released Quality Protein Maize (QPM) varieties good for nutrition improvement are being tested for their adaptation in semiarid agroecologies.



**Figure 2a.** Crop diversification for food and income security through legume (Pigeonpea)-cereal (maize) intercropping is being validated.



**Figure 2b.** Double-up legume production for food, feed, and fuelwood supply and soil fertility management via intercropping of pigeonpea and *Gliricidia sepium*



**Figure 3.** Evaluation of soil, water, and nutrient management practices at Mlali Village, Kongwa District. Drought, poor soil fertility and soil erosion in these semiarid agroecologies are major biophysical constraints to sustainable and increased farm productivity.

## Achievements

1. Mapped crop productivity underpinnings - yield gap for cereal (50%) and grain legume (30%) for targeted intervention.
2. The annual food and feed supply patterns and associated deficits, food safety, and nutrition imperatives have been characterized to guide R4D.

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