Best-bet and best fit crop-ecology paradigm for sustainable intensification in ESA

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Key messages

- No one size fits all as farmers and farms are heterogeneous
- Different biophysical environments will optimally support different pathways for intensification
- Legume –cereal rotations work better for larger farms, while intercropping for small farms ensures crop diversity

Objectives and approach

Research teams across ESA project identified technologies that present the best opportunity to increase productivity: This entailed…

1. taping into ecological provisions of leguminous crops for enhanced N cycling (Photos A, B, C)
2. Adopting cropping arrangements/sequences that respond to farm sizes and agroecologies and as well as integrating farmer production objectives (Photo D)

Key results

A. Malawi

- The pigeonpea-groundnut intercropping system resulted in grain yields of groundnut that were comparable to productivity in sole cropping (Table 1).
- The land equivalency ratio (LER) is a measure of land productivity, and a number >1 indicates that intercropping is advantageous .

B. Tanzania

- LER revealed that intercropping pigeonpea at the appropriate proportions based on local site conditions is necessary and a promising strategy to optimize yields in mixture. Higher proportions of pigeonpea in intercropping (1:2 ratio of maize to pigeonpea) was more beneficial to farmers in Mlali, a less potential site (LER = 1.53) than in Chitego, a high potential site (1.15), especially in years of poor precipitations and yields (Table 2).
- Alternate arrangement (1:1;), which is mostly used by farmers (Photo D), was less sensitive to site variations as noted by the moderate LER in 2015 and higher LER in 2016 in both sites (Table 2).

Significance and scaling potential

- For small farms, this technology offers a huge opportunity for increasing land productivity and maintaining diversified crop production, for food and income security.
- Up to 1 million households situated in pigeonpea and groundnut growing agro-ecologies will benefit from this technology
- Extension system and development partners need to be supported to disseminate and support adoption of this technology

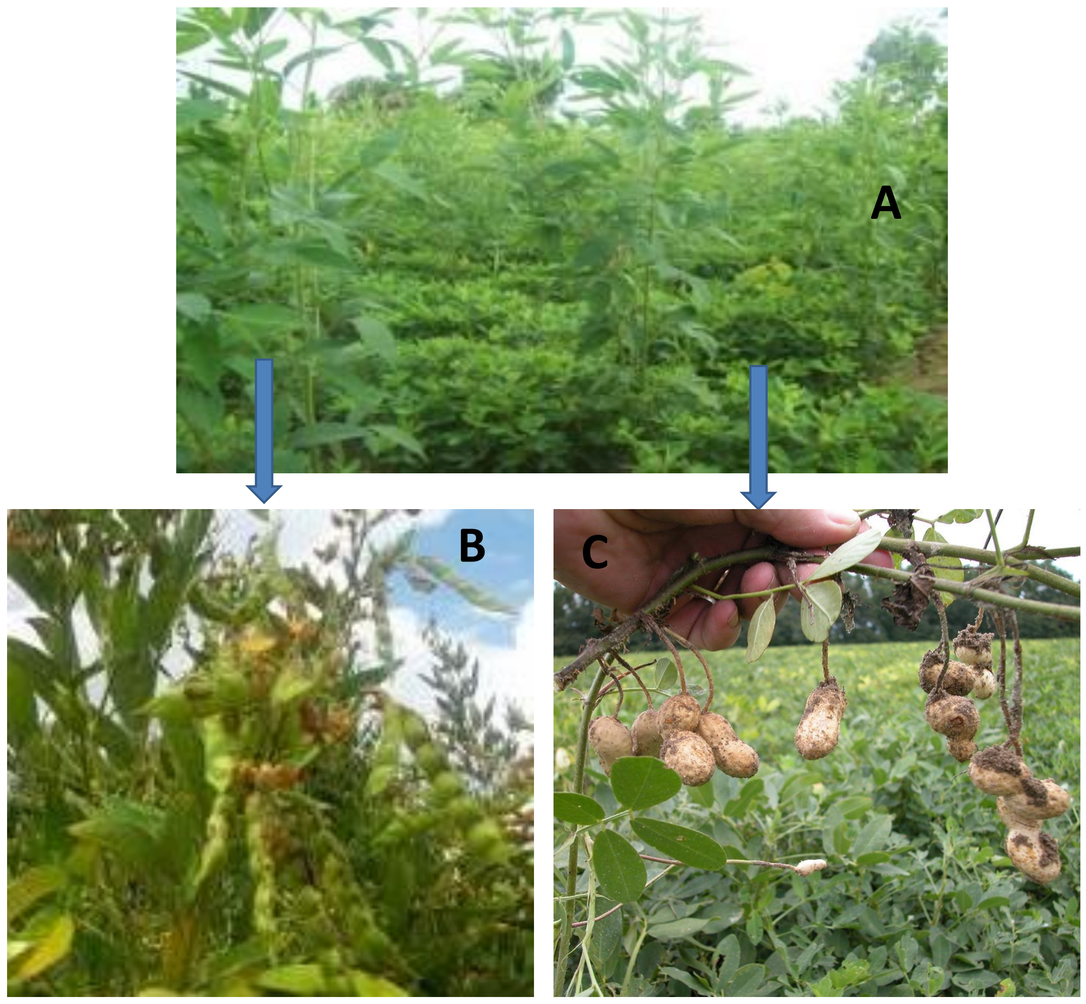

Table 1. Assessing productivity of doubled-up groundnut-pigeonpea technology

Cropping system	Grain yield (kg/ha)	LER
Sole groundnut	1650	
Intercropped groundnut	1330	1.48
Sole pigeonpea	950	
Intercropped pigeonpea	640	

Photo D. 1:2 spatial arrangements of maize and pigeonpea at Chitego, Dodoma, Tanzania

Table 2: LER for Maize-pigeonpea (PP) intercropping at Mlali and Chitego Villages, Tanzania

Maize-PP ratio	2015		2016	
	Mlali	Chitego	Mlali	Chitego
2M:1PP	1.06	1.71	1.09	1.16
1M:1PP	1.14	1.22	1.41	1.68
1M:2PP	1.53	1.15	1.02	1.49

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