

Understanding niches for multi-purpose-legume intensification in smallholder farming systems: Early applications of the decision-support Legume CHOICE tool in Ethiopia

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Introduction

Legumes have great potential to contribute to rural livelihoods and natural resource status, either in the form of **food, income, feed, protein, soil nutrients** and **fuel**. However, the provision of a given function differs between legume classes, types and species, and needs different intervention approaches. This tool guides decision-making around legume interventions.

Research objectives

- To diagnose the farming system and related entry points for multi-purpose legume intensification in farming system.
- To understand niches for identified legumes and design best-fit legume interventions for different farmer types.

Materials and methods

Four implementation sites were selected from CRP Humidtropics field sites (Table 1).

Table 1. Description of Ethiopian Legume CHOICE project implementation sites

Implementation sites	Field site	Total household	Ave. altitude	Agro-ecology	Market access
Lalisa-Dimtu	Diga	700	1306	Lowland	Good
Fromsa	Diga	550	2140	Mid-altitude	Medium
Chillanko	Jeldu	500	2943	Extreme highland	Good
Kolu-Galan	Jeldu	1150	2685	Highland	Medium

The Legume CHOICE tool has been applied following three steps :

- Qualitative assessment** of the farming system;
- Context assessment** of key attributes or constraints; and
- Community need assessment** for different legume functions.

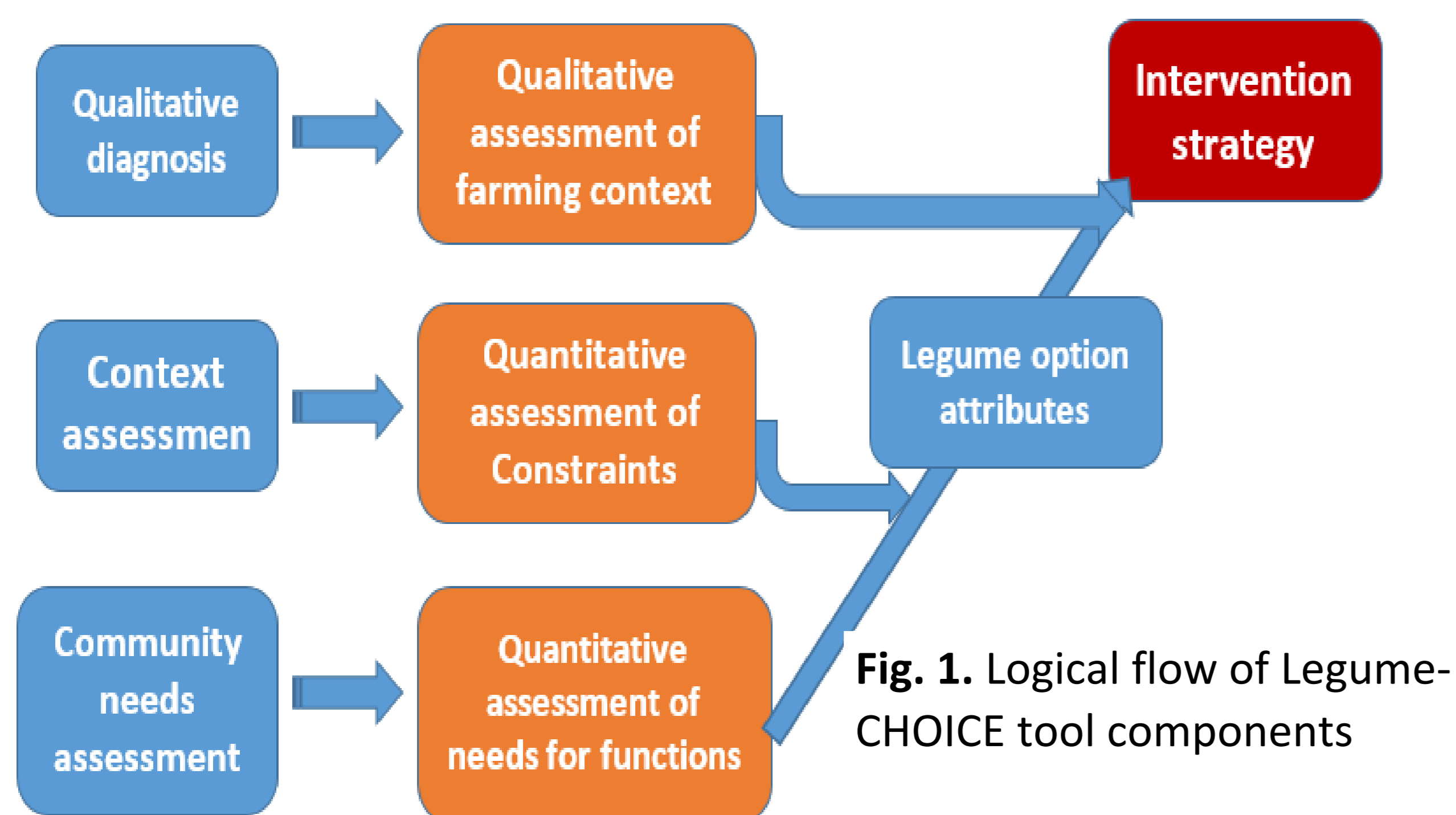


Fig. 1. Logical flow of Legume-CHOICE tool components

Results and discussion

- Output from the tool has helped to select the best legume-intervention options (Table 2).

Qualitative assessment of the farming systems

- Livelihoods of the study areas depend on the crop-livestock farming system.
- Legumes are a major component of this farming system
- Both **grain, fodder and/or tree legumes** are cultivated but on a very limited share of the farmland.

Legume production and productivity constraints

- Each community has a set of constraints that limit selection of appropriate legume interventions options (Fig. 2)

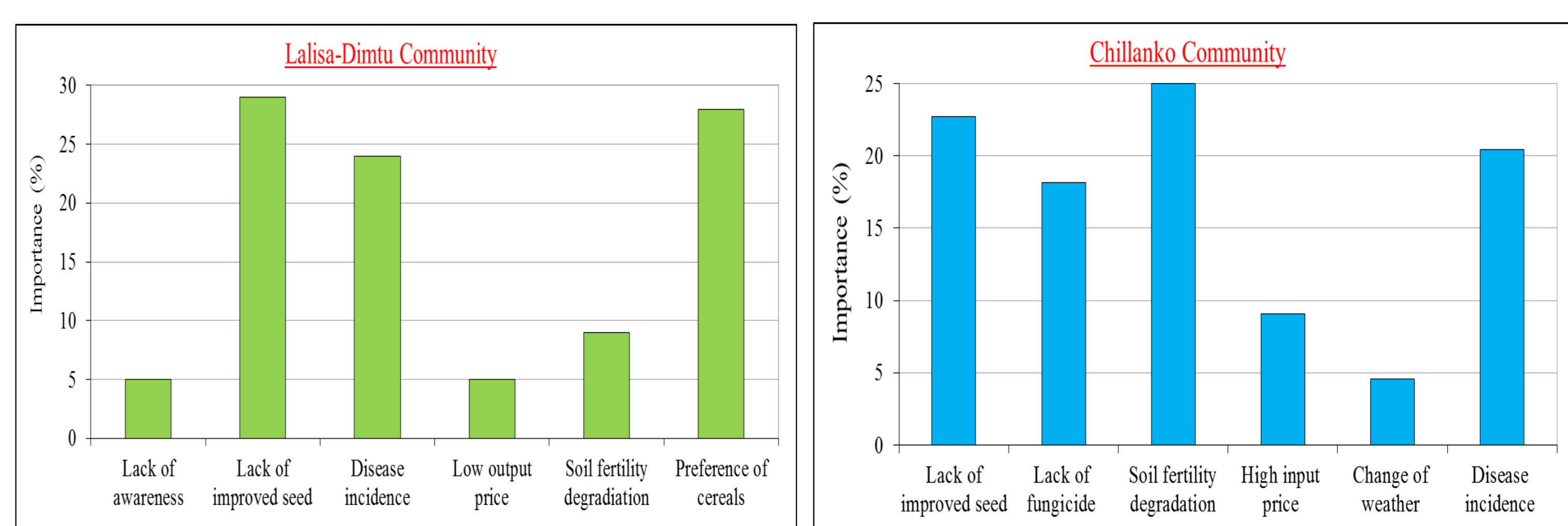


Fig. 2. Example of key constraints for legume production as ranked by two different communities: Result from context assessment of the tool

Demand for legume functions

- Each community demands different things of legume interventions (Fig. 3).
- Farmer preferences for those candidate legumes can differ between implementation sites (Table 2).
- Each legume fulfils the various legume functions to varying extents (data not shown).

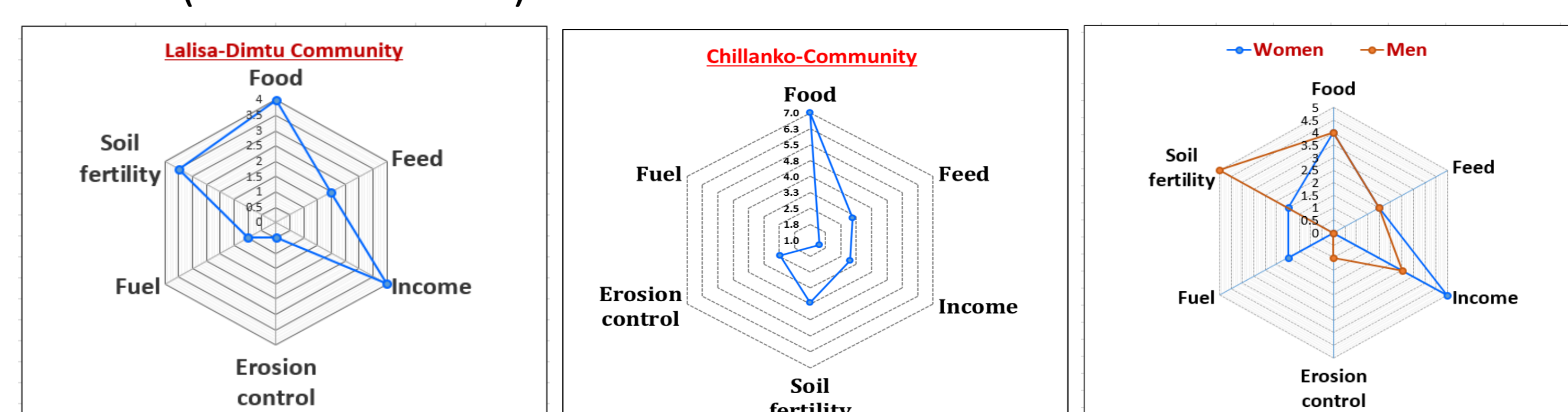


Fig. 3. Examples of farmers' demand for legume functions as ranked by different farming communities and by gender: Output from Legume CHOICE tool

Table 2. Examples of how Legume CHOICE tool helped in coming up with legume intervention activities in Ethiopia

Implementation site/agro-ecology	Priority functions	Key context constraints	Application of Legume Choice tool	Intervention description	Biophysical requirement	How it fulfils functional needs	How it fits to context
Lalisa-Dimtu (Lowland agro-ecology)	Farmers looked for livestock feed, soil fertility improvement, and fuel from tree and fodder legumes.	Lack of planting materials and soil fertility degradation	Pigeon pea, Leuceaena and Lablab identified as best fits to serve priority functions	Introduction/supply of Pigeon pea and Leuceaena seeds/seedlings	Ideal for multi-purpose production of these legumes	Introduction leads to more biomass production to feed livestock and improved soil fertility through BNF and reduced erosion	Alleviates the problems of seeds/planting materials shortages
Fromsa (Mid-altitude agro-ecology)	Farmers looked for food, income, soil fertility improvement and feed from annual grain legumes	Lack of improved seeds, soil fertility degradation, and high disease incidence	Faba bean, field pea, chick pea, lentil and grass pea identified as best fits to serve the priority functions	Farmer-based cluster high yielding and disease-tolerant grain legume seed production	Faba bean and field pea: highland legumes widely adapted/ cultivated in all farming systems	Improved seed production leads to better access to seed and high legume yield production for food, income, feed and soil fertility improvement through BNF	Alleviates the problems of improved seed shortage
Kolu-Galan and Chillanko (Highland agro-ecologies)							

Conclusion

- A range of constraints and production objectives in which the farming system operates need to be considered for legume intensification.
- Legume CHOICE decision-support tool has high potential to support selection of best-fit options for legume intensification based on needs for a range of benefits that legumes can deliver (Fig. 2-3 and Table 2).