

# Multipurpose legumes classification study



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**Participatory evaluation of multipurpose legumes in integrated crop-livestock production systems in selected districts of Ethiopia and Kenya: Farmer's preferences and decision making**

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PhD Proposal

**Abstract**

In developing countries, the agricultural sector plays a central role in the economic and social life of the nation and is a cornerstone of the economy. Crop and livestock production is mainly influenced by low soil fertility and by low quality and quantity of feed resources, respectively. Multipurpose legumes are known to perform multiple functions like grain legumes provide food, feed and facilitate soil nutrient management; herbaceous and tree legumes can restore soil fertility and prevent land degradation while improving crop and livestock productivity on a more sustainable basis. Therefore, the adoption of such multipurpose legumes, which enhance agricultural productivity while conserving the natural resource base, might be instrumental for achieving income, food security and for reversing land degradation. The integration of legumes to cereal-based systems could provide services such as high quantity and quality fodder production, soil erosion prevention and soil fertility restoration. In Ethiopia and Kenya, realizing the underexploited potential of multi-purpose legumes towards improved livelihoods and a better environment in crop-livestock systems has significant contribution to improve food and nutrition security, reduce poverty, and enhance the production environment of smallholder farmers and rural populations. Therefore, the objectives of this project are to develop

a classification of legume types like food legumes, tree legumes, forage legumes, cover legumes through literature review, consultation with key informants and farm-level surveys; assess and identify contribution of each type of multipurpose legumes to farm family objectives (provision of food, forage, soil nitrogen, fuel and others) through farm-level surveys; understand farmer perceptions of legumes and their functions through focus group discussions (participatory rural appraisal/PRA tool) at community level and assess how different farmer typology demands alters the optimal choice of legume types through simple modelling approaches.

## **INTRODUCTION**

Ethiopia has total human population of 96. 5 million in 2014 (CSA, 2014). If Ethiopia follows its current rate of growth (3. 02%), its population will double in the next 20 years and cross 300 million by 2050 ( *World Population Prospects: the 2012 Revision*). The agricultural sector plays a central role in the economic and social life of the nation and is a cornerstone of the economy (Alemayehu, 2008) and it accounts for 48. 76% to GDP (World Fact Book, 2015). The contribution of livestock to the total GDP is limited because of many factors. One the major factor is the scarcity of feed resources both in quantity and quality (Alemayehu Mengistu, 2008).

In Ethiopia highlands, crop and livestock production is mainly influenced by low soil fertility and by low quality and quantity of feed resources, respectively (Kruseman et al. 2002; Tangka et al. 2002). Feed shortages both in quality and quantity can be attributed to factors. On the other hand, escalating prices, access and price uncertainty, and unavailability at the crucial moment limit the use of inorganic fertilizers in improving soil fertility

(Lakew et al., 2000; Ahmed et al., 2003). In developing countries, the use of forage legumes integrated with food crops and livestock is often advocated to minimise external inputs as well as to improve the productivity and sustainability of crop-livestock production (Humphreys 1994; Peters and Lascano, 2003).

Over the past two decades several forages have been tested in different ecological zones, and considerable efforts have been made to test the adaptability of different species of pasture and forage crops under varying agro-ecological conditions. As a result, quite a number of useful forages have been selected for different zones. Improved pasture and forages have been grown and used in government ranches, state farms, farmers' demonstration plots and dairy and fattening areas. Forage. Production of forage seed by contracting smallholders has shown potential as a way of improving seed supply (Alemayehu Mengistu, 2002; 2006).

Menale (2011) reported that declining soil fertility and increasing soil erosion continue to limit crop yields in the Ethiopian highlands while poor quality and quantity of feed limit livestock production. Adoption of forage legumes has been proposed as a strategy that can help alleviate these problems. However, despite their proposed potential in dealing with these challenges, adoption of forage legumes by smallholder farmers is still limited. The adoption rate for improved forage crops has been very low and less sustainable. The area occupied by improved forage crops is insignificant and little contribution to the annual feed budget (Alemayehu Mengistu, 2002).

Multipurpose legumes are known to perform multiple functions like grain legumes provide food, feed and facilitate soil nutrient management; herbaceous and tree legumes can restore soil fertility and prevent land degradation while improving crop and livestock productivity on a more sustainable basis. Therefore, the adoption of such multipurpose legumes, which enhance agricultural productivity while conserving the natural resource base, might be instrumental for achieving income, food security and for reversing land degradation. The integration of legumes to cereal-based systems could provide services such as high quantity and quality fodder production, soil erosion prevention and soil fertility restoration. Enhanced availability of livestock feed can reduce degradation of grazing lands. The demand for forage and the opportunities for diffusion of forage technology might be high where livestock response to improved feed technology and profitability from livestock enterprise is high. Multipurpose legumes research throughout the developing world have shown the benefits of different kinds of legumes (Khalili et al., 1994; Humphreys 1994; Omiti 1995; Umunna et al., 1995; Peters et al., 2001; Mpairwe et al., 2003). Cultivation of forage is not widely adopted and commercial feed production is not developed (Alemayehu Mengistu, 2006; 2008)

If farmers have to adopt a technology, they must be able to clearly see the benefits. Sometimes beneficial technologies are not adopted because the benefits cannot be clearly demonstrated or are long term. The major benefits of forage legumes include higher DM yields (Alemayehu Mengistu, 2008; Shehu and Akinola 1995; Mwangi 1999), biological nitrogen fixation (BNF) (Thomas and Sumberg 1995; Mwangi 1999), improved soil fertility and better

animal performance due to the improved N supply in the diet (Alemayehu Mengistu, 2002; 2006 and Kariuki et al., 1998a).

In developing countries, despite these multiple benefits of legumes, the adoption of legumes especially for feed and soil management is very poor (Saka et al., 1994; Thomas and Sumberg, 1995; Zewdu et al., 2000; Ahmed et al., 2003). Despite these and many other attempts to introduce shrubby and herbaceous legumes on smallholder farms, adoption has been low (Paterson et al., 1996a).

Several attempts have been made to introduce herbaceous legumes on smallholder farms in Central Kenya (Wandera, 1995). The key challenges in forage development are as follows: First, forage has a low adoption rate in Ethiopia (Duncan, 2009). Second, apart from forage innovation, limits in institutional structures have also hindered forage innovation (Hall et al., 2007). Third, there is scarcity in the quantity and quality of animal fodder (Tadesse, 1998 and Yeshitila, 2008). Lastly, the rise in fodder price and inefficacy in the feed market is another set of problems (Gebremedhin et al., 2009).

There is very good opportunity to produce best adapted improved multipurpose legumes to improve the crop – livestock productivity in Ethiopia and Kenya. To address the problem of inadequate food, feed and soil fertility, the need for improved multipurpose legumes multiplication and distribution are paramount.

In Ethiopia and Kenya, realizing the underexploited potential of multipurpose legumes towards improved livelihoods and a better environment in <https://assignbuster.com/multipurpose-legumes-classification-study/>

crop-livestock systems has significant contribution to improve food and nutrition security, reduce poverty, and enhance the production environment of smallholder farmers and rural populations through facilitation of the smart integration and use of multi-purpose legumes, providing food, protein, feed, fuel, and/or organic matter in crop-livestock systems. It has also a vital purpose to provide knowledge and tools to farmers and development partners facilitating farmers to make rational decisions for enhancing short and long-term contributions of multi-purpose legumes to farmer livelihoods including aspects of legume production, input supply systems, and markets.

**The objectives of this project are:**

- To develop a classification of legume types like food legumes, tree legumes, forage legumes, cover legumes through literature review, consultation with key informants and farm-level surveys.
- To assess and identify contribution of each type of multipurpose legumes to farm family objectives (provision of food, forage, soil nitrogen, fuel and others) through farm-level surveys in Kenya and Ethiopia
- To understand farmer perceptions of legumes and their functions through focus group discussions (participatory rural appraisal/PRA tool) at community level.
- To assess how different farmer typology demands alters the optimal choice of legume types through simple modelling approaches.

**Material and methods**

The participatory evaluation of the multipurpose legumes will be conducted in different agro-ecology of the crop-livestock production systems of the

project sites of Ethiopia and Kenya. The project members of the farmers will be purposively identified and oriented about the objectives of the project.

Multi-stage, purposive or random sampling methods will be utilized during data collection through surveys, individual interview, consultation with key informants and focus group discussions using participatory rural appraisal/PRA tool based on the type of the data to be collected.

Multipurpose legume types like food legumes, tree legumes, forage legumes, cover legumes will be identified and classified through detail literature review, consultation with key informants and farm-level surveys by using semi structured questionnaire. The contribution of each type of multipurpose legumes to farm family objectives (provision of food, forage, soil nitrogen, fuel and others) will be assessed and identified through detail farm-level surveys in Kenya and Ethiopia. Farmer perceptions of legumes and their functions will be understood through focus group discussions (participatory rural appraisal/PRA tool) at community level. The way different farmer typology demands alters the optimal choice of legume types will be assessed through simple modelling approaches in Kenya and Ethiopia. Respective stakeholders, through farmers' group visit, field days, study tours and workshops will be conducted during monitoring and evaluation of the project at different phases. Finally, all data will be analyzed by using the appropriate statistical latest version of SPSS or STATA. The results will be communicated to the beneficiaries through publications, reports, workshops, formal and informal meetings.



**Work Plan**

Main Activities	Year
2015/16	2016/ 2017
PhD course work, full proposal writing and presentation,	XX
Detail literature review work to classify legume types	XX
Project site selection and meeting with the farmers both in Kenya and Ethiopia	XX
Awareness creation about the objectives of the project	XX
Data collection through surveys, individual interview, consultation with key informants and focus group discussions using participatory rural appraisal/PRA tool	XX
Survey and discussion to assess and identify contribution of each type of multipurpose legumes	XX
PRA method of data collection to understand farmer perceptions of legumes and their functions	XX
Utilizing simple modelling approaches to assess how different farmer typology demands alters the optimal choice of legume types	XX

Monitoring and evaluation of all the project works through out the project life time

XX

X

Data entry, analysis, interpretation, scientific paper writing and reporting, publication, feedback and reflection

X

Presentation of PhD dissertation

Policy-makers will be sensitized to the technologies

X

Estimated Budget break dawn

Cost Items

2015/16

2016/17

2017/18

Non-expendable Equipment:

Computer (Desk top) with its accessories

600

Computer (Lab top)

800

Printer (LaserJet)

400

Toner

100

200

300

Flash disk 8GB Genex

100

100

Sinarline (plastic cover)

80

100

120

Digital camera	300		
Leather bag	100		100
CD RW; Writing pad large, computer paper	200	300	350
All Other direct & indirect Costs			
Fuel and Lubricant	800	3000	2000
Perdiem for researchers and driver	2000	20000	15000
Transport costs (car and air)	3000	8000	3000
Data collectors/enumerators fee	1000	15000	8000
Refreshments fee during group discussion for farmers and DA	800	8000	6000
Workshop and field visit fee		5000	3000
<i>Sub-total Amount (Euro)</i>	9, 280. 00	60, 700. 00	37, 870. 00
<i>Total Amount (Euro)</i>	107, 850. 00		

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