



## Africa RISING in the Ethiopian Highlands

# Multi-dimensional Crop Improvement in Pulse Crops to support Livestock Productivity in Mixed Farming Systems

Jane Wamatu, Seid Kemal, Barbara Rischkowsky

## Introduction

Crop scientists and livestock nutrition are collaboratively exploring opportunities and limitations for improving crop residue quantity and fodder quality at source through multidimensional crop improvement. Selecting varieties with superior grain and straw traits could address the needs of humans for food and livestock for fodder.



## Methodology

- Assessment of feeding systems and feed resource availability in Africa RISING sites, **FEAST Reports**.
- Participatory evaluation of feed technologies, **Techfit Reports**.
- Assessment of country-wide crop residue utilization, **Alkhtib et al., 2016**.
- Sequential analysis of the nutritive quality of crop residues stored under current traditional method.
- Genotypes of grain legumes cultivated across multiple locations over consecutive years were collected and evaluated for haulm fodder quality traits.
- Haulm fodder quality traits were analyzed by a combination of conventional laboratory techniques and Near Infrared Reflectance Spectroscopy (NIRS).
- Genotypic variations in grain yield and straw traits were analyzed.
- Relationships between haulm traits with grain and haulm yields and genotypic x locational (GL) interactions were determined.
- Effects of genotypic variations in the nutritive value of straw/haulms on the performance of sheep was undertaken through live animal feeding trials at the animal experimental barn constructed at Sinana Agricultural Research Center.

## Outputs

- There were significant genotypic and location variations for grain yield and straw traits in lentil, chickpea, faba bean and field pea. Genotype x Location interactions had significant effects.
  - Correlations between grain and straw yields were positive, moderate and significant in lentil ( $r=0.52$ ,  $P<0.001$ ) and faba bean ( $r=0.66$ ,  $p<0.001$ ) and significantly and weak in chickpea ( $r=0.37$ ,  $p<0.001$ ).
  - Strong and negative correlations were found between crude protein and grain yield in lentil ( $r=-0.73$ ,  $P<0.001$ ) and faba bean ( $-0.12$ ,  $P=0.042$ ) and weak and significant in chickpea ( $r=0.06$ ,  $P<0.05$ ).
  - Correlations between grain yield and metabolizable energy content (ME) were weak in lentil ( $r=-0.03$ ;  $P=0.491$ ), chickpea ( $r=0.061$ ,  $P=0.021$ ) and fababean ( $r=0.164$ ,  $P=0.050$ ).
- The choice of legume cultivars with superior feed traits will have immense implication for the overall productivity of mixed crop livestock systems (Wamatu et al., 2016; Alkhtib et al, 2016; Wegi et al, 2016)

## Core partners

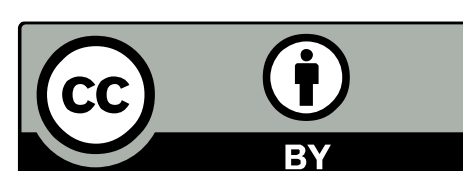


We thank farmers and local partners in Africa RISING sites for their support

## Way Forward

In collaboration with field (pulse) crop research & scaling:

- ❖ Farmer participation in dual-purpose varietal selection.
- ❖ Validate effective feeding systems through on-farm live animal feeding demonstrations.



This poster is copyrighted by the International Livestock Research Institute (ILRI). It is licensed for use under the Creative Commons Attribution 4.0 International Licence. November 2016

