Intensification of Smallholder Livestock Production through Utilization of Crop Residues for Livestock Feed in Tanzania

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Introduction

Babati district in Manyara region, Tanzania is a high potential mixed crop livestock production area producing crop and animal sourced foods for major urban areas in northern Tanzania. With expansion of arable land and resultant decline in grazing resources, crop residues are becoming an increasingly important component of livestock feeds and a key livelihood resource in these systems. Although farmers in Babati district already practice diversified farming system, the crop and livestock components co-exist more or less independently from each other. A series of studies were conducted to characterize the use of crop residues for livestock feed as an option for enhancing intensification on smallholder farms.

Key findings

- Crop residues are the most dominant feed type during the dry season (July-November).
- Average maize stover yield on farms ranges between 1.7 – 3.7 tons/ha (Figure 2), enough to feed a cow for 213 - 463 days (7-15 months).
- Crop residues contribute 34% of the total feeds available on farm in Babati where grazing and collected feeds contributes 53% and 13% of the diet respectively (Figure 3a).
- Maize stover is the most abundant and commonly used crop residue (Figure 3b).
- There is a lot of feed waste on farms due to poor feeding troughs (Plate 1), poor transportation (Plate 2) and poor storage (Plate 3).
- There are highly nutritious legume based crop residues (Table 1).

Testing of feed choppers

- On average, it took two (2) hours less time to chop crop residues when using a forage chopper compared to a machete (panga).
- The forage chopper machine chopped 137 kg/hour of maize stover (Figure 4).
- We successfully demonstrated to farmers in Babati that forage choppers can have a very significant role in reducing forage wastage and labour (time and cost) required to harvest and process feeds.

Research activities undertaken

- Used the Feed Assessment tool (FEAST) to characterize the types, distribution and use of crop residues in existing livestock production systems in Babati.
- Quantified stover yield on farms (Figure 2).
- Introduced feed choppers through village learning approaches and assessed their performance under farm conditions.

Table 1: Nutrient composition of crop residues in Babati district

<table>
<thead>
<tr>
<th>Type of crop residues</th>
<th>Crude protein % (sd)</th>
<th>INDMD % (sd)</th>
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<tbody>
<tr>
<td>Maize stover</td>
<td>3.62 (1.17)</td>
<td>53.69 (4.26)</td>
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<tr>
<td>Rice straw</td>
<td>3.70 (1.40)</td>
<td>84.87 (2.8)</td>
</tr>
<tr>
<td>Bean haulms</td>
<td>7.62 (1.78)</td>
<td>54.13 (3.46)</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>16.3 (2.32)</td>
<td>74.17 (2.06)</td>
</tr>
<tr>
<td>Pigeon pea</td>
<td>17.60 (2.0)</td>
<td>53.46 (3.58)</td>
</tr>
<tr>
<td>Cow pea</td>
<td>15.12 (6.19)</td>
<td>79.94 (11.06)</td>
</tr>
</tbody>
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Figure 1: Annual distribution of feed availability in Babati district
Figure 2: Maize stover yield observed in selected villages in Babati district
Figure 3a. The contribution of crop residues in general
Figure 3b. The contribution of different types to livestock diets
Figure 4: The output capacity of forage of different feed types on-farm
Figure 5: Plates showing poor transport and storage of crop residues.