

# Promoting utilization of alternative available feed to substitute commercial diets in smallholder beef production systems in the sub humid region in Zimbabwe

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21 July 2015



# Introduction



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- Cattle depend on natural pasture as main source of feed
- Protein content declines in the dry season
- Little or no protein supplement offered



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- Conserve forage legumes and crop residues for dry season feeding
- Use of alternative protein sources (forage legumes, groundnut stover and poultry litter) to feed cattle

# Objectives

- To demonstrate that forage legumes, crop residues and poultry litter can be used as supplementary feed in beef cattle production;
- To determine the economic impact of beef feeding using farm produced feeds as compared to commercial feed.



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# Materials and methods

## ❖ Goromonzi and Murehwa districts

### ❖ Experiment 1- 2013

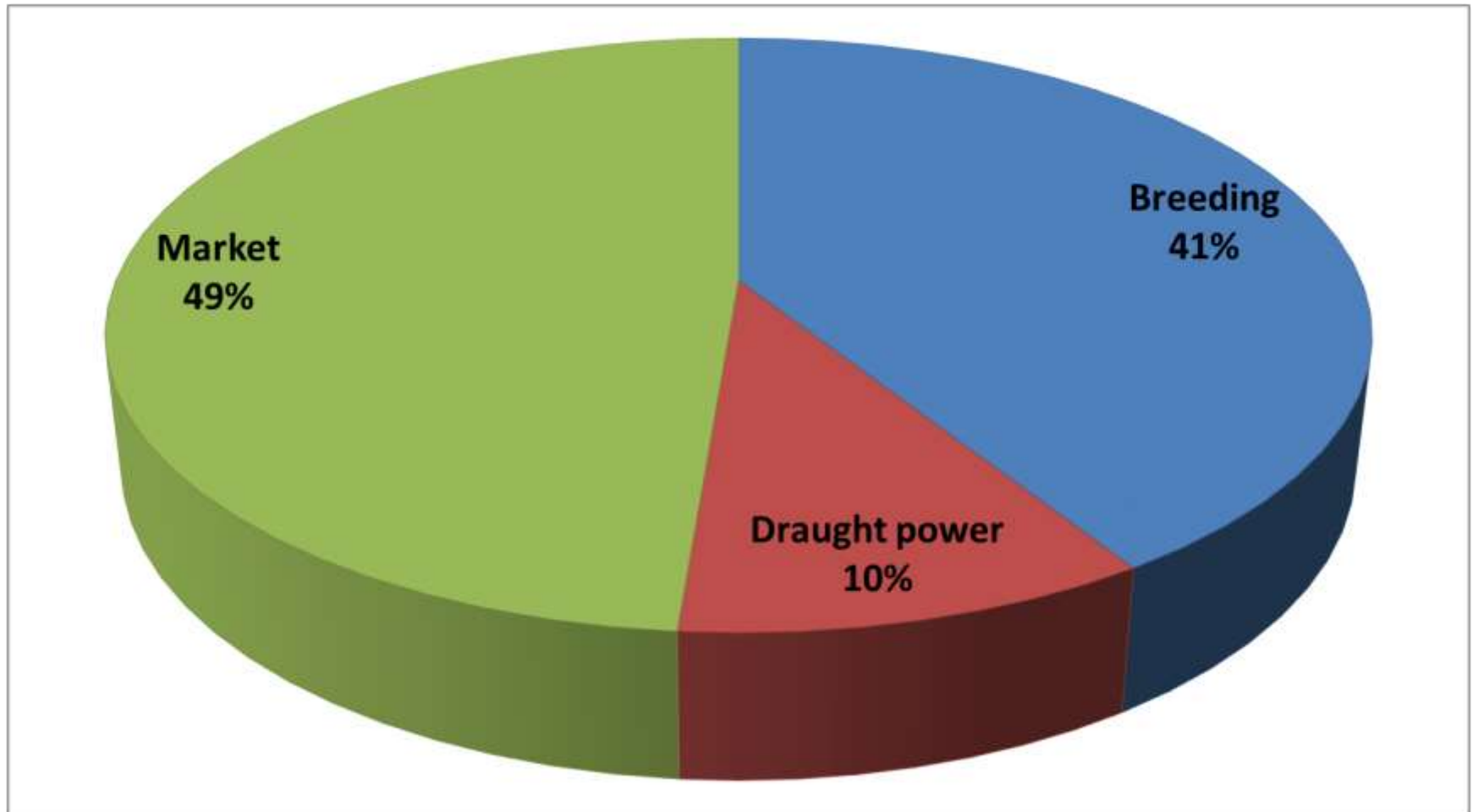
- 1 farm site, 12 beef cattle randomly assigned to four treatment groups
- Weekly measurements

### ❖ Experiment 2 – 2014

- 17 farm sites, 39 animals randomly allocated to 5 dietary treatments
- Fortnightly measurements



# Proportion of cattle supplemented in 2014 by purpose



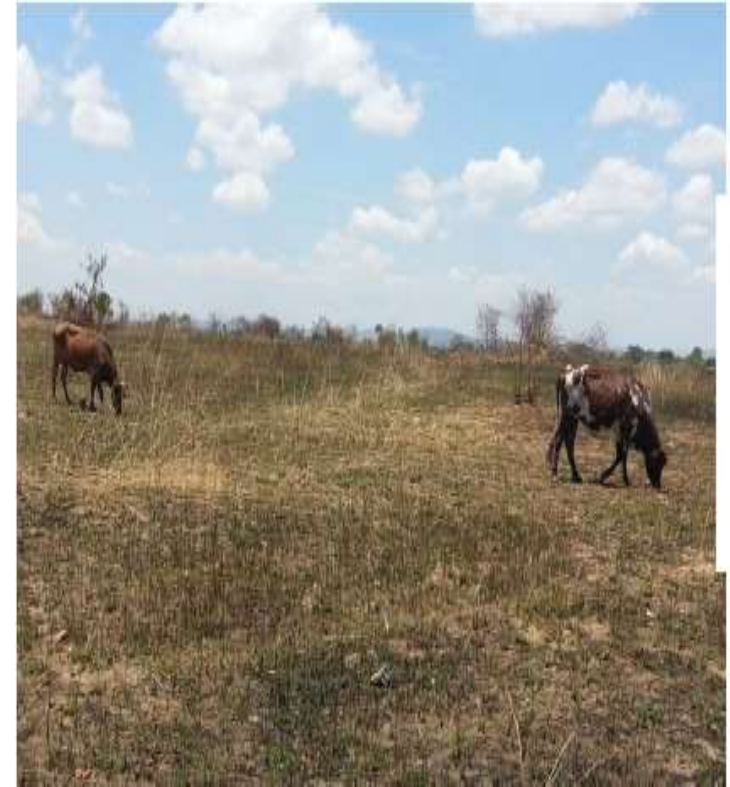
# Treatments and composition of mixed ration (%)

	Experiment 1 Treatments – 2013			Experiment 2 Treatments - 2014				
Raw Materials	M	LC	C	M	L	G	PL	C
Crushed maize	41	45	43	40	40	40	40	79
Soya bean meal	-	-	-	-	14	16	-	-
Soya bean residue	10	4	36	-	-	-	-	-
Mucuna hay	25	-	-	35	-	-	-	-
Mucuna seed	10	-	-	24	-	-	-	-
Lablab hay	-	16	-	-	45	-	-	-
Cowpea shells	-	17	-	-	-	-	-	-
Groundnut residue	-	-	-	-	-	43	-	-
Maize stover	-	-	-	-	-	-	14	-
Poultry litter	-	-	-	-	-	-	45	-
Beef Concentrate	13	17	20	-	-	-	-	20
Mineral + Vitamin mix	1	1	1	1	1	1	1	1

**Treatments:** **M** -Mucuna based diet; **LC**-Lablab-cowpea based diet; **C**-Commercial diet; **L**-Lablab based diet; **G**-Groundnut based diet; **PL**-Poultry litter based diet

# Practices

- Participatory approach
- Feed formulation
  - iso-nitrogenous (14 % CP)
  - iso-calorific (12 MJME kg<sup>-1</sup>)
- Feed offered at 1.5 % of body weight
- Feeding period – 56 days
- Maize stover offered *ad libitum*



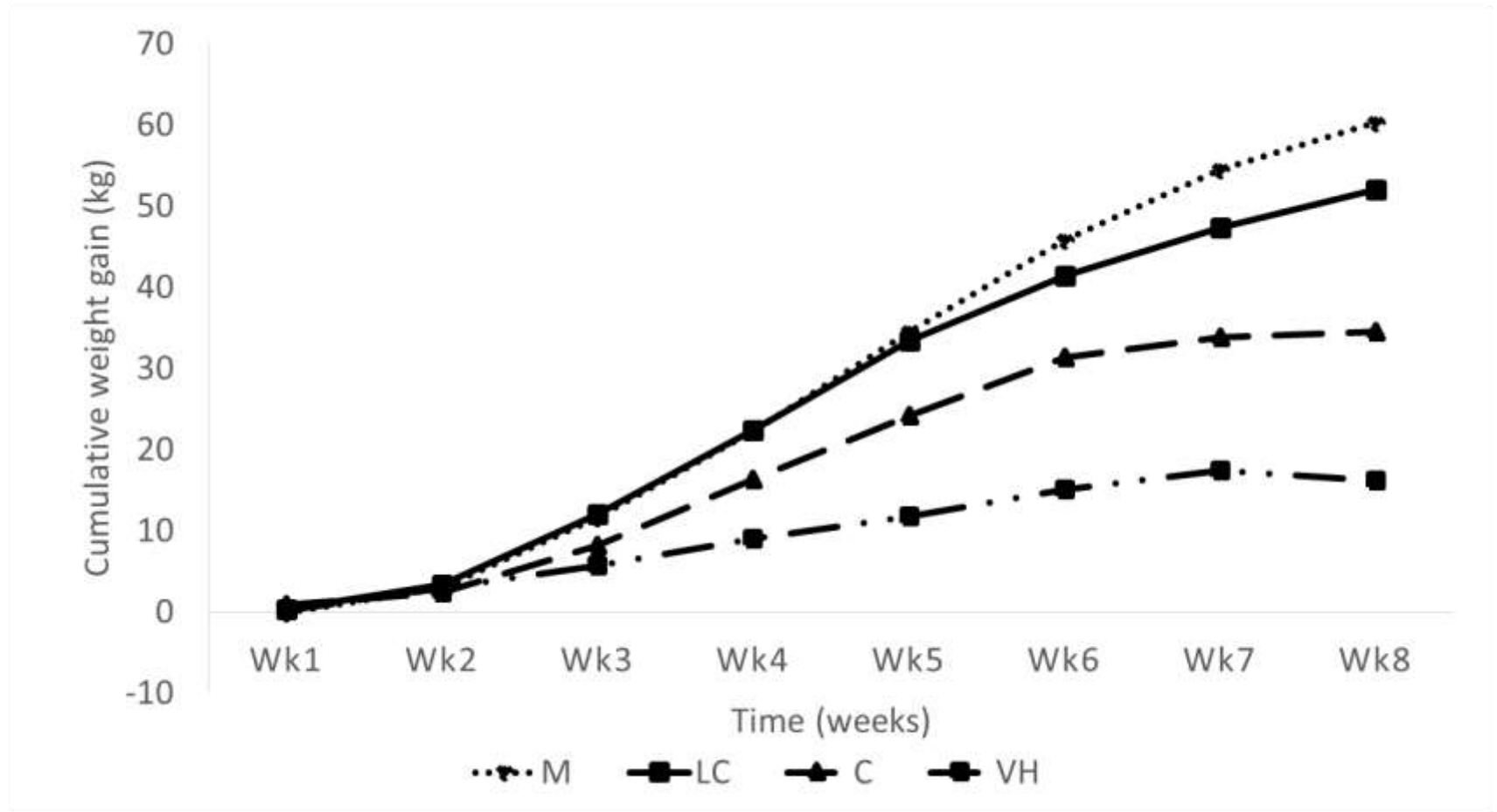
@Love more Gwiriri 2014

# Results

Experiment 1 - 2013			Experiment 2 - 2014	
Treatment	Initial BCS	Final BCS	Initial BCS	Final BCS
Mucuna	2.0	3.5	2.5	3.4
Lablab			2.8	3.4
Lablab/cowpea	2.0	4.0		
Groundnut stover	2.0	3.0	2.5	3.0
Veld grazing	2.0	2.5		
Poultry litter			2.4	3.0
Commercial	2.0	3.0	2.7	3.2

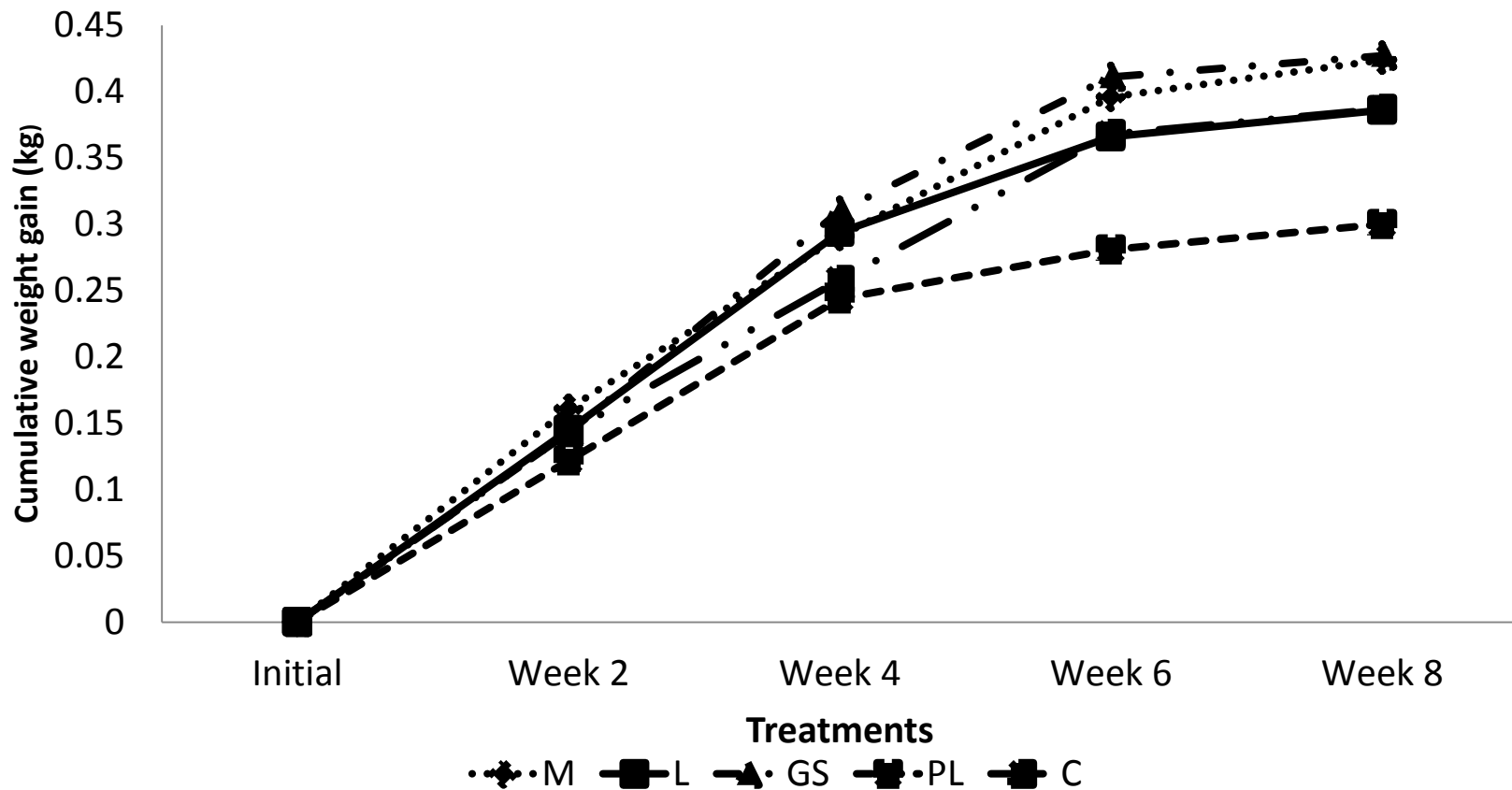


# Cumulative weekly weight gains (kg) – Experiment 1



**Treatment:** M - Mucuna based diet; LC - Lablab-cowpea based diet; C - Commercial beef concentrate based diet; VH- Veld grazing

# Cumulative fortnightly weight gains (kg) – Experiment 2



**Treatment:** M - Mucuna based ration; L - Lablab based ration; GS–Groundnut stover based ration; PL – Poultry litter based ration; C–Beef concentrate based ration

# Results

- Body weight significantly ( $p < 0.05$ ) high for animals on mucuna (60.3 kg) and groundnut stover (42.7 kg) in experiments 1 and 2 respectively over 56 days
- Males had significantly ( $p < 0.001$ ) higher body weight gain than females on the same diet

# Gross Margin analysis – Experiment 1

	Treatments			
	M	LC	C	VH
<b>INCOME (US\$)</b>	<b>1,663.89</b>	<b>1,604.08</b>	<b>1,586.79</b>	<b>1,323.25</b>
<b>COSTS (US\$)</b>				
Initial Livestock Costs	878.10	871.90	808.70	887.96
Feed Costs	192.38	178.29	183.40	3.72
Other Expenses: -Labour Costs	39.99	39.99	39.99	60.00
-Vet. Costs	6.00	6.06	6.72	7.36
Transport Costs	25.00	25.00	37.50	25.00
Slaughter Fee	50.00	50.00	75.00	50.00
Regulatory Expenses	12.00	12.00	18.00	12.00
<b>Total Costs</b>	<b>1,203.47</b>	<b>1,183.24</b>	<b>1,169.31</b>	<b>1,046.04</b>
<b>Gross Margin (US\$).animal<sup>-1</sup></b>	<b>230.21</b>	<b>210.43</b>	<b>208.74</b>	<b>138.61</b>
<b>Feed cost (\$).kg<sup>-1</sup></b>	<b>0.29</b>	<b>0.27</b>	<b>0.26</b>	<b>-</b>

# Gross Margin analysis – Experiment 2

	Treatments				
	M	L	GS	PL	C
<b>INCOME (US\$)</b>	<b>651.76</b>	<b>653.60</b>	<b>627.82</b>	<b>442.48</b>	<b>656.54</b>
<b>EXPENDITURE (US\$)</b>					
Initial livestock cost	343.10	342.47	325.22	256.29	325.47
Feed costs	75.29	89.16	74.05	23.32	100.68
Other expenses: - Labour costs	40.00	40.00	40.00	40.00	40.00
- Veterinary cost	4.00	4.00	4.00	4.00	4.00
Transport	25.00	25.00	25.00	25.00	30.00
Slaughter fee	25.00	25.00	25.00	25.00	25.00
Regulatory expenses	17.50	17.50	17.50	17.50	17.50
<b>Total costs</b>	<b>529.89</b>	<b>543.13</b>	<b>510.77</b>	<b>391.11</b>	<b>542.65</b>
<b>Gross Margin (US\$)</b>	<b>121.87</b>	<b>110.47</b>	<b>117.05</b>	<b>51.37</b>	<b>113.89</b>
<b>Feed cost (\$·kg<sup>-1</sup>)</b>	<b>0.27</b>	<b>0.33</b>	<b>0.31</b>	<b>0.19</b>	<b>0.37</b>



# Gross Margin analysis

- Feed costs were highest on mucuna ( $\$0.29.\text{kg}^{-1}$ ) and commercial diet ( $\$0.37.\text{kg}^{-1}$ ) in experiments 1 and 2 respectively.
- Poultry litter had lowest cost ( $\$0.19.\text{kg}^{-1}$ )
- Mucuna diet achieved the highest gross margin per animal ( $\$230.21$  and  $\$121.87$ ) in experiments 1 and 2 respectively.

# Discussion and conclusion

- Mucuna and groundnut based diets are produce viable returns
- Technologies are easily adopted by smallholder farmers
- Supplementing beef cattle using alternative protein sources is a viable option in smallholder systems

# Thank you

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