Sheep raising and fattening using fodder from woody species for increased food security in Mali

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INTRODUCTION

- Food security is a real concern for many farmers in Mali.
- Sheep raising and fattening play an important role in the livelihoods of rural households.
- They provide food (milk, meat), money (especially to women), and play social and cultural functions (traditional and religious celebrations).
- Shortage of forage, especially during the dry season, constitutes one of their most important constraints.
- Leaves from trees and shrubs can supply valuable feed all year round.
MAIN OBJECTIVE

Investigate the contribution of woody species that can serve both as sheep fodder and as the backbone of a productive agroforestry system aiming at improving incomes of rural households in Mali, with a special focus on women.
MAIN TOPICS

• Various species of fodder trees and shrubs were screened for nutritional content, multiplication, productivity, and sheep preference

• The effect, on sheep production, of the incorporation of fodder from such species in feeding rations was investigated

• Social and economic aspects were studied, especially in relation to gender issues
STUDY ZONE

Commune of Zan Coulibaly (Koulikoro region)

- 90 km east of Bamako
- 387 km²
- 9255 women
- 9235 men (RGPH 2009)
1) SURVEY ON FARMERS’ PREFERENCES REGARDING LOCAL TREE SPECIES USED FOR SHEEP FEEDING

• 56 farms
• 11 villages
• focus groups and individual semi-structured interviews
Preferred tree species:

1. Pterocarpus erinaceus
2. Ficus gnaphalocarpa
3. Pterocarpus lucens
4. Khaya senegalensis
5. Terminalia macroptera
2) PALATABILITY OF THE 5 TREE SPECIES
(SHEEP PREFERENCES)

- 4 villages
- 20 sheep per village
- 20 shepherds (3 women and 2 men per village)
- 5 tree species
- Every sheep had access to 5 manger, each one containing the leaves of a different species
- Ingested quantities were noted for each species
RESULTS

The 3 most ingested species:

- *Ficus gnaphalocarpa*
- *Pterocarpus erinaceus*
- *Pterocarpus lucens*
3) CONTRIBUTION OF TREE FODDER SPECIES TO SHEEP FATTENING

✓ 3 tree fodder species replacing partially or totally the peanut haulm
✓ 49 sheep
✓ Research station
✓ Feed rations :
  • R1 : control ; 50% cottonseed meal (CM) + 50% peanut haulm (PH)
  • R2 : 50% CM + 25% PH + 25% *P. lucens*
  • R3 : 50% CM + 50% *P. lucens*
  • R4 : 50% CM + 25% PH + 25% *F. gnaphalocarpa*
  • R5 : 50% CM + 50% *F. gnaphalocarpa*
  • R6 : 50% CM + 25% PH + 25% *P. erinaceus*
  • R7 : 50% CM + 50% *P. erinaceus*
RESULTS

✓ Average daily weight gain with the rations containing woody forage was equal or superior to control
✓ The ratio cost/weight gain was lower than control
✓ Best-performing rations:
  • R3 : 50% CM + 50% *P. lucens*
  • R5 : 50% CM + 50% *F. gnaphalocarpa*
  • R7 : 50% CM + 50% *P. erinaceus*
4) VEGETATIVE PROPAGATION OF LOCAL WOODY SPECIES

Stem cutting experiments were carried out in non-mist propagators using 12 fodder species:

1. Afzelia africana
2. Balanites aegyptiaca
3. Bauhinia rufescens
4. Commiphora africana
5. Faidherbia albida
6. Ficus gnaphalocarpa
7. Guiera senegalensis
8. Kigelia africana
9. Pterocarpus erinaceus
10. Pterocarpus lucens
11. Pterocarpus santalinoides
12. Terminalia avicenniodes
RESULTS

• 2 easy-to-root species, *Pterocarpus santalinoides* and *Commiphora africana*, showed high rooting ability (up to 95% of cuttings), followed by *Balanites aegyptiaca* (up to 55%)
• 4000-ppm naphthalene acetic acid increased the mean number of roots as compared to control (8.1 vs 2.7)
• The results show that *P. santalinoides, C. africana* and *B. aegyptiaca* are easily amenable to clonal propagation using low-cost non-mist propagators
5) EFFECT OF FREQUENCY AND PRUNING HEIGHT ON FODDER PRODUCTION

- 2 tree species: *Pterocarpus erinaceus* and *Gliricidia sepium*
- 2 pruning heights: 0.5 and 1.3 m
- 3 pruning frequencies: 3, 4 and 6 times a year
- Randomized complete block designs
RESULTS

✓ *Pterocapus erinaceus*:
  - Marketable fodder production (branches at least 50 cm long) was more important with 3 and 4-month pruning intervals than with 2-month intervals
  - Pruning at 1.3 m gave significantly higher fodder biomass (2.7 kg tree\(^{-1}\)) than at 0.5 m (2.1 kg tree\(^{-1}\))

✓ *Gliricidia sepium*:
  - 2-month fodder collection interval (8.5 kg tree\(^{-1}\)) outperformed the 3-month one (5.0 kg tree\(^{-1}\))
6) SOCIAL AND ECONOMIC CONTRIBUTION OF SHEEP HERDING AND FATTENING

- Regular monitoring with 87 sheep raisers (42 men + 45 women)
- Visits of sheep markets and interviews with network actors
- Survey on investment, costs of production, time invested, outcomes
- Profitability evaluation based on net revenue + sheep raisers’ own perception
SHEEP RAISERS’ OWN PERCEPTION ON PROFITABILITY

✓ For most sheep raisers, profitability = selling price superior to buying price
✓ Other costs, time invested and risks are generally forgotten
✓ Sheep fattening is a valuable activity: current account easily accessible if necessary, provision of manure, female giving birth to lamb, important socio-cultural functions
MARKET AND NETWORK

• Women are absent from the market
  – Lack of transport capacities
  – Lack of knowledge about sheep monetary value

• A lot of intermediaries without adding value
7) GENDER ISSUES

- The results deconstruct common knowledge about division of labor in sheep fattening activities.
- Both men and women are involved, although men control sale.
- The capacity of mobilizing other family members to help in the activities differed between men and women, and among women themselves according to their status inside the family structure (Muso singaden, Muso gakela, Muso bolobolen).
- Technology transfer on sheep fattening should take these differences into account.
CONCLUSION (I/II)

• Weight gain of sheep fed with rations containing fodder from tree species were equivalent to or higher than with the control ration.

• The use of fodder from tree and shrub species led to lower production costs, providing increased and diversified incomes that could be used for food purchases, thus improving food security in rural households.
CONCLUSION (II/II)

- On financial terms, sheep herding and fattening do not appear to be profitable: improved sheep value chain could help to increase profitability, especially for women.
- Development initiatives could be directed primarily at women, taking into account gender, but also generational division of labor in the family.
- Be careful: there are still many concerns about the sustainability of the tree resource.
ACKNOWLEDGEMENTS

This work was carried out with the aid of a grant from the International Development Research Centre (IDRC), Ottawa, Canada, www.idrc.ca, and with financial support from the Government of Canada, provided through Foreign Affairs, Trade and Development Canada (DFATD), www.international.gc.ca

We are grateful to all those who have contributed to the success of the study, specially to the field agents of CECI and KILABO and to the collaborating farmers and their families.