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Barriers and opportunities for the use of forage tree legumes in smallholder cattle fattening systems in Eastern Indonesia

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Introduction

Forage tree legumes (FTL) have existed in the Eastern Indonesian landscape since colonial traders introduced several species in the late 1800s. A specific effort was made to establish leucaena (*Leucaena leucocephala*) and sesbania (*Sesbania grandiflora*) for use as forage for cattle fattening at Amarasi in East Nusa Tenggara Province and Central Lombok in West Nusa Tenggara, in the 1970s (Yuksel *et al.* 1999; Dahlanuddin *et al.* 2005). Its spread within these provinces as potential forage to intensify cattle fattening systems, however, has been slow if not stagnant. In preparation for intensified efforts to encourage farmers in East and West Nusa Tenggara to grow and use FTLs for cattle fattening, we asked the question why successful FTL feeding practices by some communities had not spread widely to adjacent areas within the provinces. A situation analysis study was conducted in 2011-12 in East and West Nusa Tenggara Provinces aimed at identifying the barriers and opportunities for FTL use in smallholder cattle fattening systems. This paper describes the methodology of this study, its main findings and the implications for follow-up expansion of FTL innovations.

Methodology

The study sites were selected based on a set of criteria, including cattle populations, ownership and management systems, land ownership by farmers, current use or potential of FTLs, and suitability and accessibility of the villages for follow-up activities. The study looked both at locations where leucaena and sesbania were already being intensively used for cattle fattening but where farmer practices can be improved, and where FTL use is limited. A total of 34 hamlets in 12 sub-districts in six districts across the two provinces were visited by study teams for three days each, during which a range of data collection methods were conducted. These included a transect walk with participatory mapping, observations and informal interviews (Fig. 1), Focus Groups with male and female farmers (Fig. 2), and household interviews with 9-10 selected farmers per hamlet (Fig. 3). The study provided detailed profiles of each of the locations, and a general understanding of farmers' current cattle management practices and their perceptions on the use of FTLs as cattle



Figure 1. Informal interview during transect walks



Figure 2. Focus group discussion.



Figure 3. In-depth household interview

feed. While initial barriers and opportunities to the adoption of leucaena and sesbania innovations were identified and informed the design of an outreach strategy, continuing follow-up assessment is needed in order to understand how increased knowledge of and access to FTL innovations influence farmers' perceptions and practices.

Results and Discussion

Barriers to adoption of forage tree legume innovations that were identified included the following:

Leucaena systems (West Timor, Sumba, Sumbawa):

- Where large areas of communal grazing lands are available, farmers do not see a need to allocate resources and labour to tether or pen cattle and feed by cut-and-carry. Families that own cattle and have the capacity to fatten tend to have a relatively large number of animals and prefer grazing over a cut-and-carry system, for which they do not have sufficient labour.
- In some areas, especially West Timor, farmers believe it is safer to let cattle graze on communal land than to tether or pen them, as theft tends to happen in built-up areas.
- There is a perception that newly established forage plots will be damaged by free grazing animals if the whole community does not participate in penning or tethering practices.
- Previously introduced varieties of leucaena are prone to psyllid infestation.

Sesbania systems (Lombok):

- Farmers do not have enough land to plant (more) sesbania trees. Where sesbania trees are planted on the paddy bunds, farmers feel they can't increase their density as there are already many trees and other fodder crops on the bunds.
- Many farmers believe that the sesbania trees on the bunds disrupt the development of the main crop in the paddy field by shading. In areas in Lombok with very narrow bunds, farmers fear (and have experienced) that sesbania roots can damage the bunds or cause water leaking.

Both systems:

- FTL trees are not always available in the area, or not in sufficient amounts for intensive feeding, while other fodders such as grass are in abundance.
- Farmers lack knowledge and skills regarding tree establishment and have no access to FTL seed sources. Farmers tend to have limited knowledge on the feeding/nutritional requirements of cattle and how to match these with the nutritional value of different forages. There are many misconceptions among farmers about the nutritional value of FTLs, and their side effects on cattle and feed preferences.
- In many cases, the price received for cattle sales is not

determined by the actual live weight but on an estimation by the trader. The limited bargaining power of the farmers provides a negative incentive for achieving maximum live weight of the animals. Many farmers tend to sell their cattle under the optimum sales weight due to lack of capital. This situation is unfavourable to the adoption of good feeding practices.

Opportunities identified for the introduction and intensified use of FTLs

- There is ample availability of land that can be allocated to FTLs, especially in areas where forage production systems are underdeveloped (Timor, Sumba and Sumbawa). Farmers have shown willingness to make use of available land to integrate FTLs into their cropping and cattle feeding systems.
- A psyllid tolerant variety of leucaena (cv Taramba) is now available in Eastern Indonesia and seems to be thriving under local conditions. Some farmers manage to produce and sell FTL seed, while others market FTL foliage as forage to other farmers and perceive this to be a lucrative business.
- Areas where FTL plots were established have attracted participation from Department of Livestock cattle distribution schemes for farmers. Local village governments expressed willingness to introduce village regulations to limit free grazing of animals and hence provide more favourable conditions for FTL plots to establish.

Conclusions

To overcome barriers to the implementation of FTL innovations and capitalise on existing opportunities, an effective outreach strategy would need to address perceptions, access and regulations. Perceptions can be influenced by providing information and experiences to farmers that alter their attitudes and improve their knowledge, skills and practices. This can be in the form of exchange visits, demonstration trials, informational media, practice-based training and dialogues. Access relates to agricultural inputs, such as high quality FTL seed, advisory and credit services, and land availability. Regulations may be required in some locations to support collective action. Such an outreach strategy is comprehensive, long term, involves multiple stakeholders, and requires all elements to be lined up to overcome the diverse set of barriers and utilise existing assets.

Acknowledgements

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