

Gender, ethnicity and engagement: Uptake strategies for smallholder cattle farming innovation in West Nusa Tenggara, Indonesia

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Abstract. Smallholder cattle production is one of the most important enterprises for the majority of people in West Nusa Tenggara as a source of income. This paper reports on how gender played a role in innovation uptake in cattle farming across three ethnic groups (Sasaknese, Sumbawanese and Balinese) and recommendations for a communication strategy design that supports effective innovation uptake. The 2015 socio-cultural study applied a case study methodology involving 19 communities. The research found that gender roles in cattle farming varied across ethnic groups. While cattle farming was generally dominated by men, women's involvement was more significant for the Sasaknese and Balinese with more intensive cattle farming systems. Across all three ethnicities, women had a prominent role in decision making where financial matters and budget allocations were involved. Women's involvement in meetings was poor due to cultural barriers and improper timings. Given women are important to production decision making, their lack of involvement can impede innovation adoption. A framework is offered to integrate gender sensitivity into communication strategies to support innovation uptake for livestock research for development initiatives.

Keywords: gender sensitive initiatives, decision making, innovation uptake, smallholder

Introduction

The majority of people in West Nusa Tenggara (WNT), which consists of various ethnic groups, rely on the agricultural sector as a source of income (BPS NTB 2015), with integrated crop-livestock systems being the most common. Cattle production is one of the most important enterprises to support smallholder families and plays a significant role in providing cash for children's schooling and social ceremonies. WNT consists of two main islands, Lombok and Sumbawa, each with its own cattle farming system. In Lombok, which is dominantly inhabited by Sasaknese people, cattle are usually raised in collective pens with a cut-and-carry feeding system. Meanwhile, in Sumbawa, which is dominated by Sumbawanese people, cattle generally freely graze in communal areas such as hills, roadsides and Lar (communal grazing areas). On both islands, cattle are usually managed traditionally, with a low-input system that relies heavily on the natural environment as a source of feed, resulting in low productivity and a low return on investment (Bamualim & Wirdahayati 2002; Wirdahayati dan Bamualim 1990 cited in Mastika 2002; Talib et al. 2002; Dahlanuddin et al. 2009).

Although innovations are available to increase cattle productivity, such as improved forage and feeding management, farmers still use traditional feeding systems. A study by Hilmiasi, Panjaitan & Sutartha (2016) shows traditional farmer perspectives on forage and cattle feed in WNT like *Sesbania* and *Leucaena*. Although feeding *Sesbania* has been a common practice in Central Lombok, the practice is confined only to this area. The majority of farmers in North Lombok are not aware of this practice due to limited information on the benefits of this quality forage for cattle growth. A similar story was mentioned for Sumbawanese farmers. Instead of utilizing *Leucaena leucocephala*, which is available in their surroundings, farmers prefer to put their cattle in the maize stalk after harvest. Reasons mentioned included that feeding *Leucaena* is an uncommon practice and cattle refuse to eat it.

Women's involvement in small holder farming and their contribution to innovation uptake across developing nations has been documented in many studies (Mugniesyah & Pamela 2001; Roosganda 2007; Ogunlela & Mukhtar 2009; FAO 2013; Endang, Tenaya & Astiti 2014; Kawaruzuka 2016). Yet there has been only limited research on gender ethnicity and behaviour in cattle farming and for innovation uptake. A research for development project funded by the Australian Centre for International Agricultural Research promoted the utilisation of tree legume fodder to improve cattle productivity. An outreach strategy for the production and utilisation of forage tree legumes (FTL) was developed based on socio-cultural studies that identified the needs, barriers and opportunities for FTL innovation among different segments of rural WNT. This paper aims to provide insights on the role of gender and ethnicity in relation to the uptake

of innovations in cattle farming. The paper presents some recommendations towards the design of a communication strategy that supports effective innovation uptake.

Methodology

A socio-cultural study was conducted in 2015, applying a case study methodology (Yin 2013) that involved 19 communities (defined by hamlet) in 19 different villages across four districts of WNT province. These communities contained three different ethnic groups: Sasaknese on Lombok island (eight hamlets), Sumbawanese on Sumbawa island (10 hamlets) and Balinese on Sumbawa island (one hamlet). Detail of the study sites can be found in Table 1.

Table 1: Study sites in Lombok and Sumbawa Islands

District	Sub-District	Village	Hamlet	Ethnic
Central Lombok	Jonggat	Nyerot	Repok Nyerot	Sasak
		Gemel	Bunperie	Sasak
		Puyung	Dasan Ketujur	Sasak
		Jelantik	Montong Obok	Sasak
North Lombok	Gangga	Rempek	Telaga Maluku	Sasak
		Ganggalang	Sembaro	Sasak
		Bentek	Luk Pasiran	Sasak
		Gondang	Gondang Timur	Sasak
Sumbawa	Rhee	Rhee Beru	Poto Pedu/Jatisari	Bali
	Rhee	Luk	Luk A	Sumbawa
	Rhee	Rhee Loka	Meno	Sumbawa
	Moyo Hilir	Berare	Berare A	Sumbawa
	Moyo Hilir	Serading	Serading	Sumbawa
	Moyo Hilir	Poto	Smeri	Sumbawa
West Sumbawa	Poto Tano	Kokarlian	Kokarlian	Sumbawa
		Senayan	Senayan	Sumbawa
		Lamusung	Lamusung	Sumbawa
	Seteluk	Meraran	Meraran	Sumbawa
		Seteluk Atas	Seteluk Atas	Sumbawa

In each hamlet, ten households were selected purposively that represented low, middle and better-off households. Interviews were conducted with both male and female farmers in the family, where possible, to collect qualitative and quantitative data. In addition, focus group discussions and participant observation complemented the data collection (Chambers 1994; Bryman 2004; Marshall & Rossman 2006).

Data that were collected included gender participation in cattle farming across different ethnic groups and farming systems, financial management and decision making, and involvement in farmer group activities. The level of gender participation was measured as the proportion (%) of participants' involvement and influence in the cattle farming system. These percentages were obtained from respondents' perception of their own involvement in each activity.

Results and Discussions

Understanding cattle farming systems across different ethnic groups

Farmers at all study sites practiced an integrated crop-livestock system with paddy and maize being the main crops. Cattle were the most important livestock, followed by buffalo, horse, goats/sheep and chicken. Livestock were seen as a savings and buffer mechanism for the family economy. Livestock played a role as an accumulated asset that could be sold when the family needed a large amount of capital such as for building a house, sending children to school, and social ceremonies. As a buffer for the family economy, livestock could also be sold when crop farming failed to perform as expected.

This study shows that the cattle farming practices differed between the two islands, yet generally were managed under a traditional low input system with little intervention. In Lombok, cattle were managed intensively where cattle were put in a pen either collectively in one location, or individually in the back yard. This was influenced by the very small land tenure, around 0.4 ha per household. The average herd size was 2.5 cattle per household, with around 76% of farmers owning cattle. Those without their own cattle typically managed those of others in a profit sharing scheme. Most farmers practiced a cut-and-carry feeding system with forage

collected from communal lands such as roadsides, river banks, and rice field bund. The distance for forage collection varied between one to ten kilometres.

Different practices were found in Sumbawa Island. In all sites but Jatisari, farmers practiced a semi-intensive to extensive management system with the average herd size being around 8.2 head per household. Land ownership in Sumbawa was relatively large, more than 1.5 ha per household compared to only 0.4 ha in Lombok. For the semi-intensive system, cattle were put in the "*kebun*", a fenced piece of land, locally known as *bara* (pen). Inside the *bara*, farmers provided a feeding trough made of wood or used tyres. Usually farmers provided rice straw, native grasses and crop residue such as mung bean, peanuts and maize straw. For the extensive system, during crop planting season (November to May), cattle were mustered to the hills or unplanted areas to prevent crops destruction. After crop harvest, cattle were mustered to the farmland either owned by farmers or belonging to other farmers, so cattle could graze the cropping residues such as maize stalk and soy bean straw.

Meanwhile, in Jatisari which is dominated by a Balinese community, cattle were being managed more intensively. Many farmers already ran fattening enterprises with advanced management systems such as planting and offering feed regularly with business orientation. The existence of the Balinese community in Sumbawa was a result of the government transmigration scheme in the 1970s and 1980s that allocated farmland to the migrants (Ardiansyah 2010). These migrant farmers brought their cattle farming systems from Bali, which were more intensive, business oriented and applied a cut-and-carry feeding system. This was totally different from the subsistent extensive system of local farmers in Sumbawa. The practice of intensive and business oriented cattle farming was somewhat influenced by the migrants' need to survive in new place with limited land and resources.

As a result of more intensive farm management, cattle performance of the Balinese community was generally better than that of the Sumbawanese farmers. Several respondents outside Jatisari reported that Balinese farmers always had a much better selling price. Yet, Sumbawanese farmers were reluctant to follow the Balinese intensive cattle farming practices as it was considered to be labour intensive and alien to the local culture. A local respondent mentioned that carrying goods particularly on one's shoulder does not fit with the Sumbawanese cultural perspective. There is a local perception that carrying feed for cattle means being enslaved to the cattle. They preferred to observe and count the number of their grazing cattle without worrying about the growth rates and selling prices.

Labour distribution for cattle farming

In general, cattle farming activities were dominated by men, which was particularly true for the Sumbawanese communities. However, for the Sasak people and the Balinese, who tended to manage more intensive cattle farming systems, the involvement of women was more significant, accounting for up to 30% of role portion of the enterprise. Details of the proportion of labour allocation between men and women in cattle farming is presented in Table 2.

This study found that norms, customs and the cattle farming system influenced the roles and responsibilities between men and women in cattle farming. Rearing cattle for the Sasaknese in Lombok and the Balinese in Sumbawa Island was seen as collaborative work between husband and wife. Women's involvement was particularly prominent in tasks such as collecting and offering feed and providing water to the animals. The gaps of labour distribution between husbands and wives were even smaller for Balinese farmers. There was a case when a single mother with two small children was able to manage 20 cattle. The significant women's involvement in cattle farming for the Sasaknese and Balinese was supported by the intensive cattle farming system. In this system, cattle are kept in a pen that allow women to participate in the farming activities.

Table 2: Labour allocation (%) between men and women in cattle farming

Location/ Hamlet	Collecting feed (%)		Offering feed (%)		Offering water (%)		Cleaning Pen (%)		Looking after sick animal (%)	
	Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife
Bun Perie	83.5	15	80	20	78	22	80	10	100	0
Repok Nyerot	80	12	87	9	85	15	85	15	95	5
Dasan Ketujur	76	23	67	30	72	27	72	27	97	2
Montong Obok	78	18	77	18	87	13	87	13	97	3
Sembaro	72	26	72	27	78	22	29	71	95	5
Luk Pasiran	89	9	91	7	88	8	79	13	100	0
Gondang Timur	77	19	76	22	61	37	54	44	71	9
Telaga Maluku	55	40	55	34	66	24	66	19	78	7
Lombok (av.)	76.3	20.3	75.6	20.9	76.9	21.0	69.0	26.5	91.6	3.9
Jatisari	55	39	50	43	48	41	61	32	79	16
Berare	70	8	74	7	71	11	75	23	95	0
Luk A	79	14	79	14	77	13	0	0	100	0
Meno	55	24	64	23	56	31	0	0	100	0
Serading	78	3	80	10	80	1	84	0	72	0
Semeri	77	13	77	13	87	13	0	0	95	5
Kokarlihan	60	12	52	16	35	21	58	42	82	8
Lamusung	93	0	58	18	97	3	100	0	86	0
Meraran	81	0	81	0	84	0	0	0	97	0
Senayan	89	4	82	3	82	3	0	0	82	0
Seteluk	87	5	86	5	93	4	0	0	100	0
Sumbawa except for Jatisari (av.)	76.9	8.3	73.3	10.9	76.2	10.0	31.7	6.5	90.9	1.3

Note: there is "other" labour in all activities that made them up into 100%. "Other" can be children or other family members.

In the Sumbawese extensive cattle farming system, the role of women is far less prominent. Cattle farming activities are considered to be men's work by Sumbawese men and women, although interestingly male respondents did express their expectation for women to have greater involvement. It was revealed in the interviews that it was not common for Sumbawese women to do cattle work. They preferred to stay at home rather than going to the field looking after cattle. This was exacerbated by the extensive cattle farming system where cattle can roam in the hills, forest and communal areas. Moreover, being involved in cattle farming activities was considered to be hard work for Sumbawese women. In a half joking manner, a woman interviewee mentioned that Sumbawese women are only interested in the money from selling cattle.

Women's roles for financial management and decision making

While cattle farming was a male dominated activity, women across all ethnic groups in WNT had a prominent role in decision making, particularly when financial matters and budget allocations were involved. Respondents reported that women managed the money and that men turned income they receive over to their wives. It was common to hear that a woman was the treasurer in the family. However, decisions about spending on large expenditure tended to be consultative between men and women, although women could decide on daily needs without consulting their husbands. Details of the distribution of household management and decision making are shown in Table 3.

Table 3: role proportion between men and women in household financial management and decision making

Location/ Hamlet	Financial management		Decision Making	
	Husband	Wife	Husband	Wife
Bun Perie	16	84	70	30
Repok Nyerot	34	66	50	40
Dasan Ketujur	14	86	56	44
Montong Obok	81	19	50	50
Sembaro	10	90	55	45
Luk Pasiran	5	95	50	50
Gondang Timur	25	75	67	33
Telaga Maluku	27	72	67	33
Lombok (av.)	26.5	73.4	58.1	40.6
Jatisari	35	65	70	30
Berare	5	95	53	41
Luk A	25	75	87	13
Meno	10	90	73	27
Serading	5	95	65	25
Semeri	15	85	60	40
Kokarlihan	10	90	70	30
Lamusung	15	85	65	35
Meraran	10	90	85	15
Senayan	0	100	60	40
Seteluk	0	100	80	20
Sumbawa except for Jatisari (av.)	9.5	90.5	69.8	28.6

Table 3 shows that although women played a small role in cattle farming activities, they played a significant role in selling decision making and cash allocation from selling, which indicates that women had a great influence over financial management. Therefore, research and development activities that introduce innovations and promote practice changes need to increase women's participation. The logic is that implementing innovations and changing practices means changing farming behaviour. This process needs negotiation between husband and wife regarding family economy risks and cost consequence, because innovations usually require additional inputs. Involving women from planning through implementation and evaluation stages of the research and development initiative provides greater opportunities for women to understand the benefits of implementing the innovations. This understanding then leads to positive influences in the household that assist in the uptake of the innovations. Hence, women's involvement in research and development initiatives assists the innovation's uptake by influencing the family decision-making process. Moreover, their involvement prevents disputes between husband and wife over farming practice changes.

Women's involvement in meetings and knowledge exchange opportunities

Across all ethnic groups and cattle farming systems, women's involvement was poor or almost non-existent in farmer group or community meetings. Details of women's meeting attendance for all ethnic groups at all study sites is presented in Table 4. As shown, women's participation in attending village and farmer group meetings is very limited, around 5% compared to around 95% for men. In Jatisari, which is dominated by Balinese, women's involvement was even zero. The findings of this study are in line with other gender studies^{3,4} in which women's time commitments to household responsibilities limit their ability to access public spaces and services including agricultural extension and training. This was exacerbated by the patriarchal cultural values that were deeply rooted across all ethnic groups in this study, that the man is the leader of the family and women are in charge of household works. Therefore, women's involvement in social forums including attending group meetings, extension activities and trainings was limited.

Table 4: Role proportion between men and women in attending meeting

Location/ Hamlet	Attending village meeting		Attending Group Meeting	
	Husband	Wife	Husband	Wife
Bun Perie	95	5	98	2
Repok Nyerot	84	16	96	4
Dasan Ketujur	95	5	100	0
Montong Obok	90	10	100	0
Sembaro	100	0	0	0
Luk Pasiran	100	0	0	0
Gondang Timur	100	0	95	5
Telaga Maluku	93	7	87	13
Lombok (av.)	94.6	5.4	96	4
Jatisari	100	0	0	0
Berare	95	5	95	5
Luk A	93	7	100	0
Meno	92	8	100	0
Serading	94	6	100	0
Semeri	89	11	90	10
Kokarlihan	87	13	84	16
Lamusung	71	29	96	4
Meraran	90	10	95	5
Senayan	75	25	91	9
Seteluk	97	3	100	0
Sumbawa except for Jatisari (av.)	88.3	11.7	95.1	4.9

Interviewees reported that women tended to stay at home and rarely come to group or village meetings. However, husbands would tell their wives the results of the meetings. Reasons mentioned for this include cultural barriers and improper timing of meetings, which often clashed with household and family duties. This deprives women of opportunities for information exchange and training about improved cattle management. New information and training is particularly important for those who make major farm management decisions, as the women do.

Livestock research for development projects often fail to acknowledge women's role in the family as one of determinant factors for innovation uptake. As women play a major role in resource allocation in the household, they are influential in the decision regarding whether or not to implement an innovation or different farming practice. Therefore, research for development initiatives need to be gender sensitive in their design and implementation of information sharing and knowledge exchange activities. A study of women's empowerment to support agricultural development by Roosganda (2007) emphasizes that women have essential roles in the family and potential to direct the household towards better or worse directions. Hence, women's participation in agricultural development initiatives needs to be enhanced.

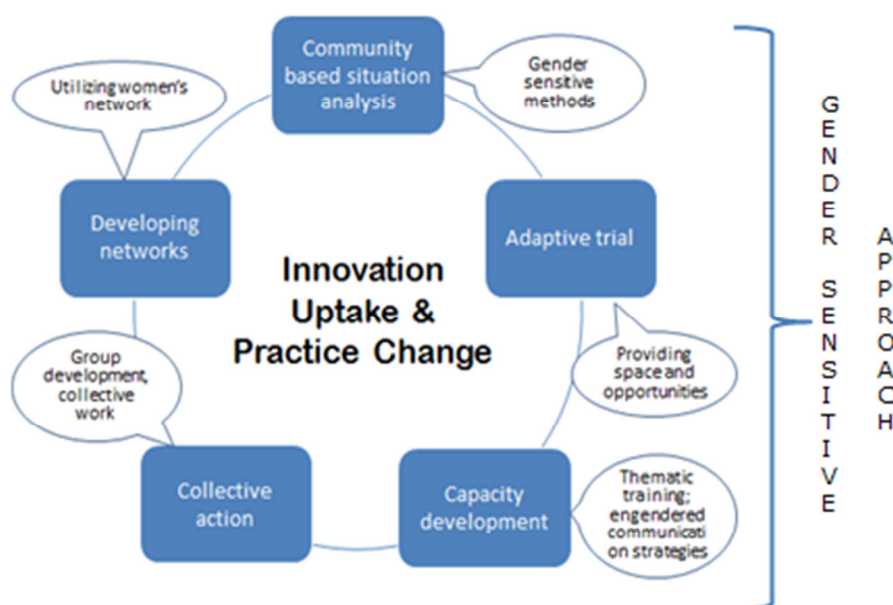
Integrating gender issues into communication strategies to support innovation uptake

The findings of this study are consistent with a number of gender studies across developing countries (Mugniesyah & Pamela 2001; Ogunlela & Mukhtar 2009; FAO 2013; Kawaruzuka 2016) that women's involvement in agricultural development program is still marginalized. One contributing factor to this condition is the design and operationalization of the programs, which are often more adjusted to men's schedule and activities in the farming system with little concern given to women's needs and conditions. This hampers women's access and participation in the activities, which subsequently inhibits women's potential to contribute to such development programs. It was observed in this study that training and practice sessions for the introduced innovations were usually run at night or in the morning, which is culturally and

practically unsuitable for women across all ethnic groups in WNT. Going out at night time, particularly for a considerable distance without husband's attendance, is considered inappropriate for women. Furthermore, morning is a busy time for doing housework. Therefore, women's access to extension services, new information, knowledge and skills on cattle farming were limited. This has overlooked women's influence for innovation uptake and improving cattle management for their important roles on family financial management and decision making process that also involves cattle farming enterprise.

There has been a strong call to reform agricultural development programs, particularly in developing countries, to understand and integrate gender issues in the design and implementation and enable women's inclusion and contribution for impact achievement (Mugniesyah & Pamela 2001; Ogunlela & Mukhtar 2009; FAO 2013; Kawaruzuka 2016). In response to this call, this study proposes a practical framework for engendered livestock research by taking into account different cattle farming systems and social perceptions of women's roles and responsibilities among different ethnic groups. The main aim of this framework is to increase innovation uptake in livestock development initiatives, leading to improved cattle management by enhancing women's involvement during the design and implementation processes through improved project design and implementation strategies. The proposed framework is presented in Figure 1.

Figure 1: A proposed framework for engendered livestock research for development initiatives aiming for innovation uptake and practice changes



Adapted from Hilmiati, Panjaitan & Sutartha (2016)

The engendered framework for innovation uptake and practice change oriented livestock research and development programs comprises five interrelated elements (see Figure 1). It begins with community based situation analysis. The situation analysis mainly aims to raise awareness of the need to improve livestock enterprise by having consensus understanding on barriers and opportunities to solve the problems. Women's involvement at this beginning point is crucial in determining their subsequent participation. It has been confirmed in a large number of studies that early involvement of participants in identifying the main problems and determining the project agenda during the design stage will create a sense of ownership over the implementation, followed by faster, more sustainable and self-motivated practice change (Chambers & Ghildyal 1985; Maurya 1989; van de Fliert & Braun 2002; Hilmiati, Panjaitan & Sutartha 2016). Enabling greater women's involvement during the community based situation analysis needs to be facilitated by designing an approach and methods that consider their social and culture circumstances. In this study, it was done by segregating men and women groups during the situation analysis. It was interesting that women's contribution and engagement during the activities were outstanding where participants gave their opinions without hesitation, an almost impossible picture in a mixed group discussion between men and women. In a mixed group discussion, male participants usually dominate the conversation, while females tend to be quiet or busy preparing drinks and refreshment.

The second and third intertwined elements of the framework are adaptive trial and capacity development with a gender sensitive approach. Very often, trialling and capacity development in livestock research and development programs target men in the design and methods. The framework in this study proposes that women also need an opportunity to conduct, adapt and take responsibilities over a trial of the introduced innovation that they experience the results of first hand. This adaptive trial is supported by thematic training that needs to be gender sensitive. It means that the training is designed to suit women's social and cultural circumstances. As an example, the training group should be segregated between men and women and scheduled at a time when it does not interfere with women's housework. This capacity development process is an opportunity to increase women's capacity, to enable them to reach and express their optimum potency.

The last interconnected elements of the proposed framework for engendered livestock research for development programs is collective action and developing networks. Women across ethnic groups have their own networks that can be employed to enhance innovation uptake. Interactions with neighbours and others either in the field or during free time usually involve information exchange of various issues. These interactions tend to have strong bonds due to family relations and have great influence over others' perceptions of the topic being discussed as the shared information come from one's experience that they know and trust. Therefore, in agreement with Endang, Tenaya & Astiti (2014) and Kawaruzuka (2016), it is suggested that understanding and empowering the gendered informal networks by enhancing women skills and capacity provide greater opportunities for innovation uptake on a wider scale. Yet, activities that involve women for the implementation of new innovations need to be communicated to the husband since a husband's support and understanding is essential for women participation to expand their capacities and implement the introduced innovations.

Conclusions

This research found that gender roles in cattle farming varied substantially between the different ethnic groups and farming systems in WNT. Sasaknese and Balinese women had higher participation for collecting and providing feed in their intensive system compared to Sumbawanese women who tended not to be involved in the extensive cattle farming system operating in their region. Across all ethnic groups and cattle farming systems, women had a dominant role in financial management including from selling cattle, and acted as a consultant for their husband in any decision making. In reverse, in all communities, women's involvement in attending meetings was poor due to cultural barriers and the improper timings of these meetings as they often clashed with household and family duties. This has deprived women of opportunities for information exchange and training about improved cattle management. Therefore, this paper proposes a framework to integrate gender issues into communication strategies to support innovation uptake for engendered livestock research for development initiatives. The core principle of this framework is engendering the initiative's processes and methods to enable women's active involvement to provide greater opportunity for innovation uptake and practice change. These processes include: situation analysis for planning; adaptive trial to reassure suitability of the innovation; capacity development to enhance women's knowledge and skills to implement the innovations; and collective action and developing networks that empower women's existing social networks to scale up the innovation uptake and practice.

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