Impact of participatory approaches on sheep production in North Sumatra, Indonesia

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Introduction

The low annual per capita meat consumption in North Sumatra (Disnak Sumut 1994) is mainly due to the limited supply of meat. Only 45% of North Sumatra's demand for small ruminants is met by local suppliers (Karokaro et al. 1993). This short supply is a reflection of the low animal population and the low productivity in the region where most of the ruminants are raised by smallholders. There is a need to increase both the population and productivity of ruminants within this region.

A new settlement at Marenu, South Tapanuli in North Sumatra Province aimed to organise smallholders whose main source of income is sheep production. A flock of 25 ewes and 2 rams were given to each transmigrant by the government in 1996. In addition, a simple woody house, a barn, and 1 ha of upland area were also made available to them. Approximately 0.5 ha of this land was planted to King grass (*Pennisetum hybrid*), while another 0.5 ha was used to grow cash crops to augment the still meagre income from sheep production. A cost of living allowance and feed supplements were also provided by the government for the first year. Income projections show that each transmigrant family with 40 ewes would earn a monthly income of 350,000 rupiah by selling 6 young rams per month.

Field visits in 1996 observed the poor condition of both sheep and forages, resulting in poor sheep production at Marenu. Therefore, this site was selected by the Forages for Smallholders Project as a pilot area for developing forage technology to improve sheep production. The participatory research (PR) method was used with farmers to ensure active and equal participation. Through this approach, their needs and their perceptions of the new technologies would be clear from the beginning (Horne 1996).

This paper discusses the impact of the PR approach on the performance of sheep production at Marenu.

Material and methods

Site description

The site is located at Marenu village, in sub-district Barumun Tengah, Tapanuli Selatan district, North Sumatra Province. This is a new settlement which has been occupied by some 100 families of transmigrants since 1996. These families depend on sheep production for livelihood. The Government provided some facilities to assist them. Soil is classified as a Tropudult; it has low fertility and low organic matter, nitrogen, and phosphorous content. Annual rainfall ranges from 2,500 to 3,000 mm and there are distinct dry and wet seasons. The rainy season can be expected from December to March. The driest months are July to October.

Marenu is contrasted with a lowland site, Pulau Gambar, near Medan where a women's group raises goats in pens. Feed is available from rice fields and nearby oil palm and rubber plantations.

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Stratification of farmers and sheep husbandry

The farmers were classified into the PR group and the non-PR group. Farmers in the first group were introduced to forage technologies through the PR approach. The non-PR group were farmers who only availed of the facilities offered by the government and whose main source of forages is King grass. A semi-intensive system was used by both groups, including both grazing and cutting forages, to feed their animals.

Farmers in the PR group were involved in all stages of the PR approach including participatory diagnosis, planning, experimentation and evaluation. Ibrahim (1997) reported that farmers agreed to try forage species with drought tolerance to improve sheep production. Using their own criteria, the farmers ranked *Paspalum atratum* BRA 9610 as the best accession among the grasses tested. This was followed by *Paspalum guenoarum*, *Brachiaria humidicola*, *Brachiaria brizantha*, *Paspalum atratum* cv. Pantaneira, and *Brachiaria humidicola* CIAT6133. These species were valued higher than King grass and are still being developed and used. Among the legumes, farmers ranked *Gliricidia sepium* as the most preferred species followed by *Leucaena leucocephala*, *Stylosanthes guianensis*, *Centrosema pubescens,* and *Calliandra calothyrsus*. However, due to its limited number, these introduced legumes did not develop at the expected pace and were not used as fast as the grasses.

Measurements of impact of the PR approach

The parameters used to evaluate sheep production – present population, time allocated for collecting cutting material and grazing, body weight of sheep and income – were measured in both PR and non-PR groups.

The data were obtained from a survey using five farmers per group as respondents. The body weights of sheep were measured monthly but comparison was made only between the two groups at the same age. The present population of sheep owned by a farmer, the time consumed for feeding, and the income generated by the PR and non-PR groups were also obtained.

Results and discussion

Starting with the same number of animals (2 rams and 25 ewes in 1996), it was shown that the total number of sheep owned by an individual farmer belonging to the PR group was considerably higher than those of the non-PR group after two years (Table 1).

Table 1. Average numbers of sheep own by farmers in January 1998, stratified by age (months).

Farmer group	Marenu, Tapsel				Pulau Gambar			
	<3 months	3-<12 months	>12 months	Total	<3 months	3-<12 months	>12 months	Total
PR group								
- rams	2	6	2		2	3	1	
- ewes	2	7	26		1	4	11	
Total	4	13	28	46	3	7	12	22
Non-PR group								
- rams	2	2	1		1	2	2	
- ewes	2	2	18		3	3	10	
Total	4	4	19	27	4	5	12	21

The number of sheep owned by farmers increased by 74% in the PR group; it remained the same in the non-PR group. The difference between the two groups may be due to the higher mortality observed in sheep owned by the non-PR group. Farmers

claimed that diarrhoea was the most common cause of death of sheep. However, the real reason for the high mortality must be further investigated, although irregular timing of drenching and lack of feed were thought to be responsible.

In general, the PR group used less time for cutting forages and grazing activities than did the non-PR group at Marenu, Tapsel (Table 2). This time reduction was attributed to the shorter distance travelled to get forage. The larger amount and easier to cut forages available in their backyard also reduced the time allocated for grazing.

Table 2. Time needed for obtaining feed for animals.

Group	Cutting forages		Grazing	
	Time (hours/day)	Location	Time (hours/day)	Location
Marenu				
– PR group	1	Backyards	4	Backyards
– Non-PR group	2	Swamps	6	Forests
Pulau Gambar				
– PR group	2	Backyards	3	Rice fields
– Non-PR group	3	Plantations	5	Rice fields

At the Marenu site, the sources of cut forages of the non-PR group farmers where the swampy areas almost 2 km away from their barns. Grazing was done on open native grassland available around the forest. The average body weight of sheep reared at Marenu was observed to be higher in the PR group than in the non-PR group (Table 3).

Table 3. Average body weight (kg) of sheep.

	Ages (month)					
	3	4	5	6	7	8
Marenu						
Rams						
- PR group	10.8	11.1	11.7	12.5	13.2	12.5
- Non-PR group	5.8	7.0	7.0	8.1	8.9	8.5
Ewes						
- PR group	9.4	10.2	11.1	11.3	11.5	12.2
- Non-PR group	7.2	7.7	8.0	8.6	9.3	9.9
Pulau Gambar						
Rams						
- PR group	8.8	9.1	11.9	-	-	-
- Non-PR group	7.1	11.0	12.2	-	-	-
Ewes						
- PR group	8.8	9.1	12.0	-	-	-
- Non-PR group	7.5	9.7	12.0	-	-	-

Table 3 shows that differences in body weight between the two groups remained similar (about 4 kg) at any given age. This would indicate that the difference started from birth; the weight might have been related to both quantity and quality of feed given to the pregnant ewes.

Since concentrates are expensive, the need for protein may be met by legumes. Therefore, the practice of planting and using legumes (herbaceous, shrubs, trees) is an important component of sheep husbandry of smallholders. Farmers in the PR group had already planted some legumes, using them as animal feed.

At Marenu, because of the greater body weight and better physical condition, the sheep owned by the PR group commanded better prices (Table 4). Manure production was also higher in the PR group because of the larger population. Therefore, farmers in

the PR group obtained an income which was 31% higher than that earned by the non-PR group.

Table 4. Income per month per farmer from sheep sales.

	Sheep (head/Rp)	Manure (bags/Rp)	Total (Rp)
Marenu			
- PR group	2 / 105,000	8 / 12,000	117,000
- Non PR group	2 / 80,000	6 / 9,000	89,000
Pulau Gambar			
- PR group	-[1]	-	-
- Non-PR group	-	-	-

[1] No regular sales

However, the present monthly income of Rp 117,000 at Marenu is only 33% of the target of Rp 350,000. Each farmer has to sell around 6 young rams per month to achieve this target. This number may be produced from a flock of 40 ewes. Each farmer currently owns only 26 ewes on average and they are able to sell only 2 rams per month. Further subsidies from government are needed to achieve the ideal flock size of 40 ewes. A larger flock needs more feed. Because forages (grasses and legumes) are relatively cheap sources of feed further development on this aspect is important.

Conclusions

The application of forage technology through the PR approach improved sheep production of smallholders at Marenu. This was closely related to problems faced by farmers. The opinions and criteria used by farmers in selecting the technology were the factors that mattered most in the development and adoption process of the said technology.

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