

Strategy of Goat Farming Improvement in Upland Watersheds

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ABSTRACT: Goat farming technologies improvement was studied in Gunungsari village, Boyolali district (Serang Sub Watershed). Study includes the following steps i.e.(1) Rapid rural appraisal (RRA) as location identification to explore information about farmer perception, requirement, and problems faced in livestock farming, (2) technology designing according with farmer's circumstances, (3) suitable technology implementation. Progressive farmer who was responsive for changing was chosen in the first steps. In general, technology improvement strategy used grouping and active farmer's participative method. Results showed that livestock farming contribute 22,7% of total income with very low labor productivity (Rp 9.00 / man-hour). Main problems faced by farmer in ruminant farming were limitation of fodder (especially in dry season),

disease and capital limited. To overcome those problems, high grass varieties were introduced as initial steps. After 22 months grasses spread rapidly to out of village. After that 20 farmers take part in goats sharing system. During 3.5 years, goats population in sharing system increase around 600% (initial population was 40 heads). Stabilized goats farming in groups, grass village nurseries and coop were introduced. But even though goats population increase rapidly, goats farming scale per households wasn't change significantly. Goats' orientation was for investment and as middle effort to be able to buy cattle. Goat were also liquid assets for farmers to get cash money when needed. To increase livestock contribution and decrease food crops dependence, higher contribution of private sector in input and capital were needed, since livestock is strong relation with land conservation in upland.

Key Words: Goat Farming, Upland Watersheds, Improvement Strategy

Introduction

In general, land in upper upland watershed are in critical condition with low productivity. It's caused by land degradation. According Arsyad (1992), decrease of land productivity in upland mainly is caused by lost of nutrients which uptaken in the crop yielding without proper land conservation effort. In fact, farmers realize the negative impact of that situation, but limited resources don't allow them to conserve their land since land conservation will reduce inputs for farming (Achil, 1978). Aside, farmers tend on shortterm orientation. in this case, direct impact at present is more important (Setiani et al, 1994). Based on that circumstances, technology introduction should be concerned on land conservation which have significant shortterm direct impact.

But, it was found in many research, technologies introduced were almost not sustain applied by farmers. Top down approach that placed farmers as an object, seemly being the cause

(Adjid, 1981). Learning from that experience, research methods used by Farming Research Systems (FSR) component of the Upland Agriculture and Conservation Project (UACP), was on-farm to increase farmers' involvement in research activity. Hopefully, response of farmer (rejection/acceptance), as well as problems and constrain in technologies introduction could be fastly identified (Hermawan and Prasetyo, 1991).

Using the above consideration, one of the technology introduced by FSR-UACP was fodder and goats establishment, related with conservation effort and concerned of perception, preference as well as farmers' capabilities. Goats were choosed base on shorter reproduction period comparing with cattle so the approach suitability could be identified soon. Aside, related with farmers' capital limitation, these probability to implement the introduction of technologies by their own resources, will be higher. In addition, livestock farming couldn't be separated with their subsistence intraditional farming. Livestock, especially ruminants, provide inputs

farming requirement. Directly, livestock provide manures, while indirectly cash income gained from livestock raising could be used to buy inputs (Lubis et al, 1991). Furthermore, in critical upland, more intensive ruminants raising farmers preference to plant forages is higher. These are important since forages could also decrease erosion. This paper discusses suitable approach in field implementation. Hopefully, the results could be used as a livestock model development, especially goats.

Research Method

Research of goat's development was carried out from 1990 up to 1993, in Gunungsari Village, Boyolali District, as a part of Serang Sub Watersheds. Research using the following steps i.e. :

Location identification, to explore farmers perception, requirement, and problems faced in livestock farming. Research used the Rapid Rural Appraisal method

Packaging of promising technology. Based on location identification, promising technology was packaged concerned in farmers' resource (labor and capital).

Technology implementation. Technologies implement in stepwise, i.e. : - fodder introduction in

the first years, - goat introduction on sharing systems in the second years, - grass nursery and group capital collection in the third year

Technologies developed in a plate of land owned by farmers. For efficiency, farmers were grouped. The approach was known by Joint Research and Development (*Penelitian Pengembangan*) which is participatory approach. Monitoring and evaluating progress conducted periodically, so problems could be identified fastly for solution.

Results and Discussion

Location identification

Goat farming profile

Commonly, farmers raise livestock. Research found that 87% of farmers raised ruminants, while 57% of them raising a goat. Amount of goat were vary. 64% of them range from 2-3 heads. There were three property status, i.e. owner, combination of owner and sharing, and sharing with fifty-fifty beneficiary system. Most of goats owned by farmers (81%), while the rest were combination of own and sharing.

Table 1. Goat farming profile in Gunungsari village, Boyolali District

Statement	Numbers of farmers (%)
Amount of goats (head)	
1	18
2	33
3	31
4	6
5	6
6	6
Property status	
own	81
sharing	16
both (own and sharing)	3

Table 2. Description of labor used, income, and goat productivity in Gunungsari village, Boyolali District

Statement	Amount
Labor used (man hours/year)	916
Income (Rp./year)	155.696
Cash cost expenditure (Rp./year)	71.739
Non cash expenditure (Rp./year)	152.668
Labor productivity on cash cost (Rp./man hours)	92

Research showed that goats raised traditionally. Goat's housing was almost never found. Goats feed supplied was in cut and carry systems, eventhough sometime goats grazing in fallow lands, along roadways, foot paths and canals, waterways, etc. In Java island there was no more existing grazing lands. Goats graze in the morning (09.00 Am-11.00 am) or afternoon (2.30 pm-16.00 pm).

Annually labor used was distribute in fluctuate way. In average, total labor used for goat raising per annum was 916 man hours, with very low labor productivity (Rp. 92,- per man hour). Mostly, labor used is for fodder collection. Peak of labor used are in August as the most difficult month for getting fodder (the driest month in dryseason). In the contrary, the less months labor used are at January and May as months of food crop yielding. Farmers commonly use the yield by products for fodder (Sabrani et al., 1989a). According to Lubis et al. (1991), usually farmers only use yield by products for fodder. They tend to collect and store it as much as possible. The problem is that forage preservation has not been known well by farmers, so many of them will be damaged and unutilized. But seemingly, livestock raising still not enough to fulfill the blank month in the dry season (June-September) since labor used is lower relatively than others.

In general, goat expense limited only in goat housing building/renovation and supplement buying (concentrate). There is no expenditure for vaccination.

Goat farming contributed to 22.7% of total family income. It include livestock selling and indirectly from manure (since farmer never sell manure). Farmers usually sell their goats if they need a big

amount of cash money. Goat selling is not base don maximum profit orientation (weight or age). If labor used was accounted as expenses, farmers will loss Rp. 68.711,- per year. But, traditional farmers are not profit oriented but utilized maximization (Sabrani et al., 1989a). For Gunungsari farmers, livestock function as saving media, investation, and source of manure.

Low productivity of goat farming was caused by poor biologic performance, beside the poor quality of feed supply and inefficient management. Furthermore, goat productivity could be improved through improving feed supply quality by combining high grass quality, legumes and supplement, beside, the neccesity of goat quality improvement, and extent management establishment (Sabrani et al., 1989a).

Problems faced in goat farming

Research showed that fodder and disease were the main problems faced in goat farming (Table 3). Bloat was the main (42%), while scabies was the rest. Farmers also mention problem in grass and others forages plantation, i.e. unavailable planting material and labor limitation (18%). 13% farmers whose unknown high forages quality plantation indicate the necessity of more intensify extention

Strategy of goat farming development

Based on the above matters about goat farming, technologies were developed. There are five criteria used in technologies development (Anderson and Hardaker, 1979), 1) biologic and agronomic feasibility, 2) comparative benefit and farmers' capability, 3) compatible with existing farming

Table 3. Goat farming restrictions

Restrictions	Numbers of farmers (%)
Goat management	
Feed supply	39
Scabies	19
Bloat	42
Forages plantation	
Unavailable planting material	65
Labor	18
Lack of information	13
Drought	4

practice, 4) suitable with infra structure, socio economic, and marketing prospect and 5) socially and culturally accepted by farmers.

Furthermore, concerning with marginal upland condition technologies improvement should orient to soil and water conservation effort (Prasetyo and Haryati, 1994).

To reach the goal, the first technology introduced in Gunungsari Village was forages either to improve feed quality or to conserve land. After forages were established, livestock management were improved in the second year, which include high goat quality on sharing system, housing management, and disease control. To increase efficiency farmers were organized in group.

Farmers grouping

As initial step, target area were around 50 hectares of land. Farmers owned the land were organized in group. Farmers grouping is the effective and efficient way to develop farming technology. Aside, relatively narrow land tenure in upland cause conservation effort should be conducted together by farmers. Conservation will be significant if practiced in a wider plate of land. Grouping and farmers participation are two factors which influence succeed of technologies institutionalization.

All farmers were given high variety of grasses and legumes planting materials. It was planted in terrace. Subsidies management were convinced to

group leader with subgroups leaders assistance.

After one year activity, evaluation showed that forages introduction were not fully implemented by farmers. So, in the following years technology difusion was refined by using some innovator farmers. The aim was to get the demonstration effect regarding to Castille (1975). Seven farmers were chosen and fully subsidized. The choosing criteria were based on : - strategic of location, - compromise, - available labor - farming as a main occupation, - active in group's, - kinds of farm were representative but have better results, - style and way of thinking were always besed on ratio and utilization.

Results showed that grasses introduction were spread rapidly after 14 th month after introduction, grasses plantation were founded in all dukuh (Subvillage), and the folowing 8 months, grasses plantation were spread to out of village (Hermawan and Prasetyo, 1991).

The direct impact of grasses and legumes plantation were feed supply quarantee. It was decreased labor used in fodder collection to 60 % (Setiani et al.,1990). Furthermore, grasses plantation increased labor productivity in livestock to 82 % or even to 109 % if farmers also plant legumes (Hermawan and Lubis, 1991). Farmers production recording were showed in Table 4.

Farmers understanding about others function of forages plantation on terraces increased. Table 5 showed that after 4 years activities, farmers

explained that forages plantation also for terrace strengthen and soil conservation. It related with duration and intensity of extention. Farmers whose intensive extent in long period will realize the importance to strengthen their terrace to control erotion. Otherwise, slope land with strong terrace will more productive and more efficient since it doesn't need to be repaired every years.

According to the research of Haryati et al., (1993), after two years plantation of teraace strengthening in Field Laboratory, Ungaran, soil erotion decreased below the tolerable level (13.66 ton/ha). Duration will be longer (4 years) if it use vegetative conservation through legumes plantation on alley cropping.

Table 4. Kinds of legumes and grasses average of terrace length planted, and production potential of 15 sample farmers in Gunungsari Village, 1993.

Kind	Length of terrace planted	Average per farm	Production (10 m/year)
	Meter		Kg/ha
Gliricidia	3.753	250.2	163.3 ^a
Flemingia	854	61.0	26,7 ^a
Kaliandra	628	48,3	-
King grass	1.596	106.4	198
Eliphant	4.789	319.3	155.6

^aCutting interval for Gliricidia and Flemingia were 90 days (4-5 cutting /years)

Table 5. Farmers' objection on forages plantation after 4 years introduction

Kind of plantation	Number of farmer (%)		
	inovator farmers	other partici-pant farmers	non partici-pant farmers
Grasses			
- terrace strengthen			
control erotion	50	43	29
- fodder	34	71	57
Legumes			
- terrace strengthen	6	57	29
- green manure	17	29	29
- fodder	17	71	57
- soil conservation	50	14	29
- fire wood	17	-	-

Table 6. Goats sharing population sharing population dynamic in Gunungsari village, Boyolali district

	March 1990	April 1991	April 1992	March 1993	September 1993
Initial					
-males	5	22	44	45	64
-females	35	39	49	64	112
Death of adults goat					
-males	2	-	-	-	-
-females	2	1	-	3	-
Births					
-males	19	22	6	19	34
-females	6	12	10	51	52
Abortus	2	5	-	3	5
Premature	4	3	2	-	14
Death of young goats					
-males	-	-	-	-	8
-females	-	1	-	-	7
Total	61	93	109	176	243

Goats sharing performance

After two years forages introduction, 40 heads (35 females dan 5 males) of grade Etawah goats were shared to 20 of farmers. The goals were to improve farmer goat genetic performance, to give opportunity to farmer to owned livestock and to encourage farmer sustain their terrace strengthen. Farmers shared the goats use inovator criterias with some addition criterias as follows: strong willingness to improve livestocks, available the feed supply, familiar with goats raising and usually 'succeeds' in their carrier, and supported by other group members.

Research showed that goat sharing population increase in 113 % rate per year (Table 6). The route of sharing were (1) for two heads of females goats farmers should give back 2 heads of young goats, and (2) farmers whose share a couple (male and female) respectively should give back 3 young goats. Then, young goats will be shared to the other farmers whose not yet received. Commonly in general, the system is known as revolving fund

system. Other results gained from the sharing is the increase of goats price (Rp 105.000,- per heads) which is higher than local goats with the same age.

Eventhough sharing of goats population increased, the average goats scale per farm didn't change significantly. It seem that, it relate with investation orientation of farmer in livestock raising. If goats population raised, farmers tend to sell and purchase calf/cattle as a change. It relate with farmers perception that cattle is more efficient in management, give more manure, could help in land preparation, and less risk of deaths. So, goats raised scale usually are kept on 2 - 3 heads (Table 1) as liquid assets if they need cash money in medium amount. Farmers will sell cattle if they need cash money in a large one .

Beside goats sharing, housing and disease management are introduced too. Research showed that housing separated with farmer house are not accepted properly by farmers. In the end of monitoring, it's just adopted by 9 farmers. Now

significant and indirect impact of housing to farmers seemly being the cause. It's differ with drugs using as disease controlling. Mostly of farmers whose known the technology, implement it to their goats.

Capital collection

Considering with the capital limitation as a constraints in livestock raising, group's was extended to collect the fund. Every members should pay Rp 5.000,- (could be paid in 4 times) to group in initial. Then the fund were loaned to members with 10 % interest rate in 3 months.

Beside that, groups was also encouraged to work jointly. During 3 years, the group was be able to build goats housing (priced Rp 250.000,-) and have 5 heads of goats. The group also make grasses nursery village about 0,3 hectares of village land (with village leaders permission). Grasses product were sold to farmers needed which priced Rp 5000,- per fied. The nursery village was also functioned as source of planting material for group members and other farmers for developing.

Sustainability and Development Possibility

Sustainability of technology implementation practices is the main goal of technologies diffusion. It's also being the goal of goat technologies development in Gunungsari village. Hopefully, technologies introduced well developed. Eventhough in average goats farm scale did not change relatively, but basically goat's quality in the area increased. The possibility of incest should be concerned, because geneticaly it's worse. However, it need new goat replacement periodically in this area especially for male goats, to improve and increase the existing goats quality.

In general, unchanged scale farm was not a problem if goats sold replace with cattle. The most important thing is how to keep the condition in which are each farmer have enough ruminants. So, farmers were encouraged to keep their terrace streghent as soil conservation effort. Enough livestock also have positive impact in land rehabilitation through manure using.

Farmer also should be extended not to use all of their food crops by products as a fodder. But apart of it should be backed or recycled to land as green manure or mulch. Farmer should not uptake too much organic matter from land.

In short terms period, increasing of fodder carrying capacity should be done by refining farmer cropping pattern. Proper cropping pattern will support feed supply in enough quantity during year. Cropping pattern improvement will also increase yield per size of land. It all based on great food subsistency in upland.

In long terms period, effort should be focussed on income increasing through livestock intensification. Optimalization of utilization on livestock raising orientation caused the low income gained from livestock (13.2 - 22.7 %), it should be changed step by step to the profit orientation. Non forages using as feed supply (consentrate) should be increased to improve livestock products quality and decrease dependency of ruminant raising on forages supply that very during on season. Knowledge about forages preservation should be extended to farmers to support livestock intensification. Extention about housing and disease management should also be increased.

Income improvement from livestock will decrease the dependency of farmers on food crops farming, wich usually inherrent which the land conservation. It will possible to intensity upland with perenials crops or others permanent vegetation. To gain the goals, it will need support from all related agencies, either governmental or private sectors, especially in inputs required. Research showed that unavailable inputs support was a main problem in sustainability of technologies implementation. Beside, limitation of capital of farmer need the existance of capital joint institusional which analog with sharing system which worked properly.

Conclusion

1. Livestock is important for farmer since their contribution meaning income (22.7%). Labor used anually in averages is 916 man hours per year with very low productivity (Rp 92,- per man hours). The low productivity caused by poor genetic of livestock, poor quality feed supply and in efficient of farmer management.
2. The goat's development strategy in Gunungsari Village work properly. Inovator farmers approach using succeed where forages plantation spread to out of village in 22 nd months after introduction. Direct impact of forages plantation are the feed supply quarante and decreation of labor used.
3. Goat population rate in sharing system is

excellent (113% per years). It used revolving fund system. Farmer orientation on goats raising are investment and as middle effort to buy cattle. So, eventhough to tally goats population on sharing system increase, goat scale per farmer relatively unchanged. It was an indication that farmer keep the scale between 2 - 3 heads . The exceeds will be sold and replaced with cattle.

4. In short terms period, carrying capacity of fodder should be increased by improving cropping pattern. It will produce by product in sufficient quantity to support feed supply and increase yield per size of land.
5. In long terms period, effort should be oriented on improving incomes through livestock intensification. Orientation of farmers should be changed stepwise from utilization optimalization to profit orientation. Concentrating of using should be increased to improve livestock quality and also to decrease forages dependency which great depend on season.
6. To reach the goals, supporting from all agencies, either governmentals or private sectors, will be needed especially on inputs required as well as joint capital wich used sharing as analogy.

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