

Promotion of Technology Options to Enhance Backyard Goat Farm Performance in Northern Mindanao, Philippines

Reynaldo Intong

Central Mindanao University, Musuan, Bukidnon, Philippines

Abstract: A project on farm-based promotion of alternative management options and farm recording through the FLS-GEM modality was implemented in Northern Mindanao, Philippines to enhance goat farm performance. A curriculum was developed by PCAARRD which was transposed into a manual which served as material in training national facilitators. National facilitators from Northern Mindanao, in turn, conducted 2 batches of Regional Training of Trainer's (ToT) producing 42 graduates, majority of whom are from the Local Government Units (LGU). Farmers were trained by these graduates on goat management interventions by attending classes at farmers' convenient time. Classes are held in a weekly basis for 4 hours in 28 meetings. Ten(10) percent of the trained farmers were assessed by monitoring their farm monthly. Data gathered included inventory, dam performance, and health. Results revealed that FLS-GEM can be a modality in reaching out farmers using the developed curriculum. Gathered data indicated an increase in the birth weight from 1.7 to 2.15 kg, weaning weight of 19.6 from 15 kg was noted. The kidding interval was shortened from 247 to 245 days and mortality from 5.01 to 2.9 % of ages 1-3 months. Mortality of those below 1 month also reduced to 2.7 from 3.01%.

Keywords: technology options, farmer livestock school, improved performance

1. Introduction

Generally, the goat industry in the Philippines is a smallholder type where 98% of its total goat population is in the hands of the backyard farmers (PSA, 2016). Goat remains an integral part of smallholder mixed farming system (PCAARRD, 2004) where it played an important role by providing farmers the opportunity to raise income through meat and milk aside from alleviating the effect of malnutrition. Despite the popularity of goat raising, productivity at present is generally low characterized by poor dam performance, slow growth of kids and relatively high pre-weaning mortalities (Cruz, et al, 2012) and tethering seems to be the predominant production system. Unfortunately only very few have taken the initiative to quantify and record farm performance to better understand the viability of goat production as an enterprise. A lot of research and development works related to goats have been done in the past, but these were fragmented.

Realizing the potential of goat as an industry, the Department of Science and Technology- Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD) took the initiative of identifying several specific management practices that could improve production performance. Infusion of good genetics through natural and artificial means was recommended in addition to improvement in feeding and nutrition as well as health management. A program to bring technologies down to the ground using the FLS-GEM modality was conceived. This modality capitalizes the participatory approach wherein raisers take the driver's seat in serving as technology developers. In this modality, the farmer has to undergo a season-long training where technology mixes are introduced to the farmer in bite sizes for them to experiment in their own goat farm.

This study intended to measure the effect of promoting various alternative management options on goat production thru the FLS-GEM to enhance goat farm performance in Northern Mindanao Region. Specifically, it aims to assess its effect on dam performance, kidding index, kidding interval, pre-weaning mortality, kids birth weight as well as weaning and slaughter weights.

2. Review of Related Literature

Small farmers are the centrepiece in any agricultural development effort. They must be provided with alternative entrepreneurial ventures to improve food security. (Intong et al, 2014). A lot of technologies are already available, but as indicated, the lack of financial and infrastructure support had always been a barrier to adoption (Foltz, 2003) and the efficient technical and institutional support services (Kulecho, 2006) are the critical factors influencing adoption of small-scale and low-cost drip irrigation in Kenya. A credit facility (Manganaan, 2003) can also be established to buy inputs to be used in the adoption of technologies. On the other hand, to dispel the notion of a government program as always a "dole-out", farmers must in a way pay the technology they are to adopt.

Farmers always consider those technologies that are easy to apply, requires less labour, time and which entails continuous decision making process and constant evaluation of resources.

The impact of technology adoption is not only productivity gains but the utility of the technologies being adopted through various modalities. This is evidenced by the continuous adoption of the goat technologies. Assessment of the extent of adopting a technology becomes necessary in understanding the basis upon which raisers decide to fully adopt these technologies. A study done in CLSU in 2008-2010, reports that those who are trained on goat production

have higher level of technology adoption than those who are not trained. Apparently, training as a mechanism for technology transfer, is very essential to increase the level of adoption. A study conducted by Intong et. al. (2001) revealed that farmers favoured information media which require their active participation such as seminar-workshop and meetings which imply that farmers want to be involved even in technology dissemination. This could help attune the technology to the local farming system and hopefully sustain technology adoption.

3. Methodology

Site of the Project

This project was implemented in Northern Mindanao Region of the Philippines popularly known in the country as Region 10. It is composed of 4 provinces but only 2 provinces (Bukidnon and Misamis Oriental) were considered in this study, as shown in Figure 1.



Figure 1: Site of Implementation

Development of the Community Facilitator's Manual

The DOST-PCAARRD consolidated and assessed all the gains from previous goat projects. The generated technologies were packaged and transposed into a Community Facilitator's Manual on Goat Enterprise Management or the Farmers Livestock School-Goat Enterprise Management (FLS-GEM) Manual.

Training on Social Preparation

After the packaging of the Community Facilitators Manual, a National Project Team was created and the members underwent training on problem analysis, participatory technology development, technology matching, and participatory evaluation of adoption to equip the team members of the needed skills. The training was facilitated by DOST-PCAARRD.

Training of Regional and Community Facilitators

A regional core team was also composed and participated in the National Trainer's Training on FLS-GEM at Central Luzon State University (CLSU), Nueva Ecija in Central Luzon. The trained core team from Northern Mindanao then conducted a regional training of trainer's (ToT) the way they were trained by the National Project Team with participants from the Local Government Units (LGU's), research institution, and from the academe. Graduates of the regional training served as the community facilitators

Selection of Farmer-co-operators

Farmer-co-operators were selected following criteria such as a) availability of at least 5 does b) willingness to undergo a season-long training c) willingness to keep farm performance record; and d) willingness to share farm record and allow publication of the generated data. Those who qualified, undergone the season-long FLS-GEM training but only 10 % of the trained farmers were considered in this study.

Research Design and Analysis

The descriptive research design was used to analyse the different goat performance indicators such as kidding interval, birth weight, slaughter weight, pre-weaning mortality and the quantification of the improvement of farm performance through technology intervention against traditional system of raising goat using frequency counts, mean and percentages.

4. Results and Discussion

Local Government Unit (LGU)-based FLS-GEM Training

Training of farmers was facilitated by the community facilitators. There were three hundred twenty-eight (328) farmers (Table 1) who successfully finished the FLS-GEM training over a period of 2 and a half years where technological options on breeding, feeding, health, husbandry management and recording to promote goat raising as an enterprise were highlighted. Ten percent (10%) of these farmer graduates were then monitored, taught to gather and analyse farm records.

Table 2 presents the LGU--based FLS-GEM training with the corresponding graduates. The City Veterinary Office in Cagayan de Oro had three (3) batches in three (3) separate locations in Cagayan de Oro City with 92 graduates followed by the Northern Mindanao Integrated Agricultural Research Center (NOMIARC) with 2 batches producing 59 graduates while the rest had 1 batch each. The community facilitators conducted the FLS-GEM training on farmer's most convenient time. Some met once a week from 8:00 am to 12: 00 noon, while others met twice a week. Classes were conducted in different facilities offered by the village officials such as covered court, or multipurpose hall and sometimes at farmer's backyard. Adult learning is participatory and hence, enrolees should feel their importance and joy every bit of the activities included in the FLS- GEM curriculum (Alo, 2013).

Participants were provided with planting materials of some improved species of forages and the method to propagate them is also part of the curriculum. Methods of how forages can be conserved were also included. To a certain extent a dole-outs system was still observed during the implementation of the project since the planting materials are given free.

Table 1: Farmer-based FLS-GEM Training in Northern Mindanao, Philippines

FLS-GEM Facilitator/s	Responsible LGU/Agency	Venue of the Training	Date of Graduation	No. of Graduates	Remarks
Honradez D. Hernandez	Impasug-ong, Bukidnon	Impasug-ong, Bukidnon	Nov. 4, 2014	25	
Raul R. Abuejela	El Salvador, Mis. Or.	Quibonbon, El Salvador, Mis Or.	Dec. 10, 2014	24	
Roy Hugo N. Pagtalunan	Tagoloan, Mis. Or.	Upper Casinglot, Mis. Or.	Dec. 16, 2014	19	
Marily D. Vistal, Jerome C. Pasios and Elvin Eppie E. Elorde	Agricultural Training Institute(ATI)	Balubal, Cag de Oro	Nov. 3, 2015	37	
Jerome C. Pasios and Elvin Eppie E. Elorde	City Vet Office, Cag de Oro	Indahag, Cag. De Oro	Dec. 10 2015	92	3 batches
Aurelio Salem	Lantapan, Bukidnon	Poblacion, Lantapan, Bukidnon	Jan. 29, 2016	30	
Coleen C. Ambos, Belen I. Panaguigon and Freddie S. Salolog	Fernando, Bukidnon	Halapitan, San Fernando, Bukidnon	Feb. 12, 2016	18	
Jair Rosal, Rosalio Cocamas, James Fenimore Intong and Ruchie Pequi	NOMIARC	Mansilop Malanang, Opol, Misamis Oriental	Feb. 26, 2016	33	
Herra B. Ipanag	City Vet. Office, Gingoog City, Mis. Or	San Luis, Gingoog City, Mis. Or.	July 5, 2016	24	
Jair Rosal, Rosalio Cocamas, James Fenimore Intong and Ruchie Pequi	NOMIARC	Bayugbayugan, Bagoceboc, Opol, Misamis Oriental	Nov. 25, 2016	26	
			Total	328	

Factors Affecting the Conduct of FLS-GEM at Community Level

The factors influencing the pace of the conduct of the FLS-GEM training at the LGU level are; (1) the initiative of the trained facilitators; (2) difficulty in identifying farmers with 5 does;(3) support of the local government units; (4) farm activities like rice planting and harvesting and (5) conflict with other work assignment. Aside from the difficulty in identifying farmers with 5 does, trained facilitators who are tasked to do some other assignments, sometimes losses the initiative of conducting FLS-GEM training particularly if the incumbent officials had prioritized other livelihood projects instead of goat raising. In addition, other farm activities such as planting and harvesting are given preferential attention.

The Baseline Data

Baseline information/data were taken from 35 backyard farmers after mapping out of possible co-operators as presented in Table 2. There were 13 farms in Bukidnon which were from the municipalities of Valencia, Malaybalay and Manolo Fortich, while the rest were from Tagoloan, Opol, El Salvador, and Alubijid of Misamis Oriental and from the City of Cagayan de Oro. There were a total of 184 does from 35 farms and the average number of does per farm is 5.25

Table 2: Distribution of farmer co-operators where baseline information was gathered from the record kept

LGU/ Municipality	Number of Farms	Province
Valencia	7	Bukidnon
Malaybalay	4	Bukidnon
Manolo Fortich	2	Bukidnon
Tagoloan	6	Misamis Oriental
Cagayan de Oro	9	Misamis Oriental
Opol	1	Misamis Oriental
El- Salvador	1	Misamis Oriental
Alubijid	5	Misamis Oriental
Total	35	

The Monitored Data

Out of 328 farmers trained thru the FLS-GEM modality, only the backyard goat farmers that were able to maintain 5 does in any given time were considered in data monitoring over a course of 2 years. There were only 34 of them. The performance of their farm was compared against the baseline data which were taken before their enrolment to the FLS-GEM.

The 34 farmers were distributed as follows: Eleven (11) from Impasug-ong, twelve (12) from Lantapan of Bukidnon and ten (10) from Tagoloan of Misamis Oriental. There were a total of 145 does monitored. On average, the number of doe per farm is 5.8 as presented in Table 3.

Table 3: Distribution of farmer co-operator where data for monitoring farm performance were taken

LGU/Municipality	Number of Farms	Remarks
Impasug-ong, Bukidnon	11	Backyard
Lantapan, Bukidnon	12	Backyard
Tagoloan, Misamis Oriental	11	Backyard
Total	34	

Comparison between the Baseline and Monitored Data

Dam Performance

The kidding index in the baseline data is 1.6 while the monitored data is only 1.43. This is probably due to the common practice of continuous breeding of animals among backyard farmers. Meanwhile, farmers who have undergone the FLS-GEM training learned the importance of scheduling the breeding of their does for convenience especially when feed resources are limited. Kid size is lower in the baseline with 1.4 compared to 1.73 from the monitored data. The kidding interval from the baseline data is recorded at 247 days against 245 in the monitored one.

Table 4: Comparison between baseline and monitored data

Performance Indicators	Baseline Data	Monitored Data
No. of Farms	35	34
No. of Does	184	173
Ave. Doe/Farm	5.25	5.8

Dam Performance		
Kidding Index	1.6	1.43
Kidding size	1.4	1.73
Kidding Interval(days)	247	245
Birth Status		
Alive	99.75	96.00
Dead	0.25	4.0
Type of Birth		
Single-tone	43.8	50.24
Twins	38.5	44.15
Triplets	16.37	4.18
Quadruplets	1.33	1.43
Sex of Kids		
Female	53.54	50.24
Male	46.46	49.76
Growth Performance of Kids		
Birth weight (kg)	1.7	2.15
Weight at 3 months (kg)	11.97	12.50
Weight at 8 months(kg)	15.00	19.60
Ave. Daily Gain (ADG)		
At 3 months (g)	-	67.0
At 8 months(g)	-	50.0
Mortality (%)		
Below 1 month	3.03	2.7
1-3 months	5.01	2.9
Weaning age	0.25	2.4
Adult	-	-

Type of Birth

The birth type both in the baseline and monitoring data is dominated by single-tone with 43.8 and 50.24% respectively followed by twins with 38.5 in the baseline and 44.15% in the monitored data. Triplets and quadruplets were also observed in both baselines and among monitored dams.

Birth Status and Sex of Kids

Kids born alive dominates both in the baseline and monitored data with deaths registering 0.25 and 4% respectively, and there were more female kids born than male as shown in Table 4.

Growth Performance of kids

Growth performance of kids was measured in terms of weight changes (kg) as the animal matures and also expressed in terms of average daily gain (ADG). The baseline data showed a lower average birth weight of 1.7kg than the monitored data with 2.15. The same trend is obtained on the average weight at 3 months where the baseline data registered only 11.97kg against 12.50kg for the monitored data. Average weights taken at 8 months were 15.00 and 19.60kg for baseline and monitored data respectively. However, data on the average daily gain (ADG) were only taken from the monitored farms and not when baseline data were gathered. The ADG at 3 and at 8 months is 67 and 50 grams respectively. These differences can be attributed to the improvement in breeding where FLS-GEM graduates can now access the services of the upgraded or proven bucks made available by the local government units (LGU's) and some NGO'S that advocate goat raising as a livelihood activity. Improvement in the nutrition of the animals can also be a factor in this increased performance of the animals. FLS-GEM graduates were taught not only to identify and establish improved forages but also how to conserve them. They also learned the basics in formulating rations for their goats.

Mortality (%)

Kids below 1 month of age registered mortality of 3.03 and 2.7 % for baseline and monitored data respectively. The highest mortality was observed in kids ages between 1-3 months with 5.01% in the baseline and only 2.9% in the monitored data. In the contrary, mortality at weaning age is 0.25 and 2.4% for baseline and monitored data respectively.

Except for the contrasting data on mortality at weaning where the baseline had only 0.25% against 2.4, generally this little reduction in mortality rates among monitored farms can be attributed to improved health management at different physiological stages of the animals such as strategic deworming to reduce worm load, proper housing to protect all animals from inclement weather and improvement in the general husbandry practices in keeping goats. No mortality on the adult category was recorded during the study period.

5. Conclusion

Technological intervention is really needed if we are to improve the production performance of goats at the backyard. Implementors must take into serious consideration the mode where these technologies are brought to the ground. Although most farmers are hesitant to any intervention, the FLS-GEM modality has changed this behaviour a bit as evidenced by the improvement in some of the considered parameters such as kidding interval, kidding index, average daily gain and reduction in mortalities.

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Author Profile



Reynaldo Intong is a graduate in BS Animal Science at the Central Mindanao State University, Musuan, Bukidnon. He took up his Masteral Degree at the same University and had his Ph. D. Degree at the University of the Philippines at College, Laguna Los Baños. His field of specialization is Animal Nutrition

and is holding an academic rank of Associate Professor at the Central Mindanao University in Musuan, Bukidnon.