Participatory Assessment of Farmer Livestock School on Goat Enterprise Management in SOCSKSARGEN, Philippines

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***Abstract*—This paper focused on the participatory assessment of the Farmer Livestock School on Goat Enterprise Management (FLS- GEM) in SOCSKSARGEN Region, Philippines. It was conducted from January 2013 to December 2016 in Pigcawayan and Aleosan in Cotabato; Tampakan South Cotabato and Alabel, Sarangani Province whose graduates had already at least two (2) years of technology adoption comprising 30% of the total graduates. Technology timeline method was used to determine technology adoption pattern, degree of adoption and the reasons for such shift or continuous adoption. Similarly, impact benefit matrix was used to determine the difference that FLS- GEM had in their lives and on the community or organization where they belonged. Results revealed the following: 1. The degree of adoption of the FLS- GEM graduates varied. Majority of them were early adaptors of the different technology or tech mixes such as proper housing, stallfeeding of grasses, strategic deworming, vitamin/antibiotic supplementation and upgrading of stock using either upgraded back or artificial insemination, 2. The said training had positive assessment on their personal competence, farm productivity and community assets and 3. Educational attainment, ease of operation had better income from goat proceeds and contributed significantly to the adoption pattern of the graduates.**

***Index Terms*—farmer livestock school on goat participatory assessment, SOCSKSARGEN, FLS- GEM**

I. Introduction

Since the early part of the new millennium, a surge in the demand for goats in many parts of the country has been observed. Raisers started purchasing stocks, breeding them, learning about ways to improve management and gradually improving farm productivity. Over time, goat production has emerged as a popular business undertaking not just for rural households but also for many affluent entrepreneurs.

Despite the popularity of goat raising, it is confronted by low productivity characterized by poor dam performance, slow growth of kids and relatively high preweaning mortalities. Kidding interval was longer than the target of eight (8) months under the Goat Industry Strategic Plan (ISP). Because of poor dam performance, the resultant offspring also suffered.

To address these problems, several specific management practices have been identified. Thus, to promote these mature technologies, products and processes generated from two (2) previous National Goat S&T Program using various promotional modalities, a curriculum for the different audiences were developed.

The Farmers Livestock School (FLS) approach was used to train community facilitators and eventually farmers. For this, the community facilitator's manual on Goat Enterprise Management (GEM) was packaged.

In 2013, the Farmer Livestock School on Goat Enterprise Management (FLS-GEM) was introduced in SOCSKSARGEN Region and also in Regions 10, 8, 1, 2 and 3 to ensure simultaneous dissemination of a uniform set of goat-based technologies and enterprises to a wider geographical setting, accelerating thus enhancement of farm performance in the six participating regions.

As of Dec. 2015, SOCSKSARGEN Region had conducted about 21 FLS- GEM with about 650 farmer-graduates handled by 20 FLS- trained facilitators.

As the FLS- GEM had just been completed and soon be upgraded to include new technologies and protocols, it is just fitting to assess its implementation to give PCAARRD, the funding agency and the project team in understanding the basis upon which raisers decide to fully adopt these technologies to ensure that these technologies are appropriately designed to their needs [1].

Manuscript received January 24, 2018; revised July 2, 2018.

doi: 10.18178/joaat.5.4.328-333

II. Objectives

The general objective was to assess the FLS-GEM using participatory approach.

Specifically, it sought to:

Analyze FLS adoption in terms of extent, pattern and reasons for adopting specific tech-mixes.

Determine factors affecting adoption pattern.

III. Review of Related Literature

A. Technology Adoption

The impact of technology transfer is not productivity gains of raisers alone but it is the critical confirmation of the utility of the technologies transferred through various modalities. Utility was evidenced by the successful adoption of the goat technologies. Adoption study is very useful in understanding the basis upon which raisers decide to fully adopt these technologies to ensure that these technologies are appropriately designed to their needs [1]. "Reference [2] "in 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 important to increase level of adoption.

B. Farmer Livestock School on Goat Enterprise Management (FLS- GEM)

The FLS- GEM for farmers consisted of 12- week technical session (1 day per week) with the FLS facilitators. Only one technology is discussed per technical session. At the end of each session, farmers go back to their farms to test the technology discussed. Reactions, acceptance or modifications done to the technology are discussed upon resumption of the session the following week. When all the technical sessions are completed, each farmer is given 8 weeks to mix and match the options he likes and see for himself the effects of the tech-mix on his family. All data related to his own farm trials are recorded.

IV. Methodology

A. Site of Project.

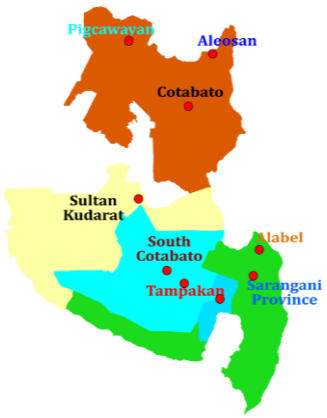

Figure 1. Sites of Implementation

SOCSKSARGEN Region otherwise known as Region XII having identified goat as one of its top 3 regional commodities was included in the National Science and Technology Program on Slaughter Goats. It is also implemented in Regions 1, 2, 3, 8 and 10. It was conducted in Cotabato Province in Pigcawayan, Aleosin, Sarangani Province in Alabel and in Tampakan in South Cotabato as shown in Fig. 1.

B. Inter-Project Workshop

The project coordinated with the key members of the other DOST-PCARRD projects to consolidate and assess all gains from previous goat projects, specifically to package the Community Facilitators' Manual on Goat Enterprise Management. The generated technologies were transposed into training materials with the help of Anna Marie P. Alo of DOST-PCAARRD (who developed the FLS in earlier years) and added to the curriculum of the existing Farmer Livestock School-Integrated Goat Management.

C. Training of Project Team Members on Social Preparation

After the Inter-project workshop on tech-assessment and modality preparation and printing of required training manuals, the Project Team had training on Farmer Livestock School (FLS), participatory problem analysis, technology matching, participatory technology development and participatory evaluation of adoption. Specifically, LRD-PCAARRD through AMPAlo equipped the Team with the needed skills.

D. Conduct of FLS-GEM for LGU Partners

To facilitate training of famers outside the project sites, the regional core team who underwent the National Trainor's Training on FLS-GEM in CLSU, Nueva Ecija trained community facilitators from other LGUs within the region using the manner they themselves were trained by the National Project Team.

E. Instruments Used and Respondents the Study.

To analyze the FLS-GEM adoption such as its extent, pattern and reasons for adopting specific technologies or tech mixes, participatory assessment of the FLS-GEM was conducted last September 8-9, 2016 at Sarangani Highlands in General Santos City participated by 47 graduates from Aleosan and Pigcawayan in Cotabato, Tampakan in South Cotabato and Alabel in Sarangani Province. These participants comprised 30% of those who have already 2 years of adoption after their graduation from the FLS-GEM.

Technology timeline method was used to determine technology adoption pattern, the degree of adoption and reasons for such shift or continuous adoption. Similarly, impact benefit matrix was used to determine the difference that FLS had in their lives and on the community or organization where they belonged following the works of FLS-GEM developer, Anna Marie P. Alo of LRD-PCAARRD [3].

F. Research Design

Descriptive research design was used to analyze the FLS- GEM adoption specifically its extent, pattern and reasons for adopting specific technologies on tech mixes and the factors affecting adoption pattern.

G. Analysis

A combination of descriptive and inferential statistics were used to analyze data. Mean, frequency and percentage were used to analyze the pattern, extent, reasons for adoption and the benefits gained from the training. On the other- hand, stepwise regression analysis following the statistical procedures on Microsoft excel 2013 was used to analyze factors affecting adoption pattern.

V. Results and Discussion

The degree of adoption was determined using the technology testing timeline method. The timelines were clustered into three such as before, during and after 2 years from FLS-GEM graduation.

The eventual pattern were clustered into 5 major production system such as 1 free grazing; 2- partial confinement; 3- tethering; 4- complete confinement and 5- rapid rotational grazing or tethering.

TABLE I. Frequency Distribution of Types of Adoptors and Their Technology Mixes Adopted.

Type of Adoptors	Frequency (n=47)	%
1. Early Adoptors	37	78.72%
- proper housing	37	100
- waste management	16	43.24
- use of upgraded buck	16	43.24
- stallfeeding of grasses	35	94.59
- strategic deworming	28	75.68
- vitamin supplementation		
- artificial insemination	28	75.68
- tree leaves supplementation	18	48.65
- concentrate supplementation	5	13.51
	5	13.51
2. Late Adoptors	4	8.51%
- stallfeeding of grasses	2	50
- vitamin/antibiotic supplementation	4	100
- use of upgraded buck	2	50
- stallfeeding of concentrate	4	100
- artificial insemination	2	50
- buck rotation	2	50
3. Non Adoptors	6	12.77%

The frequency distribution of types of adoptors and their technology mixes adopted is presented in Table I. Results showed that the results during participatory assessment revealed that 37 adoptors equivalent 78.72% were early adoptors indicating that they adopted tethering before FLS- GEM but shifted to either partial confinement during the duration of the season long FLS-GEM of the following technology mixes on proper housing, stallfeeding of grasses, strategic deworming, vitamin and antibiotic supplementation and upgrading of stock using either upgraded buck or artificial insemination. However, four (4) adoptors (8.51%) were late adoptors of either partial or complete confinement with the following mixes adopted after the training such as vitamin/antibiotic supplementation, stock selection for breeding. On the other hand, six (6) were non adoptors indicating they had already using partial or complete confinement even before their training due to their previous training on goat production. This implies that the two (2) months of participatory technology development in their respective farms had convinced themselves of the advantages or benefits of adopting such technology mixes.

The impact benefit matrix was also used to determine the impact of adoption to the FLS- GEM graduates, in their community or organization they belonged.

Table II shows the frequency distribution of the benefits of FLS-GEM to the farmers. Results revealed that 45 or 95.74% had improved their personal competence due to their knowledge gained during the FLS- GEM which opened them the opportunity to be invited as speaker during seminar and enable the two (2) to have NCII certificates. . Likewise, 42 or 89.3% had improved their financial security due to income from goat which increased their buying capacity, able them to pay deft; finance their children education and assured them of money for future needs. Similarly, 35 or 74.4% became a distinguished members of community and increased sphere of friends and influence. Moreover, 34 or 72.3% had improved their regard for goats implying a changed paradigm from goat as "pulutan" to negosyo, become more responsible, minimize vices and had better self-confidence. However, one (1) or 2.12% mentioned of negative impact as technology adoption meant more expenses. With regards to the farm, 45 or 95.74% had increased their stocks in the farm due to less mortality and healthier stocks while 42 or 89.36% had maximized the use of their farm by integrating livestock and crop. Furthermore, 35 or 74.46% had an area now devoted for forage establishment and 27 or 57.46% had utilized goat manure as soil enhancer producing better crops and at the same time generates saving on fertilizers.

In term of benefits in the community, 100% become members of the cooperative; 45 or 95.7% each had increased number of goats in the community and introduced new forage species in the community; 44 or 93.61% had benefited from upgrading of goat stocks thus producing heavier stocks; 27 or 57.44% had opened new business options resulting from increasing number of buyers coming to community and from goat allied enterprises.

TABLE II. FREQUENCY DISTRIBUTION OF THE BENEFITS OF THE FLS-GEM TO THE FARMERS

		Frequency n=47					
Level	**Key words to use to measure "Changes"**	Aleosan (n=7)	Pigcawayan (n=18)	Alabel (n=17)	Tampakan (n=5)	**TOTAL**	**Percentage**
Personal	**Improved personal competence**	7	18	17	3	45	**95.74**
	Now a distinguished member of the community	0	18	17	0	35	**74.47**
	Increased sphere of friends and influence	7	18	10	0	35	**74.47**
	Improved regard for goat	7	18	6	3	34	**72.34**
	Improved financial security due to income from goat	7	18	17		42	**89.36**
	Widened perspectives due to lakbay aral	7	18	0	2	27	**57.45**
Farm	**Stocks in the farm increased**	7	18	17	3	45	**95.74**
	Maximum utilization of farm	5	18	17	2	42	**89.36**
	An area is now devoted for forage establishment	7	18	8	2	35	**74.47**
	Utilization of goat manure produced better crops and greater saving on fertilizers	7	18	0	2	27	**57.45**
Community	**Increased number of goat raisers in community**	7	18	17		42	**89.36**
	Increased number of goats in community	7	18	17	3	45	**95.74**
	Upgrading of goat stocks introduced in community	7	18	17	2	44	**93.62**

Similar findings were observed in FLS- Integrated Goat Management (IGM) graduates in Tarlac, Zambales, Bataan and Aurora in Central Luzon in the Philippines [4].

There were changes in behavior among participants towards disseminating appropriate goat technologies. Their comprehensive knowledge especially on alternative IGM technologies made them confident and competent community facilitators. Results also revealed that participatory problem tree diagnosis and formulation of solutions were found to be effective, as these delve precisely with farmer's specific problems.

The findings imply that farmer-graduates from SOCSKSARGEN Region had positive assessment of the FLS-GEM impact on their personal competence, farm productivity and community assets.

Table III presents the reasons of the respondents for shifting or continuous adaption of the basket of technology options.

Results revealed that ease of operation had the highest frequency of 33 or equivalent to 70.57% for shifting or continuous adaption of technologies followed by safety of animals from thieves, predators and increment weather; improved productivity of goats and better income/financial security from goat proceeds with frequencies 28 (59.57%), 24 (51.06) and (29.79%) respectively.

To assess the impact of the different factors affecting adoption pattern, stepwise regression analysis following the statistical procedure of Microsoft excel 2013 was used.

TABLE III. FREQUENCY DISTRIBUTION OF REASONS FOR SHIFTING OR CONTINUOUS ADOPTION OF TECHNOLOGY MIXES.

Reasons	Frequency (n=47)				Total	%
	Aleosan (n-7)	Pigcawayan (n-18)	Alabel (n=17)	Tampakan (n=5)		
1. Ease of operation (can do other; viands simultaneously anytime)	7	17	4	5	33	70.21
2. Safety of animals from thieves, predators, increment weather	7	17	4	0	28	59.57
3. Resource endowment (availability of land, labor and capital)	0	0	0	0	0	0
4. Prescribes relationships among neighbors (prevents annoyances)	0	0	0	0	0	0
5. Improved productivity of goats (improved weights, increase resistance to illness)	7	17	0	0	24	51.06
6. Better income/financial security from goat proceeds.	0	1	13	0	14	29.79

TABLE IV. REGRESSION ANALYSIS OF THE FACTORS AFFECTING ADOPTION PATTERN

	Coefficient	Standard Error	t-statistics	P-value
Intercept	348.63	19.53	17.86	0.000
Educational Attainment	-30.53	12.08	-2.53	0.011
Ease operation	34.19	11.58	2.95	0.003
Better income	0.00	0.00	10.00	0.000

Table IV presents the regression analysis of the factors affecting adoption pattern. Analysis revealed that only 3 factors have contributed significantly to the adoption pattern such as educational attainment, ease of operation and better income from goat proceeds which is expressed as reflected in Table IV were *y* is the adoption pattern while *x* are factors affecting adoption pattern. Moreover, the negative coefficient for educational attainment implies that the less educated farmers, the more they adopt the different technologies since they are more receptive in adopting new things.

$$y=279.4x-54.292 \quad (1)$$

Moreover, the coefficient of determination (R^2) is 63.14% indicating the 68.14% of the variation in the adoption pattern is being attributed to the 3 significant factors mentioned while the remaining 36.86% of the variation was due to the other factors not mentioned including errors.

VI. CONCLUSION

The degree of adoption of the FLS- GEM graduates varied. Majority of them were early adaptors of the different technology or tech mixes such as proper housing, stallfeeding of grasses, strategic deworming, vitamin/antibiotic supplementation and upgrading of stock using either upgraded buck or artificial insemination.

The said training had positive assessment on their personal competence, farm productivity and community assets.

Educational attainment, ease of operation and better income from goat proceeds and contributed significantly to the adoption pattern of the graduates.

VII. RECOMMENDATION

Continues implementation of the said training modality and expand to other regions to reach out more goat raisers to further enhance their capability

Work out with local government units to institutionalize the said training modality in their respective community.

ACKNOWLEDGEMENT

The researchers express their sincere appreciation to the following: The Philippine Council for Agriculture, Aquatic and Natural Resources Research & Development (PCAARRD) headed by its Executive Director, Dr. Reynaldo V. Ebora and the Sultan Kudarat State University (SKSU) headed by its President, Dr. Rolando F. Hechanova for their funding support; Mr. Reynaldo C. Padilla and Mr. Elvin Z. Betita of the Office of Municipal Agriculturist (OMAG) of the Local Government Unit (LGU) of Pigcawayan, Cotabato, Dr. Constantino C Besana and Mrs. Lorena B. Hingco of OMAG of the LGU of Aleosan, Cotabato, Mr. Lance Hambala of OMAG of the LGU of Tampakan, South Cotabato and Mr. Roy S. Soberano of the OMAG of the LGU of Alabel, Sarangani Province for actively facilitating the community based-FLS-GEM in their respective community; Dr. Ruby S. Hechanova, Program Leader of the Halal R&D Program for her all out support; Dr. Reynaldo Intong for facilitating the participatory assessment; Mr. Rey Ejercito, Mr. Jomar Maltu and Ms. Rose Floresca of SKSU for their assistance and Ms. Sheila Mae P. Cadiang for encoding the paper.

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