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## **Assessment of Feed Supplementation to Dairy Goat: Results of Research and Technology Dissemination Trials**

**Muhammad Zubair Anwar, Akhter Ali, M. Azeem Khan,  
Nisar Ali Shah and Ikram Saeed**

(Social Sciences Research Institute, National Agricultural  
Research Center, Park Road, Islamabad, Pakistan)

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## **Assessment of Feed Supplementation to Dairy Goat: Results of Research and Technology Dissemination Trials**

### **Author(s)**

**Muhammad Zubair  
Anwar, Akhter Ali, M.  
Azeem Khan and Nisar  
Ali Shah, Ikram Saeed**  
Social Sciences Research Institute,  
National Agricultural Research  
Center, Park Road, Islamabad,  
Pakistan

### **Abstract**

Over the years, role and strength of dairy goat is increasing in Barani Tract of Punjab. The bread and butter needs of poor and small household are largely depends on livestock specifically on the dairy goats. The 80 percent livestock management activities are mostly depends upon women; therefore under the experimentation of feed supplementation mainly women's were included as research partners. The women perceptions regarding the effectiveness of feed supplement were collected by using a well structured questionnaire. A total of 62 women's were included in the sample size. Results indicated that 95.08% women's had shown their complete satisfaction from the feed supplements given to dairy goats. A large majority of the respondents (98.31) were in view that the given feed supplements had increased their milk productivity. Overall, 82.69 % sample women had pointed out that their knowledge about goat management has increased with this experimentation. Both empirical and experimental data shows a significant increase in milk yield i.e 520 ml and 562 ml respectively. The marginal rate of returns from milk was about 246.38 % that also revealed economic significance of the feed supplementation intervention to the dairy goats. The sustainability of feed supplementation has serious problem, about 67.27 percent respondents were in view that feed supplementation to dairy goat will not sustain due to resources poorness, availability and relatively importance of goat in household economy.

**Keywords:** Barani, Feed supplement, Dairy Goat, Dissemination, Productivity, Sustainability, Punjab

### **Background**

Livestock is a major component of the barani farming systems and closely associated with crop production. It also considered as a substitute for crop farming and provides food security against crop failure. The socio-economic and physiological conditions of the rainfall areas do not permit farmers to rely on crop production as a sole source of income. Mainly uncertain and erratic rainfall cause crop failure and have adverse effect on the livelihood of the poor farmers. Farmers therefore raise livestock as a security against crop failure, as a

means of savings and a source of supplementary income. The crucial role of livestock is further highlighted by rapidly increasing demand for meat and milk products in the country. But in the rainfed areas, this sector confronts host of constraints which if circumvented can double the output of livestock products (Khan et al 1999). The present project was initiated with the objectives to improve the women livelihood status by introducing improved goat production technologies.

In the barani tract of Punjab, role and strength of dairy goat has increased over the years Table

1. But unfortunately, milk yield of common goat breeds was very low and it was ranged between 250ml to 500ml per day. The less nutritive feed resources and five to six month fodder and forage scarcity were the main reasons. Hence, to address these issue low cost feed supplementation trial were executed. These experiments were conducted in collaboration with the Animal Nutrition Program of BLPRI, Fateh Jang, Fodder/Range Research Program and Social Sciences Institutes of NARC. Overall this study is an effort to highlight and document the performance of the feed supplementation to dairy goats. About 90 % of the goat population is found in the developing countries (Iqbal et al., 2008). Dairy goat sector in developing countries is less developed; hardly less than 5 percent of the milk is traded (Dubeut et al., 2004). Pakistan being an agrarian country supports 56.7 million goats

which are primarily being raised for mutton by millions of poor and landless communities. They are playing a significant role in the country’s economy by producing approximately 257 thousands tones mutton, 25 million skins and 21.4 thousand tones hair. They also produce about 851 thousands tones milk which amounts to 2.5 percent of the national milk supply (Ali, 2006). Goat Milk consumption has become an upper edge for the human afflicted with peptic ulcers, allergy and various gastrointestinal disorders which usually develop from intolerance to cow milk (Haenlein, 2004). Goat Milk has also been found to be useful for diabetic patients in Japan (Nagura, 2004). This facts also favours goats for dairying and can prove an ideal preposition especially for developing world where majority of goat population is found with people having low economic status.

**Table 1: Livestock Inventory and Changes in Livestock Composition (000)**

Livestock Species	1996	2000	% Change
Cattle	183	131	-39.6
Buffaloes	153	120	-27.25
Sheep	125	100	-25.0
Goat	378	449	15.8

Source: Punjab Development Statistics, 2000

This study is planned specifically to assess the short-term effects and impacts of feed supplementation intervention introduced by the nutrition program of the project. The study also aims to understand the technology choices and their impacts on the incomes of the farming community of the project area. The spillover effects of some of the matured technological components would also be measured. The prime intention of the study is to monitor the process of technologies dissemination, short-term impacts of the given interventions, farmer’s adoption behavior, constraints and their possible solutions. This would serve as a feed back to the researchers and development agencies involved in this project.

**Objectives**

- Estimate the quantitative performance of feed supplementation interventions
- Understand farmers’ perceptions about the improved feed ration

- Examine the compatibility of feed supplementation interventions with the farm situations and rural livelihood strategies.

**Hypothesis**

Introduction of low cost improved feed ration have potential to raise milk productivity of the available goat breeds.

**Methodology**

In order to see whether the given interventions properly targeted the intended beneficiaries or not, the implications of their diffusion are examined in a holistic manner in terms of the contribution they have added in their livelihood. It also empowers women’s by harnessing their views and transforming them to future development efforts. The approaches used specifically assess the given technologies in relation to the following:

- Relevance to issue of women livelihood
- Profitability of the intervention

Accessibility of the intervention  
Women’s perception regarding the adoption of proposed solution

The assessment was quiet difficult because the performance of the technology depends on a variety of factors. Therefore, both qualitative and quantitative information was collected and analyzed. The qualitative and quantitative analysis were mainly based on the descriptive statistics, benefit cost ratio (BCR), partial budgeting, marginal rate of return (MRR), marginal physical productivity (MPP) and marginal value of physical productivity (MVP). The data was collected by the use of pre-tested questionnaire. To solicit women’s perceived and observed benefits and costs of the

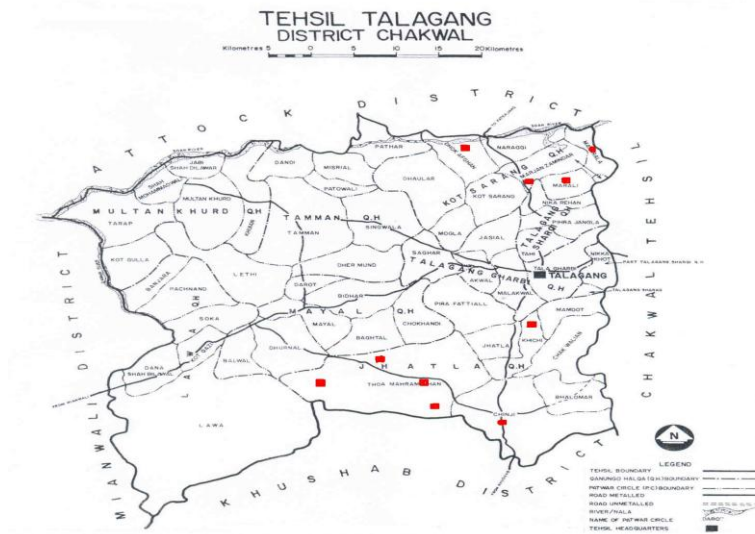
technologies as well as their opinions on its potential adoption in different farm situations, a pre-tested questionnaire was used. Mainly information was collected from the participating women’s. The information includes compatibility of technologies to the farm resource situations and their livelihood strategies established to improve the relevance of the technologies.

The feed supplementation intervention was given to dairy goat in the ten selected villages. The overall participating women in this activity was about 100, 10 from each village. Keeping in view the time and resources a sum of 62 women’s were selected as sample for this study. The village wise sample is given in table 1.

**Table 2: Sample Size by Villages**

Villages	Frequency	Percent
Dewal	7	11.3
Muthralla	5	8.1
Dhok Pathan	7	11.3
Dhok Mehar ali	7	11.3
Diba Harmal	6	9.7
Dhok Bali	6	9.7
Thatti Bangla	6	9.7
Dhok Khor	6	9.7
Mehmood Wala	5	8.1
Murali	7	11.3
<b>Total</b>	<b>62</b>	<b>100.0</b>

**Map of the Selected Villages**



### Empirical Analysis

The empirical analysis is carried out by employing the probit model given as

$$\Pr(Y = 1|X = x) = \Phi(x'\beta).$$

$$Y^* = x'\beta + \varepsilon,$$

$$\varepsilon|x \sim \mathcal{N}(0, 1)$$

$$Y \stackrel{\text{def}}{=} 1_{(Y^* > 0)} = \begin{cases} 1 & \text{if } Y^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

### Results and Discussion

#### Socioeconomic Characteristics

##### Education

Education level of the sample women's was low. Among the sample women's, majority 75.8 percent were illiterate, only 17.7 percent have education up to the primary level and 4.8 percent having education up to the middle level. It is well documented that education of the farmers has positive effect or role in the technology dissemination process. So in the present development effort, stakeholders should take in consideration that their working community is largely illiterate and unable to understand the complexities of the interventions. Therefore, it is necessary to properly educate the women's about the given technologies

**Table 3: Education Level of the Sample Farmers in the Selected Villages of the Project**

Education Level	Frequency	Valid Percent
Primary (1-5)	12	17.7
Middle	3	4.8
No education	47	75.8
<b>Total</b>	<b>62</b>	<b>100.0</b>

##### Tenancy status

Before starting the on -going assessment, the necessary variables were discussed and in this regard it was suggested that among the socioeconomic variables, tenancy status of women's must be focused because it plays an important role in the adoption of new technologies. So in the survey female's

families' tenancy status was explored. The results given in table-3 show that almost in all of the selected villages, the distribution of women's in the sample by tenancy status was very similar. Majority (89.7%) being owners, 5.2 percent were owner-cum-tenants and a small proportion of about 5.2 percent was tenant.

**Table 4: Tenancy Status of the Sample Farmers**

Tenancy	Frequency	Valid Percent
Owner	52	89.7
Tenants	3	5.2
owner-cum-tenant	3	5.2
<b>Total</b>	<b>58</b>	<b>100.0</b>
System	4	

##### Family size

On an average, the family size of the sample households was 7.25 persons; it ranged between 2 to 24 persons. The family composition wise analysis shows a minor difference between male and female population. The estimated strength of females in household was about 3.95

as of the male population 3.48 persons. In the study area, handling of livestock is the main responsibility of females. So the composition of male and female is favorable for the promotion of dairy goat project interventions.

**Table 5: Average Family Size and Male and Female Status of the Respondents**

Family	Mean
Avg. Family Size	7.25
Male	3.48
Female	3.95

**Income Sources**

The present study was conducted in the marginal areas of pothwar, Punjab. People are mostly resource poor. They have limited means of resources. Agriculture income depends upon the rainfall. Therefore people are not completely relying on agriculture solely. It is evident from table 5 that 40.13 percent household got their major share of income from the off-farm sources like jobs, labor work and self businesses in the nearest towns. A reasonable size of households 41.63 % revealed agriculture as their major source, while only 18.24 highlighted livestock as their main sources of income. The income analysis of the households depicted two things, one that the farming community have tradition of goat business and earning some money from this enterprise. The second thing is that due to income from off-farm sources, household seems able to invest some money on the improved goat production technologies but it is subjected

to the profit of the given intervention. If profit margins will be high farmers can easily attracted towards the improved goat production system.

**Table 6: Sample Households Main Sources of Income (Recheck Table)**

Sources	Percent
Agriculture	41.63
Livestock	18.24
Off- Farm	40.13
<b>Total</b>	<b>100.00</b>

**Women’s Motivational Sources**

Effective motivational sources always play an important role in the adoption and dissemination process of new technologies. It is well narrated in the literature that the influence of pears group, fellow farmers and progressive farmers worked well to convince local communities. The survey results also proved this notion. The data shows that majority of the women’s have been involved in the feed supplementation trials by the local facilitators and about 21 percent women responded that they have involved by their fellow women’s. The scientist’s contribution in motivating the women’s was very little (6.45 %) only.

**Table 7: Respondents Involvement in Dairy Goat Feeding Trials by Motivational Source**

Sources	Poor	Middle	Rich	All
Facilitators (%)	83.33	73.33	40.00	72.58
Farmers	16.67	17.78	60.00	20.97
Scientists	0.00	8.89	0.00	6.45
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

**Women’s Perceptions about Effectiveness of Feed Supplementation**

The women’s perceptions about the effectiveness of feed supplementation was collected and presented in the table 7. This data was analyzed by the household categories to see difference in their perspectives. The results depicted that across the household categories, a vast majority of the women’s 95.08 percent found the feed supplementation intervention very effective. To clarify their response, women’s were further asked how it is effective; majority of them highlighted that they have

given their view on the basis of increase in milk yield.

The regression (Probit estimates) results regarding women’s perception regarding effectiveness of the feed supplement are presented in table 8. The age coefficient is positive and significant at 5 percent level of significance indicating that experienced females have positive views regarding effectiveness of feed supplement. The education is positive and significant at 1 percent level of significance indicating that educated females consider the new technology as an opportunity. The

household category is positive and significant at 5 percent level of significance. The family size is negative and highly significant at 1 percent level of significance. The agriculture being main income source is positive and significant at 10 percent level of significant. The tenancy status is positive and non significant. The R

square value is 0.24 indicating 24 percent variation in the dependent variable is due to independent variables and vice versa. The LR  $\chi^2$  value is 124 indicating the robustness of the variables included in the model.

**Table 8: Women’s Views about the Effectiveness of Feed Supplementation**

Response	Poor	Middle	Rich	Total
Yes	91.67	97.73	80.00	95.08
No	8.33	2.27	20.00	4.92
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 9: Women’s Perception Regarding Effectiveness of Feed Supplement (Probit Estimates)**

Variable	Coefficient	t-values
Age	0.21**	2.14
Education	0.27***	3.86
Household Category	0.11**	2.02
Family size	-0.13***	-2.77
Main source of Income	0.14*	1.72
Tenancy Status	0.04	0.31
Livestock Number	0.16**	2.05
Constant	0.17***	2.65
Number of Observations	62	
$R^2$	0.240	
LR $\chi^2$	124.57	
Prob> $\chi^2$	0.000	

**Status of Milk Consumption**

Domestic use of goat milk is common and almost all goat milk is consumed at home. In the survey, to see the significance of the feed supplementation, change in milk consumption was inquired. Almost all the respondents were in view that their milk consumption has

increased. The women’s were further asked whether they used milk for tea purposes or any other. Majority around 60 percent were in view that increased milk is also used for tea purposes. While about 40 percent females have used additional milk for fattening of weaned kids.

**Table 10: Change in Milk Consumption**

Response	Poor	Middle	Rich	Total
Yes	100	97.62	100.00	98.31
No	0	2.38	0.00	1.69
<b>Total</b>	<b>100</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

**Social Advantages of the Project Activities**

The present activity was introduced for economic uplift of the poor women’s. The mechanism devised for the launching of project activities was participatory in nature. Every

stakeholder is supposed to interact with each other on bi-monthly or monthly basis. The purpose of this interaction was to discuss and share the personal experiences regarding the given interventions. To explore the social



cohesion among the stakeholders, women's were asked whether they have intensified their social relationships. A vast majority of the women's were in view that project activities have improved their relationships within the community and out of the community. A

considerable percentage (23.26%) of woman's was in view that relationship with the project staff (facilitators, BLPRI and NARC scientists) has great value for them.

**Table 11: Women's Distribution Regarding to Whom Relationship Established**

Categories	Poor	Middle	Rich	Total
With fellow farmers	66.67	78.13	80.00	76.74
With project staff	33.33	21.88	20.00	23.26
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Main Beneficiaries of the Project Interventions**

The present project was conceived to improve the poor women's livelihood through modern dairy goat production technologies. The idea is good but needs to understanding the family systems prevailed in the respective communities. Generally in the western world male and female keep and consumed their income independently but largely it is not common in Pakistan. Religiously and culturally male members of the family area responsible for the livelihood of the family, while women's

are supposed to take care the household activities. The income earned by the male family members considered the income of whole family. Contrary to this if females earned some income from any source that is also used for the benefit of whole family. So the idea of improving women income is not working well in the socio-cultural patterns of Pakistan. The sample women's response regarding the question of the main beneficiary of the project intervention was very realistic. A vast majority of the women's (92.98 %) pointed out that all family is benefited not only the female table 11.

**Table 12: Women Views Regarding the Beneficiaries of the Interventions**

Beneficiaries	Poor	Middle	Rich	Total
Male	8.33			1.75
Female		7.50		5.26
All family	91.67	92.50	100.00	92.98
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

**Participating Women Knowledge about Feed Supplementation**

To evaluate and see the farmer's interest and knowledge about the use of feed supplementation; farmers were asked whether they know about the ingredients of the feed ration. Majority of the women's 82.69 % pointed out that they know about the ingredients which used in the feed. The females were further inquired what kind of ingredients they have found in the feed ration. Among the sample women's, of 91.84 percent knows partially about the ingredients. While 8.16 percent claimed that they have complete

knowledge but when names of the items used in the feed was asked they were unable to identify all the feed ingredients. Overall from this information it is reflected that majority of the women's have taken serious interest in the feed supplementation trials. Furthermore, almost all feed supplementation trials were handled by participating women's. The participating women's were also asked do they know about improved feed ration prior to this project. Majority about 71 percent said no, while around 28 percent said yes they know about it Table 13.

The healthy effects of feed supplementation on dairy goat were also discussed with the respondents. The participating communities highlighted that good health of the animal improve resistance against the diseases, around 83 percent were favouring this logic. While about 16 percent said feed supplementation not saved animals from diseases.

**Table 13: Do you Know the Ingredients of the Fs Ration**

Knowledge	Poor	Middle	Rich	Total
Yes	66.67	84.21	100.00	82.69
No	33.33	15.79		17.31
Total	100	100	100	100
<b>Extent of Knowledge</b>				
Completely	14.29	8.11		8.16
Partially	85.71	91.89	100.00	91.84
Total	100	100	100	100
<b>Do you Know FS prior to this project</b>				
Yes	33.33	25.64	40.00	28.30
No	66.67	74.36	60.00	71.70
Total	100	100	100	100
<b>Saved From Diseases</b>				
Yes	80	81.58	100.00	83.02
No	20	18.42		16.98
Total	100	100	100	100

**Women Perceptions about Sustainability**

The actual success of any intervention depends upon its regular use. Most of the time it was observed that during the project life participating communities used new intervention regularly and tries to show positive results. Usually in the projects, technologies are demonstrated free of cost or provided on very nominal prices, therefore farmers continue new technologies, and they don't want to lose free opportunity. This issue was seriously

investigated during the on-going assessment of feed supplementation. Overall 67.27 percent respondents were in view that feed supplementation to dairy goat will not be survived. While a considerable percentage of women's (32.73%) said feed supplementation will sustain in their villages. Resources poorness and relatively less economic importance of dairy goat are the main causes limiting its sustainability.

**Table 14: Women's Response Regarding Sustainability of Feed Supplementation**

Response	Poor	Middle	Rich	Total
<b>FS will sustain or not</b>				
Yes	10	40	20	32.73
No	90	60	80	67.27
Total	100	100	100	100

**Average Increase in Milk**

The main purpose of feed supplementation (FS) was to increase the goat milk yield. The feed supplementation was provided for 60 days to the selected goats. Before starting the feed supplementation initial average milk yield was recorded i.e. 760 ml across the household categories, goat breeds and age of the goats. The average per day milk yield with feed

supplementation was 1280 ml. It shows an average increase of 520 ml in 60 days feed supplementation. The data of milk yield was crosschecked through various means just to ensure the accuracy of the data. The estimated experimental goat milk yield was quiet comparable with survey results i.e. about 562 ml per day.

**Table 15: Average Increases in Goat Milk Yield (across age & breed)**

Household category	Avg. milk yield without Feed supplementation (ml)	Avg. milk yield with Feed supplementation (ml)	Avg. Increase in milk yield (ml/day)
Poor	800	1375	575
Middle	760	1260	500
Rich	700	1250	550
All	760	1280	520

**Milk Yield by Age Groups**

The collected information was also analyzed by age groups. The range of first group is 1 to 3.5 years of age, the second group comprised of 3.6 to 7 years of age and the third group includes the goats having age between 7.1 to 12 years. The milk yield before feed supplementation shows higher milk yield in older group (880

ml), which is about 150 ml more than the first two group. Overall, milk yield with feed supplementation has increased significantly, the yield of first group was 1300 ml, the second group produced 1220 ml and the older group has shown yield (1380 ml). However, comparatively increase in milk yield was higher in young age group i.e. 560 ml per day table 15.

**Table 16: Age Wise Milk Status of Dairy Goats**

Age groups (years)	Avg. milk yield without Feed supplementation (ml)	Avg. milk yield with Feed supplementation (ml)	Increase in milk yield (Grams)
1-- 3.5	740	1300	560
3.6--- 7	730	1220	490
7.1---12	880	1380	500
<b>Total</b>	<b>750</b>	<b>1270</b>	<b>520</b>

**Breed Wise Milk Yield**

Feed supplementation was provided to different dairy goat breeds. The common breeds of the area were rulgud, teady, desi and betal. The genetic potential of these goats varied. Among these breeds, betal goat has more milk potential as compared to the remaining breeds. The average milk yield of rulgud, teady, desi and

beatl without feed supplementation was 690ml, 710ml , 880ml, 1080ml respectively. While with feed supplementation average milk yield increased across the breeds but relatively increase was higher in Desi breed (620ml). The less increase in betal milk was due to higher age of the selected goats.

**Table 17: Breed Wise Increase in Milk**

Goat breeds	Avg. milk yield without Feed supplementation (ml)	Avg. milk yield with Feed supplementation (ml)	Avg. increase in milk yield (ml)
Rulgud	690	1200	510
Teady	710	1060	350
Desi	880	1500	620
Betal	1080	1500	420

**Level of Feed Used and Increase in Milk**

The economical use of feed supplementation is necessary to harvest the optimum benefits. In the survey it was observed that the women's are

using different quantities of feed. The women's used 250 gram feed per were getting 1270 ml milk per day, while the group who used 251 to 500 gram feed was getting 1160 ml milk and

the last group used more than 501 to 1000 gram feed daily were getting 1080ml milk on daily basis. The corresponding effect of feed supplementation shows that use of 250 gram feed is more economical than the higher

quantities of the feed used. The experimental results are also supporting the survey results where 242.7 gram feed has increased milk yield up to the 564.2 litre milk per day.

**Table 18: Level of Feed Consumed and Average Milk Yield**

Sr. No	Quantity of Feed (Grams)	Avg. Milk Yield (ml)
<b>Survey Result</b>		
1	Up to 250 gm	1270
2	251 to 500gm	1160
3	Above 501 to 1000 gm	1080
<b>Experimental Result</b>		
1.	242.7gm	564.2

#### **Feed Supplementation and Increase in Goat Price**

Feed supplementation has positive effects, one on milk yield and on the other hand also improves the goat health. Both these effects have produced economic benefits for the respective communities. The relative information was analyzed by different age groups of the goats. The results reveals that

market price of all groups has increased but comparatively prices of the goats having age between 3.6 to 7 years was increased more (Rs 1392). The increase in prices of older group was relatively less which is quiet logical and looking according to the prevailing market norms. The overall increase was about Rs. 1312 table 18.

**Table 19: Average increase in Goat Price with 2 months Feed Supplementation**

age group	Anticipated price of goat without feed supplementation	Anticipated price of goat with Feed Supplementation	Increase in Price
1-- 3.5	4979	6292	1313
3.6--- 7	5318	6711	1392
7.1---12	6375	7125	750
<b>Total</b>	<b>5220</b>	<b>6532</b>	<b>1312</b>

#### **Partial Budgeting of Feed Supplementation**

The partial budget analysis of feed supplementation to dairy goat is presented in below table. From this table it is evident that feed supplementation to dairy goat is a very profitable intervention. The fixed costs are same, only difference is in the operational cost. Among the operational cost only cost that varies is feed cost, no additional labor or marketing costs involved. The supplemented feed has produced two types of benefits. One is increase in milk and the other was increase in the physical value of the goat. The estimated gross field benefits from the conventional method was about Rs 1094 and from the improved rationing, gross field benefits from

60 day feeding was Rs. 1843 per goat. The market value of feed supplemented goat has also increased, the market price of conventional goat was estimated Rs. 5220, while the goat supplied supplementation ration, has got more market prices Rs 6532. The simple reason behind this increase was the good health of the animals. The marginal rate of return from both milk and market price was about 677.96%, which shows significant economic benefit from the given intervention. The marginal rate of returns from only milk was about 246.38% that also revealed the economic significance of the feed supplementation intervention to the dairy goats.

**Table 20: Partial Budget Analysis of Dairy Goat (2month feed supplementation)**

Sr.	Items	Conventional	Improved
A	Average milk yield (grams /day)	760	1280
B	Variable costs (Rs/60day)	1085	1389
C	Cost that vary (Rs/60 day)	0	304
D	Avg. milk price (Rs/liter)	24	24
E	Gross field benefit from milk (Rs/60day)	1094	1843
F	*Gross field benefit from goat price increase	5220	6532
G	Gross field benefit E+F	6314	8375
H	Cost benefit Ratio (only milk)	1 : 1.00	1 : 1.4
I	Cost benefit Ratio (only increase in price)		1 : 5.2
J	Cost benefit Ratio (E+F)		1 : 6.1
K	MRR only from milk		246.38%
L	MRR only from increase in goat price		431.57
M	MRR from both milk and goat price		677.96%

\*Increase in price due to goat health improvement

## Conclusions and Recommendations

The study was conducted in the 10 selected villages of the dairy goat project. The total sample of the study was 62. On an average 6 farmers out of ten were interviewed. The respondents were the participating women's. Most of the sample females were poor and having less education. Majority 75.8 percent were illiterate, only 17.7 percent have education up to the primary level and 4.8 percent having education up to the middle level. The family size was ranged between 2- 24 but on an average, family size was 7.25 persons. Majority of the women's 89.7 percent have own agricultural lands, 5.2 percent were owner-cum-tenants and a small proportion 5.2 percent was tenant. It is evident from table 5 that 40.13 percent household got their major share of income from the off-farm sources like jobs, labor work and self businesses in the nearest towns. Around 40.13 percent household got their major share of income from the off-farm sources (jobs, labor work and self businesses in the nearest towns), while 41.63 % highlighted agriculture and 18. 24 pointed out livestock as

their main sources of income. More than 90 percent female pointed out feed supplementation as an effective intervention. The women's were in view that project activities have improved their relationships within the community and out of the community (Facilitators, BLPRI and NARC Scientists). A vast majority of the women's (92.98 %) pointed out that dairy goat intervention has benefited to the whole family not only the female members. Initial average milk yield was about 760 ml across the household categories, goat breeds and age of the goats. The average per day milk yield with feed supplementation was 1280 ml. It shows on an average increase of 520 ml in 60 days feed supplementation. Age wise analysis shows that as compared to other groups increase in milk yield was higher in young age group 560 ml per day. The breed wise analysis of milk yield reflected that with conventional feed, rulgud, teady, desi and beatl goats are yielding 690ml, 710ml, 880ml, and 1080ml respectively. While with feed supplementation average milk yield increased across the breeds but relatively increase was higher in Desi breed (620ml). The

use of 250 gram feed was comparatively more economical than the higher quantities of the feed used. The results reveal that market price of all groups has increased but comparatively prices of the goats having age between 3.6 to 7 years have yielded more benefits Rs 1392. The marginal rate of return from both milk and increase in market price of goat was about 677.96%, which shows positive economic significance of the given intervention.

The preliminary results show positive effect of feed supplementation on goat milk yield. Now in the future experimentation it will be better if we repeat these trials on different goat breeds having variations in the age groups. It will help us in further précising the research results and satisfying the farming communities. It was observed that women's are using different levels of feed use. While majority of them were resource poor. Therefore, it is necessary to create awareness about the economical use of feed supplementation ration. The education program seems important in this regard.

The availability of feed supplementation ration is a critical question associated with this intervention. Hence it is important for the project team to develop a viable feed marketing mechanism during and after the completion of project. Value addition in local feed resources or combinations of these resources must be incorporated in the next year feed supplementation trials. Regularly monitoring of the activities by the concerned program needs to be ensured. It is necessary to answer the

practical problems and further to satisfy the farming communities.

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