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Factors Affecting Income of Smallholder Goat Farmers in Vyas Municipality, Tanahun

Sajan Poudel[1] Kiran Prasad Bhatta[1] Surya Prasad Adhikari[2]

[1]School of Agriculture, Far Western University, Nepal

[2]National Agricultural Policy Research Centre, Nepal Agricultural Research Council, Lalitpur, Nepal.

Corresponding Author: kiran.p.bhatta@gmail.com

Abstract

Goat farming is an integral part of rural livelihoods, which is common for smallholder farmers of Nepal. Despite being a lucrative sector, especially for the rural farming households, commercialization of goat farming is very less indicating some sort of hindrances. A research was conducted in Ranigaun village of Vyas municipality-11, Tanahun from February to July 2024 to understand the income and its determinants. Data was collected from 86 households through KoboCollect mobile application using semi-structured questionnaires. Data analysis was done by STATA. The results pointed out that the average yearly income from goat farming was NRs. 60,469.76 per household. Multiple regression analysis revealed that years of schooling and goat farming experience have statistically significant positive relationship with smallholder goat farmers' income at 1% significance level. Group membership is positively significant (5% significance level). Absenteeism at households, having one or more members migrated to abroad, has negatively significant ($p < 0.01$) impact on income. Major problems in goat production were reported to be inadequate knowledge on balanced feeding (index value of 0.77) and insufficient funds for scaling-up to commercial level (0.71). Since association with some sort of groups are found to have positive impact, it is recommended that formation of such groups should be the priority of development workers. Farmers' group should also prioritize their activities to enhance the capacity of their members by providing practical skills like goat feed management. Besides, such groups can be a platform for learning-sharing on their personal experiences.

Keywords: Feeding management, KoboCollect, Livestock, Membership

Introduction

The livestock sector accounts for 24.01% of Agricultural Gross Domestic Product (AGDP), among which sector of goats shares 3.19% on AGDP in the country (MoALD, 2023). Goat farming plays a crucial role in supporting farmers' livelihood in the hilly and Terai regions, that make up a significant portion of the country's land area and population (Neupane et al., 2018). Compared to other livestock options, raising goats can be more profitable and attractive option for earning a living (Khadka & Thapa, 2020). Even in challenging environmental conditions like high temperature, scarce rainfall and rough, remote terrains, small ruminants like goats have a good contribution in farmers' lifestyle. This contribution remains important even in areas where there is challenging crop cultivation (Akinmoladun et al., 2019). Goat farming is profitable and traditionally poor farmers with lack of adequate resources have been engaged in this farming as a subsistent income generating activity (Kumar & Deoghare, 2002). In Tanahun district, Chevon production stands at 2,387 metric tons in the district, the highest among other livestock meat; it contributes to 31.88% of the total meat production of the district (MoALD, 2023). There is high demand in goat farming and Nepal Government has also focused on increasing self-dependency through different policies to encourage goat farmers by providing subsidies and support. But the farmers don't yet choose commercial cultivation. This hints at the possibility of problems on goat farming (Poudel, 2018).

Despite being an attractive option among rural households farming in small-scale, commercialization of goats is very less that indicates hindrances in income generation. Researchers have found that several socio-economic factors have influence on goat farming sector. As per the findings from Kajevhu & Mabika (2023), farm-dimension, education, age and extension visits had significant influence on goat production. Panth et al. (2021) found that gender, ethnic groups and trainings to the farmers have a significant impact on the profitability in goat farming. It was suggested that commercialization in goat farming can uplift the life standard of small scale farmers and entrepreneurship in this sector can be a powerful tool for providing employment to youths. Similarly, when uneducated farmers rear large sized herd of goats, it may negatively influence on management practices, marketing and production process (Kosgey et al., 2006). As per the findings from Dhakal et al. (2021), it was suggested that awareness among farmers is necessary regarding goat farming practices and better care. The formation of cooperative societies can help the farmers increase their access to credit facilities (Offor et al., 2018). Not much work have been carried out on smallholder goat farmers' income in the study area. Goat farming, being the source of income of many farmers,

problems aren't explored much. Therefore, the primary aim of this research is to analyze the factors that affect the income of such farmers and also, the problems associated with goat farming. The study focuses on understanding the socio-economic characteristics of smallholder goat farmers in the region. It is also essential to know about the challenges that are limiting the farm income of goat farming households which is the concern of the study. The ranking of problems gives insights to the farmers about the obstacles they encounter and their intensities in the region.

Methods and Materials

Selection of Area and Sampling

Altogether 14 wards are present in Vyas Municipality, Tanahun. Goat farming households were selected from Ranigaun village of ward no. 11 of Vyas Municipality.

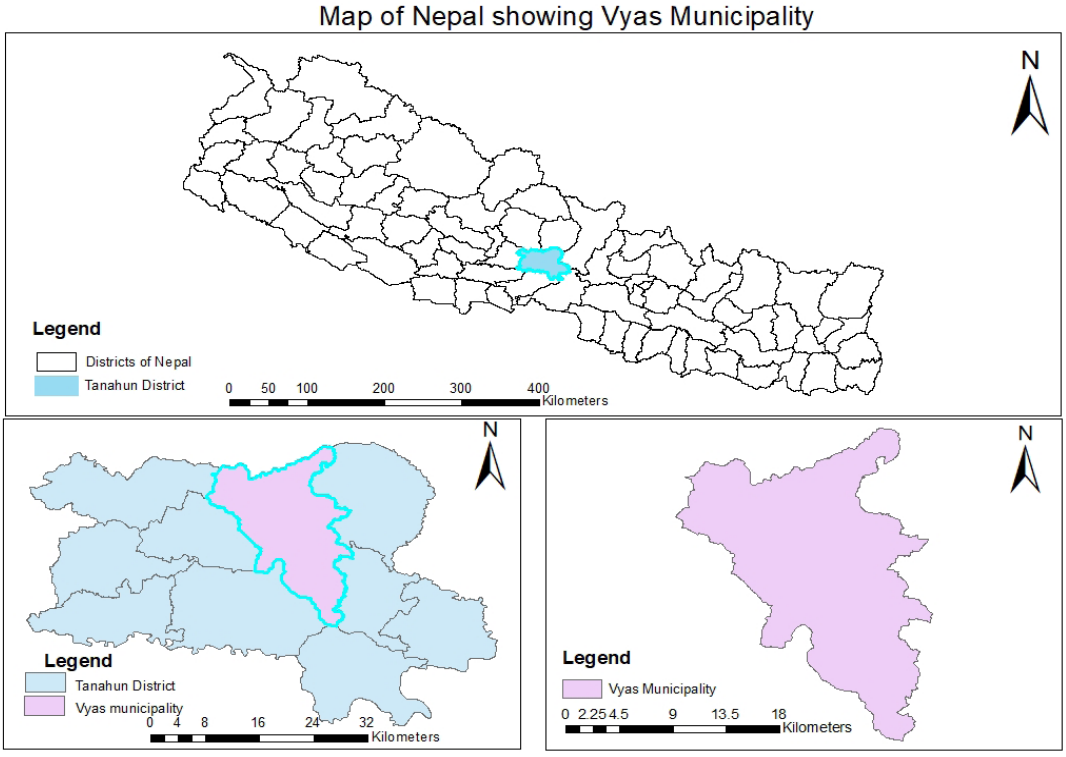


Figure 1: Map of study area

The study area was purposively selected to study on smallholder goat farmers who have been rearing goats. The sample size of 86 was obtained from the total of 110 goat farming households using Raosoft sample size calculator at 95% confidence interval and 5% margin of error. Similar sample size calculator was used by Subedi et al. (2024). The use of ArcGIS 10.4 was done for the map of area studied.

Data Collection and Analysis

Gathering of primary information was done through semi-structured questionnaires to delve into the households engaged in rearing of goats. The data acquisition process involved the utilization of questions that aligned with the research objectives. KoboCollect mobile application was used to gather data systematically and efficiently. Pre-testing of questionnaires with five households was carried out to understand the effectiveness of the prepared questions before the final survey. After pre-testing, the collection process was initiated with minor revisions.

For the purpose of obtaining valuable knowledge from raw data, data was analyzed by the use of Microsoft Excel and STATA. After the collection of raw data through KoboCollect mobile application, downloading of the information was done on Microsoft Excel. Multiple linear regression model was employed to understand the relationship and effect of different socio-economic factors on dependent variable income. Independent variables used in the model were age, gender, years of schooling, goat farming experience, family size, availability of improved breed, migration to abroad, training, group membership and access to extension services as elaborated in Table (1). Linear function is specified below as adapted from Rugube et al. (2019); Mukaila et al. (2024).

$Y = f(X_1, X_2, X_3 \ldots\ldots\ldots\ldots X_n)$

$Y = + {}_1X_1 + {}_2X_2 + {}_3X_3 + {}_4X_4 + {}_5X_5 + {}_6X_6 + {}_7X_7 + {}_8X_8 + {}_9X_9 + {}_{10}X_{10} + e$

Where, = Constant term, $_{1\text{-}n}$= Regression coefficient, e= Error term, X_1= Age, X_2= Gender, X_3= Years of schooling, X_4= Goat farming experience, X_5= Family size, X_6= Availability of improved breed, X_7= Training, X_8= Group membership, X_9= Migration to abroad and X_{10}= Access to extension services

Table 1: Variables used in the regression model

Variables	Type of variable	Description
Dependent Variable		
Income	Continuous	Annual income of farmers
Independent variable		
Age	Continuous	Age of household head
Gender	Dummy	Value 1 if male household head and 0 if female household head
Years of schooling	Continuous	Years of schooling of household head
Goat farming experience	Continuous	Years of farming experience
Family size	Continuous	Total members in the family

Availability of improved breed	Dummy	Value 1 if availability of improved breed and 0 otherwise
Training	Dummy	Value 1 if received training related to goat farming and 0 otherwise
Group membership	Dummy	Value 1 if Membership in farmers' group and 0 if not
Migration to abroad	Dummy	Value 1 if one or more members migrated to abroad and 0 if not
Access to extension services	Dummy	Value 1 if has access and 0 otherwise

For ranking problems faced by smallholder goat farmers in the study area, ranking was done by the use of formula as used by (Kandel, 2019). The Scale value of 1, 0.80, 0.60, 0.40 and 0.20 were given to the problems which were most serious, serious, moderately serious, little serious and least serious respectively.

I=

where, I= Index, Si= Scale value, fi= Frequency of respondents and N= Sample size

Results and Discussion

Characteristics of the Households

According to the survey, it was found that the average year of schooling was 8.71. The highest year of schooling was 18 which explains that farmers who were highly educated were also involved in goat farming. The minimum year of schooling was zero that means illiterate household heads were also engaged in goat farming. Most of the farmers had 10 years of schooling. The average family size of the study area was 4.63~ 5. The minimum and maximum family size was 2 and 9 respectively. According to the survey, there were more independent population than dependent population in the study area. Average independent and dependent family size per household was 3.42~3 and 1.21~1 respectively.

The mean, maximum and minimum age of household heads was 46.26, 65 and 28 respectively. For easy understanding of the household heads' age, four categories were made. Table (2) shows that the majority of household heads were of age 42-53 (39.53%) followed by 30-41 years (33.72%), 54-65 years (24.42%) and 18-29 years (2.33%). Mostly, farmers belonging to young and active age groups were engaged in goat farming.

The number of female-headed households were more than the male-headed households. This finding is similar to that of Baruwa (2012). Among 86 sample households involved in goat farming, 53.49% household heads were females and 46.51% were males. Majority (95.35%) of the household heads were married. Those who were unmarried and widowed were 1.16% and 3.49% of the total household heads respectively. A large amount of household heads (62.79%) belonged to Brahmin Community. Chettris (22.09%), Aadibashi and Janajati (12.79%), Dalits (1.16%) and others (1.16%) were also observed during the field survey. It was observed that nuclear family (70.93%) is more than the joint family (29.06%) among goat farming households.

Majority of the households (49%) had agriculture except goat farming as a primary income source. Among the sampled households, 16% had government services as a major source of income. People who were engaged in goat farming and had such farming as their principal source comprised of 14% of the total sampled households. The households with private services and remittance as their main income source were 12% and 9% of the sampled households respectively. According to the field survey, 31.40% of the households had family members migrated to abroad. Out of 86 sampled households, 68.60% had negative response. Among the sampled households, only 40.70% responded that they had received trainings. Almost half of the sample had received training and those who hadn't received were demanding skill enhancing trainings.

Table 2: Characteristics of the Households

Characteristics	Categories	Percentage
Age	18-29 years	2.33
	30-41 years	33.72
	42-53 years	39.53
	54-65 years	24.42
Gender	Male	46.51
	Female	53.49
Marital Status	Married	95.35
	Unmarried	1.16
	Widowed	3.49
Ethnicity	Brahmin	62.79
	Chettri	22.09
	Aadibashi and Janajati	12.79
	Dalit	1.16
	Others	1.16
Family Type	Nuclear	70.93
	Joint	29.06

Primary Income Source	Agriculture Except Goats	49.00
	Goat Farming	14.00
	Government Services	16.00
	Private Services	12.00
	Remittance	9.00
Migration to Abroad	One or more member migrated	31.40
	No member migrated	68.60
Trainings	Yes	40.70
	No	59.30
Group Membership	Yes	52.30
	No	47.70
Access to Extension	Yes	52.30
	No	47.70

About 59.30% had not taken part in any trainings related to goat farming. The membership in group was seen in 52.30% of the total households sampled. 47.70% of the sampled households had no participation in farmers' group, as observed in the survey. 52.30% of the total households had access to extension visits and 47.70% had no access to extension visits in the region.

Farm Characteristics

From the survey conducted, the mean years of experience in goat farming was 16.08 years. The household with minimum and maximum experience was 5 and 35 respectively. This means that goat farmers were having good years of experience in the farms. There were altogether 693 goats. The average number of goats available in the household was 8. The maximum and minimum number of goats observed in the survey were 19 and 1 respectively.

Table (3) describes about the characteristics of farm of the households. It shows why farmers raised goats. Majority (80.23%) of the households said that they reared goats for household meat consumption. Response of 66.28%, 51.16% and 39.53% households was for emergency financial security, festivals and ceremonies and regular cash income respectively. Some of the households (33.72%) responded manures as well, as the reason for goat farming.

Table 3: Farm Characteristics

Characteristics	**Categories**	**Percentage**
Reasons for Rearing	Household Meat Consumption	80.23
	Emergency Financial Security	66.28
	Festivals and Ceremonies	51.16
	Regular Cash Income	39.53

	Manures	33.72
System of Rearing	Intensive System	76.74
	Semi-intensive System	23.26
Breeds of goat	Local	43.00
	Improved	12.00
	Both	45.00
Disease Seen	Yes	17.40
	No	82.60
Vaccination	Yes	51.20
	No	48.80
Deworming	Yes	91.90
	No	8.10
Purchasing Agents	Local People	61.63
	Middlemen	24.42
	Butchers	13.95
Use of Income from goats	Children's Education	58.14
	Investment in Farm Diversification	43.02
	Paying Loans	40.70
	Savings	34.88
	Others	1.16

Altogether 23.26% of the surveyed households responded that they followed semi-intensive system of rearing for goats and 76.74% said that they followed intensive system of rearing where feeds were available at the shed. Among the sample, 45% had both local and improved breed. The households with improved and local breed of goat present were 12% and 43% respectively. Breeds like Khari, Jamunapari, Boer, Beetal, Boer Cross were observed in the farm. Majority of the farmers had a very limited knowledge on improved practices. Local breed was preferred more as the farmers reported that they performed well according to the environment and they were more hardy. Total of 17.40% responded that they had observed some diseases in goats in their farm in the past one year. Goats had suffered from bloating, diarrhea, parasitic infection and hoof rot diseases according to the surveyed households. Majority (82.60%) of the households had not observed any disease from past one year. Among the sampled households, 51.20% of the households responded that they had applied vaccine to goats. 48.80% had negative response to the vaccination practices. Majority of respondents (91.90%) had practiced deworming practice for goats. Most of them dewormed their goats every three months. As per the field survey, there was very few farmers who followed deworming process rarely. 8.10% gave negative response towards practice of deworming.

In the study region, the respondents said that local people were the purchasing agents of goat meat in the majority (61.63%) of the households. Local people were the major consumers of goat meat. About 24.42% of the farmers also sold meat to middlemen. Meat was sold to butchers among 13.95% of the households. Majority (58.10%) of the households used their income for children's education as shown in table 3. This means that children's education was prioritized by utilization of income. For the purpose of farm diversification, farm income was utilized by 43% of the sampled households and some used the income to pay loans. Among the observed households, 40.70 % had used the income to pay loans and 34.90% did some savings from the income generated. 1.20% used income for other purposes for instance emergency purposes, as responded by the farmers.

Cost and Income

The annual average veterinary cost was found to be NRs. (Nepali Rupees) 549.42 per household as shown in Table (4). The cost in feed yearly among the sampled households was NRs. 22,058.13 in average. Marketing cost yearly was found to be NRs. 422.67 in average. The mean annual maintenance cost reported by goat farmers was NRs. 534.88. The total cost was found to be NRs. 23,565.10 from the study excluding the initial shed construction cost and cost of family labors.

Table 4: Cost and Income

Description	Amount in Nepali Rupees
Yearly Cost per Household	
Veterinary Cost	549.42
Feed Cost	22,058.13
Marketing Cost	422.67
Maintenance Cost	534.88
Total Cost	23,565.10
Annual Income from goats per household	60,469.76
Benefit	36,904.66

As per field survey, the annual average amount of goat meat sold per household was 60.11 Kgs (Kilograms). The total meat sold in the study area in a year was 5170 Kgs. Average selling age of goat was 15.14 months. The mean selling weight of goat was found to be 20.51 Kgs. In the study site, the annual average income from goat farming per household was NRs. 60,469.76. The annual average value of goat manures included in the income was NRs. 4,045.34. The benefit obtained was of value NRs. 36,904.66 from goat farming in the region according to the data from survey.

Regression results

Table (5) presents the effect of different factors, for instance age, sex, year of schooling, goat farming experience, family size, migration to abroad, availability of improved breed, training, group membership and access to extension services, on income from smallholder goat farming.

The findings of the analysis showed that year of schooling of farmers was positively related with income at 1% level of significance level. Holding the other factors constant, a year increase in schooling can increase the income by NRs. 3,091.11. More educated farmers, can yield better income suggesting education had significant effect on income of goat farming. Findings from Dhara et al. (2019) also suggested that education status had a positive impact on economic condition of the goat farmers.

Table 5: Regression Results

Variables	Coefficient	St.Error	t-value	p-value
Age	456.992	366.308	1.250	0.216
Gender	-1501.940	5238.862	-0.290	0.775
Years of schooling	***3091.115	869.359	3.560	0.001
Goat farming experience	***1440.880	542.966	2.650	0.010
Family size	365.193	2026.147	0.180	0.857
Availability of improved breed	5052.696	5149.093	0.980	0.330
Training	8014.333	6014.659	1.330	0.187
Group membership	**14316.270	6269.160	2.280	0.025
Migration to abroad	***-15129.300	5231.466	-2.890	0.005
Access to extension services	649.999	5900.488	0.110	0.913
Constant	-20974.882	17721.430	-1.180	0.240
R Squared	0.617			
Adjusted R squared	0.566			
*** and ** show significance at 1% and 5% respectively				

Goat farming experience had a positive relationship with income of smallholder goat farmers (at 1% significance level). As observed in the field survey, farmers with better experience on goat rearing reported about better income. Offor et al. (2018) also suggested that experience had a positive relationship with goat farming. The household where one or more members were migrated to abroad had a negative relationship with income at 1% significance level ($p < 0.01$). This suggests that labor

shortages due to outmigration can reduce income of the households. Similar conclusions were given by Gc & Hall (2020). Not having skilled manpower for care and management of kids and adult goats can decrease the farm performance. Group membership had a significant association with income of smallholder goat farmers with p- value 0.025 (at 5% significance level). The coefficient of the variable group membership explains that farmers involved in groups were found to have their income more with the value of NRs. 14,316.27 than those who were not involved. Membership in group can help smallholder farmers to increase their income. Group membership has helped in knowledge sharing among goat farmers regarding management practices contributing significantly to income. Membership was found to motivate farmers to carry out farm activities and develop awareness. Similar findings were obtained by Neupane et al. (2022). Farmers had lesser knowledge on improved practices and technologies as observed in the field survey. Other independent variables, for instance age, family size, availability of improved breed, training, access to extension services had a positive relationship but were not significant. The independent variable gender had a negative relationship with income but was not significant.

Problems and Ranking

For the problems that were most serious, serious, moderate, little serious and least serious as mentioned by the farmers, the scale values of 1, 0.80, 0.60, 0.40 and 0.20 were used respectively. Problems such as inadequate knowledge on balanced feed, insufficient fund, non-availability of green fodder, lack of proper marketing knowledge and less extension were found among the goat farmers as shown in Table (6). Firstly, the farmers of the study area had inadequate knowledge on balanced feed for goats which was found to be the major problem faced by them. This problem stands at the first rank with index value 0.77. Among total samples, 52.32% of the households found that insufficient knowledge on balanced feed was the most serious problem in small-holder goat farming sector. Farmers were mostly not aware of the feed requirements of goats at growth phases.

Table 6: Problem Ranking

Problems	Most Serious (1.00)	Serious (0.80)	Moderate (0.60)	Little Serious (0.40)	Least Serious (0.20)	Index	Rank
Inadequate Knowledge on Balanced Feed	45	15	3	16	7	0.77	I
Insufficient Fund	18	39	10	10	9	0.71	II

Non-availability of Green Fodder	9	17	28	19	13	0.58	III
Lack of Proper Marketing Knowledge	10	13	18	26	19	0.53	IV
Less Extension	5	7	30	13	31	0.47	V

Moreover, having insufficient fund stood at the second rank among the problems faced by goat farmers. Majority (45.34%) of the respondents found this problem as the serious one. The farmers were not having sufficient resources to scale-up their business despite being interested. The index value for this problem was found to be 0.71.

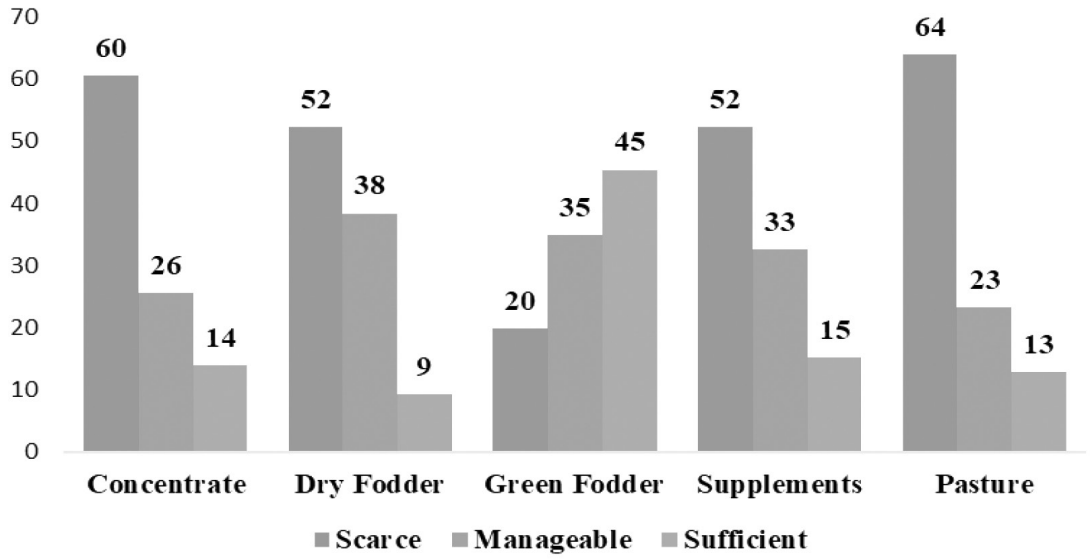
On the other hand, green fodder non-availability when needed stood at the third rank among the problems faced by the farmers. It is ranked as the third major problem. Among the sampled households, 10.46% said that this was the most serious problem. The index value for non-availability of green fodder was found to be 0.58. Majority of respondents found this problem as a moderately serious problem. As majority of farmers said that they had limited land, cultivation was limited.

Additionally, having no proper marketing knowledge and ideas was found to be one of the major problems in the study area as per the respondents. The farmers reported that knowledge on marketing can improve their income. A limited understanding about marketing strategies and networking ideas has been an obstacle to scale up this business among interested farmers. This problem stood at the fourth rank among the problems of smallholder goat farmers. The index value for this problem was found to be 0.53. Knowledge enhancing programs from local level can encourage these smallholder farmers. Finally, less extension visit was one of the challenges faced by the goat farmers. The respondents said that people who had access to extension visits got services very rarely. The problem of less extension stood at the fifth rank among the problems of the smallholder goat farmers.

Condition of Availability of Feed

Figure (2) below illustrates the availability of feed for goats in the farm. Among the sampled households, availability of concentrates, dry fodder, supplements and pasture were found to be scarce in condition. The percentage of households that responded that: availability of concentrates for goats were scarce, manageable and sufficient were 60%, 26% and 14% respectively.

Figure 2: Condition of Availability of Feed



About 52% of the respondents said that availability of dry fodder was scarce while 38% and 9% said that it was manageable and sufficient respectively. Majority of the respondents (45%) had sufficient availability of green fodder and others had manageable (35%) and scarce (20%) availability of it. Majority of the respondents said that availability of supplements was scarce (52%) in condition. 64% of the households responded that the availability of pasture was scarce. 23% and 13% had manageable and sufficient pasture availability respectively.

Conclusion

Goat farming is popular among smallholder farmers in Nepal although the average holding size is less (8). Being a vital means of income and nutrition for impoverished rural families, this holds great potential and is one of the lucrative enterprises for farmers. The annual average income obtained by the goat farmers per household was NRs. 60,469.67. Despite this, the lack of commercialization within the realm of goat husbandry indicates potential challenges. The findings of the regression also showed that year of schooling of farmers was positively related with income of smallholder goat farmers ($p < 0.01$). The average year of schooling of the sampled farmers was less (8.71) indicating this as one of the hindrances of goat commercialization. However, migration to abroad had a negative relationship with income of smallholder goat farmers ($p < 0.01$). The study found that 31.40% of sampled households had absenteeism and hence, it stood as one of the major reasons for low commercialization due to the lack of family members that could tend the goats. Group membership had a statistically significant relationship with income of smallholder goat farmers (p<

0.05). From the survey, 52.30 % of the selected farmers were engaged in one or more such groups, which can be enhanced to improve the income from goat farming and this may be the best option for scaling-up of this enterprise to commercialization.

Discussion regarding problems of goat farming showed that inadequate knowledge on balanced feed was the major problem faced by smallholder goat farmers (index value 0.77). So, we suggest that active participation of smallholder goat farmers in local groups, associations, co-operatives, etc. should be enhanced as well as such memberships should act as a platform to provide farmers with knowledge sharing opportunities and support networks that contribute to better goat management and hence, income. It is also recommended that such farmers' groups should prioritize their activities to enhance the capacity of farmers by providing skill enhancement programs and knowledge sharing opportunities on goat farming including feed management.

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