Research Article

Assessing Potential Contribution of Livestock Farming on Poverty Alleviation in the Rain-fed Areas of Punjab

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Abstract | This study was an effort to evidence the poverty alleviation in rain-fed areas of Punjab with the help of livestock. For this purpose survey research design was used and data was collected with the help of an interview schedule from randomly selected 200 samples from two purposively selected districts Chakwal and Rawalpindi. Data were analyzed using Statistical Package for Social Science (SPSS). Data depicts that the maximum number of respondents were belonging to the age category of above 40 years of age and 70 respondents were recorded as illiterate. There were 75% of respondents (148) who claimed that there are multiple major income sources. The respondents who had a low level of poverty and a high level of poverty were the same in the study area. Among respondents, 25% said that they don't have easy access to the local livestock market for selling animals and their products. Moreover, according to the livestock farmers cow has proven the least productive species in the study area. There is an ignorable trend of spending on mechanized livestock management/handling, paid extension services, and loan repayments. Almost 81% of the livestock farmers said that they only keep the health record of their livestock head. Above 50% of the farmers said that are unable to afford the veterinary services available. In the case of LDDD, LED and DVS, farmers said that they have assisted us. But the farmer organization and NGOs have not contributed a little in this regard. There should be pro-poor policies and reforms in helping the development practitioners for institutional reforms to support vulnerable livestock farmers.

Introduction

About two-thirds of the agricultural community in Pakistan has small farmers characterized by small landholdings and some factors that affect their productivity and capacity of income generation. Livestock farming is an important part of emerging rural farmers and has an unparalleled potential for productivity and income generation. Livestock farmers make up the bulk of the farm's income. Smallholder farmers and landowners who do not own land earn about 35% of their income from this sub-sector. In addition, the livestock sector generates employment for about 30 million people; most of them use to live in rural areas of the country (Akram *et al.*, 2018). Pakistan is gifted with animals that have great genetic potential. Pakistan currently has 38.8 million buffaloes, 46.1 million head of cattle, 30.5 million sheep, 1.1 million head camel and 74.1 million goats (GoP, 2017-18). The livelihood of shepherds and herdsmen depends entirely on the livestock sector. Their quality of life has improved considerably over the years. Livestock species play a very important economic, cultural and social role in rural households as they contribute to improving the income and well-being of the farm family. Livestock contributes to family support, food security, income, land production, property conservation, livelihoods, agricultural sustainability, transport, diversity and sustainable production, cultural and social objectives and finally family and community employment (Faraz and Waheed, 2016).

Raising livestock is among the most important sectors of agricultural economies (Luqman *et al.*, 2013). It has been playing a prominent role in providing livelihood opportunities to rural communities through the provision of food, uncooked nutritious elements, and income (Sadaf *et al.*, 2021), and also contributes to rural development in the end (Ali and Khan, 2013). Various studies have confirmed the potential of the livestock industry as an important contribution to the lives of the rural poor (Lopez-Ridaura *et al.*, 2018; Mazur and Tomashuk, 2019; Fanz, 2018). Likewise, the developing countries of the world, a similar condition is prevailing in Pakistan where there are more than half of the people live in rural settings and rely on their subsistence agriculture (Anon, 2014). That has been noted to address food safety issues that have occurred in a growing number of the country, the potential bearing sector (livestock) in agriculture offers a variety as well benefits in many ways for the rural poor (Westermann *et al.*, 2018).

Concerning the problems of the livestock sector in Pakistan, there are plenty of issues associated with economic, social, cultural and most importantly biological ones (Riasat *et al.*, 2014; Akram *et al.*, 2018). There are many other findings, according to their reports this domain is facing a variety of issues, undermining the real strength and progress of this potential bearing aspect of agriculture in the country. These problems are proving a meaningful hurdle in achieving the sustainability goals when it comes to the agricultural economy as a whole or just the rural development in the country.
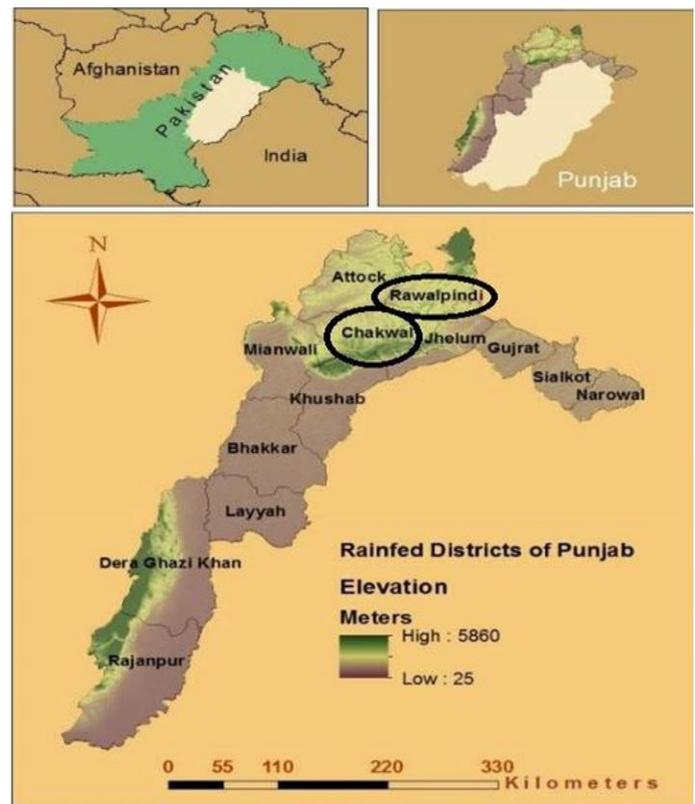
Map of study area [Source: Jamro et al. (2018)]

During 2015-2016, total milk and meat production increased by 3.22 percent and 3.7 percent, respectively, compared to 2014-2015 (Khan, 2021). Livestock development plays an important role in the country's economic growth. Only crop production may not be a suitable solution to the problems of poverty and malnutrition at the level of household (Khan *et al.*, 2014). In this situation, the current need is being stated as there is a requirement for improvement in the livestock sector as of international parameters for meat and dairy products. For this reason, the first step should be to identify the main problems of livestock and assessment of potential this sector holds. In this

way, farmers which are vulnerable to poverty will be able to better contribute to the livestock sector by the adoption of the latest production technologies and management methods for livestock.

Materials and Methods

The main types of research designs in social sciences are categorized as experimental, exploratory, survey and many more. Keeping in view the nature of the current research plan, survey research was used. For this study quantitative approach/procedure was adopted to collect data from respondents. Pothowar region has a great cultural and geographical significance. It has four districts namely; Chakwal, Jhelum, Rawalpindi and Attock. All the people who are raising livestock in the Pothowar region constitute the population of this study. The respondents were actively involved in the livestock sector. The proposed research is conducted in the Pothowar region of Punjab. It comprises four districts which stated above. Two districts with the highest poverty rate in rural areas from the rain-fed region (Pothowar plateau) of Punjab were purposively selected for current research. Rawalpindi and Chakwal were selected being the highly intense districts in case of poverty (GoP, 2019-20).

A sample of 200 respondents was drawn with the help of Krejcie and Morgan Table after obtaining an estimate from secondary data available. Data was collected by carrying out face-to-face interviews of livestock farmers following the protocol of survey research.

In this research, a structured interview schedule having both close-ended and open-ended questions was prepared considering the objectives of the current study. Before final data collection, the reliability and validity of the schedule were calculated. In addition to face validity, the content validity of the interview schedule was also checked by the experts of the field in the Department of Agricultural Extension and Department of Animal Sciences at the College of Agriculture, University of Sargodha. Interview Schedule's reliability was calculated through SPSS, it was 0.764.

The interview schedule comprises of different dependent and independent variables. The whole interview schedule was composed of four major sections. First section deals with background information profile (socioeconomics) of respondents. Second section deals with the household income level and access to markets for the livestock farmers. The third section of the interview schedule was involved in assessing the household food security level. The fourth section was prepared to have an insight into the status of education acquired among the households. The last section of the interview schedule was addressing the challenges being faced by the livestock farming community in the study area. The collected data were coded in Microsoft Excel and analyzed using SPSS (version 12). Descriptive statistics were used for data analysis and its interpretation.

Table 1: *Frequency distribution of education level, landholding status, and income source of respondents. n=200.*

Education level of Respondents		
Education	**Frequency**	**Percentage**
Illiterate	70	35%
Up to Primary	78	39%
Up to Matriculation	36	18%
Intermediate and above	16	8%
Landholding of Respondents		
Arable land	**Frequency**	Percentage
No land	6	3%
Up to 2.5acres	38	19%
2.6-5acres	56	28%
5.1-7.5acres	12	6%
7.6-10acres	46	23%
Above 10acres	42	21%
Major Income Sources of Respondents		
Income Sources	**Frequency**	Percentage
Crops Farming	22	11%
Rearing of Livestock	06	3%
Off-farm Income	24	12%
Multiple from the above ones	148	74%

Results and Discussion

Education makes an individual have an understanding of a thing or phenomena from a different point of view. It grooms his personality, mindset, approach towards different things and most importantly the behavior of the individual. So, if the farmer/respondent is educated then this job becomes easier to some extent. Hundal *et al.* (2016) asserted that education level has an impact on the management of dairy products and overwhelmingly the process of livestock management. Among 200 of the respondents, 70 respondents said that they have not acquired any formal education.

Respondents which selected primarily as their level of education were 39%. Matriculation, intermediate and above have the consecutive number of 36 and 16. Results of above Table 1 show that to some extent the population of the targeted area can understand what is suitable for them to acquire the objective of food security.

It is understood that farmers with a small piece of land struggle much more than the big farmers. They struggle for resources, opportunities, output, status, and attention of authorities. That's why they are more vulnerable to the effects of economic, political, social, cultural, natural, and physical disasters. Farmers with maximum land do not struggle much for resources. As they use to have enough investment, savings and resilience to tackle the disturbance or loss. Results, which were recorded after having an analysis of the response against this question is as follows. There were 38 respondents out of 200 who have 2.5 or less than 2.5acres of farming land. From the livestock rearing farmers, 26% of respondents said that they have 2.6 to 5 acres of land. The respondents which have more than 5 acres of land and up to 7.5acres were only 12 in number from the sample of 200. In the end, there were 46 and 42 farmers who own the land from 7.6 to 10acres of land and above 10acres of land consecutively.

In addition, Table 1 also explains the major source of income of the targeted population. According to the findings, 22 respondents thought that crop farming is a major source of income for their families. Only 06 respondents said that the rearing of livestock is their major source of income. Choosing the option of off-farm income as a major source of income was the choice of 24 respondents. Surprisingly there were almost 75% of respondents (148) claimed that according to them there are multiple major income sources from the above-mentioned sources. Recorded results showed that the majority of the respondents have opted for the last option as their major sources of income are multiple.

Figure 1 and 2 explains two phenomenons as what is their per month household income level and specifically how much they earn per month only from their farm activities. Firstly, we will discuss the household income level of the livestock farming community. There were 03 categories of the farming community including; up to 50,000PKR, 50,001 to 100,000PKR

and more than 100,000PKR. There were 67% of the farming community who said that they earn up to 50,000PKR per month at the household level. Moreover, there were 29% of the respondents claimed that they earn from 50,001 to 100,000PKR at the household level in a month. This means that medium to high number of livestock farmers earn up to 100,000PKR and up to 50,000PKR respectively.
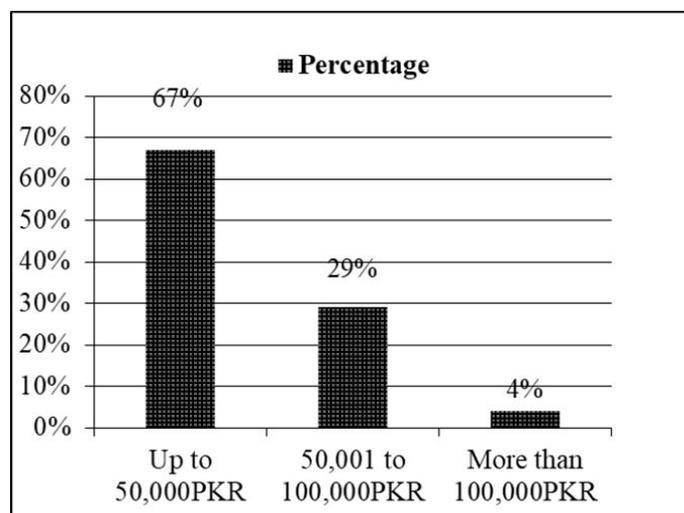

Figure 1: *Household income(n=200).*
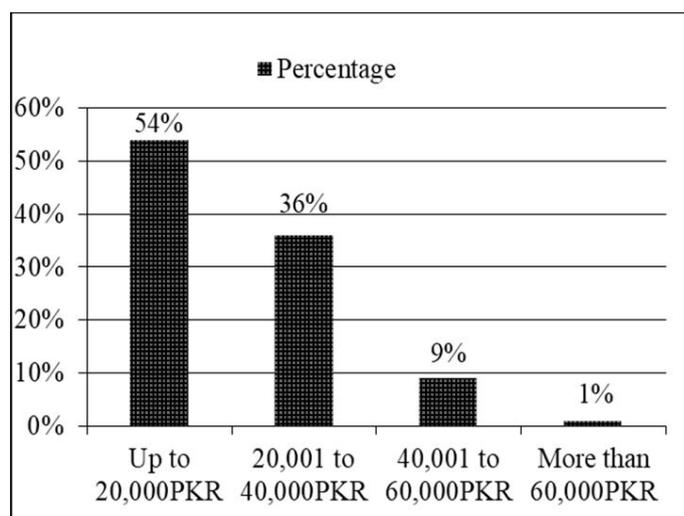
Figure 2: *Income from livestock (n=200).*

The concern about how much they earn only from activities is discussed as under. There were 04 categories of the income level of livestock farmers only from the farm including; Up to 20,000PKR, 20,001 to 40,000PKR, 40,001 to 60,000PKR and more than 60,000PKR. Results reveal that there were more than 50% of farmers (54%) who said that they earn up to 20,000PKR/month from the farm activities. While there were 36% of the livestock farmers said that they earn 20,001 to 40,000PKR/month from the farm activities only. While 9% and only 1% of the

livestock farmers claimed that they do earn 40,001 to 60,000PKR/month and more than 60,000PKR/month consecutively from the farming activities. It means that in the study area livestock farming is not beneficiary enough for generating per month income to satisfy family needs.

Table 2: *Descriptive statistics of perceived poverty levels of household (n=200).*

Poverty Level	Frequency	Percentage	Mean	SD
Very Low	20	10%	3.34	1.31
Low	36	18%		
Neutral	54	27%		
High	36	18%		
Very High	54	27%		

Table 3: *Mean and standard deviation of income & affordability status of respondents.*

Income & affordability status	Mean	SD
I get adequate monthly income from livestock	3.07	.99
I can easily afford basic needs	3.13	1.06
I have saved some income in bank or house	2.78	1.15
I have some newly purchased livestock	3.05	1.08
I can easily pay for veterinary services	3.24	1.00

Scale: *Strongly disagree=1, Disagree=2, Neutral=3, Agree= 4 & Strongly agree=5*

The purpose of adding this question was to know about the actual financial condition of the respondents. To have an idea about their current survival status, the response of poverty level was against 5 points Likert scale (Very low=1, Low=2, Neutral=3, High=4 and Very high=5). Anyhow it is clear from the response that 54 respondents were found in neutral condition as they perceived themselves, they are not facing poverty and even they don't consider themselves as well-off. The condition of 27% of respondents was observed very much severe as they stated that they are facing a high level of poverty. The respondents who opted for low level of poverty and high level of poverty were the same in the study area *i.e.* 36 livestock farmers. It means that almost 30% of the residents of the study area justify that there is found equality in the opposite economic status of livestock farmers. Hussain *et al.* (2007) verified that residents of rain-fed areas usually face a chronic level of poverty. Anyhow, it is clear from the results that only 10% of the livestock farmers perceive that they think that they are facing a poverty level of very low category.

The mean value of 3.34 also indicates that there exists a neutral to high rate when asked about the poverty level of the respondents.

Further, an effort was made to look into the affordability of the household. This will make the situation clearer that how much the household can prove resistant towards poverty. There was a total of seven statements prepared in light of literature for checking the specific variable. The highest mean value obtained by the statement, "I can easily pay for veterinary services" *i.e.* 3.24 with a standard deviation of 1.00. This statement is followed by, "I can easily afford basic needs". This obtained the mean value of 3.13, which means that they are not agreed on being independent and not even showing themselves vulnerable. Data of both of the above-mentioned statements declare that the cumulative response was more close to neutral on the Likert-type scale. When asked about the income saving, findings come up with the mean value of 2.78 (lowest one). This indicates that the livestock farmers almost negated the statement about income saving in the house or any bank as well. Qasim (2012) declared that farming community of rain-fed areas is much attracted towards rearing of livestock for income generation rather than cropping. He further stated that less use of pesticides and fertilizers inhibits their production growth.

Table 4: *Frequency distribution of suitable marketing pattern for respondents to sell livestock.*

Marketing system	No/Type of livestock					
	Buffalo	Cow	Goat/sheep	Poultry	Multiple	None
Weekly animal market of area	12	42	06	04	112	24
Private sale	02	06	34	06	120	32
Middlemen	00	14	34	00	80	72
Factory	00	00	06	04	06	184
Local village market	08	10	08	66	92	16

The behavior of approaching the local market, factory or middlemen does matter in this regard. It has given us an insight into the frequency of livestock visits for selling animals or his livestock. Another benefit of studying behavior is that it has awarded the researcher of popular marketplace and approach of livestock farmers and which object of livestock increase their visiting frequency. Sources included are; "weekly animal market of area", "private sale", "middlemen",

"factory" and "local village market". Data in Table 4 depicts that almost all of the selling points or sources are not much popular when it comes to just selling buffalo. Anyhow all the selling sources except factory inlets are termed as popular when selling multiple livestock species. Selling cows at a weekly local animal market was opted by 42 livestock farmers. On the other hand, selling goats/sheep in a private sale and through middlemen obtained the recommendation of the same respondents. Findings make clear that farmers don't have an understanding of the right place and time for the sale of respective animals. Ahmad *et al.* (2020) also endorsed the same fact and categorically said that in Punjab farmers do lack in the sale of animals at right and place.

Table 5: *Descriptive statistics of expenses spent on-farm for the last year by the respondent.*

Item	Mean	SD
Purchase of animals	1.85	1.38
Feed and supplements	2.00	.827
Veterinary services and drugs	1.06	.397
Labour (permanent and temporary)	.05	.329
Machinery and equipment	.06	.342
Transport and marketing	.97	.412
Extension services	.02	.140
Loan repayments	.00	.000

Scale: *No expense spent at all=0, Up to 15000=1, 15001-30000PKR=2 & Above 30000PKR=3*

Expenses spent on the farm can be made us visualize how much interest the owner has and where he wants to see his investments in the future. For measuring this Likert type scale of 03 was developed except for the livestock farmers who claimed that they do not spend any expenses. Feed and supplements obtained the highest mean value of 2.00/3.00. This means that there is the general possibility of spending from 15001PKR to 30000PKR by the livestock farmers of the study area on their farm. For spending on machinery and equipment, extension services and loan repayment mean values were .06, .02 and 00 respectively. There is an ignorable trend of spending on mechanized livestock management/handling, paid extension services and loan repayments. While on purchase of animals and veterinary services alongside drugs for livestock obtained the mean score of 1.85 and 1.06 respectively. It means there exist livestock farming communities that spent up to 15000PKR on their farm. All they need is spending at the right time and the long-term

advantage of the investment. Training in this regard will help in leading the livestock farming community towards spending which is long-lasting and more rewarding.

The situation of food security also explains the inclination or vulnerability of a household towards poverty. Considering this aspect farmers were asked about whether they perceived any situation of food security at the household level or not. The highest mean score was obtained by the factor of having access to stuff for household *i.e.* 3.61. It was followed by the factor namely, "can afford at least three meals per day". It obtained the mean value of 3.43 which means that there is found a general perception among the farmers they didn't really agree or even disagree with the statement. In the respect of cultural and religious norms of the study area, the livestock farming community has debarred themselves from protesting and complaining of the situation with relevance to food security. Jaleta *et al.* (2018) deliberately stressed that poverty alleviation is possible with its mitigation through livestock management. The fact established here is that in the case of small landholders, livestock management and their due value is very effective against household poverty.

Table 6: *Mean and Standard deviation of food security status perceived by livestock rearing farming community.*

Statements	Mean	SD
I can afford at least three meals per day	3.43	1.034
There is availability of food in stores in my home	3.38	1.020
I have access to animal foodstuffs	3.61	.721
I have enough food in most of the months during the year	3.17	1.071
I sometimes have excess food for sale	2.94	1.226

Scale: *1= S. Disagree, 2= Disagree, 3 = Neutral, 4 = Agree, 5 = S. Agree.*

Table 7: *Frequency distribution of appropriate program or organization which have ever assisted.*

Organization/Experts	Yes	No
Livestock & Dairy Development Department	188(94%)	12(6%)
Livestock Extension Department	180(90%)	20(10%)
District Veterinary Services	200(100%)	00(00%)

Services providing stakeholders play a key role in making a sector efficient and more productive. There asked whether Livestock & Dairy Development De-

partment (LDDD), Livestock Extension Department (LED), District Veterinary Services (DVS), Farmer organizations and NGOs assisted them in livestock management best suited in the local scenario or not. In the case of LDDD, LED and DVS, about 90% of farmers said that they have assisted us. But the farmer organization and NGOs have not contributed a little in this regard. Like the term District Veterinary services points towards the non-government functionaries which only concerned with the sale of their products except the development in true ways. For the change, there should be sincerity among all the stakeholders to be active players of the game. Ignorance on the part of local NGOs and farmer organizations is a moment of great concern for the stakeholders and especially the state institution. Mahmood *et al.* (2020) has stated that advisory services are not reaching to number of farmer in the rain-fed areas of Punjab. Moreover, the use of technology is also being denied in this regard. The use of cell phones and other ICT tools is not very much popular in those areas.

Table 8: *Effect of income levels on the poverty level of the households.*

Variables	Coefficient	t-stat	P value
Intercept	0.208	165.81	0.000
I get adequate monthly income from livestock	0.387	3.712	0.000
I can easily afford basic needs like	0.195	1.947	0.053
I have saved some income in bank or house	-0.182	-2.293	0.023
I have some newly purchased livestock	0.252	3.187	0.002
I can easily pay for veterinary services	0.171	2.166	0.032
F-stat	61.66		
Durbin Watson	2.079		
R^2	0.614		
Adjusted R^2	0.604		

Regression model

Finding of the above table showcase that factors depicted of income levels do effect the poverty at household level. Since the poverty at household level is representative of the decisions that livestock farmers make at household, so the same is the case found in the rain-fed areas of Punjab. In addition to this income saved is the significant role player in poverty at household level among all indicator as depicted by t-value = -2.293. Income from livestock and newly purchased livestock obtained the t-vale = 3.712 and 3.187 respectively. These two indicators also obtained the p-value = 0.000 and 0.002, respectively. Having monthly income from livestock products and newly purchased livestock has key role in poverty rate at household level.

Paying for veterinary services also significantly affecting the poverty at household level as the p-value indicated in table is 0.032. Only affording basic needs of daily life has nothing to with the poverty level of household as it obtained the p-value = 0.53. Overall, the model is moderately fit as the R^2 = 0.61.

Conclusions and Recommendations

The livestock role in agriculture as a whole and specifically in rural livelihood beholds diversity in it. The contribution it makes in agriculture is associated with the stimulation of growth in the overall economy by making bulk contributions at the national level and specifically by supporting a specific household. Farming experience in keeping livestock is impressive when it comes especially to study area. More than half of the respondents were literate and educated enough to understand the guidance and knowledge about farming techniques. The study area livestock farming is not beneficiary enough for generating per month income to satisfy family needs. There was found a little inclination towards a high rate of poverty in the study area. They use to sell both dairy and non-dairy products for income generation. This habit or interest inclination of livestock farmers indicates their consistent behavior and managing their household expenses without taking the risk or taking steps about which they are not confident. Anyhow all the selling sources except factory inlets are termed as popular when selling of multiple livestock species. There is an ignorable trend of spending on mechanized livestock management/ handling, paid extension services and loan repayments. Some livestock farmers stated that they keep livestock for savings and cover health expenses. They adopt multi-crop system which is beneficial for the grower to gain maximum economic return and it also climate-smart practice. In the case of Livestock Dairy Development Department Punjab, Livestock Extension Department Punjab and District Veterinary Services, are providing assistance to farming community especially for livestock management. But the farmer

organization and NGOs have not contributed a little in this regard. In the light of the above findings here are some recommendations;

1. In rain-fed areas, popular as well as more suited to ecosystem species of livestock should be encouraged
2. Training and supervision regarding record keeping of livestock at the farm should be emphasized
3. Local Government bodies should regularly focus on poverty statistics and act actively against actors responsible
4. Local assistance providing departments need to reschedule their response time and strategy
5. There should be pro-poverty policies and reforms in helping the development practitioners for institutional reforms to support vulnerable livestock farmers of the study area.

Novelty Statement

Livestock farming is one of key strategy to reduce poverty among vulnerable segments and communities in rural areas and to improve their household income and generate sustainable livelihoods.

Author's Contribution

Muhammad Luqman: Conceived the major idea of research as principal author.
Adeel Mustafa: Prepared initial draft of manuscript and data collection
Sheer Abbas: Data collection
Muhammad Yaseen: Proofread and finalized the manuscript.
Muhammad Umer Mehmood: Prepared research instrument and data analysis.
Raheel Saqib: Reviewed the literature.

Conflict of interest
The authors have declared no conflict of interest.

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