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Examining the Impact of Livestock on Poverty Alleviation: A Case Study of Kalla Saifullah, Balochistan

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Contents:

Abstract: *The study aimed to investigate livestock's role in waning rural poverty in Kalla Saifullah district, Balochistan. Using convenient sampling, a sample of 150 was collected from three tehsils of the Kalla Saifullah district. The study found that most households were below the poverty line but could escape poverty with the help of livestock benefits. The study employed the logit model. The results of the explanatory variables showed that the benefit from livestock, age of the household head, agriculture credit, livestock training, gender of the household head, land ownership and education of the household head exhibited a significant but inverse association with the poverty of the households. Nevertheless, the size of the household has a positive impact on poverty, while family labour has no bearing on poverty. Therefore, to alleviate poverty in the region, which may significantly contribute to sustainable economic growth, the government needs to encourage interest-free loans and enhance the ability of the livestock producers through training.*

Key Words: Livestock, Benefits from Livestock, Poverty, Balochistan

Introduction

Livestock accounts for 61.9 per cent of agriculture's value-added and 14.0 per cent of Pakistan's Gross Domestic Product (GDP) in 2021-22. Moreover, livestock is the primary source of income for people who live in the country's rural areas, as more than 8 million rural households are involved in livestock raising, which accounts for 35-40 per cent of their total income (PES 2021-22). Livestock's gross value increased by 3.26 per cent, from Rs. 5,269 billion in 2020-21 to Rs. 5,441 billion in 2021-22 (the base year is 2015-2016). Therefore, to boost the economy, offer food availability, and reduce deprivation in the country, the government needs to intensify its efforts in this area. Also, to increase the amount of food produced per animal, the government had to improve veterinary health care, breeding techniques, artificial insemination services, the use of balanced rations to feed animals, and how livestock illnesses were dealt with (PES 2021-22).

In Pakistan, nearly 30 million people work in

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the livestock industry, most of which belong to rural areas. Generally, they are small farmers. Pakistan's agricultural community has around two-thirds of small landholdings; these farmers have few elements to enrich their productivity and ability to generate money. Among them, the most significant is livestock (Khan et al., 2018).

As a result of its geographic and climatic characteristics, Balochistan has the best conditions for raising livestock. As per facts, only 5 per cent of the province's land is arable, while the rest of the area is rangeland. Despite the province's limited manufacturing capability and inadequate infrastructure, it still supplies 20 per cent of the country's livestock. Moreover, the livestock sector shows a momentous position in the economy of Balochistan. Around 50 per cent of the province's entire agricultural production comes from poultry, dairy, camels, sheep, goats, and their by-products, which account for 10 per cent of the provincial GDP (Government of Balochistan 2021).

Moreover, the livestock sector offers the sole livelihood source for most of Balochistan's population. Livestock helps with financial assistance, food security, land preservation, livelihoods, transportation, cultural and social goals, and finally, provides employment to families and communities (Khan et al., 2018 & Ali, N., et al., 2021). Therefore, livestock performs an imperative role in the lives of rural families in Balochistan.

Livestock farming is crucial to contemporary rural farmers' livelihoods in Balochistan. It offers unmatched potential for productivity and a source of income. Moreover, a large share of the farmer's income is produced by livestock in Balochistan. As in Balochistan, around 60% of the income of small landholders and landless farmers comes from livestock (Khan et al., 2018, Shaikh S.A 2016, Khan et al., 2015).

Killa Saifullah is a district in the northwestern part of Balochistan. The district is one of the wealthiest districts in the province in terms of livestock. More than 82 per cent of the district's population lives in rural areas directly and indirectly attached to livestock. Moreover, the primary economic activities of Killa Saifullah are farming and raising livestock, followed by mining and quarrying. The district has 342,932 residents, with 161,121 women and 181,806 men. The rural inhabitants were 279,639 (81.54% of the total), while the urban residents were 63,293 (18.46%). Literacy rates stand at 32.77 per cent (Pakistan Bureau of Statistics, 2017). Furthermore, 97.85 per cent of the population speaks Pashto, the most common language. Since livestock is the district's second-most important economic activity, most people in rural areas rely heavily on their livestock for livelihood. They are marketing livestock to other provinces. Livestock is also a significant source of milk, wool, hides, and skins in the district. Moreover, the rural population often uses animals to get to places where no other form of transportation exists.

According to the Agriculture Census 2015, the livestock population in Killa Saifullah was 2417726, while the poultry population was 344826. Moreover, the livestock population comprises 125294 cattle, 352 buffaloes, 1252166 sheep, 986008 goats, 24903 camels, 1979 horses, 672 mules, and 26352 asses (GOB, Agriculture Census, 2020). These statistics show that the most prevalent livestock species in the district are sheep and goats.

The livestock industry complements other industries and agricultural production, as well as a buffer against crop failure-related revenue shocks. It creates a steady flow of income and employment and reduces the seasonality of livelihood patterns, especially for rural poor people. In addition to males, women and kids also help their families with livestock grazing. Still, as they are family employees, they are not compensated for their labour in monetary terms. Women also take care of the household pets; they gather animal feed and perform other tasks like milking. In the future decades, livestock is anticipated to become a significant driver of the district's agricultural expansion and economic growth. Therefore, this study aims to assess the impact of livestock farming on household poverty in Killa Saifullah.

Materials and Methods

This section confers research design, data collection,

and data sources. The theoretical framework is also discussed in this section. The study was carried out in the Kalla Saifullah district of Balochistan. The following tehsils are purposely selected as they are the most populated parts of the district: Kalla Saifullah, Muslim Bagh and Loiband. The method of sample size selected is known as proportion sample (T. Yamane, 1967), whose formula is as under:

$$NI = \frac{n}{N} \times Ni \qquad (1)$$

Whereas:

NI = Potential number of the respondents in each tehsil/sub- tehsil

i = Tehsil number1,2, and 3.

N = Entire population of the district.

n = Entire sample size i.e 150;

N_i = Total number of the population in the targeted tehsil.

Table 1. Tehsil-wise Selection of Samples

Tehsil	n	N	N_i	NI
Kalla Saifullah	150	239,019	132,346	83
Muslim Bagh	150	239,019	78,711	49
Loiband	150	239,019	27,962	18
Total			239,019	150

Data Collection

A well-planned interview design with a combination of open and closed questions was used to collect evidence from ranchers on demographics, livestock production, and its benefits, including issues related to livestock husbandry, such as a lack of agriculture credit and training faced by farmers. The questionnaire was generated in English and decoded into the local language with explanations. The survey aimed to collect data on the socioeconomic opportunities and challenges faced by livestock farmers. Killa Saifullah District's Livestock Department provided vital information, which was a significant hand in the accomplishment of the goals of the study. The data was gathered from January to February 2022 from the three tehsils in the district, i.e., Kalla Saifullah Tehsil, Muslim Bagh and Loiband.

The study used two steps of data analysis to achieve the objective of the study. In the first step, we estimate unidimensional poverty and then use a logit model to ascertain. The Economic Survey of Pakistan states that the poverty line in 2018-19 was Rs. 3757.85 (based on the Cost of Basic Need approach (CBN), while the CPI increased to Rs. 4546.57 in 2021-22. After that, poverty was determined using the FGT index (Foster-Greer-Thorbecke, 2010). The Head Count Ratio (HCR), Poverty Gap Ratio (PGR), and Squared Poverty Gap Ratio (SPGR) may be calculated by using FGT the following formula:

$$FGT \propto = \frac{1}{N}\sum_{i=1}^{N}\left[\left(\frac{Z-Y}{Z}\right)\right] \propto \qquad (2)$$

Where N represents the overall sample size, Z represents the projected poverty line, and Y represents the consumer spending per person, the values 0, 1, and 2 may be used to estimate the HCR, PGR, and SPGR, respectively.

By dividing the number of impoverished people by the total population, the HCR or prevalence of poverty is applied to calculate the proportion of deprivation throughout the population. PGR calculates the average detachment under the poverty threshold, which indicates how far families are from the poverty line. However, SPGR measures the typical amount of the square of poverty for each family. As a result, it explains the disparity between the poor by giving greater weight to those who are more deprived of resources (Siddiqui, A. 2007 & Khan et al. 2019).

Specification of the Logistic Model

In this study, respondents were assessed for poverty being a binomial quantitative dependent variable that can have a value of 0 or 1, with 1 indicating that the household is poor and 0 otherwise. A model

looks at how likely a household is poor based on several independent factors. These factors can be dummies, discrete and continuous. Since respondents in this study were classified as either poor or not by evaluating their poverty level, this binary relationship turns the data into either 1 or 0 forms. Logistic regression is a distinctive technique for resolving dichotomous variables. The explained variable is made of dual (0, 1) values, which is a significant justification for employing the logistic regression model (D. N. Gujarat, 2003) and (G. S. Maddala, 2007) as the OLS regression approach is ineffective for parameter estimates and heteroscedastic error correction. Since Y = 1, the likelihood of the dependent variable being equal to one is related to the independent variables' determination by the Logit function, which is the logarithm of the odds Y = 1 value. This is presumptively true that the value of Y relies on $X_1 \dots\dots X_k$. As a result of this, the mathematical form of the Logit Model is expressed as under:

$$ln\left(\frac{Y_i}{1-Y_i}\right) = L_i = \beta_0 + \beta_1 X_1 + \cdots\cdots\cdots\cdots + \beta_k X_k + \mu_i \quad (3)$$

Whereas $\left(\frac{Y_i}{1-Y_i}\right)$ is the odds ratio, Yi = probability to be poor, 1-Yi = probability to be non-poor, β0……. βk are the estimated parameters, $X_1 \dots\dots X_k$ is the independent variable and $\mu_i$is a random error of the model.

The specification of the model is written as:

$$L_i = \beta_0 + \beta_1 BFL + \beta_2 AC + \beta_3 + \beta_4 AHH + \beta_5 EHH + \beta_6 GHH + \beta_7 LT + \beta_8 LOW + \beta_9 SHH + \beta_{10} FL + \mu_i \quad (4)$$

Where Li is the probability of being poor, β_0 = Intercept, BFL= Benefits for Livestock, AC=Agriculture Credit, AHH= Age of Household Head, EHH= Education of Household, GHH= Gender of Household Head, LT=Livestock Training, LOW= Land Ownership SHH= Size of Household FL= Family Labor and μ_i= Error term.

It maximizes log-likelihood rather than minimizing the residual; logit model coefficients are evaluated by (D. N. Gujarat 2003 and G. S. Maddala 2007). An estimate of the odds ratio is used to convey the likelihood that an event will occur. Odds are calculated by exponentiating the resultant parameter known as the odd ratio. One unit change in the explanatory variable changes the odds. If it has a value larger than 1, the independent variable enhances the likelihood that the result will occur, and vice versa (Field, 2005 & A. I. Abdelrahman, 2010, Memon, M. H., et al. 2015). Like OLS, the logistic regression model uses marginal effects as a fundamental metric for explaining results; in contrast, marginal effects compute the change in estimated likelihood owing to a unit variation in the regressors; OLS measures the instantaneous change in the estimated variable due to a unit change in the regressor (W. H. Green 2003).

Results and Discussion

Table 2 compares the three tehsils estimated poverty levels, i.e., Kalla Saifullah, Muslim Bagh, and Loiband. According to the results, 70 per cent of families are in absolute poverty in Kalla Saifullah, with a depth of poverty of 51 per cent and severity of poverty of 36 per cent. In Muslim Bagh, the prevalence of poverty is 72 per cent, the depth of poverty is 41 per cent, and 30 per cent of people live in extreme poverty. Similarly, Loiband district findings show that poverty incidence, depth, and severity are 75, 55, and 33 per cent, respectively. The table also reveals that, on average, 72 per cent of people in the research area lived in poverty during 2021–22.

Table 2. Overview of Poverty in District Kalla Saifullah

Tehsils	Kalla Saifullah	Muslim Bagh	Loiband
HCR	70	72	75
PGR	51	41	55
SPGR	36	30	33

The percentage of countryside families staying in poverty is largest in Laiband than in Killa Saifullah and Muslim Bagh. The household survey findings show that Loiband is the district among the chosen rural regions with the highest level of poverty, followed by Muslim Bagh and Kalla Saifullah. This suggests that Loiband needs more resources than Kalla Saifullah and Muslim Bagh to help poor households escape poverty.

Table 3. Results of the Logit Model

Variables	Parameters	OR	ME	Z-Value	P-Value
Intercept	3.810	----	----	2.10	0.01
BFL	-1.030	0.310	-0.210	-3.40	0.00
AC	-0.0023	0.611	-0.100	-2.89	0.00
AHH	-0.100	0.800	-0.020	-2.40	0.02
EHH	-1.020	0.510	-0.010	-2.01	0.03
GHH	-1.050	0.710	-0.090	-2.98	0.00
LT	-0.001	0.820	-0.110	-3.01	0.00
LOW	-0.621	0.310	-0.100	-3.41	0.00
SHH	0.0214	1.020	0.001	-2.01	0.04
FL	-0.001	0.912	0.002	-1.04	0.21
Pseudo R- square		0.3801		Likelihood Ratio	41.710(0.000)
Hosmer-Lemeshow goodness of fit test		4.82		Pearson goodness of fit test	15.1(0.19)

Whereas: Odds Ratio (OR), Marginal Effect (ME), Benefits from Livestock (BFL), Agriculture Credit (AC), Age of Household Head (AHH), Education of Household (EHH), Gender of Household Head (GHH), Livestock Training (LT), Land Ownership (LOW), Size of Household (SHH) and Family Labor (FL)

The results of the Logit Model are displayed in Table 3, demonstrating that livestock benefits are significant and diminish the probability of being vulnerable to poverty. It seems that livestock serves as the foundation of livelihood for the people living in rural areas of Killa Abdullah. Moreover, the benefits of livestock include food production, a source of income, social security, etc. These results are consistent with the findings of (Hilina, M. 2005, and Gebretsadik, S. 2008, Hameed, G., et al. 2018), which show livestock provides greater benefits and a greater likelihood.

The study results further indicated that households led by men are unlikely to be poor than those led by women. This negative impact is since male farmers may have had more experience farming than female households. The results revealed that household size has a positive relationship with poverty while family labour is inconclusively related to poverty. Nevertheless, since livestock care is done by family members may be led to disguised unemployment. However, on the other hand, the household head's age, livestock training and agriculture credit are adversely and firmly linked with poverty, implying that senior people are more vested and capable and that they have greater expertise and access to resources in farming. Likewise, the household's land holding is statistically significant, detrimental to poverty, and lowers the likelihood of living in poverty since more land gives rural residents more opportunities for farming activities

The odds ratio of the logit model is reported in the fourth column in table 03, as the odds ratio is an alternative method of justifying the study's findings. Since, in the study, the value for the poor is 1 while for the non-poor is 0, a value less than 1 is suitable and shows convergence as it approaches zero. The odds ratio in favour of not being poor compared to being poor is 0.61 for agriculture credit, which suggests that agriculture credit reduces the odds of being poor on average by 39 per cent. Nevertheless, for household education age and gender, the odds values are 0.80, 0.51, and 0.71, which indicate that

household education, age and gender had a significant impact on poverty reduction. Owned land and livestock have odd ratios of 31 and 82 per cent, respectively. This means that owning property and having livestock training reduce the chances of being poor by 69 per cent and 28 per cent, respectively. The estimated odds of family size are 1.72, which shows it spurs poverty to some extent while the family is not creating any difference in poverty. The benefits from livestock assets have an odd value of 0.31, indicating that livestock benefits reduce the odds of rural families being poor by 71 per cent on average. It demonstrates how livestock is a crucial source of reducing poverty in Killa Saifullah.

The marginal effect values are also displayed in table 3, which indicates that a unit rise in the regressor over a specific threshold level will alter poverty. The findings imply that the risk of being poor decreases by 21, 10, 02, 01, and 09 per cent for every additional unit of benefits from livestock, agriculture credit, household age, education and gender, respectively. If a household has land, the probability of being poor drops by 10 per cent. The projected outcomes of household size and family labour are negligible, demonstrating that these factors have little bearing on the poverty of families. The livestock training also diminishes poverty by 0. 11 per cent.

Pseudo-R-square is used to test how well the logistic regression model fits the data; this study shows that the factors related to poverty observed in this study explain 36% of the model's variation and are in line with any cross-sectional analysis. Besides, all the diagnostic tests of the model indicate that there are no econometrics or specification issues in the model.

Conclusion

The study examined the contribution of livestock to alleviating rural poverty using primary data. The study applied the logit model to investigate the causes of poverty with a particular emphasis on livestock in Kalla Saifullah. The results demonstrate that possessing animals, agriculture credit, and livestock training considerably lower the severity of poverty. Additionally, the size of the farmland, the education level of the family head, age and gender have a favourable effect on household poverty reduction. However, poverty is positively correlated with household size, while family labour shows inconclusive results. The study findings have several significant policy implications for reducing poverty in Killa Saifullah. The government intends to develop the livestock industry to enhance agricultural output and reduce poverty. First, the poor should be supported financially through micro-financing to raise livestock since it may help to alleviate rural poverty. Large livestock, like cows, should also receive priority since they have favourable lag effects and have a more significant influence on reducing poverty than other types of livestock. In many smallholder systems, increasing crop and animal production productivity has been used to raise household income and combat rural poverty. Lastly, getting more money and education to rural families and making them more resistant to shocks will help them eliminate rural poverty.

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