

## **Socio-Economic Factors Affecting Livestock Production in Pishin Sub-basin, Pakistan**

**Geography**

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### **Abstract**

*Through simple random sampling, a total of 200 farm household were selected for the survey in Pishin sub-basin, Pakistan. Questionnaire, field observations & group discussions were used to collect data on livestock production and extension services. The male household heads were picked up for interview. The female were not interviewed because of cultural and religious concerns. The data collected through the survey were analyzed statistically with SPSS version 16. Frequencies, percentages and PI (PI) were used to analyze the collected data. Results revealed that the herd size for the adult ruminants were more as compared to other domestic animals. PI showed that rangelands were the major source of livestock feed. Bulk of the households stated that the feed sources for the livestock were not enough. No rules and regulations were found regarding rangelands management in the area. Bulk of the surveyed households mentioned a decreasing trend in livestock number. Fewer households were found to have access to extension services. No formal institutions were found, providing agricultural credits to the households. The results suggest useful policy implications for sustainable use of collective rangeland resources for livestock production in the area.*

**Keywords:** *Livestock; Farmer’s views; Extension services; Rangelands; Pishin sub-basin*

## **Introduction**

Out of 88 million hectare (ha) of land area of Pakistan, about 65 percent is rangelands. The largest province of Pakistan in terms of land area and with just about 90 percent of rangelands, Balochistan provides vast grazing opportunities for the pastoralists. Rangelands provide the chief source of feed for small ruminants in Balochistan. Livestock play an imperative role in the economy of Balochistan (Shafiq, 2008). The rural population of Balochistan is involved in livestock production because of uncertainty in crop production. This is because livestock are believed to work as bank and can be converted into cash in the case of crop failure (Raziq et al. 2010). Nearly 70% of the inhabitants of Balochistan earn their livelihood from livestock rearing (Shafiq and Kakar, 2007). The main livestock types reared in the province are small ruminants i.e., sheep and goats. The livestock system in Balochistan depends on the living standard of the livestock owner (Hussain & Durrani, 2007). Due to weak socio-economic conditions of the pastoralists, the collective rangelands are unsustainably used without any rules and regulations (Sarwar et al. 2002, Qasim et al. 2011). The range productivity is also getting low not only due to unfavorable climatic conditions (Mirza et al. 2009) but also due to socio-economic factors like overgrazing and overuse of rangeland resources (Hussain & Durrani, 2007). Pastoralist's knowledge needs and perceptions are imperative for livestock development. Therefore, there is a need to understand the pastoralists' socio-economic conditions, their perception and understanding of feed sources, trend of livestock number, problems on crops and livestock rearing, rules and regulations of rangeland management and extension services in Pishin sub-basin, Pakistan. The methodology we used differs from previous studies in that we have used primary data from household surveys to analyze the livestock production system and extension services in the area. The research suggests policy recommendations that might help improve the livestock resources of the province.

## **Profile of the study area**

Pishin sub-basin was selected for this study. It is a part of the northern highland region of Balochistan. The entire area of the sub-basin was 7,004 square kilometer. The area is situated between 29° 10' to 31° north latitudes and 66° 14' to 67° 31' east longitudes. Elevation of the area reaches to 3,137 meters. Bulk of the household was uninformed of the contemporary ways of rangelands management. Just about 90% area of Balochistan province is considered to be rangelands, which is used for grazing purposes by bulk of the population living in the area. Arid and semi-arid climate prevail in the area. It is however a fact that these collective rangelands are used without any

restrictions. Hence, a need was felt to find out the facts about livestock population, feed sources and extension services in the area.

## **Methodology**

To compute the number of households in the study area, we used the census data of 1998, because no updated statistics of the census was available after 1998. According to GoP (1998), the total numbers of households in the study area were estimated as 72,572. The sample size estimation of Yamane (1967) was used for calculating sample size. With a precision level of 7.0, the equation gave a sample size of 200 households. The Random sampling was employed to choose households for interview. Owing to religious and societal norms, the female of the area were not permitted to join the outside home activities. For this reason female were not interviewed in this study. Questionnaire, field observation & group discussions were the major tools for collection of primary data. The interview was performed for the period of December, 2008 to May, 2009. A questionnaire with both close and open ended questions was administered for collection of information from the head of the households. For making corrections in the questionnaire, it was tested prior to the survey. Interview, field observation and focus group discussions were employed to collect information from the household heads. The information collected was then organized and were finally analyzed statistically through SPSS, version 16. Frequencies and percentages and PI were used to analyze the data.

## **Results and discussions**

### **Households and land holding size of the area**

Results revealed that the family size for the area was just about 9 individuals per house. The lowest and highest values for the size of the family were 5 and 14, correspondingly. We therefore made three classes of the family size i.e., small (1-5), medium (6-10) and large (11-15). In the medium class, there were 77% households. However, in the large and small classes, the households were 18 and 5%, correspondingly. The land holding size was 46.51 acres. For this reason, we made five classes of the household i.e., marginal (0-25), small (26-50), medium (51-75), large (76-150) and very large (151-300). Results showed that preponderance of the households (40%) were falling in the marginal, chased by the small (31%), large (15.5%), medium (11%) and very large classes (2.5%), correspondingly.

*Livestock: Ownership and production*

It was found that livestock raising was a common practice in the area. This is for the reasons that approximately eighty percent (80.5) of the surveyed households were found involved in livestock raising activities. Due to easy accessibility of the pastoralists to open rangelands, a good number of the people from the area kept domestic animals which were used not only for household utilization (normally for meat, milk) as well as for cash income. Bulk of the household was rearing small ruminants. Results showed that approximately 80% of the households, who reared livestock, were falling in the medium class of household size. On the other hand 2.5% of the small class and 18% of the large class were observed keeping livestock. Considerable difference for livestock ownership was found among the household classes through chi-square test. Table 1 show the herd size in livestock standard unit (LSU) \* for the livestock of the area.

Table 1: Ownership of livestock by household classes

Household classes	Yes	No	Average
	Herd size in LSU		
Small	2.4 (4)	15.3 (6)	5.0 (10)
Medium	79.6 (128)	66.9 (26)	77.0 (154)
Large	18.0 (29)	17.8 (7)	18.0 (36)
Total	100.0 (161)	100.0 (39)	100.0 (200)
Chi square Significance level	0.04		

Note: Number of observation is shown in parentheses.

### Herd Size

The herd size computed in LSU for the young ruminants was less than the adult ruminants. In the same way, the herd size for the young cattle was also less (0.42) than the herd size for the adults (0.66). The reason for this may be that the adult domestic animals are kept for production of milk and the young livestock are sold out soon as they are not productive. Table 2 shows that the herd size for sheep, goats and poultry were 24, 23 and 16 correspondingly.

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\* LSU is used for computation of livestock grazing. The LSU values for adult male and female cattle are correspondingly 0.69 and 0.95. It is 0.38 for the young cattle. The values for mature male and female Sheep and Goats are 0.22 and 0.25 correspondingly. For young Sheep and Goats it is 0.07 (Thapa and Paudel, 2000).

Table 2: Domestic animals of the area

Animal type	Herd size in LSU		
	Mature	Immature	Average
Cattle	0.9 ± 1.2	0.5 ± 0.8	1.2 ± 2.2 (215)
Sheep	18.6 ± 11.4	6.8 ± 5.7	24.6 ± 17.2 (4,945)
Goats	15.6 ± 12.5	6.5 ± 5.6	23.3 ± 16.3 (4,641)
Horse	0.02 ± 0.08	-	0.02 ± 0.08 (1)
Donkey	0.06 ± 0.4	0.05 ± 0.3	0.2 ± 0.5 (28)
Poultry	8.2 ± 4.0	8.6 ± 3.7	16.2 ± 5.6 (2,374)

Note: Average herd size (LSU) ± standard deviation, Number of observation is shown in parentheses.

Herd size for other domestic animals such as cattle, horse and donkey were low in contrast to small ruminants. The results clearly show small ruminants were commonly reared in the area.

### **Income from domestic animals**

Mostly small ruminants and rarely cattle were used for cash income. Table 3 shows that small ruminants were the most important domestic animals that earned higher income for the households. Cattle were raised principally to get milk for domestic use and not for cash income. Results show that small ruminants were largely reared for income generating purposes.

### **Livestock Feed: Sources and adequacy**

Those households, who did not grow fodder for their domestic animals, used open rangelands for grazing. The results indicate that bulk of the households from the area did not grow fodder for their domestic animals. Fewer households from the area were observed to grow fodder for their domestic animals. It was also found that only small ruminants were taken out for grazing but grasses, crop residue and concentrate mixture were used for feeding cattle. Table 4 shows the frequencies for domestic animal's feed sources. To find out the priority of the households for the feed sources for their domestic animals, we computed the PI, according to the formula suggested by Miah (1993). The index shows grazing as the prime choice of the households for feeding livestock in the area. Use of grasses, crop residue and concentrate mixture came 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> correspondingly by the index. Fodder tree was not used as a fodder source. This may be because of the arid and semi-arid conditions fewer trees may be available for feeding the domestic animals. Nearly 85% of the households were of the view that the

feed sources were insufficient. 12.1% of the households mentioned that feed sources were sufficient. Only 2.6% of the households mentioned that the feed sources were in excess of their domestic animal's needs. The results clearly show the inadequacy of feed sources for livestock in the area. Besides insufficiency of feed sources, the livestock population in the area is still on rise.

Table 3: Income from domestic animals

Types of domestic animals	Rupees/year		
	Average	Minimum	Maximum
Sheep	29,978.2	6,000.0	70,000.0
Goats	27,728.2	8,000.0	70,000.0
Cattle	23,082.3	10,000.0	60,000.0

### Household's ways to manage deficiency in feed sources

Crop residue and concentrate mixture were used by the households to supplement feed sources for domestic animals. Bulk of the households (57%) used crop residue and fewer (8%) households used concentrate mixture. Very few (2%) of the households used grasses to supplement shortage in feed sources. These statistics indicates that the households usually use crop residues, when there is insufficiency for livestock feed.

### Rangeland management: Rules and regulations

None of the households mentioned about existence of any rules for management of collective rangelands. The vegetation cover in the area has nearly been depleted due to easy and open right of entry of the households to the rangelands. Small ruminants were seen nearly all over the place openly grazing.

Table 4: Households' priority for feeding their domestic animals

Priority	Use of Grasses	Residue remaining from crops	Grazing in rangeland	Use of concentrate mixture	Respondent's frequency				
Most important	16	-	145	1					
Very important	-	140	-	20					
Important	10	13	2	36					
Least important	-	2	14	9					
Not important	-	-	-	-					
Total	26	155	159	66					

PI	0.8	0.7	0.9	0.5
Order	2	3	1	4

Note: To compute PI for fodder sources, we gave a value of 1 for the most important source, 0.75 for the very important, 0.50 for important, 0.25 for the least important and 0 for the fodder source not important.

Computation of PI was performed using the formula  $I = \sum S_i f_i / N$

Where,  $I = PI$  such that  $0 \leq I \leq 1$

$S_i$  = Value at the  $i^{th}$  priority

$f_i$  = Frequency of  $i^{th}$  priority

$N$  = Number of observation

### **Livestock population trend and causes for their increase or decrease**

A greater part of the surveyed households (61.4%) stated that their livestock number is on decrease during the past fifteen years. However, some of the households (38.6%) mentioned that their livestock number is increasing. The reasons for increasing number of livestock were cash income (67.7%), animal breeding (17.7%) and for household use (14.5%). None of the households mentioned that they use domestic animals for transportation. As far as the reasons for livestock decrease are concerned, bulk of the households (60.8%) reasoned drought. 31.9% gave the reason of decrease in fodder sources and 7.2% gave the reason of animal diseases. The feed shortages in the area may be considered the major reason behind the decreasing trend in livestock number, which may have an effect on the health of domestic animals, making them vulnerable to diseases.

### **Access to extension services and type of assistance offered**

Bulk of the households (85%) mentioned that they had never been visited by extension agents. Fewer households (15%) mentioned that they have been visited by agricultural extension agents. However, the households mentioned that they were not frequently visited by extension agents. This is because 12% of the households mentioned that they were visited once during a year and merely 3% of the households mentioned that extension agents had visited them once in six months only. The degradation of rangeland may be attributed to the inefficiency of the extension agents. We also computed the accessibility of extension agents by farm categories in order to know that whether only the large land holders have access to the extension services or otherwise. However, the hypothesis was rejected as the results showed that bulk of the households (60%) having marginal land holdings had been visited by extension agents. Hence it was found that extension agents offered more

of their services to marginal class households. The extension agents' access to small, medium, large and very large farm class was 13.4, 10.0, 10.0 and 6.7% respectively. This may be due to the reason that the households with the marginal land holdings had to strive hard for fulfilling their dietary needs from small pieces of land. The households were offered support by the extension agents in veterinary services (43.2%), provision of different farming implements (37%) and for help in conserving soil and water (19.8%). None of the households mentioned that they were offered any technical help by the extension agents.

### **Satisfaction of the households' with the help offered by the extension agents**

Different ranks of satisfaction of the households were shown with the assistance offered by extension agents. Results showed that 37.7% of households were strongly satisfied from the assistance of the extension agents. The same percentage of the households (37.7%) was only satisfied and 16.7% of the households were disappointed from their assistance. Only 10.0% of the households were strongly disappointed from their assistance of extension agents. So we conclude that bulk of the households that had been visited by the extension agents were satisfied with the assistance offered to them.

### **Problems and solutions on crops and livestock production**

Dearth of water for irrigation was the major issue in the area because bulk of the responses (37.5%) was obtained for this issue from the households. Soil barrenness was also main problem in the area because 24.2% responses were obtained for it. Some of the responses (11.4%) were obtained for not easy access to credit. Deficiency of fodder for the domestic animals was also a major issue because 26.9% responses were obtained for it. The households had adopted various ways to solve these issues. For example, 5.1% responses were obtained for flood water to solve the water scarcity for irrigating crops. To solve the problem of soil barrenness, the households (45.6% responses) were obtained for the use of compost and fertilizers. To deal with the issue of fodder shortage, bulk of the household's responses (49.2%) were obtained for buying fodder for domestic animals.

### **Credit access, sources and reason of taking credit**

Bulk of the surveyed households (62.5%) had no access to agricultural credit. Some of the households (37.5%) had availed credit for agricultural and family needs. Bulk of the respondents had no access to credit and it can be inferred that the poorer households could not easily apply

conservation measures. We also computed the access of the households to credit by farm class to know that which farm class has easy access to credit. The table 5 shows that the marginal and small farm classes had easy access to credits in contrast to medium, large and very large farm classes. The reason for this may be that the households with the small land parcels had struggled hard for enhancing the agricultural yields. But no significant difference for the access to credit sources among the different farm classes was shown by the chi-square test.

Table 5: Households' access to credits by farm classes

Farm Class (acres)	Yes	No	Total
	% respondents		
Marginal	32.0 (24)	44.8 (56)	40.0 (80)
Small	33.3 (25)	29.6 (37)	31.0 (62)
Medium	14.7 (11)	8.8 (11)	11.0 (22)
Large	17.3 (13)	14.4 (18)	15.5 (31)
V. Large	2.7 (2)	2.4 (3)	2.5 (5)
Total	100.0 (75)	100.0 (125)	100.0 (200)
Chi significance level	0.424		

Note: Number of observation is shown in parentheses.

The households only obtained credits from their nearby relatives. That is why no collateral were used for taking credit and no interest was also taken by relatives. All the households replied that they had not been supported by governments for credits. The analysis revealed that they had build up a very good social capital system. The households did not take credit from money lenders and government banks because of interest rates and no easy availability of collaterals. However those households having access to credit, bulk of them (52%) used loans for horticulture development. This was due to the reasons that the households earned high net profit from horticultures. About 32% households used it for household spending and 16% used it for livestock raising. The households did not use the accredit amount for crop farming or pasture developments. It was also revealed from the analysis that credits were mostly taken by marginal and small farm holders. The high amounts of credits were taken by marginal, medium, small, very large and large classes, correspondingly. Table 6, however shows that no noteworthy differentiation was detected for the credit amounts taken by the farm classes.

Table 6: Borrowing amounts by farm class.

Farm class (acres)	Amount (Pakistani Rupees)
Marginal	279,166.6 ± 83,297.2 (24)
Small	268,000.1 ± 69,041.2 (25)
Medium	272,727.2 ± 78,624.4 (11)
Large	230,769.1 ± 63,042.4 (13)
V. Large	250,000.1 ± 70,710.5 (2)
F. Significance level	0.96

Note: Average amount in rupees ± standard deviation, Number of observation is shown in parentheses.

### Conclusions and recommendations

Bulk of the households was found raising domestic animals to supplement their diet and to diversify their income. Rearing of small ruminants was proffered by households than any other types of domestic animals. This is because they were easily grazed in open rangelands and were also used for cash income. They were also preferred for meat and milk in the area. Grazing was the imperative source of livestock feed. However, the feed sources of rangelands were stated to be inadequate. The households used grasses, crop residues and concentrate mixture to supplement feed sources for the domestic animals. Bulk of the households stated that livestock number in the area is on decrease during the past 15 years. The main reasons mentioned by households for decrease in number included drought, land degradation and animal diseases. High amount of money was earned from horticulture and livestock sectors. The extension agents in the area did not pay full attention to the households. This was evident from the analysis because fewer households were given full attention by the extension agents. Several socio-economic constraints of the pastoralists affected the livestock production system in the area. No rules and regulations were found for rangeland management. The types of services offered by extension agents were limited to provision of indispensable implements for farming. The major problems faced by the households were shortage of water for irrigation, soil barrenness, and unavailability of credits and feed insufficiency. The households found alternative solutions for these problems like harvesting flood water for growing certain crops and use of compost and manure to increase soil fertility. Fewer households were found who have borrowed agricultural credits, mostly from their relatives. To overcome the problems on crops and livestock, the extension agents should be directed by authorities to regularly

visit the farm households to solve their problems. The rangelands should be managed through rotational grazing or enclosures for sustainable use. The government and non-governmental organizations should provide agricultural credits and sufficient veterinary services to the farmers to increase production of domestic animals in the country.

## References

- Durrani, M.J. and F. Hussain. (2007) Forage productivity of arid temperate Harboi rangeland, Kalat, Pakistan. *Pakistan Journal of Botany*, 39(5): 1455-1470.
- GoP (1998b). Population and Housing Census of Pakistan: Provincial Results, Balochistan. Islamabad.
- Mirza, S. N. Akhtar, M and Qayum, M. (2009). Effect of Drought on Rangeland Productivity and Animal Performance in Dryland Region of Balochistan, Pakistan. *Agriculturae Conspectus Scientificus*, 74 (2): 105-109.
- Qasim S, Shrestha RP, Shivakoti GP, Tripathi NK. (2011) Socio-economic determinants of land degradation in Pishin sub-basin, Pakistan. *Int J Sustain Dev World Ecol*. 18(1): 48–54.
- Raziq A, M Younas and Z Rehman, (2010). Prospects of livestock production in Balochistan. *Pakistan Veterinary Journal*, 30(3): 181-186.
- Shafiq, M and Kakar, M. (2007). Effects of Drought on Livestock Sector in Balochistan Province of Pakistan. *International Journal of Agriculture & Biology*, Vol. 9, No. 4: 657–665.
- Sarwar, M. Khan, M and Iqbal, Z. (2002). Feed Resources for Livestock in Pakistan. *International Journal of Agriculture & Biology*, Vol. 4, No. 186–192.
- Shafiq, M. (2008). Analysis of the role of women in livestock of Balochistan. *Pakistan Journal of Agriculture and Social Science*, 4: 18–22.
- Thapa, G., & Paudel, G. (2000). Evaluation of the livestock carrying capacity of land resources in the Hills of Nepal based on total digestive nutrient analysis. *Agriculture, Ecosystems & Environment*, 78(3), 223-235.
- Yamane, T. (1967) *Statistics: an introductory analysis*: Harper & Row New York.