PRODUCTION OF WOOL AND HAIR IN HIGHLAND BALOCHISTAN, PAKISTAN

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ABSTRACT

Livestock provides the motive power for agricultural operations, meat and milk for the human consumption and by-products such as skins, wool, hair, manure for local use and contributes largely to export earnings as well. There are 24.7 millions of sheep and 54.7 millions of goats in Pakistan, and in Baluchistan 10.64 millions of sheep and 11.4 millions of goats. These subsist about 30 million hectares of heavily degraded rangelands with different production systems, with an annual increase rate of about 7%. The proportions of adult and young sheep were 44 and 21% and the proportions of adult and young goats in their flocks were 20 and 15%, while the proportion of adult goats was 1.5 times more than it's young one. The sheep/goat ratio in the flocks was 1.91. In Baluchistan *Balochi, Bibrik, Harnai* and *Rakshani* are major breeds of sheep while *Kajli* and *Khurasani* are two major breeds of goats. *Harnai* breed of sheep is mainly raised for wool production while,*Kajli* and *Khurasani* breeds of goats are mainly raised for mutton and hair. Shearing is done by the professional shearers or by the flock owners themselves twice a year for sheep and once a year for goats.

Keywords: Breeds, goat, hair, population, sheep, valley, wool.

INTRODUCTION

Livestock production is an integral part of the rural economy of Pakistan. It is an important component of the agriculture sector as it accounts for 49.6% of the agricultural value added and about 10.4% of the country's gross domestic product (GDP). Livestock products also significantly contribute in exports, as the animal products 51.5 billionrupees were

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exported in 2001-02, representing 11.4% of export earnings (GoP, 2002), about 6.5 million families and more than 30-35 million rural population is engaged in livestock farming. By keeping 2-3 cattle/buffaloes and 5-6 sheep/goats per family for deriving 30-40% of total household income (GoP, 2002). Livestock also serves as a security against crop failure in rain-fed agriculture of Pakistan and to meet emergency requirements of the households.

Within livestock sub-sector, milk contributes 60%; mutton 19%, beef 12% and the remaining comes from skins, hides, wool and offal (GoP, 2002). Livestock provides the motive power for agricultural operations, meat and milk for the human consumption. By-products such as hides, skins, wool, hair, manure are either locally used or in the industry. It contributes largely to export earnings as well, however, the contribution of wool and hair is much higher when we consider knotted woolen carpets exported from Pakistan.

Livestock rearing especially small ruminants is one of the major economic activities on the vast rangeland of Baluchistan. The scarcity of water for irrigation does not allow the expansion of arable farming beyond a certain limit. The topography, climate and forage resources of Balochistan make it one of the best-suited areas in the country for the production of small ruminants. A significant portion of small ruminants, i.e. 10.64 millions of sheep and 11.4 millions of goats, is reared in Baluchistan. The estimated wool production is 39.7 thousand tones while estimated hair production is 20 thousand tones during the year 2002-03 in Pakistan (GoP, 2002). Despite the *laissez faire* type approach from the government for the development of livestock sector, it has been growing at an impressive rate. Over the past seventeen years, annual growth in goat population was found as 2.8%, while sheep population experienced negative growth rate. In case of livestock products, milk production increased at 5.3%per annum followed by beef by 3% while mutton and wool production fallen at 0.1 and 2% per annum respectively (GoP, 2003).

Wool enjoys an important place in Pakistan's economy and is the basic input of warm cloth and carpet industries. Generally, there are four types of wool i.e. fine, medium, long and coarse wool. Pakistan is producing coarse wool, which is best one in the world used in the carpet manufacturing and floor covering. Although the quality of wool produced in Pakistan is not suitable for making fine quality thread to be used in garments industry, however, it is an important input for making thread used in carpet manufacturing. A number of other household products are also indigenously manufactured from using sheep wool thread and hair. The white colored, clean wool fetches relatively higher price as compared to dirty and pale colored one. Similarly the mixed wool is also receiving low price. However, the reflection of incentive for quality wool

production in wool price is very little compared to the amount of efforts needed to produce good quality wool (FAO, 1987).

In future, the demand for livestock products is expected to increase at quite higher rates induced by growth in population. The prime purpose of this study was to determine how wool/hair production could be encouraged and supported in future. The present study was specifically initiated to study the existing wool and hair production practices at the farm level particularly by breeds to identify constraints for higher productivity and recommendations for production of quality wool and hair in Balochistan.

MATERIALS AND METHODS

Within Baluchistan province, *Kovak* valley (Kalat district) and *Asghara* valley (Loralai district) were selected for the present study being a very important area for small ruminants rearing. In order to achieve the objectives, primary and secondary sources of information were composed. Primary data were collected from small ruminant owners. A multi-disciplinary posse of scientists from economists and livestock programme NARC, Scientist from arid zone research center Quetta and agricultural economist from technology transfer institute, Quetta participated in this study. The study was conducted during the month of February 2005. Random sampling technique was used for selection of livestock owners for data collection. Great care was taken in collecting the data form small ruminant in general and wool/hair production practices in particular. The items about which data were collected are characteristics of sample livestock herders, production parameters of small ruminants and marketing of wool/hair. A well-crammed and pre-tested questionnaire was contrived to log the information on socio-economic characteristics of the small ruminant owners.

Table 1. Distribution of sample farmers raising small ruminants.

Valleys	Numbers of livestock herders	%
Kovak Valley (Kalat district)	33	54
Asghara Valley (Loralai district)	28	46
Total	61	100

Source: livestock survey results 2005

Overall, 61 owners of small ruminants were selected for this study from both the areas. 54% sample livestock herders were interviewed from *Kovak* valley (Kalat) and the remaining 46% of them were selected from *Asghara* valley (Loralai) as shown in Table 1. For data analysis, simple cross tabulation was performed on the gathered data using SPSS/PC computer software.

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RESULTS AND DISCUSSION

Most people living in rural areas mainly depend on small ruminants for their livelihood. Major portion of the household income comes from the supplementary animals-raising that also helps to increase farm productivity. Animals-raising is a higher risk enterprise than crop production. In a worst case scenario, the crop farmers looses the seed and other input investment he had made, what he still has the land whereas, the animal raiser looses everything, the mother stock as well as the expected crop (Buzdar *et al.,* 1989). They further stated that losses could come from drought, snow, hailstorms, epidemic and higher incidence of diseases. Landowners are able to accumulate and store surpluses whereas the animal raisers tend to be less able to do this. Besides, among the communities in Baluchistan, as social obligation increase progressively with an increase in flock size, there is disincentive to accumulate larger flocks. Overall mean flock size was found 134 animals for flock, which   ranged from 19 to 1000 animals per flock in the study areas. Inter valley comparison on flock size revealed that mean flock size in *Kovak* valley was larger than *Asghara* valley. The flock size in *Kovak* valley ranged from 20 to 1000 whereas, it ranged from 19 to 500 in *Asghara* valley.

Flock size and composition

The sheep and goat were two types of animals in the flocks. Overall mean adult and young sheep flock were 71 and 31 with their standard deviation of 58 and 32, respectively (Table 2). The number of adult sheep ranged between 4 and 400 and that of young sheep ranged between 5 and 200 in the study area. The average number of adult and young sheep in Kovak valley was 73.5 and 34.1 respectively with the standard deviation of 70 and 37.7 respectively. The number of adult sheep in Kovak valley ranged between 10 and 400 and for young sheep it ranged between 6 and 200 respectively. The mean number of adult and young sheep in Asghara valley was 52.5 and 38.7 with a standard deviation of 27.85 and 25.5 respectively. The results revealed that average number of adult and young sheep was significantly greater in Kovak than in Asghara valley. Whereas, adult goats ranged between 1 and 300 and young goats ranged between 1 and 100.Different types of animals and their by-products i.e. milk, meat, skin, and especially wool/hair are required to fulfill the sheep and goats raisers' need for cash, food, appliances and transportation.

For animal raisers, these are important consideration in deciding on the composition of flock. However, the most important consideration in this choice is the precious availability of grasses, shrubs, trees and vegetation in the rangeland (Buzdar et al. 1989). They stated that there

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Table 2. Average and total number of sheep and goatsraised by sample households.

Characteristics	Kovak	Asghara	Total
Flock Size			
Number	33	28	61
Sum	4960	3215	8175
Mean	150.3	114.8	134.1
SD	167.2	86.1	136.4
Min.	20	19	19
Max.	1000	500	1000
Adult Sheep			
Number	29	28	57
Sum	213	1470	3600
Mean	73.5	52.5	70.6
SD	70.1	38.7	58.1
Min.	10	4	4
Max.	400	200	400
Young Sheep			
Number	29	28	57
Sum	990	777	1767
Mean	34.1	27.8	31
SD	37.5	25.5	32.2
Min.	6	5	5
Max.	200	130	200
Adult Goat			
Number	25	26	51
Sum	1029	578	1607
Mean	41.2	22.2	31.5
SD	67.2	20.4	49.8
Min.	1	4	1
Max.	300	100	300
Young Goat			
Number	25	26	51
Sum	811	390	1201
Mean	32.9	15.0	23.6
SD	22.8	20.4	19.6
Min.	1	4	1
Max.	100	100	100

Source: Survey results 2005

four important reasons for animal raisers to raise mixed sheep and goat flocks rather than a pure flock. Firstly, goats have the mobility and night vision necessary to graze over large areas of the range, while sheep have the necessary instinct to follow. Secondly, while sheep prefer to graze on grass and other vegetation close to the ground, goats prefer to browse on tree leaves and shrubs. Thus, a more balanced grazing is obtained and extreme pressure on any type of botanical resources is avoided. Thirdly, the goats tend to be more hardly and resistant to

drought conditions than sheep. In worst conditions, sheep may be completely or partially lost, while goats still provide minimum subsistence needs. Fourthly, the sheep and goat meat, wool/hair, skin and other by-products have different and sometimes competing uses.

The market prices of the animals and their by-products vary and fluctuate from year to year. Therefore, it makes good economic sense to raise a mixed sheep/goat flocks, changing the composition as economic and household utility conditions. During the survey, information on these aspects was collected. The results showed that animal raisers raised mixed sheep and goat flocks for good economic sense. Overall proportions of adult and young sheep were 44 and 21% and the proportions of adult and young goats in their flocks were 20 and 15%, while the proportion of adult goats was 1.5 times, more than its young one (Table 3). Overall sheep/goat ratio in the flocks was 1.91. The sheep/goat ratio in *Asghara* valley was 2.32 whereas this ratio in *Kovak* valley was 1.70. This is most probably, an indication of the condition of the rangeland vegetation. *Asghara* valley has more grasses and ground vegetation while *Kovak* valley has least grasses but relatively more shrubs.

Table 3. Flock composition of small ruminants of sample herders.

Characteristics	*Kovak*	*Asghara*	Average
Adult sheep (% of total animals)	43.0	45.7	44.0
Young sheep (%)	20.0	24.2	21.6
Adult goat (%)	20.06	18.0	19.7
Young goat (%)	16.04	12.1	14.7
Total	100.0	100.0	100.0

Source: Survey results 2005

Shearing practices of wool/hair

All the sample shepherds reported that no special arrangements were made at all, because due to illiteracy they were unaware of it. The sheep and goats are washed or dipped in antiseptic fluids before or after shearing, rather the animals on the ground. Shearing is done by the professional shearers or by the flock owners themselves. The shearing process lasts for nearly two weeks. The production of wool/hair in the autumn season is more than the spring season. Ping and Wang (1999) reported that average growth and production rate of wool/hair were faster during the warm season and slowed during the cold season**.** The shearing of sheep was done twice a year where the hair of goats were cut once a year. Similar practices of shearing were observed in both, *Kovak* and *Asghara* valleys. Shearing of sheep and goats were done with the help of locally made scissors, which are not very effective. Farmers reported that 10-20% wool/hair is left on the body of small

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ruminants. The shearing is not uniform in the study area. Sample animal raisers are ignorant about the use of modern shearing machine.

Production of wool/hair

The wool/hair production as by-products of sheep and goats is the major objective of investigation under this study. The data on different breeds of sheep and goats showed that *Balochi, Bibrik, Harnai* and *Rakshani* are major breeds of sheep raised in sample flocks while *Kajli* and *Khurasani* are two major breeds of goats. *Balochi* sheep are raised only for mutton and wool. The *Harnai* breed of sheep is mainly raised for wool production. The *Rakshani* breed of sheep is commonly for wool and mutton, while *Kajli* and *Khurasani* breeds of goats are especially raised for mutton and hair.

The information on wool production per animal from different breeds of sheep of *Balochi, Bibrik, Harnai* and *Rakhsani* are shown in Table4. The results suggest that the wool production was 2.3, 1.8, 1.8 and 1.3 kg/animal for *Balochi, Bibrik, Harnai* and *Rakhsani* respectively. However lower wool production was observed under *Rakhsani* that may be attributed to mismanagement in shearing practices. The wool production of sheep namely *Balochi, Bibrik* and *Rakshani* breeds was higher in *Kovak* valley than that of *Asghara* valley whereas, the wool production from *Harnai* breed was produced only in *Asghara* valley while Rakshani breed in Kovak valley (Table4).

Table 4. Average wool production from sample sheep by breeds (kg/animal).

Breeds of Sheep	Kovak	Asghara	Average
Balochi):	2.4	2.2	2.3
Bibrik :	1.8	1.6	1.8
Harnai):	--	1.8	1.8
Rakshani :	1.3	--	1.3

Source: Survey results 2005

The overall mean yield of white, black and mixed wool from adult sheep of *Balochi* breed was 2.1, 0.2 and 0.1 kg respectively (Table5). The average yield of white, black and mixed wool from young sheep of *Balochi* breed was 1.6, 0.1 and 0.1 kg respectively. It is clear from the results that overall average yield of white wool from adult and young sheep of *Bibrik* breed was 1.8 and 1.1 kg, respectively.

No black and mixed wool was obtained from this sheep breed. The average yield of white and mixed wool from adult sheep of *Harnai* breed was 1.7 and 0.1 kg respectively. The overall mean yield of young, white

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Table 5. White, black and mixed wool production per animal from sheep by breeds.

Breeds of Sheep	Kovak	Asghara	Average
Balochi (adult)			
White	2,2	1.9	2.1
Black	0.2	0.2	0.2
Mixed	01	01	0.1
Balochi (young)			
White	1.6	1.4	1.6
Black	0.1	0.1	0.1
Mixed	01	0.1	0.1
Bibrik (adult)			
White	1.8	1.6	1.8
Black	-	-	-
Mixed	-	-	-
Bibrik (young)			
White	1.2	1.2	1.1
Black	-	-	-
Mixed	-	-	-
Harnai (adult)			
White	-	1.7	1.7
Black	-	-	-
Mixed	-	0.1	0.1
Harnai (young)			
White	-	1.1	1.1
Black	-	-	-
Mixed	-	0.1	0.1
Rakshani (adult)			
White	1.3	-	1.3
Black	0.1	-	0.1
Mixed	0.1	-	0.1
Rakshani(young)			
White	0.9	-	0.9
Black	0.1	-	0.1
White	0.1	-	0.1

Source: livestock Survey results 2005

and mixed wool from young sheep of *Harnai* breed was 1.1 and 0.1 kg, respectively. Overall mean yield of white, black and mixed wool from adult sheep of *Rakshani* breed was 1.3, 0.1 and 0.1 kg respectively. The average yield of white, black and mixed wool from young sheep of *Rakshani* breed was 0.9, 0.1 and 0.1 kg, respectively. Inter-valley comparison of wool production from adult and young sheep of different breeds revealed that mean wool yields of adult and young sheep of

Balochi and *Rakshani* breeds was higher in *Kovak* valley than *Asghara* valley. The reason behind this was that two breeds were mainly raised in *Kovak* valley. The wool yield from both adult and young sheep from *Harnai* breed was observed in *Asghara* valley because this breed was not raised in *Kovak* valley. Inter-breed of sheep comparison on wool production showed that *Balochi* ranked on top followed by *Bibrik, Harnai* and *Rakshani.* It can be concluded that if the main purpose of raising small ruminants is wool production then the priority should be given on raising of *Balochi* and *Harnai* breeds in *Kovak and Asghara* valley.

The what mean yield of hair of goats by breeds are shown in Table 6. It is evident from the data pointed in this table that the overall mean yield of the hair production from goat of *Kajli* and *Khursani*was1.2 and 1.1 kg per animal, respectively. Inter-valley comparison on hair production from goat of *Kajli* breed revealed that mean yield of hair of goats of this breed was higher in *Kovak* valley than *Asghara* valley whereas, the average yield of goat of *Khursani* breed was higher in *Asghara* valley than in Kovak valley (Table 6). The wool/hairs are the most valuable by-products as they are used for making rugs, carpets, tents and all types of containers for grain and household goods.

Table 6. Mean yield of hair production of goats by breeds.

Breeds of Goats	Kovak	Asghara	Average
Kajli	1.3	1.2	1.25
Khursani	1.0	1.2	1.10

Source: Survey results 2005

The marketing of wool and hair as byproducts of sheep and goats was also studied. The data on home consumption and marketing of wool/hair of sheep and goats is presented in Table 7. The results in the table showed that overall 31% of total wool production was used for home consumption by sample animal raisers. The wool consumption at home is a function of a variety of factors, some of which are market price of wool, family skills in making handicrafts, rugs, tent and containers using wool as the input and the prices of the substitute goods in the market. A major proportion of wool (69%) was marketed either in the village or in market (Table 7). Inter-valley comparison on wool consumption and marketing revealed that a major proportion of wool was marketed in *Asghara* than *Kovak* valley. This is mainly attributed to skills of animal raisers in *Asghara* valley who are known to have greater family skills in making handicrafts. The hair of goats were fully consumed at home for making handicrafts. None of the sample respondents marketed hair of goats either in *Kovak* valley or in *Asghara* valley. There is no trend at all for the marketing of hair of goats in the study area. Animal raisers reported during the survey that wool was never sorted for marketing. So

much so even the coloured wool was not separated. There is no definite method for the disposal of wool in the study area. Local traders who were sometimes flock-owners, generally purchased the wool. Taylor (1995) reported that the use of technology to develop forward contract selling would also be of advantage to the farmers.

Table 7. Wool/hair consumption and marketing in study area.

Animals	Kovak	Asghara	Overall
Sheep wool (% of total production)			
Household consumption (%)	28	34	31
Marketing (%)	72	66	69
Goat hairs			
Household consumption (%)	100	100	100
Marketing (%)	---	---	---

Source: Survey results 2005

In *Kovak* and *Asghara* valleys, traders or their agents purchased wool from other cities like Multan, Hyderabad and Karachi who quite often made advance payments. The logic behind the customs were the absence of sorting facilities and the demand for cash which forces the animal raisers to forward deals. These deals are below the actual prevalent markets rates. The periodical markets are also held at few places to better marketing facilities to buyers and sellers. The middlemen add dust, dirt and water into the wool as reported by the sample animal raisers during the survey time. Information regarding the wool sale price observed in the area is presented in Table 8.

The results in the table showed that price received by the animal raisers was different for white, black and mixed wool in the study area. *Barajas-V F and C. Esteban-Monoz* reported that main problems of the wool industry are a lack of quality control, strong market competition from traditional wool producing countries and the low status of wool production. The price of wool/hair was very low in the study area. Ashton (1998) reported that low wool prices relative to prices for other commodities have resulted in substantial movements away from wool production. Overall mean retail prices per kg of white, black and mixed wool were Rs 23.8, 12.5 and 12.5 respectively.

Farmers received Rs 17 as mean price of 1 kg of wool. Animal raisers in *Kovak* and *Asghara* valleys received Rs 16 and Rs18 as mean prices of 1 kg of wool in their areas. Overall mean wholesale prices of 1 kg of white, black and mixed wool were Rs 26.9, 16.3 and 15.6respectively.The average wholesale prices of 1 kg white, black and mix wool in *Asghara* valley were relatively higher than *Kovak* valley (Table 8).

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Table 8. Wool sale price (Rs/kg) received by sample animal raisers.

Levels	Kovak	Asghara	Overall
Farmer's level	16	18	17
Retail Price			
White	22.5	25.0	23.8
Black	16.5	18.8	12.5
Max	23.8	17.5	12.5
Wholesale Price			
White	26.3	27.5	26.9
Black	18.1	20.0	16.3
Max	15.0	16.3	15.6

Source: Survey results 2005

The difference between the farmer price and retail and wholesale price was the marketing margin earned by the marketing intermediaries in the study area.

The above results revealed that wool being marketed in the study area was generally not cleaned and sorted which contained all sorts of impurities e.g. grease, dust, dirt and vegetable matter. The marketing of un-cleaned and un-sorted wool forced the dealer to maintain an unusual margin of difference between sale and purchase of wool. Therefore, it is proposed that there is an urgent need for the training of animal raisers for sorting and cleaning the wool in the study area.

The wool/hair are the most valuable by-products as these are used for making rugs, carpets, tents and all types of containers for grain and household goods. The data analysis depicts that *Balochi, Bibrik, Harnai* and *Rakshani* are major breeds of sheep while *Kajli* and *Khurasani* are two major breeds of goats. *Balochi* sheep are raised mainly for mutton and wool. The *Harnai* breed of sheep is mainly raised for wool production. *Rakshani* breed of sheep is mainly for wool and mutton. *Kajli* and *Khurasani* breeds of goats are mainly raised for mutton and hair. The average wool yield of young sheep of *Balcohi, Bibrik, Harnai and Khrasani* breeds 1.8, 1.1, 1.1 and 0.9 kg per animal.

CONCLUSION

Shearing was done by the professional shearers and by the flock owners themselves. Shearing of sheep and goats were done with the help of locally made scissor, which were not very effective. Sample animal-raisers were ignorant about the use of modern shearing machine. Overall 31% of total wool production was used for home consumption by animal-raisers. The wool consumption at home was a function of a variety of factors, some of which were market price of wool, family skills in making handicrafts, rugs, tent and containers using wool as the input and the

prices of the substitute goods in the market. Secondly, due to low marketable surplus the farmers of the area sell their wool/hair at lower rate because market/transportation charges are higher beyond the reach of the small farmers. Besides these there is no classification and grading practices, lack of cleaning and mixing of wool with dirt further deteriorates the conduction. To improve the quality and quantity of wool/hair in Baluchistan, firstly streamline the wool/hair collection system. Sorting of wool/hair is essential and collection of wool/hair at the producers level. There is a need to implement sorting of fleece into body wool/hair, skirting and colored wool/hair at the time of shearing. Improve wool/hair-shearing technology which is low cost because the existing one is not economically feasible due to its high costs.

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