

PROSPECTS OF RANGE DEVELOPMENT IN POTHOWAR (PUNJAB)

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Abstract

The present survey was undertaken to assess the prospect of range development in Pothowar tract Punjab. For this purpose at local level, 64 persons i.e. eight large farmers, eight medium farmers, sixteen small farmers and thirty two landless persons were interviewed. At Govt. level, all range personnel were also interviewed. The number of livestock kept was highly correlated with the size of landholdings of people. Major source of income was from livestock rearing. For grazing purpose, the dependence of people on vegetation of Govt./state owned Rakhs varied from 74-99.9 percent. More than 52 percent forage requirements of livestock of all respondents remained unmet after grazing. Grazing problems faced by the majority of graziers were low carrying capacity of Rakhs, lack of drinking water and protection measures forced by the Forest Department. The major constraints regarding range development efforts were lack of funds, and interest of range personnel working in the field. Other constraints were half hearted implementation of existing range management regulation and inadequate research.

Introduction

Rangelands in Pakistan occupy about 70% of total area of the country which are the mainstay of country's livestock industry and contribute 10.4% towards GDP (Economic Survey, 2006-07) which comes mostly from livestock raised on rangelands Pothowar tract of Punjab which includes Islamabad, Rawalpindi, Chakwal, Jhelum and Attock districts with an area of 1.5 million ha. The tract lies between Jhelum and Indus River. Altitude varies from 300 to 1500 m. Ecologically; it is located in the sub-tropical semi-arid to sub-humid zone. Geomorphologically, the plateau can be classified into mountains, hills, rock plains, weathered rock plains, piedmont plains, loess plains and river plains (Beg *et al.*, 1985). The soils of the area have developed from wind and water-transported materials consisting of loess, old alluvial deposits, mountain outwash and recent stream valley deposits; some are derived from shales and sandstones.

At present area of state owned rangelands in this tract is 0.1 million Acres. This area is distributed in different localities of tract in the form of 9 Rakhs. The climate of the tract is temperate in the northeast to sub-tropical semi-arid in the southwest. Annual rainfall varies from 250 mm in the southern part of salt range to over 1500 mm at Islamabad. Temperature extremes are 45°C in June and often drop below freezing during January.

Pothowar Range Management Division, Chakwal, is entrusted with the development of these rakhs under the administrative control of Conservator of Forest Range Management Circle, Lahore. Since independence, efforts are being made by the Govt. to develop these rakhs, but their major part is still undeveloped. Due to misuse and negligence, the rangelands in general, are producing 10-50% less than their potential.

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Materials and Methods

Two types of interview schedules were prepared to obtain the needed information for present study. Interview schedule No-I was used for local people residing in the vicinity of state-owned rangelands (Rakhs) and interview schedule No-II was used for range personnel of Range Management Division Chakwal. Prior to conducting the actual survey both the interview schedules were pre-tested. After pre-testing, these were given the final shape for collecting data.

The following categories of respondents were made for interview schedule No-I:

Category No-I:	Eight large farmers
Category No-II:	Eight medium farmers
Category No-III:	Sixteen small land owners
Category No-IV:	Thirty two landless persons

Range Management Division Chakwal consists of nine Rakhs. The detail of each Rakh was obtained from the office of Divisional Forest Officer Range Management Chakwal. Four Rakhs were selected randomly and each selected Rakh, the nearest 2 villages were surveyed, wherefrom sixteen local persons were interviewed according to interview schedule No-1. Of these sixteen respondents there were (a) two large size land owner (b) two medium size land owner (c) four small size land owner and (d) eight land less respondents. In this way, 64 respondents in total were interviewed from all the four Rakhs. Similarly, all the range personnel involved in Range Management Division Chakwal were interviewed according to interview schedule No-II. In this case interview schedule the following categories of respondents were made:

Category No-I:	Foresters
Category No-II:	Forest Guards

The data thus collected were tabulated and finally interpreted to consolidate the findings of the present study.

Results and Discussion

a. Literacy level and family size

Literacy Level: Landless respondents were 83.3 percent illiterate. In other cases 57.1 percent of small, 36.4 percent of medium and 25 percent of large farmers were illiterate (Table 1). This indicates that percentage of illiteracy decreases from small to big farmers. Large farmers were somewhat more educated than others. This might be due to better economic resources possessed by them.

Family size: Average size of family of large, medium, small farmers and landless respondents was 6.4, 5.0, 6.5 and 5.2 respectively (Table 1). This shows that big farmers having sound financial condition with large families.

Table 1. Literacy level and family size of respondents

Category	Education					Average Family size		
	No. of respondents	Metric (%)	Middle (%)	Primary (%)	Illiterate (%)	Male	Female	Total
Large farmer	08	14.3	28.6	32.1	25.0	3.7	2.7	6.4
Medium farmer	08	9.1	18.2	36.4	36.4	2.7	2.3	5.0
Small land owner	16	14.3	0	28.6	57.1	3.6	3.0	6.5
Land less respondents	32	0	0	16.7	83.3	2.9	2.4	5.2

b. Occupation and sources of income

Occupation: 44 percent of the male family members except the dependents such as children and aged persons of big farmers engaged in farming while 11 percent 14 percent, 17 percent, 6 percent and 8 percent are engaged in grazing, services in Pakistan, working abroad, do their business and other works respectively.

In case of medium sized farmers 36 percent male members engaged in farming while 26 percent in grazing, in case of small farmers 31.3 percent male members working as farmers, 27.1 percent working as grazier while 41.7 percent of the landless respondents working as grazier and 42.7 percent of the same category were forced to supplement the income by working as labourer because of low economic returns from livestock.

Sources of Income: Major source of income of all categories except big landlords was livestock rearing. Contribution of livestock to the total income was 43-91 percent. Second source of income in case of medium and small farmers was farm crops. Labour was also a source of income for small farmers and landless respondents (8.8 and 6 percent) while 10 and 8 percent income of big and medium sized respondents were come from business. As a part of income the dependence of respondents on livestock was increasing from big to small farmers. Small farmers and landless respondents were depending more on livestock, which constitutes 43-91 percent of their total income (Table 2).

Table 2. Occupation of male family members and source of income

Category	Occupation						Source of Income		
	Farming (%)	Grazing (%)	Service in Pakistan (%)	Working abroad (%)	Business (%)	Any other (%)	Livestock (%)	Farm crops (%)	Others (%)
Large farmer	44	11	14	17	6	8	43	47	10 Business
Medium farmer	36	26	22	10	0	6	53	39	8 Business
Small land owner	33.3	27.1	15.6	9.4	5.2	9.4	71.5	19.7	8.8 Labour
Landless respondents	4.2	41.7	11.4	0	0	42.7	91	3	6 Labour

c. Average livestock and size of holdings

Average number of livestock kept by large, medium and small farmers was 126.5, 113.5, and 68 respectively. This number in case of landless respondents was 59. Of the total number of livestock in each category of the respondents Goat were highest in number i.e. more than 52 percent of the entire local livestock wealth. Sheep and cattle were second and third respectively in series. Number wise buffalo had fourth position (Table 3a).

Table 3a. Size of holding and number of livestock

Category	Average size of land holdings (Ac)	Species						
		Goat	Sheep	Cattle	Camel	Buffalo	Others	Total
Large farmer	107	60 (47%)	30 (24%)	20 (16%)	1 (0.8%)	15 (11.8%)	0.5 (0.4%)	126.5
Medium farmer	41	60 (52%)	29 (26%)	21 (19%)	1 (0.8%)	2 (1.7%)	0.5 (0.5%)	113.5
Small land owner	04	35 (51%)	14 (21%)	10 (15%)	1 (1.5%)	7 (10%)	1 (1.5%)	68.0
Landless respondents	---	31 (52%)	9 (15%)	13 (23%)	1 (1.7%)	3 (5%)	2 (3.3%)	59.0

The correlation Coefficient between the average size of land holding and average number of livestock kept by respondents of all categories 1.49. It was revealed that both these variables were highly correlated with each other i.e. greater the size of land holding, the greater was the number of livestock the detail of this is as under:

Average Size of land holding of big, medium and small farmers was 107, 41 and 4 acres respectively (Table 3a).

Table 3b. Correlation coefficient

Land form	No. of respondents	Average holding	Average No. of livestock
Large	08	107	126
Medium	08	41	113
Small	16	04	68
Landless	32	---	59

Calculation of the correlation between size of holdings and number of livestock

X	X ²	y	y ²	ΣXY
107	11449	126	15876	13482
41	1681	113	12769	4633
04	16	68	4624	272
0	0	59	3481	0
ΣX=152	ΣX ² =13146	ΣY=366	ΣY ² =236750	ΣXY=18387

$$H_0 = 0 \quad H \neq 0$$

$$\alpha = 0.05$$

$$\text{Correlation coefficient (r)} = \frac{\sum XY - (\sum X \sum Y / n)}{\sqrt{(\sum X^2 - (\sum X)^2 / n) (\sum Y^2 - (\sum Y)^2 / n)}}$$

$$= \frac{18387 - (152 \times 366 / 4)}{\sqrt{(13146 - (152)^2 / 4) (236750 - (366)^2 / 4)}}$$

$$= 0.91$$

Therefore H is rejected, the result is highly significant.

d. Feeding sources

Grazing: For this purpose, the dependence of landless persons and small farmers on the vegetation of Govt. Rakhs was more than other respondents. In this regard large and medium farmers were depending 74-83 percent on the vegetation of Govt. Rakhs while small farmers and landless respondents were depending 92-99.2 percent on these Rakhs. More than 52 percent forage requirements of livestock of all respondents remained unmet after grazing at Govt. Rakhs because of poor carrying capacities of these Rakhs. While grazing the livestock at Rakhs, the respondents did not care about the protection measures advised by the forest department (Table 5). These people using the Rakhs as they wished.

As assessed from the study the major problems there were low carrying capacity of Rakhs and lack of drinking water for domestic as well as livestock. Lastly presence of unpalatable species were also trouble some for the livestock.

e. Stall feeding

About 15 percent of the large farmers, 9 percent of the medium farmers and 7 percent of the small farmers were stall feeding their livestock. In case of landless respondents about only 0.8 percent practicing this. The data indicated that number of persons using this practice decreased from large land lord to land less respondents.

Table 4. Sources of feeding livestock by the respondent

Category	Grazing percentage at Rakh	Average daily grazing hours	Grazing practices			Grazing at private range land	Stall feeding
			Rotational	Continuous	Unsatisfaction after grazing		
Large farmer	74	8.5	54	63	46	11	15
Medium farmer	83	8.9	65.5	61	345	8	09
Small land owner	92	9.0	44.9	52	55.1	1	07
Landless respondent	99.2	9.6	57.4	55	42.6	--	0.8

f. Grazing Problems

Majority of the respondents from all categories was facing shortage of water, low carrying capacity and unpalatable vegetation of the Rakhs (Table 5).

Table 5. Grazing problems of the area

Category	Problems			
	Lack of water for livestock (%)	Low carrying capacity (%)	Unpalatable vegetation (%)	Protection measures of the forest department (%)
Large farmers	42.9	28.6	28.6	31.9
Medium farmers	63.6	54.5	54.5	42.7
Small landowners	85.7	50	50	47.3
Land less respondents	100	66.7	38.9	52.0

g. Sources of water and health facilities

Majority of the respondents from all the categories were using water of well and hand pumps both for themselves and their livestock, while 28.2 percent of big, 18.8 percent medium, 92.9 percent small and 72.2 percent landless of respondents used pond water for their livestock (Table – 6).

Livestock health care: The large and medium farmers benefited from veterinary, Hospitals / dispensaries more than small farmers and landless respondents. This MIGHT BE due to their social status and personal contacts. Average distance of the hospitals/dispensaries from the residential places of respondents was 12km (Table 6). Overall all the respondents were enjoying the veterinary facilities 77.8-100 percents.

Table 6. Sources of water and health facilities

Category	Well / hand pump for Human being and livestock %	Canal / pond for human being and livestock	Health facilities for livestock			Distance to nearest hospital (Km)
			Hospitals (%)	Dispensary	Medicine Available	
Large farmer	71.4	26.6	85.7	14.3	100	12
Medium farmer	63.6	36.4	63.6	36.4	92	12
Small land owner	76	24	57.1	42.9	81.8	12
Landless respondent	53.3	46.7	50	50	77.8	12

h. Marketing facilities

The roads leading to such markets are 31.95 percent are Kacha and 66.25 percent Paka. Majority of the respondents were selling their livestock in markets. About 50-54.5 percent of the both small and medium farmers were selling their livestock in villages. In case of landless respondents it was 33.3 percent.

Table 7. Marketing

Category	Sell		Average Distance to the nearest market (Km)	Road
	Village (%)	Market (%)		K/P (%)
Large farmer	0	100	11	28.6/71.4
Medium farmer	54.5	45.5	11	44.5/55.5
Small land owner	50	50	14	21.4/71.4
Landless respondent	33.3	66.7	14	33.3/66.7

i. Assistance needed by the respondents and suggestions for range development

Type of assistance

Need for capital investment: The number of persons needing capital was more in case of large farmers than from all other categories of respondents. The average estimated amounts of capital needed by large, medium, small farmers and landless respondents were Rs.150000, Rs.120000, Rs 50000 and Rs. 35000 respectively. The main purpose was the purchase of quality livestock. The difference in extent of capital requirement was due to the difference in needs of people and was directly related to the size of holdings.

Other needs: Majority of the respondents from all the categories pertained to sufficient vegetation in Rakhs and were seeking honest advices regarding good breed for getting maximum

j. Suggestions of respondents for range development

The percentage of respondents giving such suggestions increased from landless

to large farmers. This might be due to somewhat better literacy level and economic conditions of the respondents. The major suggestion given by all the respondents were regarding to alleviation of the constraints of insufficient vegetation in Rakhs.

Table 8. Types of assistance needed by the respondents

Category	Capital				Other types of help		Suggestions for range development			
	% age of respondents	Amount	Purpose		Provision of vegetation	Market establishment	Growing of vegetation	Water development	Both	%age respondents
			Livestock purchase	Others						
Large farmer	62.5	150000	Livestock	---	71.4	28.6	35	27	48	90
Medium farmer	---	120000	Livestock	---	67.5	32.5	60	-	40	77.3
Small land owner	7.9	50000	Livestock	---	57	43	62	10	28	50
Land less respondent	50	35000	Livestock	---	59	41	70	20	10	36.9

k. Assessment of qualification of range personals

All the foresters and forest guards were matriculates (Table 8). The divisional forest officer, sub-divisional forest officer and the range officers were M. Sc. and B. Sc. in Forestry. They were having average experience of 10-30 years. The above qualification of the range personnel indicated that none of them was especially trained in the field of range management.

Table 9. Education and experience of the range personnel

Category	Education			Higher education of range management (%)	Experience (Years)
	Metric / FSC (%)	BSc (%)	MSc (%)		
Forest guard/Forester	100 (Metric)	---	---	---	10-30
Range officer/SDO	20	40	40	---	10-30
DFO	---	---	100	---	10-30

I. Constraints in the way of range development

The most important constraints pointed out by staff were lack of funds and lack of interest. It was revealed that range personnel in Pakistan dislike the service conditions in range management circle and try to get themselves transfer to forest divisions.

Other constraints: were lack of application of strict range management laws and initiation of research.

Behavior of local people: It was reported that very few graziers were non-cooperative with range personals. Such graziers were unlawfully grazing their livestock when and where they wanted. The major reason for this non-cooperation was due to low carrying capacity.

Table 9. Range land constraints

Category	Constraints/problems					
	Lack of Stock water resources	Lack of funds	Lack of interests of range personals	Lack of strict Management policy	Lack of research	Lack of staff + non-cooperation of people (%)
Forest Guard/Forester	80	100	100	100	20	70
Range officer/SDO	90	100	100	100	70	60
DFO	100	100	100	100	100	40

m. Range development efforts

Reseeding, tree plantation and removal of unwanted plant species in Rakhs were claimed as the major development made by foresters and forest guards. The divisional forest officer chalked out the rotational grazing programme in Rakhs in addition to other works.

n. Strategies for range development

Creation of an independent range management department: All of the foresters supported this idea while 60 percent of the forest guards were also of this view. The Divisional Forest Officer, Sub-divisional Forest officer and range officers strongly favour this idea for proper development of rangelands.

Provision of sufficient funds: 100% of the respondents demanded more funds.

Research and Scientific range management: The Conservator of Forests Range Management circle and his sub-ordinate DFO, SDFO and RFO are in view that field oriented research is needed and management of these lands must be on scientific lines.

Table 10. Strategies for range development

Category	Independent range management department (%)	Sufficient funds (%)	Scientific management (Research) (%)
Forest guard	60	100	100
Forester	100	100	100
Range officer	100	100	100
SDO	100	100	100
DFO	100	100	100

Recommendations

- After completing this study the following suggestions/recommendations are given/endorsed for proper development of rangelands of Punjab.
- An independent department of Range Management should be created at provisional level with adequate technical personnel.
- All the undeveloped area of Rakhs should be reseeded to increase carrying capacities.
- Field oriented research should be initiated in each Rakh.
- Proper grazing system should be followed.
- Local people should be involved in developmental activities.

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