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ASSESSING CARRYING CAPACITY AND VEGETATION COVER OF RAKH DAGAR KOTLI (THAL)

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Abstract

Dagar Kotli is an important Rakh of Thal rangelands. The current study conducted in this particular Rakh revealed a small potential of supporting only 0.177 animal units (AU) per hectare per growing season on a re-seeded and protected pasture. *Cenchrus ciliaris* stood at the top of the palatable species (24.80%). The other species included *Eleusine flagellifera* (27.52%) and *Elionurus hirsutus* (13.85%).

Introduction

Livestock play a significant role in the economy of Pakistan, contributing 9% share in GDP (Government of Pakistan, 1998-99). It is an important source of food for the people, raw material for developing industries, and commodities for export to earn vitally needed foreign exchange. Rangelands provide a good base for the production of livestock and undoubtedly this is the only and best land use. About 122 million heads of livestock with an average annual growth rate 3.3% are supported fully or partially by rangelands (Khan, 1999). With the passage of time, the increase in livestock population would exert an extra pressure on the diminishing range resources. All the committees constituted by the government from time to time have emphasized that the vast range resources, untackled so far must be developed. But practically nothing has been accomplished in this respect. Due to centuries of misuse and overgrazing, quantitatively and qualitatively these lands produce 10% to 50% of their potential productivity and retrogression is still in progress (Quraishi, 1998).

Thal occupies 2.5 million hectares, comprising districts of Mianwali, Bhakkar, Leiah, Muzaffargarh and some parts of Khoshab, Sargodha and Jhang. Out of total area, about 32% is grazing lands which consist of nine Rakhs under the control of Range Management Circle. Ecologically, this area falls under arid, semi-arid and desert plains. About half of the land surface is covered by sand dunes and the rest of the area is flat. There is an ample scope for increasing forage production through managing the area scientifically. In order to achieve the socio-economic development of the rural/pastoral masses, it is a dire need of the time that the vast resources must be harnessed and their

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productivity be improved. The proposed study would definitely help to assess the range resource and find out the best possible solution for maximizing its use. The study was conducted with the objectives: to assess the Carrying Capacity, and to determine the Vegetation Cover.

Materials and Methods

There are two growing seasons of range grasses; late spring and after monsoon. The current study was carried out in May 1999.

Location

Rakh Dagar Kotli is under the management control of Divisional Forest Officer, Bhakkar. Bhakkar Range comprises the following range units:

1. Rakh Babu Hundalal
2. Rakh Chhiken
3. Rakh Dagar Kotli

Climatic Condition

1. Soil

The soil is sandy with huge sand dunes. About half of the area of Rakh Dagar Kotli is under sand dunes and the other half comprises inter-dunal flats.

2. Temperature

There are two extremes of temperature observed in the area. The hottest month of the year is June while the coldest month is December. Maximum temperature goes up to 50°C during summer. In winter, the minimum temperature goes down to the freezing point.

3. Rainfall

The area falls under arid zone. During summer, the precipitation is minimum and desiccating windstorms are the characteristic of the area. The area receives an annual precipitation of 400-800 mm. Most of the precipitation is from Monsoon rains in July-August. This precipitation plays vital role in the establishment of grasses and shrubs. Reseeding operations are performed before the onset of rainy season to utilize the moisture of rains for seed germination and subsequent growing.

Management aspects

1. Area

The total area of Rakh Dagar Kotli is 3267 ha. For management purposes, it is divided into 20 pastures. These pastures vary in area ranging from 81 to 263 ha.

2. Grazing system

Rotational grazing system is being followed in Dagar Kotli. The area is not fenced at all and the demarcation of the pastures is only by the approach roads. Rotational grazing is, therefore, not successful in real sense because trespassing is on the mercy of the graziers who very frequently trespass the pastures under protection. Grazing permits are issued by the Divisional Forest Officer on nominal charges for sheep, goats and cattle.

3. Reseeding

Out of 20 pastures, 3 (Nos. 3, 16 and 17) were re-seeded in June 1998 covering an area of 405 ha. Reseeding of *Cenchrus ciliaris* was done only because it is the dominant palatable and nutritious species of the area.

4. Vegetation cover

Eight pastures were selected randomly to determine vegetation cover. A 100 feet (30.48 m) measuring tape was stretched diagonally. The tape was stretched by two persons 0.5 meter above the ground surface. The plants/bare areas lying vertically under the meter mark were noted. Ten equidistant transects were taken from each pasture to observe the true picture of the vegetation cover.

S.No.	Species	Local Name
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a: Tree species

1.	<i>Prosopis cineraria</i>	Jand
2.	<i>Acacia tortilis</i>	Kikar
3.	<i>Zizyphus mauritiana</i>	Ber
4.	<i>Tamarix aphylla</i>	Frash

b: Shrubs

1.	<i>Zizyphus numularia</i>	Malah
2.	<i>Capparis aphylla</i>	Karir
3.	<i>Acacia modesta</i>	Phulai
4.	<i>Salvadora oleoides</i>	Van
5.	<i>Calligonum polygonoides</i>	Phog

c: Grasses/Herbs

1.	<i>Cenchrus ciliaris</i>	Dhaman
2.	<i>Elionurus hirsutus</i>	Gorkha
3.	<i>Sueda fruticosa</i>	Lana
4.	<i>Cymbopogon jawarancusa</i>	Khavi
5.	<i>Eleusine flagellifera</i>	Chimber
6.	<i>Leptadenia spartium</i>	Khip

Increasesers

Some of the unpalatable shrubs were in abundance. These included *Aerua javanica* and *Calotropis procera*.

Carrying capacity

As there are only three protected pastures among the total twenty, where reseeding of *Cenchrus ciliaris* was done, so the carrying capacity was determined on the basis of these three pastures.

For this purpose, 10 equidistant line transects 100 feet each were laid out diagonally. A quadrat of 1 m² was thrown on each transect at 30, 60 and 90 feet distance mark of the tape. Forage in each quadrat was carefully cut 2.5 cm above the soil surface with the help of sickle. The harvest was weighed on the spot with the help of a spring balance. The data were recorded along with the name of species of the grasses. The harvests were air dried in paper bags and then preserved in plastic bags.

Results and Discussion**Vegetation Cover**

The results revealed the following composition of grasses/herbs:

S.No.	Species	Local Name	Percent
1.	<i>Cenchrus ciliaris</i>	Dhaman	24.80
2.	<i>Sueda fruticosa</i>	Lana	1.68
3.	<i>Cymbopogon jawarancusa</i>	Khavi	3.44
4.	<i>Eleusine flagellifera</i>	Chimber	27.52
5.	<i>Elionurus hirsutus</i>	Gorkha	13.85
6.	Others		1.95
7.	Bare soil		26.76

Carrying Capacity

Carrying capacity was determined on the basis of three protected and re-seeded pastures. Rest of the pastures were unprotected and overgrazed and were, therefore, excluded for determining carrying capacity. Carrying capacity of the area as computed 0.177 AU/ha/growing season is very low because of deterioration and degradation of range area due to heavy grazing. Carrying capacity was determined for spring season for grasses only. Carrying capacity was determined as follows:

1. Average fresh forage production per quadrat = 116.289 gm
2. Average dry forage production per quadrat = 58.1445 gm
3. Production of dry forage per hectare = 58.1445x10
= 581.445 kg
4. Available forage = 50% per growing season = 290.7225 kg

Carrying capacity of the tract
(AU/ha/growing/season)

= 290.7225

[Forage required per animal unit
per year = 1642.5 kg (9×365/2)]

= 0.177AU/ha/growing season

or = 5.65 ha/AU/growing season

Conclusions

It is concluded from the study that the Rakh Dagar Kotli is under heavy grazing pressure from the vicinity. Due to uncontrolled overgrazing, the resource is depleted. Excessive livestock in contrast with carrying capacity determined cautions further depletion of range resource.

It is strongly recommended that to improve the range resource, grazing should be completely stopped. The local people should be made aware of the consequences of

jeopardizing the resource through overgrazing and they should be involved to restore the range resource.

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