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## DETERMINING GRAZING POTENTIAL OF TREATED AND UNTREATED AREAS OF POTHOWAR TRACT (GULIAL RESERVE FOREST)

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### Abstract

Survey of Gulial Reserve Forest of Pothwar tract having an area of 16998 Ac was carried out in October, 2007 to assess the forage production of treated (reseeded) and untreated areas which was partially reseeded in 1999-2000 under PFSDP. *Cenchrus ciliaris* (Dhama) was the principal grass species (85%) in treated areas while *Eleusine flagellifera* (Chimber) (38.72%) in untreated areas. General grass coverage on the average was 9.7% and 36.75% in un-treated and treated pastures respectively. Carrying capacity based on dry biomass of grasses/herbs was found to be 18 Ac/AU/Yr and 10 Ac/AU/Yr in un-treated and treated areas. Study concluded that untreated area provides fodder to 944 Animal Unit/5664 Sheep Unit while that of treated area to 1700 Animal Unit/10200 Sheep Unit.

### Introduction

Pakistan is an agricultural country having 143 million heads of livestock which contribute 10.8% towards the GDP (Anonymous, 2006-07). Nutritional requirements of these animals are met mainly through fodder crops, grasses and shrubs. Area under cultivated fodder crops in Pakistan is 2.45 million hectares (Anonymous, 2005-06). This area cannot meet the fodder requirements of the huge number of livestock. More area for fodder crops can not be set aside due to ever increasing population demands for cereals and other food crops (Akram, 1990) reported that livestock were getting only 75% of required amount of total digestible nutrients and there was 60% shortage of digestible crude protein. Current estimates of deficient in nutrients are 48.53 million tons of TDN and 6.99 million tons of DCP (Anonymous, 2006). The demand of meat, milk and milk products are increasing due to rapid increase in human population. From existing genetic pool of animals these demands could only be met through enhancing livestock production whereas up to 50% production can be increased by improving the quality and quantity of feed (Hasnain, 1983) recording to (Hanjra *et al.*, 1995) that animals in Pakistan are getting 38% of their nutritional requirements from rangelands.

About 65 - 70% of the total area of Pakistan and 47% of the area of Punjab consists of rangelands which are the mainstay of country's livestock industry. These rangelands are not producing much due to overgrazing, unscientific management, wrong policies and are producing up to 10-50% of their total potential. Since independence, efforts are being made by the Government to develop these rangelands but still their productivity is very poor. A proper solution of this problem is the need of time. To overcome these issues the Government has to launch such programmes emphasizing on reseeded of palatable grasses on the rangelands

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Grazing potential or carrying capacity describes the number of grazing animals, a management unit is able to support without depleting rangeland vegetation or soil resources. It reflects the average level of sustainable production over the long term. Determining carrying capacity is a fundamental component tool that connects forage supply and consumption. Evaluating carrying capacity is an important application of rangeland inventory and monitoring programmes because it represents the key management tool to ensure sustainable use of natural resources.

Species composition and vegetation cover are good indicators of a range condition. There is ample scope for increasing forage production if rangelands are managed scientifically. The assessment of present potential of a range resource is very important in order to plan for its development. Keeping this in view, Gulial Reserve Forest was surveyed for the following objectives:

- Determine species composition of the area/making inventory of the Rakh.
- Assess change in vegetation cover of treated and untreated area.
- Calculate carrying capacity of reseeded and non reseeded area.

### Material and Methods

Survey was conducted for the following parameters:

- Species composition / inventory
- Vegetation cover in percentage
- Carrying capacity

### Species composition/inventory

For species composition, method used by Chaudhry *et al.* (2000) was adopted. A 33 m measuring tape was stretched along the diagonal of the pasture in the randomly selected directions. The plant species lying vertically after every 30 cm were recorded on data sheet. Twenty equidistant transacts were taken in a systematic sampling from each compartment along the diagonal line. Species percentage was determined by simple mathematical calculations.

### Percent cover

After making inventories or data collection for species composition, 1m<sup>2</sup> quadrat was put along each transact at 10, 20 and 30 m intervals. Percent area covered by grasses/herbs was estimated by ocular observation in each quadrat.

### Carrying capacity

Forage in each quadrat was cut 2.5 cm above the ground surface with the help of sickle. The harvest material weighed in grams at the spot with the help of a sensitive spring balance. Weighed samples were packed in paper bags and air dried to determine average dry weight (in grams) per quadrat. Some samples also oven dried in Punjab Forestry Research Institute laboratory to get a constant weight stage. The value thus

obtained multiplied by 4.04 gave average weight in (Kg/Ac) of dry grasses/herbs.

## Results and Discussion

Total area of Gulial Reserve Forest is 16998 Acres, which is divided into 104 pastures/compartments varying in size from 46 to 356 acres for management purposes. The soil of Gulial falls in active and recent flood plains associated with sub-recent flood plains, old river terrace, redeposited loess plains and weathered rock plains. Four percent of the area is gullied, 31.8 percent is hilly gravelly land, 31.4 percent is rough broken land and 2.7 percent is riverbed. The climate of the area is classified as sub-humid, sub-tropical continental (Semi-arid to sub-humid). Rainfall of the district is 584.3 mm/year most of which occurs during late summer (monsoon) season. Mean maximum summer and minimum winter temperatures are 35.9°C and 7.2°C respectively.

### Species composition/inventory

Species composition of un-treated and treated areas of Gulial Reserve Forest as shown in Table 1 and 2 indicate that *Eleusine flagellifera* (Chimber) (38.73%) was the main grass species of untreated area and *Cenchrus ciliaris* (Dhaman) (85%) of treated area.

Table 1. Species composition of untreated areas in Gulial Reserve Forest

S. No.	Botanical Name	Local Name	Percentage
1	<i>Eleusine flagellifera</i>	Chimber	38.73
2	<i>Cymbopogon jwarancusa</i>	Khavi	24.03
3	<i>Cenchrus ciliaris</i>	Dhaman	8.0
4	<i>Aristida adscensionis</i>	Lumb	7.46
5	<i>Bothriochloa pertusa</i>	Pulwan	6.77
6	<i>Dactyloctenium seindicum</i>	Madhana	6.11
7	<i>Hetropogon contortus</i>	Seriala	5.55
8	<i>Sporobolus marginatus</i>	Khiv	1.54
9	<i>Cenchrus biflorus</i>	Lumber	1.0
10	<i>Cenchrus setegarous</i>	Kala Dhaman	0.81
Total =			100

Table 2. Species composition of treated areas in Gulial Reserve Forest

S. No.	Botanical Name	Local Name	Percentage
1	<i>Cenchrus ciliaris</i>	Dhaman	85.0
2	<i>Eleusine flagellifera</i>	Chimber	10.0
3	<i>Cymbopogon jwarancusa</i>	Khavi	3.0
4	<i>Aristida adscensionis</i>	Lumb	1.5
5	<i>Bothriochloa pertusa</i>	Pulwan	0.5
Total =			100

### Vegetation cover

As shown in Table 3 and 4, vegetation cover by grasses/herbs ranged from 5.87 to 15.4% in untreated pastures whereas it is 25–50% in treated pastures. Average vegetation cover was found to be 9.7% and 36.75% in untreated and treated pastures respectively. Both the tables indicate that percentage of bare ground is 90.3 and 63.25 for untreated and treated areas respectively.

Table 3. Vegetation cover of untreated areas in Gulial Reserve Forest

S. No.	Un - Treated areas		
	Pasture #	Vegetation Cover %	Bare ground %
1	70	15.4	84.6
2	35	11.2	88.8
3	36	6.33	93.67
4	23	5.87	94.13
	Average	9.7	90.3

Table 4. Vegetation cover of treated areas in Gulial Reserve Forest

S. No.	Treated/Reseeded areas		
	Pasture #	Vegetation Cover %	Bare ground %
1	51	50	50
2	52	25	75
3	53	32	68
4	57	40	60
	Average	36.75	63.25

### Carrying capacity

Dry biomass production of palatable grasses/herbs was 358.5 kg/Ac for untreated and 663.25 Kg/Ac for treated area, and carrying capacity calculated was 18 Ac/Animal Unit/year and 10 Ac/Animal Unit/year for untreated and treated areas respectively if taking fifty percent as grazing intensity.

Table 5. Average fresh and dry fodder yields (Kg/Ac)

Un - treated areas			Treated/Reseeded areas		
Pasture #	Fresh yield (Kg/Ac)	Dry yield (Kg/Ac)	Pasture #	Fresh yield (Kg/Ac)	Dry yield (Kg/Ac)
70	521.0	287.0	51	1650.0	908.0
35	257.0	141.0	52	725.0	398.0
17	804.0	442.0	53	950.0	522.0
23	480	264.0	57	1500.0	825.0
Average	515.5	358.5	Average	1206.25	663.25

Table 6. Carrying capacity of Gulial Reserve Forest

Type of land use	Carrying capacity	
	AU/Ac/year	Ac/AU/year
Un – treated areas	0.054	18
Treated / Reseeded areas	0.10	10

### Conclusion and Recommendations

It is concluded from the Table 3, 4, 5 and 6 that maximum production/yield of grasses was obtained from treated area. Therefore it is strongly recommended that remaining depleted/degraded pastures of Gulial Reserve Forest should be reseeded and rotational system of grazing must be implemented to acquire the long term production of grasses and livestock.

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