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PHYTO-SOCIOLOGICAL STUDY AND DETERMINATION OF CARRYING CAPACITY OF THE RESERVE FOREST COMPARTMENT -17 OF MARGALLAH HILLS NATIONAL PARK

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Quantitative study was conducted on the vegetation of the Reserve Forest compartment 17 of Margallah Hills National Park. Phyto-sociological observation were made on the fifteen transect lines covering every geographical area of the compartment. It was observed that Kao (*Olea ferruginea*) was the dominant tree of the study area, occurring as first in the 7 out of 15 strands, followed by Chil (*Pinus roxburghii*) dominant in first 5 strands and Kamila (*Mallotus philippensis*) dominant in first 3 strands. The dominant Shrub was Khokhan (*Myrsine africana*) and the dominant Grass was Loonder (*Themeda anathera*). Human and animal impact can clearly be seen in the area in the shape of over grazed grass patches, denuded patches of soil. Encroachments were made by the local people for cultivation adding to the vegetation deterioration of the compartment 17 of Margallah Hills National Park.

Keywords: Phyto-sociological study, quantitative, carrying capacity.

INTRODUCTION

Margallah Hill National Park is situated at the north-eastern side of the Capital. It covers a vast area of 15,883 ha, consisting of Margallah Hills 12802 ha, Rawal Lake 1702ha and Shaker Parian 1376ha. The Park is located between 33*43'N/72*55'E latitudes.

Margallah Hill National Park was established in 1980. Since the time of its establishment it is under the control of CDA (Capital Development Authority) vide notification number 443[1] / 80. Topography of the area is rugged comprising of steep slopes and gullies. The main constituent of the rocks is the Limestone. The mountain has the elevation of 1600m on the western side, which increases as we move towards the eastern side. (Anwar, 2001).

The soil is Colluvial, wind deposited, dark brown to yellowish brown in color with a fine texture and well developed profile. (Hijazi, 1984).

The climate is Sub-Tropical to Semi-Arid. The Average maximum and Average minimum temperatures of the area is 34.3^0C and 3.4^0C respectively. The area receives a reasonably thick quantity of Monsoon rainfall up to 1200 mm per year.

There are a number of fresh water springs in the Park. These Fresh Water Springs provides drinking water to inhabitants and also support other needs of the communities living in the Park Hills. (Shinwari, 1998).

Underground water condition is moderate. The quality of the underground water is good with p^H of 7.4.

The Park is very diverse in the Biodiversity point of view. There are 616 species of plants, 250 birds, and 35 mammals present in the National Park.

Mammals: Mammals in the park include--Asiatic leopard (**T**), Wild boar (**C**), Golden Jackal (**C**), Rhesus Macaque (**V**), Leopard cat (**R**), Gray Goral sheep (**V**), Barking deer (**V**), Chinkara gazelle (**R**), Red fox (**C**), Pangolin (**R**), Porcupine (**C**), Yellow throated marten (**R**) and Fruit bats (**C**).

Note: **T**=Threatened, **V**=Vulnerable, **R**=Rare, **C**= Common

Birds: Birds in the park are--Himalayan Griffon vulture, Laggar falcon, Peregrine falcon, Kestrel, Indian sparrow hawk, Egyptian vulture, White cheeked bulbul, yellow vented bulbul, Paradise flycatcher, Black partridge, Cheer pheasant, Khalij pheasant, Golden oriole, Spotted dove, Collared dove, Larks, Shrikes, Wheatears and buntings.

Reptiles: Reptiles in the park are--Russell's viper, Indian cobra, Himalayan pit viper and Saw scaled viper.

Human population residing in the Park is randomly distributed. There are 38 villages comprising of more than 92000 peoples. (CDA 2000)

With the passage of time and the human development, there are certain biotic and abiotic factors which imparted significant negative changes to the environment of the National Park.

One of the important set back was the decline of the vegetative cover. This was due to unplanned grazing which rapidly replaced the palatable species with the unpalatable ones.

Research was conducted in the Reserve Forest Compartment 17 of the Margallah Hills National Park. The total area of the comp. is 60 ha (CDA Directorate of Environment).

Research was oriented on the Phyto-sociological aspects and the Carrying Capacity of the Compartment 17 of Margallah Hills National Park.

MATERIALS AND METHODS

Materials and Methods consist of the following steps:

1) A comprehensive review of the literature concerning the Vegetation and Phyto-sociological studies done on the other compartments of MHNP and the researches done on the same topic in other areas.
2) Division of the site in different Physiographic Units through repeated surveys of the area.
3) Socio-economic survey of the area using a detailed and well developed Questionnaire.
4) Phyto-sociological Survey of the site for the identification of different kinds of vegetation present in the compartment.
5) Calculation of the Forage production, Carrying Capacity and Stocking rate of the compartment.

RESULTS AND DISCUSSION

1) Line Transect Method

The surface of the compartment was lush green when viewed from above. There was sufficient grass cover on the surface, with very few patches with no grass on it. The barron areas were occupied by bare rocks.
The area covered by vegetation under each transect line was measured accurately using Vegetation Survey Data Form. The results are given in Table 1.

2) Quadrate results

Three Quadrates were placed at random on each transect line. The vegetation was clipped and fresh weights were taken. The results are shown in Table 2.
Average Fresh weight per quadrate was 231g/m^2
C.C. of comp. per year = 360360 X 0.5 (PUF) / 2555
= 141 Animal Units
No. of A.U kept by the local people was calculated through the information collected from the local people through a well built questionnaire.

Total No. of animal units kept by the peoples is 146 A.U
(Rasheed Fahad, Internship Report 2005)
From the above calculation, we can conclude that the people living near the compartment are using more than the carrying capacity of the compartment vegetation. Very little is left behind for natural wild life. It is observed and measured that there are certain areas in the compartment where the soil is fully covered with the vegetation but there is no vegetation to be clipped above 2-3 cm from the ground. This is because the animals have consumed all the grass cover right from the base. This is one indication that there are more grazing animals than the Carrying Capacity of the area.
Therefore, we should reduce the influence of the local people on the compartment so that the grazing pressure on the compartment vegetation could be reduced. This can be done by educating the local peoples about the Grazing System (Rotational Grazing System). If this is not done in time the animals will eat up all the newly emerging vegetation and the area will be filled by the obnoxious plant species. This will ultimately result in under fed animals

Questionnaire

Following information was collected:
The main or sole source of energy is wood. They use it to cook their food and keep them warm in winter. They use almost double wood in winter the wood they use in summer months. Information the local people gave was that now a days, in the newly constructed houses, there are fireplaces in every room, which consume more wood which, give rise to more wood consumption. Average consumption of fuel wood is 400-600 kg / month which doubles in winter.
93% of the local people burn wood as fuel, 5% uses Kerosene oil and 2% use gas cylinders as fuel.
The people living in the villages near the compartment prefer to burn the wood of Sanatha (*Dodonia viscose)*, then Chir (*Pinus roxberghii)*. They extensively use Sanatha as fuel wood because it catches fire easily and burns longer. Chir also catches fire easily as it has high oil contents in its wood.
There were no garbage drums in the compartment for the disposal of waste. People throw their waste wherever they like. CDA should place waste drums near the village so that people could use it to throw in the waste.
According to the local people fire erupts every year but at small scale and it is controlled by the local people themselves with no help from the CDA. The people control the fire through Fire Beaters. Fire Beater is mainly the green branches of the trees which, is found to be very effective.

Observation

1. Most of the area is under cultivation.
2. Animals not allowed entering in the cultivated field.
3. Due to grazing pressure the unpalatable shrubs are increasing.
4. Very lean Animals due to lack of palatable species.
5. Density of the vegetation is high due to more proportion of thorny shrubs.

Conclusion

The compartment vegetation is under high grazing pressure that has resulted in the reduction of palatable

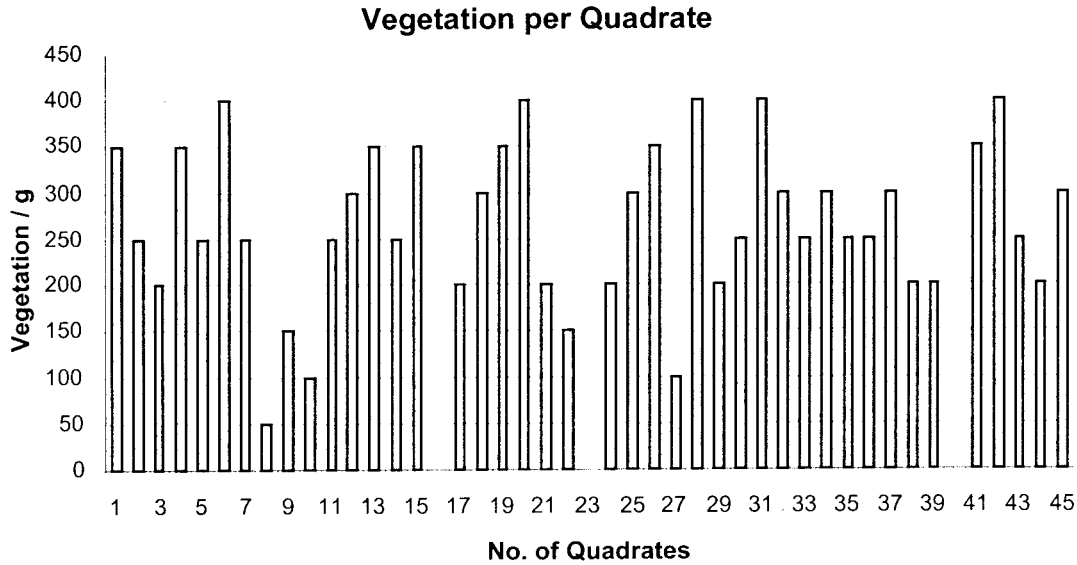
Table 1. Percentage cover of each vegetative species on three topographic areas of the compartment 17

SLOPPY AREA		PLANE AREA		STREAM BANKS	
TREES		**SHRUBS**		**SHRUBS**	
Kao (Olea ferruginea)	5%	*Khukhan (Myrsine Africana)*	10%	*Granda (Carissa opaca)*	18.6%
Chir (Pinus roxburghii)	5.5%	*Granda (Carissa opaca)*	5.4%	*Khukhan (Myrsine Africana)*	12.3%
Kamila (Mallotus philippensis)	2.6%	*Bakard (Justicia adhatoda)*	3.6%	*Bakard (Justicia adhatoda)*	11%
Aloocha (Prunus bokhariensis)	1.6%			*Sanatha (Dodonaea viscose)*	6.5%
				Batangi (Pyrus pashia)	3.6%
SHRUBS		**GRASSES**		**GRASSES**	
Khukhan (Myrsine Africana)	30%	*Palwan (Dchanthium annulatum)*	30%	*Loonder (Themeda anathera)*	25%
Granda (Carissa opaca)	16%	*Loonder (Themeda anathera)*	22%		
Bakard (Justicia adhatoda)	8%	*Sariala (Heteropogon controtus)*	7.2%		
Batangi (Pyrus pashia)	6%	*Baru (Sorgham halepense)*	5.4%		
Sanatha (Dodonaea viscose)	3%	*Dhaulu (Chrysopogon montanus)*	2.6%		
GRASSES					
Loonder (Themeda anathera)	18%				

Total area under vegetative cover was **88%**

Species found

DOMINENT TREES		DOMINENT SHRUBS		DOMINENT GRASSES	
Common Names	**Botanical Names**	**Common Names**	**Botanical Names**	**Common Names**	**Botanical Names**
Kangar	*Pistacia chinesis*	Bakar	*Justicia adhatoda*	Loonder	*Themeda anathera*
Jangali Anar	*Punica granatum*	Granda	*Carissa opaca*	Palwan	*Dchanthium annulatum*
Kao	*Pinus roxburghii*	Sanatha	*Dodonaea viscose*	Sariala	*Heteropogon controtus*
Sharin	*Albizia lebbeck*	Batangi	*Pyrus pashia*	Dhaulu	*Chrysopogon montanus*
Kamila	*Mallotus philippensis*	Khokhan	*Myrsine africana*	Baru	*Sorgham halepense*
Phulai	*Acacia modesta*	Dhavi	*Woodfordia furticosa*		
Kannair	*Nerium oleander*	Pataki	*Gymnosporia royleana*		
Bakain	*Melia azedarach*				



species and increase of unpalatable species (thorny shrubs). High deforestation rate is experienced by the area as there is no source of fuel other than wood.

Recommendations

- Alternate source of fuel should be provided to the local people.
- Looping and topping of the trees should be stopped or this would result in the death of the tree.
- The local people should be given education about the grazing system.
- The animals should be stall fed on the vegetation from the cultivated fields.
- Artificial Reseeding of palatable species should be done.
- Reforestation program should be adopted to revive the vegetation and palatable species growth should be encouraged

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