Study on Climate Change of Faunal and Floral Diversity of Shekhawati Region of Thar Desert

[1] Swati, [2] Dr. L.C. Verma

[1] Research Scholar, (**Geography**), Bhagwant University, Ajmer, Rajasthan

[2] Research Supervisor, Bhagwant University, Ajmer, Raj.

Email ID: - swatikhatri71@gmail.com

Abstract

Shekhawati region is rich with biodiversity which attract the researchers, scientist and biologist. The fauna and flora found in the study area has highly desertic adaptations and are not evenly and densely spread on the land of study area. The study conducted during 2012 and 2013 when data of Nilgai observed. The region has 120 species of migratory and resident birds of the desert. The chief floral elements in the region are Prosopis cineraria (Khejri), Azardirachta indica (Neem), Ficus religiosa (Pepal), Dalbergia sisso (Seesam), Acacia nilotica (Desi Babul), Salvadora persica (Mitha Jal), Albizzia lebbek (Sares), Prosopis juliflora (Vilayti Babul). The leaves of desert plants are often reduced to spines and thorns to minimize water loss by evaporation. Shekhawati region located in north-eastern of Rajasthan and cover only 8% area of the state. Climatic condition of the area is both extreme – very hot summer and very cool winters. The region lies in semiarid zone with low floral diversity due to scantly and irregular rainfall. Wind velocity in the region is quite high during the summer and sand storms are common feature of the area. Sand dunes are dominant in the entire region especially in north-western part. The region is part of Indian Thar Desert exhibit little mammalian diversity. During last three decades numbers of large mammals has been drastically decreased in the Shekhawati region due to inference of people in natural habitats of mammals for their beneficiary activities. The mammalian diversity of Shekhawati region is represented by 40 species of mammals belonging to 20 families and 31 genera. The region covers 9% mammalian diversity of India and 58.8.% of Thar. During survey of mammalian species both direct methods like line transect

method and indirect methods by identification of sign were used. The conversion of desert land into irrigated agriculture is also affecting the biodiversity scenario in the region. Mammals that are adapted to desert environment is rapidly vanishing due to interference and destructive activities of man.

Keywords: Fauna, Flora, Thar Desert, Mammals, Birds, Xerophytic Plants.

Introduction

The study of fauna and flora in Shekhawati Region is a complementary part of my Ph. D research work on Nilgai. The study conducted during 2012 and 2013. During my field survey on ―Population Dynamics, Ecology, Breeding Biology and Pest Status of Nilgai in Shekhawati Region of Thar Desert‖, flora and fauna also observed. Shekhawati region is rich with biodiversity, which attract the researchers, scientist and biologist. Though a large percentage of the total area is desert and even though there is little forest cover, Rajasthan has a rich and varied flora and fauna. The natural vegetation is classed as Northern Desert Thorn Forest (Champion 1936). These occur in small clumps scattered in a more or less open forms. Density and size of patches increase from west to east following the increase in rainfall. The Northwestern thorn scrub forests lie in a band around the Thar Desert, between the desert and the Aravallis. The Aravalli and the south-eastern region is home to the dry deciduous forests, with tropical dry broadleaf forests that include teak, Acacia, and other trees. The hilly 'Vagad' region lies in southernmost Rajasthan, on the border with Gujarat. With the exception of Mount Abu, Vagad is the wettest region in Rajasthan, and the most heavily forested. North of 'Vagad' lies the Mewar region, home to the cities of Udaipur and Chittaurgarh. The Hadoti region lies to the southeast, on the border with Madhya Pradesh. North of 'Hadoti' and 'Mewar' lies the 'Dhundhar' region, home to the state capital of Jaipur. Mewat, the easternmost region of Rajasthan, borders Haryana and Uttar Pradesh. All these regions have varied flora and fauna distinct to the region.

Thar desert in Rajasthan has only 6% area of the total area of the country. Within this little area, with hostile climatic conditions, about 15.8% (68 out of 428) mammalian species are surviving.

Earlier workers (Bates et al. 1994a, b, c; Joshi, 1984; Prakash, 1994, 1995; Rahmani, 1991; Rana, 1980; Rice, 1991; Sankaran, 1992; Sankhala, 1979; Saxena, 1975; Singh and Sharma, 1985; Tehsin, 1980, 1987; Tripathi et al., 1985; Wada, 1984 and Singh, 1995) [101, 102, 103, 31, 60, 61, 75, 77, 80, 85, 86, 104, 105, 106, 98, 99, 107, 93] have done a faunistic survey and made significant contribution towards study of mammals in Rajasthan. Wilson and Reeder (1993) [100] listed the mammalian species of the world. On basis of his report Agarwal (1998) [2] reported 13 orders, 42 families, 180 Genera and 390 species of mammals in India. Of these, 8 orders, 23 families, 45 Genera and 66 species have been recordred from Thar desert of Rajasthan (Chakarborthy et al., 2005) [18]. Alfred and Agarwal (1995) reported 68 species belonging to 9 orders dwelling in the thar desert. The Thar, as an ecosystem, is under the process of ecological transformation. This transformation has largely been brought about by the mighty Indira Gandhi Canal and partly through global climate changes. Indira Gandhi Canal water in the Churu and Jhunjhunu district is mainly used for drinking purpose. Because of this Canal irrigation, shadow effects on flora had been observed and 42 plant species of irrigated area have expanded their distribution to non-irrigated area. Uncontrolled mining in mountain range of Aravalli and other small hiclocks in Jhunjhunu and Sikar districts are also affecting the floral and faunal diversity. Changing floral composition will definitely affect the faunal composition of the region. Many mesic species of small mammals are expanding their distribution towards the the Thar (Parkash, 1995), many aquatic birds have recently invaded the Thar (Soni, 1994; Idris et al. 2009) [108, 29]. The present inventory of mammals and birds will help in monitoring the population in future. Shekhawati region is not so rich in carnivores and large mammals' diversity as compared to other districts of the Thar desert. Major reason for the poor diversity of these animals is high human population, fast destruction of natural habitats, industrialization, illegal mining, irrigation, shrinking forest covers and poaching. Only protected area of the region, Tal Chhapar Blackbuck sanctuary, is a small fenced area of about 7.19 sq km

Review of Literature

Line transects method (Rodger, 1988, 1991) [82-84]: In this method, line transact of 1 square km. were used in different locations of study area and observation were made by walking along the road side both on foot and by vehicle. The observations were taken in early morning and late evening hours. The presences of different mammalian species in the particular habitats were noted. Large mammals like Semnopithecus entellus, Macaca mulata, Boselaphus tragocamelus, Antelope cervicapra, Gazella gazelle etc. that can tolerate the humans presence and allow the observations to be made from close quarters by necked eyes in open field, dense forest or in hilly part of the region. 8x40 Olympus binoculars were also used for observing mammals. Photographs were taken by using Cannon Supershot and hp 945 digital Camera. Water source method was also applied for observation of mammals during the noon and sometime at night in the summer because this time temperature reached on peak and water crisis begins and mammals comes near water body in search of water. During field visit in the area for identifications of mammalian species some indirect methods were also used. Animal signs such as pellets, scats, quills, kill and burrows which are indicate the presence of an animal in the area, were carefully observed and photographs were taken. Rural people also helped us in identification by presence or absence of mammals by providing them photographs and pictorial guides for identification that are likely to be found in the area. Confusing and difficult group of mammals were confirmed by sending the photographs to wildlife experts.

Certain agriculture and forestry practices can support climate mitigation whilst improving rural livelihoods. Efficient and informed use of resources, in collaboration with other resource users, offers high potential gains.

Traditional cropping systems in semiarid areas such as the northern savannah zone in Ghana are dominated by cereal-based systems, usually combining two or more crops in a field. Intercropping minimizes risk of crop failure from drought or flooding and spreads the need for

labour over a longer period (Stanturf et al, 2011). Millet and sorghum are the most important grain staples grown in the Upper East and Upper West regions, and maize, millet, and sorghum are important staples in the Northern Region (Dietz et al., 2004; Gyasi et al., 2008). Yam is an important food crop in the Northern and Upper.

West regions (EPA, 2008). Of these crops, millet is the least risky with regard to climate-induced fluctuations in yield followed closely by sorghum and maize, making all of them important for food security. Rice and cotton have much wider variation in productivity year to year. Some farmers also grow vegetables in gardens and irrigated plots during the dry season. Northern Ghana is the most important part of the country for livestock production, giving it an advantage over the south in this regard. Cattle, goats, sheep, chicken, guinea fowl, and pigs are the main animals raised (Dietz et al. 2004, Hesselburg and Yarro 2006). For some agriculturally-dependent communities in the Upper East and Upper West regions, household food security relies more on livestock than on farming (Dietz et al., 2004; Hesselburg and Yarro, 2006; Van der Geest, 2004).

Materials and Methods

The Shekhawati region of Indian Thar desert, located in the ′ 02° to 29′24°north-east part of Rajasthan lies in between 27 E longitude at a height of about′ 5° to 76′4°N latitude and 73 320 meters from sea level. The region covers an area of 27,529.44 sq km and connects with the boundaries of Hanumangarh district in north, Hissar in north-east, Bhiwani, Rohtak and Mahendragarh districts of Haryana in south-east, Jaipur and Nagaur in south and with Bikaner district in west. Not much work has been carried out on survey of existing mammalian species in Shekhawati region of Thar desert. Though, Chakraborthy et al. (2005) [18] made a district-wise survey on mammalian diversity of Thar desert. Present study is largely based on our observations in the field during last six years from May 2008 to March 2014. For this, the area was divided into three parts based on its ecophysiological characters viz 1. Middle-eastern part of the Shekhawati region - Plain agricultural area 2. Southerneastern part of the Shekhawati

region - Arawali mountainary range, its foothill site and small hillocky areas. 3. Northwestern part of the Shekhawati region – Thar desertic area. The Mammals of the region were monitored all the year round, during all the seasons. During study period minimum one site was visited per month to record the mammals and their related parameters. Total 84 sites were visited in the study area. During field survey of mammalian species both direct and indirect methods were used. Following methods were applied:

The Shekhawati region of Indian Thar desert, located in the North-East part of Rajasthan lies in between 27 24 to 29 02 N latitude and 73 4 to 76 5 E longitude at a height of about 320 meters from sea level. The region covers an area of 27,529.44 sq km and connects with the boundaries of Hanumangarh district in north, Hissar in north-east, Bhiwani, Rohtak and Mahendragarh districts of Haryana in southeast, Jaipur and Nagaur in south and with Bikaner district in West. Cross winds, dust and sand storms are common in the area which results in annual changes in the topography of the sandy habitats (Joshi and Sharma, 1964). Drought and famines are very common, but climatically the area is not a true desert (Stein, 1942). During the study period extensive survey work was conducted in different villages of Shekhawati region. Animals were followed for regular observation and protocols were recorded for scan and adlibitum sampling (Altman, 1974). The observation carried out by the aid of 10x50 binoculars and data was supported with photography using Nikon P510 42 X zoom.

Results

A total of 40 species of mammals are found in the study area. They belong to 8 orders, 20 families, and 31 genera. Out of 110 species of order Chiroptera present in India, 18 have been reported in Thar desert of Rajasthan and only eight are present in Shekhawati region. Pholidota and Lagomorpha are smallest orders in the region with only one species each. In the study area order Chiroptera has maximum number of six families; while order rodentia, with 14 species is largest one constituting 35% of the total mammals (Table 2 and figure 1). Some species of small and large mammals like chinkara, mongoose and hares were predominantly

found in the desertic crop area of north-west part of study region, where as jackal, fox, jungle cats, etc. were predominantly observed in the community lands, hilly areas and near water bodies. Blue bull, desert cat and many small rodents were well distributed in all kinds of ecological settings. Interestingly two primate species were also seen in the area of Shakambari and Loharlgarl, Kirdoli and some other parts of southeast of Shekhawati region (Table 1). Out of 40 mammalian species found in this study area, six species are in Schedule I and one species is in schedule III, of five species listed in Schedule II and six species in schedule IV and thirteen species are in Schedule V of Wildlife (protection) act, 1972 and the status of remaining species is not mentioned.

Owing to strong variation in climatic, edaphic, physiographic, topographic and geological characteristic, the Shekhawati region of Rajasthan shows a wide diversity of habitats. The fauna and flora found in the study area has highly desertic adaptations and are not evenly and densely spread on the land of study area. Climatic conditions of a region have a great deal to do with the increasing population and distribution of fauna and flora. It is the area of good numbers of animals, trees species and different habitats, mapping it a unique ecological zone (Singh, 2007). The area can be classified into Sub-humid region based on climatologically data and the occurrence of reptiles. Animals: The region is a haven for 120 species of migratory and resident birds of the desert. One can see eagles, harriers, falcons, buzzards, kestrel and vultures. Shourt-toed Eagles (Circaetus gallicus), Tawny Eagles (Aquila rapax), Greater Spotted Eagles (Aquila clanga), Laggar Falcons (Falco jugger) and kestrels. A total of 130 species belongs to 92 Genus, 33 Families and 15 orders were identified during the study period (Dubey and Shyoran, 2011).

Hypothesis

In this research work I would like to consider certain parameter so that our objectives can be solved taking various tools. Hypothesios are based on objectives.

1. We will have to Provide credible, science-based climate change education resources.

2. I will have to Educate students about climate change.

3. To Provide success stories about what students and others are doing to help protect and conserve natural resources to encourage schools and classrooms to learn outside and take action.

4. I will have to Meet national science education standards as they relate to climate change.

5. We will have to Increase participation in and understanding of citizen science programs related to climate change mitigation so that students learn the importance of being a good steward.

6. We will have Share information about what the partner agencies are doing to address climate change.

7. I will have to Understand the role of citizens, public land management agencies, and non-governmental organizations in protecting and conserving natural resources.

References

1. Dwivedi, S. R. (2006) Managing Human Resource PersonnelManagement in Indian Enterprises, 2nd ed 2.

2. Bamberger, P, Meshoulam, I. (2000), Human Resource Strategy: Formulation, Implementation and Impact, Thousand Oak, CA: Sage 3.

3. Kandula, S. R. (2001), Strategic Human Resource Management, New Delhi: Prentice Hall of India 4.

4. Parek, U, Rao, T.V. (1981), Designing and Managing Human Resource Systems, New Delhi: Oxford and IBH 5.

5. Ellan Ernst Kossek et al., ―Managing Human Resources in the 21stcentury- from core concepts to strategic choice‖, South-western College publishing Thomson learning, 2000

6. Ian Beardwell et al., ―Human Resource Management– a contemporary approach‖, ed. 3, Pearson Education, 2001.

7. Gulev S, Hanawa K, Le Quéré C, Levitus S, Nojiri Y, Shum C K, Talley C K and Unnikrishnan A. 2007. Observations: Oceanic Climate Change and Sea Level. In:

Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon S, Qin D, Manning M, Chen Z, Marquis M, Averyt K B,

8. Tignor M and Miller H L (eds)]. Cambridge University Press. Cambridge, United Kingdom and New York, NY, USA.

9. Boko M, Niang I, Nyong A, Vogel C, Githeko A, Medany M, Osman-Elasha B, Tabo R and Yanda P. 2007.

10. Githeko A and Woodward A. 2003. International consensus on the science of climate and health: The IPCC Third Assessment Report. Climate change and human health: risks and responses, McMichael A, CampbellLendrum D, Corvalan C, Ebi K, Githeko A K, Scheraga J S and Woodward A (eds). WHO, Geneva. pp. 43 – 60. (Global health)

11. GCOS. 2005. Analysis of Data Exchange Problems in Global Atmospheric and Hydrological Networks – February, 2005 GCOS-96