FLORISTIC AND ETHNOBOTANICAL STUDIES OF RAMGARH VISHDHARI WILD LIFE SANCTUARY OF BUNDI (RAJASTHAN)

रामगढ विषधारी वन्य जीव अभ्यारण्य बून्दी (राजस्थान) का पादपीय एवं लोकवानस्पतिक अध्ययन

A THESIS

Submitted for the award of Ph.D. Degree

in the faculty of Science of

UNIVERSITY OF KOTA, KOTA

By

Kapil Nawar

Supervisor

Dr. O.P. SHARMA

P.G. DEPARTMENT OF BOTANY

GOVERNMENT COLLEGE BUNDI

UNIVERSITY OF KOTA, KOTA

2015

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CERTIFICATE

It certified that the

1. Thesis entitled **"FLORISTIC AND ETHNOBOTANICAL STUDIES OF RAMGARH VISHDHARI WILD LIFE SANCTUARY OF BUNDI (RAJASTHAN)"** submitted by **Kapil Nawar** is an original piece of work carried out by the candidate under my supervision.
2. Literary presentation is satisfactory and thesis is in a form suitable for publication.
3. Work evinces the capacity of the candidate for critical examination and independent judgment.
4. Candidate has put in at least 200 days of attendance every year.

DATE :

Dr. O.P. SHARMA
P.G. DEPARTMENT OF BOTANY
GOVERNMENTCOLLEGE BUNDI

CERTIFICATE

It is to certify that **Mr. Kapil Nawar** has done his research work on the topic **"FLORISTIC AND ETHNOBOTANICAL STUDIES OF RAMGARH VISHDHARI WILD LIFE SANCTUARY OF BUNDI (RAJASTHAN)" under the guidance of Dr. O.P. SHARMA,** P.G. Department of Botany, Government College Bundi (Rajasthan).

Date : **Principal**

Governmen College Bundi

ACKNOWLEDGEMENT

It gives immense pleasure to put on record my deep sense of gratitude to my guide Dr. O.P. Sharma, P. G. Department of Botany, Government College Bundi for his valuable guidance, keen interest and constant inspiration throughout the period of this work. He has truly been friend, philosopher and guide to me. But for their generous help and patient supervision this thesis would not have seen the light of the day. I owe my deepest gratitude to him.

I express my heartiest gratitude to Dr. L.K. Dadhich, former Principal MIMT, Kota, Dr. R.K. Dubey, former Principal Government College, Bundi, Dr. N.K. Sharma, former Principal Government College, Jalore and Dr. S. K. Shringi, Botany Department Government College, Kota. They have willingly directed, inspired and encouraged me throughout the tedious course of this challenging study. They helped me from their vast store of knowledge and experience.

I am thankful to Mrs. Snigdha Dwivedi, Principal Government College, Bundi, for providing all the facilities and support in carrying out the research work.

I also convey my sincere thanks to Dr. V. B. Shrivastava, Dr. Rohini Maheshwari, Dr. D. K. Rathore, Sh. R. P. Meena and Dr. M. K. Rawat of Botany Department Government College Bundi for their valuable suggestion and timely help each and every steps of research work. I am sincerely thankful to Dr. P. K. Salodiya, Dr. P. C. Bhati and Sh. R. R. Parihar of Govt. College Bundi for their support and other generous help during the research.

I am thankful to Mr. Vijay Singh, ACF Wild Life (Ramgarh Vishdhari Wild Life Sanctuary), Man Mohan Ji and Surendra Singh Ji of forest department of Bundi for permitting and supporting me to complete my field study in protected forest area of Ramgarh Vishdhari Wild Life Sanctuary. They also help me for provide the valuable information regarding the study.

A word of praise will not sufficient to express my reverence and affection words my respected father Mr. Jag Mohan Nawar and Mother Smt. Lalita Nawar, it is due to their boundless love, never ending affection forbearance, deep understanding, endurance, moral boost and benevolent care that enable me successful accomplish my work. I am deeply indebted to my grandfather Mr. Bhanwar Lal Nawar and Grand Mother Smt. Jagni Bai for their affection, appreciation and encouragements. Moral support I received from my sister Miss Suman Nawar and Deepmala Nawar.

I greatly appreciate the incredible support of my wife Smt. Meenakshi Nawar, my son Devansh Nawar, my daughter Lakshita Nawar and my sister's son Mikul Samriya without their love, it would not have been possible for me to complete my thesis.

I pay my sincere thanks to my all friends Rajendra Prasad Meena, Dhanraj, Anil, Dr. Satya Prakash Sen, Dr. Subhash Verma, Dugra Lal Regar, Narendra Kumar Mehra, Hemraj Soni and Ramswaroop Prajapat for rendering, much needed moral supports and encouragement.

P.G. Department of Botany
Government College Bundi
(Rajasthan)

Kapil Nawar
M.Sc., M. Phil.

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INTRODUCTION

Rajasthan is quite rich in floristic diversity probably due to presence of different variable and diversified climatic, physiographic, edaphic and habitat conditions. The Haroti plateau has a rich floristic diversity suggests many kinds of plant species. Ramgarh Vishdhari Wild Life Sanctuary is a single compact and large forest ecosystem in Haroti region. It is located in Bundi district of Rajasthan state and 45 km. away from it.

The submitted thesis on the floristic and ethnobotanical study of Ramgarh Vishdhari Wild Life sanctuary of Bundi district south east Rajasthan was taken up to evaluate its on holistic basis. Earlier it had a larger forest cover, but due to environmental degradation quite a large number of plant species are threatened. Many plant species of sanctuary have ethnobotanical significance. The present investigation was made to holistic approach of ecosystem of area with reference to floristic diversity and also to enumerate the plant species being used by the local population for food, fodder, fuel, fibre, dyes etc. Along with economic value of various plant species, ethnobotanical uses of prevalent in tribal population have also been assessed in the present study.

Ethnobotany is the study of how people of a particular culture and region make the uses of indigenous plants. Ethnobotanists explore how plants are used for such things as food, shelter, medicine, clothing, hunting and religious ceremonies. It may be said that the ethnobotany has become a broader discipline, which is interested in all studies about the relationship between people and plants. Scope of ethnobotany is not confined to one area but it covers a broad range of study areas, which are interconnected to each other in one sense or the other. So, there is a great opportunity to explore the ethnobotanical approach towards the modern civilization and giving them a

firm task, which should include conservation of plant species and other forms of biological diversity and sustainability in supplies of wild plant resources.

Ethnobotany has grown into a systematic discipline of plant science. It deals with the natural and direct relationship between plant and people. This is the study of plant human interaction in a given environment. These studies assume great importance in enhancing our knowledge about plants grown and used by native tribal communities, the rich diversity assembled by them for their sustenance and different means adopted by them for its preservation and conservation.

The significance of ethnobotany is manifold. The study of indigenous food production and local medicinal knowledge may have practical implications for developing sustainable agriculture and discovering new medicines. It also encourages an awareness of the link between biodiversity and cultural diversity, as well as a sophisticated understanding of the mutual influence of plants and humans. The study intends to highlight the role that local people's knowledge and cultural perspectives can play in resource management and conservation.

As a field of research and study, ethnobotany is an interdisciplinary approach using botany, anthropology, history, chemistry and many others. It is a multidisciplinary science, deals with disappearing traditional knowledge, system and relationship between human beings and surrounding flora. It has attracted much attention, not only due to its great academic or historical importance, but also due to many economic applications.

Hence major contribution of ethnobiological study today is towards the understanding and bioprospecting of biodiversity which has assumed great economic, ecological, social and political significance for the modern civilization. There is a close link between ethnic diversity and biological diversity. Different ethnic societies use a particular plant species in their locality differently as a source of food or as a source of medicine or for both.

Not only that they posses specific knowledge about the use of these wild species, but they have also been instrumental in protecting and preserving them through cultivation and in situ conservation.

Our knowledge of medicinal plants has mostly been inherited traditionally. There is a growing tendency all over the world to shift from synthetic to natural based products including medicinal plants. This study is concerned with the ways of ethnic perception and uses of plants influence in the natural environment. It covers the entire Ramgarh Vishdhari Wild Life sanctuary of Bundi district. Though this study is the plant species diversity of area have been explored. Special attention is given in this study to the factors that make plants a resource that sustains the rural people and how the management of this resource is vital to their survival and progress.

The traditional knowledge system of ethnic societies is fast eroding. There is an urgent need to inventories and record all ethnobiological information among the diverse ethnic communities before the traditional cultures are completely lost. Tribal people have thorough knowledge of herbal medicine. But tribal are gradually loosing their knowledge of herbal medicine. Their knowledge has to be safeguarded therefore a list have been prepared of plants with their medicinal value found in area. This was the main objectives of this study.

The floristic and ethnobotanical information presented in this investigation is based on :-

(a) Field survey during the study
(b) Ethnobotanical notes and information from tribal and local people covering whole area
(c) Collection tours in different seasons

The present work has been divided into Ninth chapters .The first chapter is an introduction to the work. This chapter includes concept of ethnobotany, plan of work and significance of the study.

In the second chapter review of the literature has been mentioned. General accounts of the study area and their profile have been described in third chapter. Location dimension, geology, phytogeological relationship, soil, drainage system have been studied in this chapter. Relevant table have also been attached. Fourth chapter contains methodology adopted during research. Observations of the ecological factors (climatic, edaphic, topographic and biotic) have been discussed in fifth chapter. The meteorological data of last two years have also been given. In the topographic factors physical regions of study area have also been made. Soil classification, pH and general characters of soil have been studied in edaphic factor. Biotic factors have been recorded in detail.

The sixth chapter is related to the floristic study of Ramgarh Vishdhari Wild Life sanctuary. For the study this chapters have been divided in five sub units. These are vegetational classification, floristic composition, study of plant community, check list of flora of the area and synopsis of the indigenous flora. A list of rare and endangered taxa of the area have been attached in this chapter.

The seventh chapter is devoted to ethnobotanical study of the area. In this chapter ethnic communities of the area and their socio-economic status have been recorded. Sub unit of this chapter includes the sacred groves and magico–religious beliefs of the area. Detailed studies have been made of the Non Timber Forest Products of the area. In these concern wild edible plants, plants for beauty care and plants of economic importance in the area have been discussed after extensive observation. To record the important information about the plants of medicinal importance for tribal and rural people, various localities of the area were visited from March 2011 to October 2014. The detailed accounts of ethnomedicinal plants of the area have been described. This was the main objective of this study. Relevant maps and tables have also been attached in this chapter.

After floristic and ethnobotanical studies of Ramgarh Vishdhari Wild Life sanctuary, necessity of management plan is felt. Therefore management plans have been proposed in chapter Eighth. This chapter contains the proposals for management of sanctuary area. Objectives of management and problems being faced have been discussed in detailed, in which author's suggestions and opinion have also been included.

The present study highlights the floristic richness along with ethnobotanical wealth of area.The observations on the above aspects have been presented chapter wise. At the end summary is given in ninth chapter, followed by references and glossary. Photographic plates showing habitat, flora etc. are also put separately at the end.

The present study was made with the following objectives:-

1. To prepare a floristic list of this region.
2. To do the floristic study of area in which the vegetational analysis, physical region wise distribution and community study is included.
3. To analyse the synopsis of the indigenous flora of the area.
4. To provide an information regarding conservation and management of ecosystem and biodiversity of the area.
5. To categories various plant species, on the basis of their ethnobotanical uses.
6. To documents the ethnobotanical data from existing literature and from actual fieldwork.
7. To project the plant genetic resources of the area.
8. To discuss the socio-economic status of ethnic communities of the area.
9. To develop scientific approach among people towards their sacred beliefs.
10. To describe the basis, magico-religious beliefs of folk concept and sacred groves of the sanctuary area.
11. To prepare the management plan of sanctuary area for their sustainable and eco-development.

REVIEW OF LITERATURE

Studies on the flora, ecology and their nature of distribution of various part of India have been made by Cooke (1901-1908), Kanjilal et al. (1934-40), Patnaik and Patnaik (1956), Chavan and Sabnis (1961), Maheswari (1963) and others. Haines (1921-25) discussed the marshy and aquatic plants of Bihar and Orissa. Deb (1975) has reported the distribution and probability of occurrence of aquatic vascular plants in relation to the climatic conditions of Assam, Arunachal, Tripura and Manipur of the North – Eastern region with the other states of India. Santapau (1953, 1967), Mirashi (1954), Majumdar (1965), Patel (1971) and many others have contributed knowledge of different localities of the country. Mitra et al. (1971) published a list of aquatic and semi aquatic plants cultivated in the Indian Botanic Garden, Howarah. Islam (1989) reported the aquatic weeds of North-east India and their economic importance.

The earliest records on the flora of Rajasthan are those of King (1879), Macadam (1890) and Adams (1899). Since the publication of king's "SKETCH OF THE FLORA OF RAJPUTANA" in 1879, many workers have contributed to our knowledge of the flora of Rajasthan. Blatter and Hallberg (1918-1921) published a remarkable work on the plants of the Indian desert. Shantiswarup (1951, 1952 and 1954) listed plants of Jodhpur and its neighbourhood, Shantiswarup (1958) listed some common plants of Jaisalmer and its neighbourhood. Sankhla (1951) enumerated plants of North-West Rajasthan together with their life forms. Similar lists of the plants of Jaisalmer and Bikaner were compiled by Shantiswarup (1957-58). Bhandari (1974a, 1974b, 1978 and 1990) in a series of papers reported a large number of plants species from Western Rajasthan. Quite a large number of papers have also been published on the floristic studies from Eastern Rajasthan desert (Mulay

and Ratnam, 1950; Ratnam and Joshi, 1952; Nair, 1956; Nair and Nathawat, 1956-57 and Nair and Kanodia, 1959). Agarkar (1952), Shantiswarup (1952 a, 1952b, and 1952c), Biswas and Rao (1953) and Joshi (1957) have studied ecology and plant association of sandy areas. Vyas (1964) in a series of papers studied various aspects of the vegetation of Alwar. Vyas and Gupta (1962) enumerated the medicinal plants of Alwar and described the vegetation of Tijara and its neighbourhood. The vegetation types of Jaipur have been described by Joshi (1958), Verma (1967) and Sharma (1974).

The flora of Western Rajasthan has extensively been worked out by Bhandari (1978) with its critical revision in 1990. He has enumerated 682 species of flowering plants belonging to 352 genera distributed among 87 families. Similarly, flora of North-East Rajasthan has been worked out by Sharma and Tiagi (1979). These authors have recorded 627 species grouped into 343 genera belonging to 95 families of angiosperms.

The reports on the flora of Central Aravalli region are also available. Sharma (1958) enumerated trees and shrubs of Ajmer. Sharma (1975) studied the vegetation of different areas of Ajmer in relation to soil conditions. Detailed investigation on phytosociological attributes of the flora of rocky and sandy areas of Ajmer was made by Sharma (1980) who differentiated some plant populations on the basis of edaphoclimatic factors. Gena and Sharma (1988) described the vegetation of different habitat of Rajasthan, particularly of Ajmer region. Similarly, Sharma et al (1900) have been enumerated grasses and sedges of Ajmer district. Extensive studies have been carried out on Ajmer region (by Yadav, 1992 and Sharma, 1993) along with different ecological aspects.

Shetty and Singh (1987-1993) described the flora of Rajasthan. The floristic and ecological studies of Mount Abu have been made by Sutaria (1941), Mahabale and Kharadi (1946), Raizada (1954), and Jain (1962). These investigations indicate that the vegetation of Mount Abu is rich both in

number and density of species. Important contributions on the forest vegetation of Rajasthan are those of Ratnam (1951), Gupta and Bhandari (1965), Ramdeo (1969), Kanodia (1963) and Vyas (1967). Dadhich (1974) studied vegetation of Jhamar Kotra hills, Udaipur and its neighbourhood (Ph.D. thesis, University of Udaipur).

Mathur (1960) has classified the forest of Rajasthan into seven following major types of formations:

1. Dry teak forests
2. *Anogeissus pendula* forests.
3. Mixed deciduous forests
4. *Boswellia serrata* forests
5. *Butea monosperma* forests.
6. Tropical thorn forests
7. Subtropical evergreen forests

Gupta (1966) studied vegetation of Kota and its neighbourhood. Sharma (1986) has described the taxonomical and phytosociological studies of vegetation of Jhalawar and its environs (Ph.D. Thesis, University of Rajasthan, Jaipur). The notable contribution from Haroti region includes Gupta (1965 and 1966), Majumdar (1971 and 1980), Singh (1979), Shringi (1981), Khan (1993), Sharma (1999) and Sharma (2002).

The term Ethnobotany was first applied by Harshberger in 1895 for the discipline dealing with the natural and direct relationship between plants and people. It was defined as “the use of plants by aboriginal peoples”.While he was teaching at the University of Pennsylvania. Although the term was not used until 1895, practical interests in ethnobotany go back to the beginning of civilization when people relied on plants as a way of survival. Only one publication ‘Introduction to Ethnobotany’ written by Faulks (1958) was available till a few year ago. Its scope was much elaborated by Faulks. Prior to this term (ethnobotany), many botanists were already including the use of plants by people within their study. In India it was Dr. S. K. Jain from NBRI,

Lucknow, affectionately known as ‘Father of Indian Ethnobotany’ who made pioneering investigations. Jain (1981) published ‘Glimpses of Indian Ethnobotany’ which serves as a reference book for scholars in the field.

The wild plants in Indian folklore have been and are used to meet the various needs of the tribals. It is estimated that almost 15,000 plant species in India are used by tribals and poor people. These plants are used for purposes of food, fodder, medicine, drugs, clothing, agricultural implements, hunting, narcotics and mastigateries, poison, gums and dyes, insecticides and fuel, etc. Ethnobotany, a recent branch of economic botany dealing with relationship between human societies and forests, was tackled for detailed studies on tribes, regions and different utility groups. Ethnobotany has many different definitions. The most widely accepted and wed is “the use of plants in primitive societies.” Schultes (1986) interpreted ethnobotany as usually the study of relationship which exists between people of a primitive society and their plant environment. The definition and scope of ethnobotany has remained impressive even by the narrowest definition of the discipline. This is an interdisciplinary science and undertakes a research on the relationship between people and plants in the areas of: linguistics, education, healing, nutrition, archaeology, paleology, resource tenure and management, livelihood, etc. Ethnobotany can therefore serve as a gateway to many disciplines.

Faulks (1958) considered the subject of ethnobotany as the total relationship between man and vegetation, which meant more than even the scope of economic botany.

Schultes (1962) interpreted ethnobotany as usually the study of relationships which exist between people of a primitive society and their plant environment.

Vartak and Gadgil (1981) considered ethnobotany as a branch of economic botany, a section of which deals with the role of plants in the life and culture of aborigines and tribal people.

Jain (2001) laid down that ethnobotany deals with the study of total natural and traditional inter-relationship between man and plants and his domesticated animals.

There are many important books covering all aspects of ethnobotany (Faulks, 1958; Jain, 1981, 1989, 1991a, 1991b, 1995; Saklani and Jain, 1994; Joshi, 1995; Schultes and Reis, 1995; Martin, 1995; Cotton, 1996; Pei Shengji et al, 1996; Rao et al, 1996; Verghese, 1996; Singh and Pandey, 1998; Varma et al, 1998; Bently, Robert and Trimen, Henry 2007).

Earlier the works were carried out on ethnobotanical and medicinal aspects of plants by number of workers. Among them are Nadkarni (1926), Thakkar (1950), Dastur (1952), Chopra and Chopra (1955), Jain (1964 and 1965), Shah et al. (1981) and Audichya et al. (1983). A considerable amount of work on the ethnobotany in different region of country has appeared (Bhattacharya 1996; Nurani 1997; Mitaliya 1998; Bhatt and Mitaliya 1999; Thyagarajan and Krishnaswamy 1999; Bhatt et al. 1999 and 2000; Badola 2002; Chettri 2005 and Kala, Dhyani and Singh 2006).

Ethnobotany of certain ethnically distinct primitive or otherwise interesting human societies, e.g. on the Mikir of Assam by Jain and Borthakur (1980), on Bhils of Rajasthan by Joshi (1982), on Tharus of Uttar Pradesh by Maheshwari et al. (1981), on Bhoxa tribe of Bijnor and Pauri Garhwal by Maheshwari and Singh (1984).

Ethnobotany of any specific geographical region, which may have one or more distinct ethnic groups, e.g. on Central India by Jain (1963 and 1981), on Kumaon by Shah and Joshi (1971), on Santhal Pargana by Goel et al. (1984), on Mirzapur by Maheshwari et al. (1986), northern India by Shah (1982), Rajasthan by Singh and Pandey (1982), and on Indian desert by Shekhawat and Anand (1984).

In Rajasthan, King (1869 and 1870) was the first person to record the wild plants which are used as famine food and vegetable products as food in

the desert zones of the state. Anonymous (1960 and 1964) have highlighted details about the Adivasis of Rajasthan in general and their dependence on forests for their day-to-day needs.

During the last 30 years, however considerable notable work has been on ethnobotanical plants in comparison to other aspects. The notable contribution on ethnobotanical works from Rajasthan includes Joshi (1981, 1982a, 1982b, 1983, 1985, 1991, 1993,1994 and 1995), Singh and Pandey (1983 and 1998), Sebastian and Bhandari (1988), Sharma et al. (1989 and 2010), Billore et al. (1991), Mishra et al. (1991), Joshi and Awasthi (1991 and 1992), Barola (1992), Asawa (1995), Sharma and Trivedi (1995), Katewa and Guria (1997), Guria (2000), Trivedi (2002), Trivedi and Nargas (2002), Jain et al. (2004, 2007, 2009), Katewa et al. (2004), Sharma (2004), Joshi (2009), Gautam and Sharma (2014) etc.

Joshi and Awasthi (1992), conducted intensive ethnobotanical studies in the Aravalli of Rajasthan. In a preliminary survey conducted in Banswara and Dungarpur districts Joshi (1982a) has given an interesting account of the usage of 54 plants by the 'Bhils' for their shelter, food, firewood, weapon etc. in their day-to-day life and as source of industry to Bhil. Joshi (1982b) has reported an interesting native technique- "a Cattle alarm device'' locally known as 'Halan' amongst Sahariya tribal farmers in Kota District. This is used by the local people for protecting the crops in the fields. 'Halan' is made up of numerous poles, long strings of plant fibre and *Butea monosperma* leaves. The device is quite simple and efficient. Singh et al. (1982) have given an account of the plants used in religious beliefs in Rajasthan. Sebastian and Bhandari (1984a) have recorded plants used in magico-religious beliefs by the Bhils of Kherwara area (Rajasthan).

In some of the interesting papers, on the enumeration of medicinal lores together with the details of the drugs and mode/style of tribal practice by the Bhils, Kathodias and others by Joshi (1981, 1989, 1993 and 1994), a

complete picture of the folk medicines being practiced by the rural and tribal practitioners have been given. Studies on ethnobotany and ethnomedicinal uses of ferns and fern- allies in Rajasthan have been studied by Sharma and Vyas (1985). Ethnobotanical study of the home remedies of different communities of Jaipur district has been studied by Sen and Batra (1997a and 1997b) and Sen (1999). They have also recorded remedies for constipation and abdominal pains (Sen and Batra 1998). Dixit (1991) carried out an ethnobotanical survey of the ingredients of the home remedies used in Ajmer district. Audichya et al. (1992 and 1995) recorded some promising folk remedies used in acute illnesses and in primary health care.

Studies on anti-fertility/birth control have been the focus of attention for the many workers. The tribals particularly the Bhils enjoy sex liberally and adopt a number of birth control measures and try to keep the population in control. This fact can be substantiated since a number of effective contraceptives/fertility regulatory drugs have been recorded from Rajasthan. The contributions made by Billore and Audichya (1978), Audichya et al. (1992), Billore (1984) are significant and needs further scrutiny through clinical trial, this being a national problem deserving special attention.

Sharma (1991) has reported observations on the ethnobotanical study of the Kateri (*Solanum surattense*) from South-East Rajasthan. i.e. Mukundaras in Kota district. An interesting plants study by Joshi (1985) is on some weather indicating plants used by the Adivasis of southern Rajasthan. Joshi (1995) and Singh and Pandey (1998) have dealt on the ethnobotany of some areas of Rajasthan in detail.

Sebastian and Bhandari (1984b) have recorded medicinal lores from Mt. Abu, based on the Garasia, tribes. Singh and Pandey (1996) reported interesting plants used in venereal and gynecological diseases. Sharma, (1990) and Joshi (1991) recorded plants used in Guinea Worm (Naru) from south–east and southern Rajasthan.

However, the studies related to ethnobotany of Ramgarh Vishdhari Wild Life sanctuary of Bundi district are not available. Therefore, it would be essential to record these plants which have great importance in terms of resource conservation, planning and management related issues. The present investigation is an addition to the knowledge of certain interesting plant species utilised by the tribals and rural people of the locality not only for the treatment of various diseases but also for their substantial relevance as sacred groves and their association with places of worship held sacred either in themselves or as the abode of deities. Besides, there are some plants reported in the area which are used for taboos and magico religious belief by the tribals and rural people of the area.

STUDY AREA

The history of Bundi dates back to 1193 A.D. when Prithviraj Chauhan lost out to Mohammed Ghauri. Following that few Chauhan nobles fled to certain locations in the Chambal valley, where they overpowered the Meena and Bheel tribes. However, in the 12th century A.D. Bundi came under the dominance of the Chauhans and reached its highest glory in medieval times. A little later the two camps in the Hada sect established independent states of Bundi and Kota on either side of the Chambal River. Although Bundi lost its earlier stature with the rise of Kota, it continued as an independent state within the British rule. But after independence, Bundi was incorporated into the state of Rajasthan.

Bundi is said to have derived its name from the tribal chieftain's name - Bunda Meena, hailing from the Meena tribe that dominated the region. In the 12th century A.D., Hada Rao Deva conquered this territory and founded Bundi state and Hadoti. The domain of the Hadas of Bundi and Kota extended from the hills of Bundi in the west to the Malwa plateau in the east.

Ramgarh Vishdhari Wild Life sanctuary is a single compact and large forest ecosystem in Haroti region. It is located in Bundi district of Rajasthan state and 45 Km. away from it. The total area of the sanctuary is 307.00 Sq. Km.

Location dimension :

The Ramgarh Vishdhari Wild Life sanctuary lies in the south-eastern part of Rajasthan between 24º 59' 11'' to 25º 53' 11" North latitude and 75º 19' 30'' to 76º 49' 30'' East longitudes. The sanctuary is almost elongated width approximate 10 Km. and length 50 Km. approx north to south and east to west respectively.

Constitution:-

Prior to the formation of the state of Rajasthan, these forests were a part of the erstwhile Bundi princely states and were managed as hunting

reserves. After independence, these forests came under the control of the Govt. of Rajasthan. In 1982 a part of the forest was declared as Ramgarh Wild Life Sanctuary under section 18 of the Indian Wild Life (Protection) Act 1972, Vide Notification No. DF1/A/Raj/8/75 dated 20.5.82.

The Ramgarh Vishdhari Wild Life sanctuary has a potential to be extended as satellite area for Ranthambore Tiger Reserve. This sanctuary can be home for expanding population of Ranthambore Tiger Reserve. This is also a part of proposed Rajiv Gandhi Biosphere reserve. The sanctuary is important corridor connecting forest of Ranthambore and Mukundra hills.

Ramgarh Vishdhari Wild Life sanctuary is the only habitat in Haroti region which provide abode to tigers. It has been reported that tiger from Ranthambore tiger project area (from Swaimadhopur district) frequently move into the Ramgarh Vishdhari Wild Life sanctuary via Kaul ji closed area corridor. Earlier this sanctuary was known as Sikargah of Bundi State.

Previously this sanctuary was known as nursery for breeding of tigers. This is home for the Panther, Sloth bear, Wolf, Hyena, Jackal, Sambhar, Blue-Bull, Langur, Porcupine, Indian fox, Jungle Cat, Chital and Chinkara etc. But the biotic pressure on this area is unimaginable in the form of illegal grazing, mining and poaching. Presently the Ramgarh Vishdhari Wild Life sanctuary does not have a management plan to follow for its systematic and scientific management. Importance of management plan is also felt for conservation of biodiversity and sustainable development.

One tiger ‘Vanraj’ has completed one year in Ramgarh Vishdhari Wild Life sanctuary, which came from Ranthambore Tiger Reserve of Swaimadhopur district. After this the tiger has established own territory in this area. This tiger is the cub of the tigeress ‘T-8’ of Ranthambore Tiger Reserve, now it is named ‘T-62’ by the forest department. Presently tiger is moving in Ramgarh Vishdhari Wild Life sanctuary area.

After the arrival of ‘T-62’ a lot of changes have been seen in the sanctuary area. Like due to its fear, the illegal grazing and the cutting of trees have decreased so much. And the number of ‘Chital’ has increased which is better symbol for the sanctuary in the point of view of biodiversity.

There is a sufficient evidence to prove that said area was suitable home for tigers and it should be developed as a buffer area for the critical tiger habitat (CTH) Ranthambore national park. Out of the total sanctuary area of 307 Sq. Km. around 196.20 Sq. Km. areas is declared as buffer zone of CTH Ranthambore in Bundi district vide government notification No. F. 3(34) Forest/2007 Jaipur Dated 06.07.2012. Buffer Zone of critical tiger habitat of Ranthambore Tiger Reserve will be finalised after detail study and consent of local people.

The Ramgarh Vishdhari Wild Life sanctuary covers the area of former Bundi state. Almost all the forests of this division were controlled by the states of Bundi by their Jagirdars under them. The rulers and Jagirdars had a keen love for Shikar Game was, therefore, well preserved and protected. Ramgarh Vishdhari Wild Life sanctuary was a personal shooting area of Maharaja of Bundi state. No other person could hunt in those days in this area. His Highness and his authorised guests used to come here for the game of hunting every winter. They constructed a building named Ramgarh Mahal as shooting camps (Fig. 5 and 6). All local people used to take part in this game and get money in return. At that time tiger population was high. The rulers of Bundi state did the hunting and use to observe certain rules.

Ramgarh Vishdhari Wild Life sanctuary attained notorious for illegal poaching in the year 1991. It was widely believed that many tigers were poached. Some tiger skins were recovered in January, 1991from local people Ranglal Meena, Kalyan Meena, etc. of resident of Motipura village in Bundi. Kalyan Meena and Ranglal Meena were arrested on 19.1.91 and 20.1.1991 by forest officials of Ramgarh Vishdhari Wild Life sanctuary. Mr. Ranglal Meena was expired on 26.1.91 in forest department custody. After this tragedy

villagers and politicians held a great agitation against forest department. Forest officials left there Chowki, Naka and Range office due to violation by villagers. This one incident impacted the sanctuary very adversely.

Ramgarh Vishdhari Wild Life sanctuary is virtually an ecological island burdened with heavy pressure of human and cattle population. The economy and livelihood of local people depend to a large extent on the resources of sanctuary.

Physical and Ecological boundaries of sanctuary:

North : Akoda, Fajalpura, Nayagaon, Dabeta, Vishdhari, Kalanala, Palasthuni, Gudha sadavartiya, Nandgaon, Bassi.

South : Bundi Nainwa road upto Jaitpur, Bundi Jaipur road upto Phoolsagar turn.

East : Jaitpur Nainwa road

West : Bundi, Dalelpura, Thikarda, Borkhandi

The sanctuary is stretched as continuous double lines of Vindhyan hills from South-West to North-East direction over a length of approximate 50 km. The slopes are usually moderate to steep. Meiz river coming from Northern side of Ramgarh Piplia block and enters into sanctuary area and another river Machali which enters from North- East part of sanctuary. Both these rivers mix together near Ramgarh place and appear as a single river. This river comes out from the sanctuary at Khatkar village.

The ethnic communities residing in this region include Bhil, Meena, Kanjar, Sansis, Gurjar, Bairwa, Mogiyas, Gadoliya Lohar, Raibaris, Kalbelia, Banjara, etc. Gadoliya Lohar and Kalbelia are most well known nomadic tribes. Kalbelia are commonly seen in townships on road side and ‘dearas’. They are well versed in methods of treating snake bites and scorpion stings, for which they uses various plants as antidotes. Kanjar, Sansis and Mogiyas

are semi-nomadic criminal community and they depend on forest for shelter and medicare.

There are 41 villages located inside and on the boundary of sanctuary. The entire economy of villages inside the sanctuary is based on cattle rearing and breeding. Revenue of these villages surrounding the sanctuary is largely based on agriculture economy.

The flora and fauna of both Vindhyan and Aravalli hill ranges exist in the Ramgarh Vishdhari Wild Life sanctuary. The forests of both the ranges were continuous in the past but due to fragmentation of vegetation cover the sanctuary has become an ecological island. The Ramgarh Vishdhari Wild Life sanctuary adjoins Pholai forest block on the Eastern side, Bundi fort on the Western side, Bundi Nainwa via Khatkar Road on the Southern side and Mara Fatehpura village on the Northern side.

On all other sides, Ramgarh Vishdhari Wild Life sanctuary is surrounded by agricultural revenue land, but the abundant presence of many wild animals in the agricultural fields indicate that there is no barrier to these mammals and the area as a whole is rich in wildlife. But the fact remains that with the degradation of forest area, expansion of agriculture fields and other land uses, the ecological boundary tends to limit up to Ramgarh Vishdhari Wild Life sanctuary area only in as true sense.

Legal Status:

Presently Ramgarh Vishdhari Wild Life sanctuary encompasses an area of 215.67 Sq Km. The present legal status of the forest area included in the Ramgarh Vishdhari Wild Life sanctuary is as under:

Reserve Forest :	173.69 Sq. Km.
Protected Forest :	41.98 Sq. Km.
Revenue land :	91.33 Sq. Km

Total area of sanctuary :	307.00 Sq. Km.

GEOLOGY

The geological history of the area is associated with the gemorphic history of the Aravallis and the Vindhyans. Geologically, Bundi is in a transitional zone in the sense that here the younger Vindhyans were folded and faulted against the older Gwaliors. The junction of the Upper Vidhyans with the older rocks of the Aravallis, reveals an extremely long fault or great throw, which has brought almost horizontal strata of the Vindhyan sandstone in contact with the highly folded and foliated schists of the Aravallis. This Great Boundary Fault divides the district into two equal parts.

The area includes the confluence of the ancient Aravalli system with Vindhyan system, wherein the later are brought against the former at the Great Boundary Fault. It has a unique geomorphology.

There are number of other secondary faults in the district which are also a result of Cretaceous faulting. About one kilometer of Bhaironpura, the Great Boundary Fault is joined by a small fault near Ramgarh in the form of a horse - shoe. Afterwards the fault turns north - west and finally joins the Great Boundary Fault near Bhaironpura.

The topography of the area is undulating and central hilly region. The soils of the sanctuary are formed by the Aravallis and Vindhyan system of rocks. Metamorphic and Sedimentary rocks belonging to pre Aravallis-Vindhyan system cover the area. Pre - Aravalli rock units are made up to Quartzite, Mica Schist’s and Gneiss. The rocks of the Vindhyan super group are made up of sand stone, shale and breccias of widely variable composition and character occupying most part of the reserve. The soils though shallow on the hills are suitable for supporting forest of *Anogeissus pendula.* In the areas where quartzite forms the upper most strata, the soil is very poor. These areas possess a very thin layer of coarse grained soil. These soils are less fertile.

Major Types of Rocks –

Rocks of pre Aravallis - Quartzite, Mica, Schists and Gneiss.

Rock of Vindhyan - Sand stone

The terrain of Ramgarh Vishdhari Wild life sanctuary is mostly rugged and hilly. The configuration of the hills are typically Gwalior's and lower Vindhyans and are characterised by ridges, on one side and gentle slope, on the other side.

PHYTOGEOLOGICAL RELATIONSHIP

The geology of the area has a strong influence on the soil types which in turn determines the vegetation types. The red sandy soils occurring on the Aravalli system support pure stands of *Anogeissus pendula.* These areas are characterized by poor growth of *Anogeissus pendula* and its associates *Boswellia serrata, Lannea coromandelica, Diospyros melanoxylon, Wrightia tinctoria* etc. Large grassy blanks also occur on these soils. The fine sandy soils occurring on the Vindhyan system shows poor growth of *Anogeissus pendula,* but a fairly good growth of *Anogeissus pendula* can be seen in the valleys, hill slopes and depressions. The sandy soils, sandy clay and gravel areas support scrub forests of *Flacourtia indica, Butea monosperma, Acacia catechu, Capparis decidua* etc.

On the slopes and valleys where transported soil is deposited, it is mixed with broken shale's pebbles while along 'nallas', it is mixed with boulders. The most of the valleys in the sanctuary have *Ficus racemosa, Syzygium cumini, Mitragyna parvifolia* etc. The undergrowth consists of *Flacourtia indica, Grewia flavescens, Barlaria prionitis, Helicteres isora, Dichrostachys cinerea, Capparis sepiaria* etc. Availability of grasses is

strongly linked with the terrain and biotic pressures. *Apluda mutica* and *Andropogon pumilus* occurs on the slopes and in the area free from disturbances. The areas which are heavily exposed to grazing the species of *Aristida* and *Sporobolus* mostly occurred.

Vetiveria zizanioides and *Vitex negundo* occurs in the 'Streams' and 'Nallahs'. *Chrysopogon fulvus* and *Saccharum spontaneum* is found on barren rocks on the slopes. *Digitaria ciliaris*, *Heteropogon contortus* and *Setaria pumila* are found in the dense vegetation where the light availability is poor. *Sporobolus* spp. occurs in the area which has a fair amount of alkalinity in the soils and is exposed to disturbance. *Themeda quadrivalvis* is found in plain areas with closed canopy. Other grasses found in the area are *Cenchrus ciliaris, Oropetium thomaeum, Eragrostis pilosa, Echinochloa colonum, Cynodon dactylon, Dichanthium annulatum, Bothriochloa pertusa* etc.

The rocks of the area generally support scrub forest. The dominant species of this scrub is the *Anogeissus pendula* whose brown leafless branches or with small and scanty purplish brown leaves, give it a peculiarly dull and life less aspect. On the level top of the hills this brown forest is diversified with the bright green of *Diospyros melanoxylon* and *Boswellia serrata* trees. The common xerophytic scrub *Euphorbia royleana* occur on the slope of hills such as Rameshwar and Ramjhar. A notable peculiarity of this *Euphorbia royleana* is that it never grows except on rocky ground, where the slopes meet the alluvium the *Euphorbia royleana* abruptly ceases.

Vindhyan formation supports the more or less pure vegetation of *Anogeissus pendula* mixed with a fair percentage of *Diospyros melanoxylon, Acacia catechu, Lannea coromandelica* and *Sterculia urens* on the bare exposed rocks. The shruby growth is mainly of *Grewia flavescens.*

SOIL

The texture and composition of soil play an important role in the luxuriant growth of the vegetation of a particular area. The soil of Ramgarh Vishdhari Wild life sanctuary is vary in texture and composition. The soil is comparatively fertile, brown or gray brown. At some area it is light reddish and black in colour. The texture of soil in general is sandy loam or clay. The pH range was noted to be 6.25 to 8.28.

The soil of the area, in general can be divided into hilly, shallow, rocky areas and the soil of the plains. All over the forest areas of the sanctuary the soil is generally dry impoverished and deficient in humus on the slopes. These soils are light textured, shallow and covered with stone and boulders. The soil on the plateau areas of the sanctuary is sandy loam to loam, mixed with gravel and boulders and is reddish in colours. It is generally shallow. In depressions along the bank of 'nallahs' and in other low lying areas, the soil is clayey loam to clayey and is fairly deep. This type of soil is favourable for the growth of peculiar angiospermic taxa. USDA system of classification has been based on the origin, developmental processes and factor affecting development of the soil. Table 3.1, reveals the types of soil in the area according to forest blocks. The types and important characteristic of the soil of study area according to the USDA classification are given in Table 3.2.

TABLE – 3.1

Type of soil in the area according to Forest Blocks

		Types of Soil			
S. No.	**Forest Block**	**Black Cotton Soil**	**Red Sandy Soil**	**Sandy Soil**	**Clay Soil**
1	Shikar Burj	+	-	-	+
2	Bherupura	+	-	-	-
3	Jharpir	+	+	-	-
4	Vishdhari	+	+	+	-
5	Ramgarh	+	+	+	+
6	Pipliya Manak Chowk	+	+	+	+
7	Khatkar	+	+	+	-
8	Khatiyari Rajwas	-	+	-	-
9	Folai	-	+	+	-

TABLE – 3.2

Soil order and their important characteristics of study area

(According to new USDA classification)

S.No.	Soil Order	Important Characteristics	Colour
1	Vertisols	Excess of clay	Deep black
2	Inceptisols	Incomplete weathering, no clay	Shallow black
3	Alfisols	Brown upper layer, high base content, excess clay in middle layer	Mixed red black

DRAINAGE SYSTEM

The availability of water is not uniform throughout the year in the area of Ramgarh Vishdhari Wild Life sanctuary. The terrain, topography and geology of the area influence the water regime by contributing towards runoff and recharging the area ground water. The water holding capacity of the area is poor due to the geological formations. The availability of water increases from Dang, Ravines, Valleys, Khoh, and Wet lands. Due to exposed rocks, low soil depth and raised terrain, the ‘Dangs’ are the driest part of the reserve.

In the ‘Khohs’ or ‘Nallahs’ some spring are live even in the hot season and such areas become the nuclei of wild life activity in summers. During the monsoon season a number of streams flow out of the reserve. The streams dry up later and scattered pools of water in the dry streambeds serve as perennial water holes for wild animals.

A number of water ponds built in the villages which exist in the Ramgarh Vishdhari Wild Life sanctuary retain water till late in winters. The wetland areas of Ramgarh Vishdhari Wild Life sanctuary i e. Meiz River and Machali River support a variety of aquatic flora and fauna. In addition, they are favourate grounds of many birds species.

During monsoon, water is widespread and animals avoid humid and uncomfortable wetlands and migrate to ‘Dangs’ and other areas of higher altitudes which are comparatively dry and comfortable. After October and November they start moving downwards i.e., towards valleys and later to stream areas. During dry and hot months of May and June nearly all the animals are found near water holes. This seasonal variation in water availability helps in proper utilization of habitat throughout the year according to the productivity of the area. Meiz and Machali River flows in the middle of the Ramgarh Vishdhari Wild Life sanctuary.

Meiz river coming from northern side of Ramgarh Piplia block and enters into sanctuary area and another river Machali which enters from North-East part of sanctuary. Both these rivers mix together near Ramgarh place and appear as a single river. This river comes out from the sanctuary at Khatkar village. Water bodies and wetlands in forest areas of Ramgarh Vishdhari Wild Life sanctuary are mentioned in map 3.1and table - 3.3.

TABLE – 3.3

WATER BODIES AND WET LANDS IN FOREST AREA OF RAMGARH VISHDHARI WILD LIFE SANCTUARY

1. Bhenrupura talab
2. Balaji Ka Nala
3. Bada Rawal Ji Ka Nala
4. Amba Wala Nala
5. Jamunia Deh
6. Kharia Nade
7. Kohani Deh
8. Bala Ji Ka Deh
9. Semlya Deh
10. Jait Sagar
11. Shambu Sagar
12. Thikrada talab
13. Phool Sagar
14. Banganga reservoir
15. Machali river
16. Bheru Ji Ka Deh
17. Banskhol Kui
18. Gardi Bawari
19. Jhal Khoh
20. Triveni
21. Bora Bawari
22. Chulia Deh
23. Thandi Jhari
24. Meiz River

METHODOLOGY

The main objectives of the present work are to study the floristic and ethnobotanical aspect of Angiosperms of Ramgarh Vishdhari Wild life sanctuary area. For the purpose of a systematic plan of study area was drawn and prepared the chart for the work.

In floristic survey, plants of different habitat were collected from various sites. The plant materials were collected in flowering seasons, if flowers and fruits were not present, the leafy material was collected and complete notes were made. On the basic of present study, collected plants were arranged according to their families, genera and species. Herbarium sheets of collected plants were prepared and it was preserved.

Field work forms an important tool in ethnobotanical studies. Valuable data were collected with the help of knowledgeable of local informants on plants or plant parts used, their processing, preparation and dosage etc. for a particular ailment. Voucher specimens were collected during these field trips.

The floristic and ethnobotanical information presented in this investigation was based on –

1. Collection tours in different seasons during the work.
2. Ethnobotanical notes from interviews of tribal/rural persons covering whole area.
3. Identifying the endangered plants of area.
4. Preparation of herbarium sheet of collected plants.
5. Study of floristic composition of forest stands, vegetation of different habitat, elevation zone, and plant community.
6. Ethnomedicinal plants of the area.

To record the important information regarding the medicinal importance of the plant for tribal and rural people various localities of sanctuary area were visited in different season. The valuable information regarding the medicinal use of the plant by the folk was described with

available details of methods of collection, processing, preparations, dosages and administration and mixture of other herbs, if any.

The various modes of administration are as follows :-

1. Raw plants/parts.
2. Juice of plant part.
3. Plant part in edible form either by powdering, burning or frying it and mixing with other ingredients or with food.
4. Extracts by crushing fresh drug.
5. Ash of plants.
6. Poultices.
7. Decoctions
8. Paste.
9. As tooth brush.
10. Contact treatment (tying drug to some body part).
11. Complex treatment with one or more plants.
12. Oils.

To collect first hand information on sources of drugs and folk knowledge regarding conservation of biodiversity, intensive ethnobotanical explorations were undertaken in the different villages under study area. The social, local customs, beliefs and mythological rituals of nomadic, tribal and rural people live in that areas were studied. As well as their socio-religious and ceremonies play an important role in the preservation of the plant diversity. So they were studied. The wild plants of study area which having economic importance for various purposes were studied and tabulated with special reference to :-

1. Edible plants or plant parts
2. Plants used in construction of houses/huts
3. Plants used in beauty care
4. Role of plants in religious beliefs
5. Plants used in folklore, and

6. Plants species of miscellaneous uses.

Ramgarh Vishdhari Wild life sanctuary was touched at diverse places; road side localities were covered by vehicles, while some remote places were travelled by bicycles or on foot. All relevant information was noted after repeated discussions and interviews with Ojhas, Bhopas, Mukhias, Vaidyas and old experienced villagers.

Selected and knowledgeable tribals of assorted ages were taken for excursions within forest and ethnobotanically important plants were collected. Individual interviews were also taken of ethnic experienced person of the area. The procedure of interview varied according to the degree of participation and attitude of the community towards outsider. By organizing folk gatherings, participating in their various activities- ceremonial and otherwise, notes were taken. Documentation of information during and after field work was carried out on scientific lines.

Trible ‘mela’ or festivals were also visited to study the plants and plant products of the area. Forest personnel, school teachers, government doctors, postal authorities, social worker and other personnel with experience in or posted in these regions were interviewed and exhaustive discussions were held with them for collecting fresh information or confirming the prior collected one.

Ethnobotanical data were collected during the March, 2011 to October, 2014 from the various sites of the area. In ethnobotanical study the related information’s regarding literature, herbaria, sculptures on temples, folklore songs, proverbs and tales etc., were observed. In the survey of sacred grove the relevant information of protected plant species was registered.

The data was collected along various lines in different manners – by enquiry, observation, interview and participation. A camera was carried during survey and the most common and ethnobotanically important plants were photographed.

Questionnaires for Individuals Ethnobotanical Survey

Name :

Age : **Sex :**

Occupation : **Caste :**

Experience in this field :

How do you know about the uses :

Vernacular Name :

Plants and their uses :

1. **For Sacred/ Religious belief**
   - (a) Purpose
   - (b) Name of the plant worshiped/used
   - (c) Ceremonies/Festival/Occasion etc.

2. **As Food**
   - (a) Purpose
   - (b) Name of the plant used
   - (c) Parts used
   - (d) Food preparation

3. **As Antidote**
   - (a) Purpose
   - (b) Name of the plant used
   - (c) Part used
   - (d) How Administrated

4. **As Antipyretic**

(a) Purpose

(b) Name of the plant used

(c) Part used

(d) How Administrated

5. For Beautification

(a) Name of the plant used

(b) Parts used

(c) Mode of uses

6. Diseases and their fundamentals

Name of Diseases	Name of Plants used	Parts used	Mode of Administration

7. For Miscellaneous purpose

Purpose	Name of Plants used	Parts used	Uses

ECOLOLOGICAL FACTORS

CLIMATIC FACTOR

Climate of any region is chiefly determined by meteorological influences as relative humidity of air, temperature, wind pressures and rain fall rates. Climatic factors characterise in general, a particular region. In this chapter a detailed study of the climatic factor of Ramgarh Vishdhari Wild Life sanctuary has been described.

CLIMATE OF THE AREA:

The climate of area is characteristic of adjoining south - eastern Rajasthan with a long and intensely hot summer, medium rainfall and a short mild winter. The hot weather usually begins about the middle of March and extends up to the middle of October. The heat soon becomes intense and is accompanied by strong, hot westerly wind known as the ‘loo’.

The rocks get heated during the day times and radiate heat till late night in summer months. The climate of area is moderate and difference in elevation is not so large as to vary the climate to any considerable extent within the area. January is the coldest month while May and June are the hottest months during which period maximum temperature reaches up to 45^{o} C.

The region is affected by its location the surrounding topography and the air masses travelling over the region, which lead to a greater local variation in weather phenomena.

Meteorological categorisation of the seasons in area is:

Pre-monsoon season	:	March, April and May
Monsoon season	:	June, July, August and September
Post-monsoon season	:	October and November
Winter season	:	December, January and February

The normal rainfall of the area is 73.68 cm. There are large variations in the rainfall from year to year. On an average there are 32 rainy days (days with rain of 2.5 mm. or more) in a year. Winter rains may also occur occasionally during January-February in area .The rainfall during these months is usually restricted to a few small showers, but they are boon to the unirrigated crops. Frosts, are generally not common, certain valleys and depressions may occasionally experience pool frost but the occurrence is however insignificant.

The amount of annual rainfall influences the vegetation. Annual rain fall determines the type of vegetation. The forest vegetation of area is described as ‘tropical dry deciduous’.

Dry air prevails over the area except in the south west monsoon season. In the summer months particularly in the afternoons the relative humidity is very low and is greatly influenced by intensity of solar radiation, temperature, altitude, wind exposure, cover and water status of soil. Ramgarh Vishdhari Wild Life sanctuary area show relatively higher atmospheric humidity during monsoon period. Humidity plays an important role in life of plants particularly the herbaceous vegetation.

Some of the depressions which originate in the Bay of Bengal during the south west monsoon season and move across the central parts of the country reach the area during its later stages and cause heavy rain and strong winds. Dust storms and thounder storms occur in the area in summer months.

Comparisons of the meteorological data of the region for the year January 2012 to December 2013 have been recorded in Table 5.1 to 5.4. It is evident that average temperature shows much fluctuation so far as minimum and maximum temperature range is concerned. So also the amount of relative humidity and precipitation rates reveal wide variations during different seasons of year 2012 and 2013.

It is also clear from these data that comparatively higher amount of precipitation, increased humidity and congenial temperature regimes during the months of July to November in the area make the overall climate favourable for the growth of herbaceous vegetation especially moisture loving cryptogamic taxa.

TABLE – 5.1
Meteorological data of study area for the year – 2012

Months	Rain fall		Temperature (°C)		Relative Humidity (%)	
	Total no. of rainy days	Rain fall (mm)	Average maxi. (Mean maximum)	Average mini. (Mean minimum)	Average R.H. at 7.00 (Morning)	Average R.H. at 7.00 (Evening)
January	08	001.6	20.51	7.480	68.25	54.86
February	02	000.2	24.59	9.460	62.44	52.72
March	Nil	000.0	26.08	11.32	60.12	48.22
April	Nil	000.0	35.21	20.73	42.74	37.41
May	05	68.80	42.04	28.46	40.28	20.03
June	05	56.40	44.78	30.29	52.90	31.40
July	18	332.0	34.66	26.76	79.35	64.76
August	12	204.0	29.44	25.25	88.60	77.35
September	08	61.12	32.30	24.69	70.07	58.88
October	Nil	000.0	31.89	23.10	58.16	34.52
November	Nil	000.0	27.26	15.56	61.78	31.39
December	04	012.6	23.63	12.28	67.03	52.75

TABLE – 5.2

Average temperature and relative humidity of study area for the year – 2012

Months	Average Temperature (°C)	Average Relative Humidity (%)
January	13.99	61.56
February	17.02	57.58
March	18.70	54.17
April	27.97	40.08
May	35.25	30.16
June	37.54	42.15
July	30.71	72.05
August	27.34	82.98
September	28.50	64.48
October	27.49	46.34
November	21.41	46.58
December	17.96	59.89

TABLE – 5.3
`Meteorological data of study area for the year – 2013

Months	Rain fall		Temperature (°C)		Relative Humidity (%)	
	Total no. of rainy days	Rain fall (mm)	Average maxi. (Mean maximum)	Average mini. (Mean minimum)	Average R.H. at 7.00 (Morning)	Average R.H. at 7.00 (Evening)
January	04	004.9	19.58	10.35	69.05	62.05
February	Nil	000.0	24.11	13.04	68.49	57.06
March	Nil	000.0	30.48	17.62	62.09	50.15
April	Nil	000.0	36.12	22.92	41.66	23.66
May	Nil	000.0	41.95	29.59	37.70	21.62
June	09	41.04	42.61	29.99	38.77	15.18
July	22	287.7	37.56	25.74	86.80	73.74
August	17	198.4	31.14	23.86	88.70	75.36
September	11	78.82	33.39	25.38	72.56	63.04
October	02	008.2	32.96	21.99	61.10	48.12
November	Nil	000.0	29.18	17.38	56.60	39.18
December	Nil	000.0	24.26	13.36	54.50	32.40

TABLE – 5.4

Average temperature and relative humidity of study area for the year – 2013

Months	Average Temperature (°C)	Average Relative Humidity (%)
January	14.97	65.55
February	18.56	62.76
March	24.04	56.12
April	28.52	37.66
May	35.77	29.66
June	36.51	26.97
July	31.65	80.27
August	27.50	78.03
September	29.69	67.80
October	27.20	54.51
November	23.28	47.89
December	18.81	43.45

TOPOGRAPHIC FACTOR

Climatic factor is greatly influenced by the topography of the area. Light, temperature, moisture etc. may vary at different altitude and latitudes. Topographic factors are concerned with the physical geography of the earth in the area. Topographic factors influence vegetation by producing variations, in the climate and soil conditions of geographical region.

The Ramgarh Vishdhari Wild Life sanctuary lies in the south-eastern portion of Rajasthan between 24º 59’ 11’’ to 25º 53’ 11” North latitude and 75º 19’ 30” to 76 º 49’ 30” East longitudes. This hill range is generally wooded and contains root stocks of *Anogeissus pendula*. The slopes of the hills are moderate to steep, but at some places, for instance Khatkar, become precipitous near the top. For many miles, the precipitous scarp on the southern face of this range forms an almost impassable barrier between the plain country on either side.

In Bundi district there are four passes; namely, one at the town of Bundi, through which runs the road from Deoli to Kota, another a little farther to the east near Jainiwas, through which the direct road to Dei passes; a third between Ramgarh and Khatkar, where, the Meiz has formed a channel for itself and the fourth near Lakheri in the north-east. The north western plain of the area is less fertile and has scattered hillocks. These northern and north western hillocks are either pre Aravalli origin or off shoots of central Bundi range. Once upon a time these hills supported fairly dense forest but at present time, these pre Aravalli hills are mostly barren.

Speed of water flow is determined by the steepness of slope. It affects soil characteristics and vegetation. Loss of water as runoff is more with increase in steepness of the slope. Two sides (one slopy and other plain side) of mountain inspite with similar annual rain fall bear different vegetation. On a steep slope *Euphorbia royleana* (a xerophytic species) can be seen as abundant

vegetation at Rameshwar (Fig.12) and Ramjhar. Soil erosion is also related with the steepness of the slope (Fig. 17).

In order to make the study comprehensive scientific, the study area has been divided in to five physical regions having uniformity of habitat, slope, soil, forest etc. –

1. Dang
2. Khoh, Stream and Nallah
3. Ravines
4. Valleys
5. Wet lands

These regions and their vegetation and characteristics are shown in Table 5.5.

TABLE – 5.5

PHYSICAL REGION OF RAMGARH VISHDHARI WILD LIFE SANCTUARY

	Habitat	**Vegetation**	**Characteristics**
1.	'Dang'	Mainly stunted *Anogeissus pendula* and grass lands of poor quality	Dry and plain plateaus with little soil and moisture in depression.
2.	'Khoh', Stream and 'Nallah'	Mixed forest with *Anogeissus pendula*	Deep wide nallah, cut into rocks with slopes and flat bottom, rich in moisture and soil.

3.	Ravines	Mixed crops with good grasses, green throughout the year	Moist throughout the year with water holes and pools. Main wild life area in the hot dry summer season.
4.	Valleys	Mixed crop with big trees and good grass lands	Areas with good soil depth and moisture.
5.	Wet lands	Aquatic flora, grasses on the fringe	Water bodies where water remains throughout the year.

The topography varies from gentle slopes to steep vertical rocky cliffs; from flat topped hills of the Vindhyans to the conical hillocks and sharp ridges of the Aravallis. The tops of Vindhyan system known as 'Dang' have very shallow soil depth with little moisture after rains and have sparse vegetation. Valleys with good depth of soil and moisture support mixed forest of good growth and composition. The availability of water is not uniforms. The wetland areas of Ramgarh Vishdhari Wild Life sanctuary support a variety of aquatic flora.

Valley have *Anogeissus pendula* forests mixed with *Acacia catechu, A. leucophloea, Dichrostachys cinerea, Butea monosperma, Lannea coromandelica, Ficus benghalensis, F. religiosa* etc. The groundcover is mostly grasses. Grass cover in the valleys provides ideal cover for wild animals and ground birds. Grasslands and trees form best habitat for carnivores, mainly *Anogeissus pendula* forest of poor quality mixed with *Ficus racemosa, Diospyros melanoxylon, Butea monosperma* and *Lannea coromandelica*. These are dry waterless areas and during hot summer season they appear lifeless.

In the ravines due to the poor soil, the main species are *Acacia leucophloea, Maytenus emarginatus, Balanites aegyptiaca* and *Clerodendrum phlomidis* etc. The under growth is *Zizyphus mauritiana, Zizyphus nummularia, Achyranthes aspera* and *Capparis decidua*. The main ravine area in sanctuary is Semlya Deh and Chulia Deh.

EDAPHIC FACTOR

Soil is one of the most important ecological factors. This is the upper layer of earth in which plants grow. The study of soil is important in many respects. Soil is natural habitat for plants. Knowledge of it is helpful in agricultural practices such as cultivation, irrigation, artificial drainage and use of fertilizers. It is also important from geological, mineralogical and paleobotanical points of view. Edaphic factor is important which influences the vegetation of angiospermic flora. In order to study the edaphic factor soil types, classification and soil erosion have been taken into consideration.

SOIL TYPES:

The types of soil in the Ramgarh Vishdhari Wild Life sanctuary area according to forest blocks have been described in previous chapter. The texture and composition of soil play an important role in luxuriant growth of the vegetation of a particular area. The soil of Ramgarh Vishdhari Wild Life sanctuary is vary in texture and composition. The soil is comparatively Black cotton, Red sandy, Sandy and Clay in colour and types. The texture of soil in general is Sandy loam to clay. The pH range was noted to be 6.25 to 8.28.

Ramgarh Vishdhari Wild Life sanctuary area may be divided in to five physical regions. The description of soil of all these regions are as follows:-

S. No.	Physical region (Habitat)	Soil types
1.	'Dang'	Foot hills, little sandy loam soil with clay depressions
2.	'Khoh', 'Stream' and 'Nallah'	Sandy, soil mixed with gravel and boulders, fairly deep
3.	Ravines	Sandy and erodible soil, poor soil
4.	Valleys	Sandy loam soil, with good depth and moisture
5.	Wet lands	Rich black loam and marshy soil

SOIL CLASSIFICATION:

USDA system of classification has been based on the origin, developmental processes and factor affecting development of the soil. The types and important characteristic of the soil of study area according to the USDA classification are given in Table.

Soil order and their important characteristics of the study area (According to new USDA classification)

S.No.	**Soil Order**	**Important Characteristics**	Colour
1	Vertisols	Excess of clay	Deep black
2	Inceptisols	Incomplete weathering, no clay	Shallow black
3	Alfisols	Brown upper layer, high base content, excess clay in middle layer	Mixed red black

SOIL EROSION:

The erosion of the top soil and silting of the existing water holes is a major concern. Due to situation, the water availability to the wild animals during the pinch periods is severely affected. In soil erosion, fertile soil surfaces are detached and removed from their original places and are deposited at some other places .In this area soil is directly affected by heavy rain fall and rapidly running water. Continuous flowing of water through gullies further deepens the grooves and may ultimately result in ravines. Ravines are 15 to 30 m. deep and with steep vertical sides.

In mountain and hills such as Rameshwar, Khatkar and Ramjhar soil is eroded by heavy rain fall. By this running water percolates through the crevices of rocks thus great masses of soil and loose rocks lying on the steep slip downwards. Excessive grazing, deforestation, undesirable forest biota and

mechanical practices by man are important factor which causes soil erosion. Deforestation and over grazing is the commonest factor which is responsible for soil erosion of the area. Goat and sheep during the summer season graze the forest vegetation and make the soil bare.

There are several serious effects of soil erosion in the study area are as follows:-

1. Due to uprooting of trees, shortage of timber and fuel results
2. Loss of soil stability and fertility
3. Shortage of fodder
4. Destruction of land in plains

BIOTIC FACTOR

The biotic environment of any ecosystem consists primarily of the producers, the consumers and the decomposers. In the ecology of plant communities, the producing organisms are the green plants and the consumer organisms are very diverse. The latter includes men, animals, insects and even plants which compete for light, water, minerals and space.

The influence of man, upon the vegetation of area has been very adverse. Large areas of forests are used for fire wood and other domestic purposes, as a result of which the vegetation has decreased and has reached the present status. Herds of grazing animals kept by nomadic tribes used up the vegetation wherever it existed. Man is used to felling the trees and lopping the tops of the branches for domestic purposes and even the ground vegetation is scrapped by him for fuel purposes.

The hills have also been subjected to biotic interference specially because species like *Anogeissus pendula, Boswellia serrata, Wrightia tinctoria* and *Acacia catechu* growing in these areas are cut for fire-wood, timber and preparation of '*Kattha*' dye. In addition to man, the grazing animals like sheep and goat and other cattle cause considerable damage to the vegetation.

The study of biotic factors of the area is mentioned below :-

1. **DEFORESTATION:-**

Wood is very commonly used for fuel-wood, house building and agriculture implements. Outer area is ravenous and devoid of trees, therefore, most of the requirement of timber and fuel-wood is met from the forests. Conflict between villagers and forest staff is a common occurrence. *Anogeissus pendula* is the most preferred firewood species.

Right holders and the professional grazers also do a lot of damage by unscientific cutting girdling pollarding and lopping of the trees. Man has been very successful damage of vegetation by illicit fellings. It is fairly common in all the forest block of the area .The forest around area are destroyed due to the practice of collecting wood by head load (Fig. 18). Illicit felling of particularly of *Anogeissus pendula* for small timber and firewood are rampant throughout the forest of this area. The distraction is more noticed near about city. Forest is extracted illicitly by the villagers. Some particular class of people are engaged in forest destruction in a regular manner throughout the year of which mention should be made of 'Gaddis'of Talabgaon, 'Multani' of sub urban area of Bundi, 'Bhils' of Manak chowk and Lohrpura. These people have made this practice as a profession to earn money.

2. **OVER GRAZING:-**

The another reason of exploitation of these forest vegetation is faulty management. The incidence of grazing in these forest is heavy (Fig.16). Grazing is allowed in all the forests areas. The graziers of neighbouring districts come to this area. Besides, a large block of migratory sheep come away every year during monsoon in the division. The principal vegetation of this area *Anogeissus pendula* is badly lopped. Besides, other trees like *Acacia leucophloea, Acacia nilotica, Zizyphus mauritiana* etc. are usually heavily lopped. The goat graziers do maximum damage by lopping the trees. The damage by lopping is most significant in this area.

Most of the parts of the Ramgarh Vishdhari Wild Life sanctuary are the worst affected by illegal grazing during monsoon i.e. by Buffaloes, Cows, Sheep's and Goats. The main reasons for illicit grazing are lake of space for cattle, lack of fodder, lack of pasture land to meet the local demand.

Adverse impacts of the illicit over grazing on sanctuary are :-

(i) The area is getting degraded.

(ii) There is every possibility of spread of communicable disease to the wild animals.

(iii) Illegal wood cutting is also resorted to along with illegal grazing.

(iv) There is every possibility that the villagers might resort to poisoning carcasses of cattle killed by wild animals.

Prominent illegal over grazing areas are : - Bherupura, Naya gaon, Vishdhari, Khatkar, Loharpura, Pipliya, Guda Sadawartiya, Mundli, Debeta, Motipura, Kalanala and Bhimganj. Because of excess grazing the palatable grasses are totally absent and only unpalatable grasses like *Aristida* spp. are dominate in such places.

3. **ANIMALS:-**

Rabbits, squirrels, rats and peacocks pick up the plants in the seedling stage and use them for their food. Thus, even at the sprouting stage, vegetation in considerable affected. As a result of grazing, browsing and trampling the photosynthetic organs are removed, plant cover becomes thin and soil is no longer protected from the influence of wind and water thus shrubs are reduced to dwarf under shrubs and consequently, a sparse plants cover results.

Rats and white ants live beneath the soil. These animals by digging holes and boring through the soil crevices make the soil very loose which affects its water holding capacity. In addition to this the white ants damage the trees.

4. **POACHING:-**

Poaching usually occurs when wild animals cross the boundaries of the reserve for getting better fodder from the agricultural fields. Traditionally, Mogiyas, Kanjars and Banjaras communities are associated with poaching. Some of the people from Rajput and Muslim communities are also involved in poaching. Farmers also employ Mogiyas and Kanjars to protect their agricultural crops from the damage by wild animals. The pattern of poaching found to be more prevalent in the area is the poisoning of the carcass and capturing by laying out of traps.

A well organised efforts to identify and control the poaching is lacking unorganised poaching cases also go unreported because of poor communication with the villagers and lack of an effective secret information system.

5. **ILLEGAL REMOVAL OF NON TIMBER FOREST PRODUCTS:-**

Illegal removal of *Butea monosperma* leaves from the periphery of the forests is common occurrence. *Butea* leaves are used for thatching of huts, fodder and preparing 'Pattal -Dona'. Other items of use are *Diospyros melanoxylon* leaves and their fruits. Though stall feeding of cattle is not in practice in this area, illegal grass collection from Ramgarh Vishdhari Wild Life sanctuary is also resorted to in a limited extent.

6. **WILD FIRES:-**

Fire is by far the most serious cause of injury to the forest owing to the dense growth of grasses, dried annual herbs etc. Incidences of fire are common during the hotter parts of the year i. e. March to June. Due to repeated fires in addition to the damage of the vegetation the soils also get hardened as a result on ecological retrogression sets in which tends to increase the grassy blanks and the number of xerophytic species. Fires are incendiary as well as accidental.

As summer approaches, the fallen leaves and dry grasses along with dry wood form an ideal material for outbreak of fire incidences. Negligence by illicit graziers and honey collectors result in fire incidences. Wild fire in the sanctuary is basically in the form of ground fire causing damage to ground cover, grasses and wild animals residing therein.

7. **ALIENATION OF THE LOCAL PEOPLE:-**

The Ramgarh Vishdhari Wild Life sanctuary has evolved through different stages. The ownership changed from princely states to Government through this process of state controlling the resources, the local people got alienated gradually over-a-period of time. The local population in the past had access to forest with almost no controls. After the promulgation of Forest Act and Wild Life Protection Act, the free access has been restricted. There are restrictions on collection of minor forest produce and grazing. On the other hand there is an increased incidence of wildlife crop damage and cattle lifting.

8. **SPREAD OF *PROSOPIS JULIFLORA* :-**

The *Prosopis juliflora* are posing serious problem to the Ramgarh Vishdhari Wild Life Sanctuary. Grazing by goat and sheep is facilitating the spread of *Prosopis juliflora*. Many of the reserve are infested with *Prosopis juliflora.* It has gained bushy growth devoid of thick stem; therefore, it has not helped in reducing pressure on forest where the demand is for good fuel wood or small timber for agricultural implements.

9. **ENCROACHMENT:-**

The boundary of Ramgarh Vishdhari Wild Life sanctuary connected with the muncipal area, as well as rural areas. Due to the expansion of the township, many areas are already encroached and new colonies came up in these areas. Still much area is highly prone to encroachment. The maintenance of forest boundary and records is very poor.

10. **PARASITES:-**

The damage from parasites like *Cuscuta reflexa* and *Dendrophthoe falcata* sometimes causes damage to *Adhatoda zeylanica, Acacia nilotica, Salvadora oleoides, Zizyphus mauritiana, Boswellia serrata, Lannea coromandelica* and *Holarrhena pubescens.*

11. **FUNGAL ATTACK:-**

Damage by fungi is negligible in these forests. Important fungal attack (*Fomes fomentaris*) has been noticed on *Acacia catechu* which results in broom like formation. Fungus *Phyllactinia corylea* attack on *Dalbergia sissoo,* an important wild timber plant of area. The damage is however not very significant.

12. **INSECTS:-**

Some damage by borer insects has been noticed in the case of *Acacia catechu* which renders the trees unfit for *Kattha* production. Borer attack has also been noticed in the *Acacia nilotica* plant. The heart wood borer (*Scolytus multistriatus*) attacks at cellular region of *Acacia catechu* and *Acacia nilotica*.

FLORISTIC STUDY

VEGETATIONAL CLASSIFICATION

For the purpose of describing the vegetation of the Ramgarh Vishdhari Wild Life sanctuary, it has been classified in two different ways : -

(1) Physical region wise vegetation

(2) Elevational zone wise vegetation

1. PHYSICAL REGION WISE DISTRIBUTION OF VEGETATION IN SANCTUARY AREA

A. DANGS

These are flat tabletop plateaus, surrounded by bold vertical cliffs. The soil depth is very shallow and there is hardly any water bodies except in shallow constructed ponds and some moisture available only in depressions. In the summer season the area look deserted due to dry leafless of *Anogeissus pendula* and lack of water. The main Dangs areas occur near the Ramgarh, Motipura, Dalelpura and Guda Sadawartiya.

This area has a sandy loam soil with clay depressions. These conditions support mainly *Anogeissus pendula* of poor quality mixed with *Acacia catechu, Acacia leucophloea, Ficus racemosa, Cassia fistula, Diospyros melanoxylon, Butea monosperma, Dichrostachys cinerea* and *Lannea coromandelica. Anogeissus pendula* are found along with the nallahs where moisture conditions are little better. Under growth is scanty to moderate.

The plant species found in these areas are mostly *Zizyphus mauritiana, Grewia tenax* and *Salvadora oleoides.* Ground cover is mostly grass. Common grass species are *Bothriochloa pertusa, Cenchrus biflorus, Aristida depressa, Chrysopogon fulvus* and *Panicum antidotale.*

B. KHOH, STREAMS AND NALLAHS

There are areas where water flows and remains for a longer period than other areas. These constitute the drainage of water sheds and are continuous in nature in sanctuary. These are found in folds of hills and streams which finally join with rivers. In these areas, even in the hot summer when other areas are dry and hardly have any natural water some small pools are available and are characterized by a belt of green trees in the summer and this network of belts are the life line of wild life in this dry deciduous area.

These areas are richest in diversity of flora and species found along with *Anogeissus pendula* are *Diospyros melanoxylon, Sterculia urens, Lannea coromandelica, Syzygium cumini, Phoenix sylvestris, Ficus benghalensis, Wrightia tinctoria, Ficus religiosa, Ficus racemosa, Butea monosperma* and *Vitex negundo*. These are rich in herbs and shrubs along with a variety of grasses.

C. VALLEYS

The terrain of Ramargh Vishdhari Wild Life Sanctuary is hilly and there are many valleys in areas lie between two hills with flat bottom and rich soil and vegetation is good. Some water remains in the nallahs is provide sustenance to wild life during hot and dry summer.

Valleys have sandy loam soil with good depth and moistures, which combined support mixed forest of good growth and composition. The main species are *Anogeissus pendula* mixed with *Acacia catechu, Dichrostachys cinerea, Butea monosperma. Ficus benghalensis, F. religiosa, Lannea coromandelica* and *Mitragyna parvifolia etc*. Undergrowth is mainly *Grewia flavescens, Euphorbia nivulia, E. royleana* and *Salvadora oleoides.* Ground cover is mostly grass. The common species of grasses are *Aristida depressa, Saccharum spontaneum* and *Cenchrus setigerus*. Common weeds are *Cassia tora, Achyranthes aspera, Adhatoda zeylanica* and *Tephrosia purpurea.*

D. RAVINES

Both banks of the river Meiz are cut up by these ravines due to the sandy and easily erodible soil of these areas. These ravines are up to 50 mts. deep with precipitous narrow gullies. There are a few waterholes too.

Due to the poor soil, the main species are *Acacia leucophloea, Dichrostachys cinerea, Balanites aegyptiaca, Butea monosperma, Acacia catechu, Lannea coromandelica* and *Bridelia retusa* along with *Moringa oleifera, Salvadora oleoides* and *Grewia flavescens*. The main grasses are *Andropogon pumilus, Chloris barbata* and *Heteropogon contortus*.

E. WETLANDS MARSHES

Due to the presence of water these areas become the centre of activity of animals both wild and domestic. These water bodies contain a variety of aquatic flora, according to the depth of the water body. The main wetlands areas of Ramargh Vishdhari Wild Life sanctuary are Jait Sagar, Phool Sagar, Bherupura, Kohani Deh etc. in side and on the border of the sanctuary.

Important aquatic genera of plants are *Nymphaea, Nelumbo, Lemna, Wolffia. Spirodela, Azolla, Hydrilla, Typha, Sagittaria* etc.

2. ELEVATIONAL CLASSIFICATION OF THE VEGETATION

The forest vegetation of the hills of the area may be divided on the basis of elevational zone in the following types :-

(a) Top *Boswellia serrata* zone

(b) Intermediate *Anogeissus pendula* zone

(c) Lower miscellaneous forest zone

(a) Top *Boswellia serrata* zone:-

The *Boswellia serrata* zone is found on the tops of the hills. Almost all part of area is generally precipitous.The associates of *Boswellia serrata* are

Lannea coromandelica, Sterculia urens, Wrightia tinctoria, Anogeissus latifolia and Acacia catechu etc.

These forests are found as steepness of the slopes and the absence of economically important species. *Boswellia serrata* was not exploited in the past but now it is used for commercial purposes i.e. for packing cases, gums and paper pulp etc. Gum is extracted in large quantities from *Sterculia urens*. The forest is generally open and stunted, the average height of the trees varies from 30’ to 40’. Natural regeneration is poor and younger age classes sparse.

In the lower regions and depression where the rock is mainly genesis formation *Anogeissus pendula* grows in more or less pure stands. There the slope is steep *Acacia catechu* comes up in admixture with *Diospyros melanoxylon, Acacia nilotica and Wrightia tinctoria* etc.

(b) Intermediate *Anogeissus pendula* zone:-

In this zone the main species is *Anogeissus pendula* which is of the greatest economic importance species in this area and yields good charcoal fuel and small sized timber for agricultural implements. The common associates of *Anogeissus pendula are Acacia catechu, A. leucophloea, Bauhinia racemosa, Moringa oleifera, Wrightia tinctoria, Mitragyna parvifolia, Holoptelea integrifolia* and *Butea monosperma.*

The common shrubs in this zone are *Zizyphus nummularia, Capparis sepiaria, Grewia flavescens, G. tenax, Euphorbia royleana* etc. In fully stocked *Anogeissus pendula* forests growth is very poor. The common grasses of open area are *Dichanthium annulatum, Aristida depressa, Heteropogon contortus and Apluda mutica* etc. The common climbers are *Tinospora cordifolia, Mucuna pruriens, Abrus precatorius, Pergularia daemia* and *Aristolochia bracteolata.*

The tree growth in this zone is good. The average height of the trees is 20’ to 30’. The regeneration of the principal species i.e. *Anogeissus pendula,*

Acacia catechu and *Acacia leucophloea* is satisfactory. The regeneration of *Anogeissus pendula* by root suckers is also common.

(c) Lower miscellaneous forest zone:-

The lower miscellaneous forest can be divided in to three categories –

(1) Forest along the moist banks

(2) Forest on the open plateau

(3) Forest of thorny shruby vegetation

(1) **Forest along the moist banks :-**

Forest of moist banks consists of *Butea monosperma, Ficus racemosa, F. benghalensis, F. religiosa, Syzygium cumini, Phoenix sylvestris* and *Acacia nilotica.* The common shrubs of these areas are *Vitex negundo, Adhatoda zeylanica and Jatropha gossypifolia* etc.

(2) **Forest on the open plateau:-**

These plateaus are situated near the foot hills. The forest growth is severely damaged by the graziers and right holders on account of the easy approach. The common tree species are *Butea monosperma, Acacia nilotica, A. leucophloea and Anogeissus pendula*. The common shrubs are *Grewia flavescens, Capparis sepiaria, Calotropis procera* and *Zizyphus nummularia.*

(3) **Forest of thorny shruby vegetation:-**

Many areas consist of thorny shruby vegetation. The species found in these areas possess xerophytic character. The common species of these are *Salvadora oleoides, Euphorbia royleana, Acacia nilotica, Capparis decidua, C. sepiaria, Zizyphus mauritiana, Z. nummularia* and *Calotropis procera*.

FLORISTIC COMPOSITION

Floristically south eastern Rajasthan especially Bundi district is considered to be the richest part of the state. Ramgarh Vishdhari Wild Life sanctuary is located in Bundi district and it has large forest ecosystem in Haroti region, yet it has not received due attention. Therefore an urgency to explore this floristically rich area of Rajasthan was realised. The study of floristic composition of forest stand of area has been made bearing in mind various aspects.

GENERAL CHARACTER OF VEGETATION:

The forest of the Ramgarh Vishdhari Wild Life sanctuary fall under the category of "dry tropical forest" (as per Champion and Seth, 1968) of Rajasthan. Edaphic and biotic factors chiefly determine the composition, distribution and quality of these forests rather the climate conditions revealing over the tract. As per Champion and Seth the following group and sub types are recognised :-

Group 5 Tropical dry deciduous forest

Sub-group 5B Northern tropical dry deciduous forest

Type C2 Northern dry mixed deciduous forest

The main forest vegetation of area has been described on the basis of forest types and cover :-

General forest types and cover of sanctuary area-

The forests of Ramgarh Vishdhari Wild Life Sanctuary fall under Tropical dry deciduous forest. The following groups of floristic series are recognised in this area :-

1. *Anogeissus pendula* pure
2. *Anogeissus pendula* mixed
3. *Anogeissus pendula* scrub
4. *Acacia catechu*
5. Tropical dry mixed vegetation
6. Tropical moist mixed vegetation
7. Mixed scrub vegetation
8. Grassland
9. Degraded Grassland

1. ***Anogeissus pendula* pure**

It is dominant species and constitutes about 80% of the vegetation cover. It represents the edaphic climax. Generally found in the hilly area, it maintains a luxuriant growth on the gentle slopes of the hills due to better soil formation and water holding capacity. It is a slow growing species with generally varying girth and heights ranging from 10-15 meters with crown cover more than 60 %, found on hill slopes and valleys. The growth of *Anogeissus pendula* is generally stunted on plateaus where the residual soil is poor and shallow. *Grewia flavescens* in under-storey is a common associate of *Anogeissus pendula.*

2. ***Anogeissus pendula* mixed-**

In certain localities especially on hill slopes *Anogeissus pendula* occurs with other deciduous species like *Sterculia urens, Boswellia serrata, Butea monosperma* and *Acacia catechu* etc. The crown cover density ranges from 20-40 and 40-60%. *Anogeissus pendula* being the dominant species, *Boswellia serrata* and *Sterculia urens* occurs on steeper slopes while *Butea monosperma* comes up in valley areas. Such forests are seen all around consisting of shrub species like *Grewia flavescens, Capparis decidua, Cassia tora, Calotropis procera* and grasses. Undergrowth is generally moderate to scanty depending upon the density of the forest.

3. ***Anogeissus pendula* scrubs-**

Large areas of *Anogeissus pendula* forests have been degraded due to severe biotic interference in the vicinity of villages and fringe areas.The growing stock are mostly consists of stunted and crooked *Anogeissus pendula* and its associates. The density is extremely poor and growth is irregular. A fair proportion of *Anogeissus pendula* is invariably found in the bushy form. Inferior species like *Balanites aegyptiaca, Dichrostachys cineria* and *Euphorbia* spp have invaded in these forests. Due to continuous grazing the quality of grasses is poor. *Aristida* spp is most common grass, which is indicator of heavy grazing. This type is location specific and mostly confined to fringe areas.

4. ***Acacia catechu***

Such forests are common on gentle slopes and plains near habitation, cultivation and fissure areas. The common associates are *Acacia leucophloea, Acacia nilotica, Zizyphus nummularia* and tall grass species like *Heteropogon contortus, Dichanthium annulatum* and *Apluda mutica*. *Acacia catechu* occurs as an associate in almost all the forest types in the sanctuary. It forms pure patches in the plains where the soil is deep sandy loam or on dry poor sites where the soil is extremely shallow.

5. Tropical dry mixed vegetation

Few patches of dry mixed forest comprising of *Holoptelea integrifolia, Lannea coromandelica, Butea monosperma, Sterculia urens* along with *Anogeissus pendula*. *Acacia nilotica* are found in transitional zones and on the undulating surface.

6. Tropical moist mixed vegetation

These type of vegetation are mostly consists of moist species like *Syzygium cumini, Ficus racemosa, Diospyros melanoxylon, Phoenix sylvestris, Flacourtia indica, Mallotus philippensis, Terminalia bellirica* and *Mangifera*

indica. Such forests are common in the valley areas around water streams, lakes and reservoirs. The valleys are characterized with fertile soil, sufficient water sources, humidity etc. The aquatic vegetation consists of *Nelumbo nucifera, Nymphaea nauchali, Azolla pinnata, Trapa natans, lpomoea aquatica, Utricularia aurea* etc. The aquatic habitats maintain various life forms and are palatable species for wild animals.

7. Mixed scrub vegetation

This type of vegetation is generally thorny and woody.In these type genera such as *Acacia, Prosopis, Dichrostachys* and *Capparis* are well represented. There is no clear differentiation of the canopy and the different species grow in all sizes. The undergrowth consists of *Zizyphus nummularia, Grewia tenax. Grewia flavescens, Capparis sepiaria, Adhatoda zeylanica* etc. The ground cover consist of grasses and herbs like *Desmostachya bipinnata, Aristida* spp., *Heteropogon contortus, Apluda mutica, Dichanthium annulantum, Xanthium strumarium, Argemone mexicana, Cassia tora* etc.

8. Grasslands

Extensive grassy blanks occur on the flat tops and gentle slopes of the sanctuary hills. They are closely related to the geological formation of the area. The forest consists of sparsely scattered species such as, *Acacia catechu, Boswellia serrata, Zizyphus mauritiana, Bauhinia racemosa* and *Anogeissus pendula.* The trees are stunted and shallow rooted. The ground cover consists mainly of grasses like *Apluda mutica, Aristida* spp. and *Heteropogon contortus*.

In the Vindhyan formations these blanks occur on the flat tops and the soil is therefore shallow and poor. The growing stocks of these grassy blanks usually consist of scattered trees of *Butea monosperma, Diospyros melanoxylon, Zizyphus mauritiana* and *Anogeissus pendula*. The ground cover mostly consists of *Z. nummularia* and grass like *Apluda mutica, Dichanthium annulatum, Aristida* spp. etc. They form green carpets on slopes particularly

during rainy season and just after the rains. On the plateau *Heteropogon contortus* shows better performance due to shallow roots system. In the valleys the herbs and grasses cover the soil to maintain the moisture in it. It includes grasses like *Dichanthium annulatum* and *Cynodon dactylon*.

9. Degraded grasslands

These are commonly found in areas of biotic interference in fringes and poor sites where soil is shallow on the flat tops, and steeps slopes. These grassy blanks provide the main grazing grounds to the cattle in these forests and are heavily browsed leading to reduction in palatable grasses, herbs and shrubs.

TABLE – 6.1

Types of vegetation in the sanctuary area according to forest blocks

S. no.	Forest Block	Main types of vegetation and cover								
		Anogeissus pendula (pure)	*Anogeissus pendula* (Mixed)	*Acacia catechu*	Tropical dry (Mixed)	Tropical Moist (Mixed)	*Anogeissus pendula* (Scrub)	Mixed scrub	Grass land	Degraded grassland
1	Shikar Burj	_	+	_	+	+	_	_	_	_
2	Bherupura	+	+	_	+	_	+	_	+	+
3	Jharpir	+	+	+	+	_	+	+	_	+
4	Vishdhari	+	_	_	+	+	+	+	+	_
5	Ramgarh	+	+	+	+	+	+	+	+	_
6	Pipliya manak chowk	+	_	+	_	+	+	+	_	+
7	Khatkar	+	+	+	+	+	+	+	_	+
8	Khatiyari Rajwas	_	_	_	+	_	+	+	_	+
9	Folai	_	_	_	_	_	_	+	_	+

RARE AND ENDANGERED TAXA

Many interesting, important indigenous plants of the area are disappearing or decreasing in number of density and frequency, thus threatening the survival of several species. These are :-

Abrus precatorius
Adina cordifolia
Alaangium salvifolium
Annona squamosa
Anogeissus latifolia
Asparagus racemosus
Bombax ceiba
Bridelia retusa
Centella asiatica
Cochlospermum religiosum
Crateva nurvala
Dalbergia sissoo
Diospyros cordifolia
Enicostema axillare
Erythrina suberosa
Feronia limonia
Helicteres isora
Madhuca indica
Manilkara hexandra
Moringa concanensis
Mucuna pruriens
Pterocarpus marsupium
Sphaeranthus indicus
Terminalia bellirica
Thespesia populnea
Utricularia aurea

PLANT COMMUNITIES

PURE FORMATION

Most of the plants grow in association. However, some form pure stand or population patches at certain areas, these are :-

Tree species: -

Acacia catechu
Acacia leucophloea
Acacia nilotica
Ailanthus excelsa
Anogeissus pendula
Balanites aegyptiaca
Boswellia serrata
Butea monosperma
Dichrostachys cinerea
Ficus racemosa
Holoptelea integrifolia
Mitragyna parvifolia
Phoenix sylvestris
Syzygium cumini
Terminalia arjuna

Shrubs and Herbs species

Achyranthes aspera
Adhatoda zeylanica
Calotropis procera
Cassia tora
Echinops echinatus
Grewia flavescens
Ipomoea fistulosa
Jatropha gossypifolia
Lantana camara
Martynia annua
Parthenium hysterophorus
Tephrosia purpurea
Vitex negundo
Withania somnifera
Xanthium strumarium
Zizyphus nummularia

PLANT ASSOCIATION

Five sites of Ramgarh Vishdhari Wild Life Sanctuary were selected for the study of angiospermic plant community. Rameshwar, Khatkar, Ramjhar, Ramgarh and Jhar balapura were selected for this study. In addition to the extensive observation of plant communities, this study has been done bearing in mind various aspects, during the survey.

Base	Slope	Top
Anogeissus pendula-Terminalia arjuna	*Anogeissus pendula-Lannea coromandelica*	*Boswellia serrata-Sterculia urens*
Anogeissus pendula-Prosopis juliflora	*Lannea coromandelica-Grewia flavescens*	*Boswellia serrata-Anogeissus latifolia*
Mitragyna parvifolia-Butea monosperma	*Lannea coromandelica-Euphorbia royleana*	*Sterculia urens-Lannea coromandelica*
Butea monosperma-Anogeissus pendula	*Anogeissus pendula-Euphorbia royleana*	*Boswellia serrata-Lannea coromandelica*
Butea monosperma (Pure stand)	*Anogeissus pendula* (Pure stand)	*Anogeissus pendula* (Pure stand)
Butea monosperma-Phoenix sylvestris	*Anogeissus pendula-Grewia flavescens*	*Anogeissus latifolia-Anogeissus pendula*
Phoenix sylvestris-Syzygium cumini	*Grewia flavescens-Phoenix sylvestris*	*Anogeissus pendula-Boswellia serrata*
Butea monosperma-Prosopis juliflora-Anogeissus pendula	*Anogeissus pendula-Syzygium cumini*	*Anogeissus pendula-Lannea coromandelica*

MAJOR ANGIOSPERMIC PLANT COMMUNITIES AT RAMESHWAR

Anogeissus pendula- *Salvadora oleoides*	*Anogeissus latifolia-* *Anogeissus pendula*
Anogeissus pendula- *Prosopis juliflora*	*Anogeissus pendula-* *Salvadora oleoides*
Prosopis juliflora- *Acacia nilotica*	*Anogeissus pendula-* *Mitragyna parvifolia*
Acacia nilotica- *Salvadora oleoides*	*Mitragyna parvifolia-* *Wrightia tinctoria*
Anogeissus pendula- *Acacia nilotica-* *Salvadora oleoides*	*Wrightia tinctoria-* *Anogeissus pendula-* *Lannea coromandelica*
Acacia leucophloea- *Albizia lebbeck-* *Pithecellobium dulce*	*Anogeissus pendula* (Pure stand)
Capparis decidua- *Zizyphus mauritiana-* *Salvadora oleoides*	*Anogeissus pendula-* *Wrightia tinctoria*

Base **Slope and top**

MAJOR ANGIOSPERMIC PLANT COMMUNITIES AT KHATKAR

Ficus racemosa-	*Acacia nilotica-*

BASE	SLOPE AND TOP
Mitragyna parvifolia- *Butea monosperma*	*Acacia catechu-* *Boswellia serrata*
Acacia nilotica- *Salvadora oleoides*	*Boswellia serrata-* *Lannea coromandelica*
Phoenix sylvestris- *Vitex negundo*	*Lannea coromandelica-* *Grewia flavescens-* *Pongamia pinnata*
Anogeissus pendula- *Helicteres isora-* *Balanites aegyptiaca*	*Lannea coromandelica-* *Butea monosperma-* *Diospyros melanoxylon*
Acacia nilotica- *Salvadora oleoides-* *Butea monosperma*	*Sterculia urens* (Pure stand)
Anogeissus pendula (Pure stand)	*Anogeissus pendula-* *Sterculia urens*
Anogeissus pendula- *Phoenix sylvestris*	*Anogeissus pendula-* *Flacourtia indica*

MAJOR ANGIOSPERMIC PLANT COMMUNITIES AT RAMJHAR

Salvadora oleoides- *Capparis decidua-* *Capparis sepiaria*	*Boswellia serrata-* *Anogeissus pendula-* *Grewia flavescens*

Butea monosperma- *Salvadora oleoides-* *Grewia flavescens*	*Grewia flavescens-* *Acacia leucophloea-* *Acacia catechu*
Zizyphus nummularia- *Flacourtia indica-* *Wrightia tinctoria*	*Anogeissus latifolia-* *Acacia catechu*
Acacia leucophloea- *Anogeissus pendula*	*Anogeissus pendula* (Pure stand)
Anogeissus pendula- *Bauhinia racemosa*	*Anogeissus pendula-* *Lannea coromandelica*
Balanites aegyptiaca- *Zizyphus mauritiana-* *Zizyphus nummularia*	*Mitragyna parvifolia-* *Wrightia tinctoria*
Flacourtia indica- *Dichrostachys cinerea-* *Acacia catechu*	*Butea monosperma-* *Wrightia arborea*
BASE	**SLOPE AND TOP**

MAJOR ANGIOSPERMIC PLANT COMMUNITIES AT RAMGARH

Balanites aegyptiaca- *Ailanthus excelsa*	*Acacia nilotica-* *Zizyphus mauritiana-*

BASE	SLOPE AND TOP
	Acacia catechu
Balanites aegyptiaca- *Anogeissus pendula-* *Salvadora oleoides*	*Holoptelea integrifolia-* *Lannea coromandelica-* *Prosopis juliflora*
Flacourtia indica- *Acacia nilotica*	*Dichrostachys cinerea-* *Prosopis juliflora*
Butea monosperma- *Acacia leucophloea*	*Anogeissus pendula-* *Acacia nilotica*
Bauhinia racemosa- *Zizyphus mauritiana*	*Anogeissus pendula-* (Pure stand)
Capparis decidua- *Zizyphus mauritiana*	*Anogeissus pendula-* *Butea monosperma*

MAJOR ANGIOSPERMIC PLANT COMMUNITIES AT JHAR BALAPURA

CHECK LIST OF FLORA

PTERIDOPHYTIC TAXA OF SANCTUARY AREA

I. OPHIOGLOSSACEAE

1. *Ophioglossum petiolatum* Hook.

2. *Ophioglossum costatum* R. Br.

II. PTERIDACEAE

3. *Actiniopteris radiata* Link.

4. *Adiantum capillus-veneris* L.

5. *Adiantum incisum* Forssk.

III. THELYPTERIDACEAE

6. *Christella dentata* (Forssk.) Holttum.

IV. MARSILEACEAE

7. *Marsilea minuta* L.

V. SALVINIACEAE

8. *Azolla pinnata* R. Br.

CHECK LIST OF ANGIOSPERMIC TAXA OF RAMGARH VISHDHARI WILD LIFE SANCTURY

I. RANUNCULACEAE

1. *Ranunculus sceleratus* L.

II. ANNONACEAE

2. *Annona squamosa* L.

III. MENISPERMACEAE

3. *Cissampelos pareira* auct. non L.
4. *Cocculus hirsutus (L.)* Diels
5. *C. pendulus* (J.R. & G. Forst.) Diels
6. *Tinospora cordifolia* (Willd.) Miers

IV. NYMPHAEACEAE

7. *Nymphaea nauchali* Burm. f.

V. NELUMBONACEAE

8. *Nelumbo nucifera* Gaertn.

VI. PAPAVERACEAE

9. *Argemone mexicana* L.

VII. FUMARIACEAE

10. *Fumaria indica* (Haussk.) Pygsley

VIII. BRASSICACEAE

11. *Coronopus didymus* (L.) Sm.
12. *Sisymbrium irio L.*

IX. CLEOMACEAE

13. *Cleome gynandra* L.
14. *C. viscosa* L.

X. CAPPARACEAE

15. *Capparis decidua* (Forsk.) Edgew.
16. *C. sepiaria* L.
17. *Crateva nurvala* Buch. – Ham.
18. *Maerua arenaria* (DC.) Hook. f. & Thoms.

XI. COCHLOSPERMACEAE

19. *Cochlospermum religiosum* (L.) Alston

XII. FLACOURTIACEAE

20. *Flacourtia indica* (Burm. f.) Merr.

XIII. CARYOPHYLLACEAE

21. *Polycarpaea corymbosa* (L.) Lam.
22. *Silene conoidea* L.
23. *Spergula fallax* (Lowe) Krause
24. *Stellaria media* (L.) Vill.

XIV. PORTULACACEAE

25. *Portulaca oleracea* L.

XV. ELATINACEAE

26. *Bergia ammannioides* Roth

XVI. MALVACEAE

27. *Abelmoschus moschatus* Medic.
28. *Abutilon indicum* (L.) Sweet
29. *A. ramosum* (Cav.) Guill. & Perr.
30. *Althaea ludwigii* L.
31. *Hibiscus caesius Garcke*
32. *H. lobatus* (Murr.) O. Ktze.
33. *Malvastrum coromandelianum* (L.) Garcke
34. *Pavonia zeylanica* (L.) Cav.
35. *Sida cordifolia* L.
36. *S. ovata* Forsk.
37. *Thespesia populnea* (L.) Soland. & Corr.

XVII. BOMBACACEAE

38. *Bombax ceiba* L.

XVIII. STERCULIACEAE

39. *Helicteres isora* L.
40. *Melhania magnifolia* Blatt. & Hallb.
41. *Sterculia urens* Roxb.

XIX. TILIACEAE

42. *Corchorus aestuans* L.
43 *C. depressus* (Linn.) Stocks
44. *Grewia flavescens* A. Juss.
45. *G. tenax* (Forsk.) Fiori
46. *G. teliifolia* Vahl
47. *Triumfetta pentandra* A. Rich.
48. *T. rotundifolia* Lam.

XX. ZYGOPHYLLACEAE

49. *Tribulus terrestris* L.

XXI. OXALIDACEAE

50. *Oxalis corniculata* L.
51. *O. corymbosa* DC.

XXII. RUTACEAE

52. *Aegle marmelos* (L.) Corr.
53. *Feronia limonia* (L.) Swingle

XXIII. SIMAROUBACEAE

54. *Ailanthus excelsa* Roxb.

XXIV. BALANITACEAE

55. *Balanites aegyptiaca* (L.) Del.

XXV. BURSERACEAE

56. *Boswellia serrata* Roxb. ex Cocls.

XXVI. MELIACEAE

57. *Azadirachta indica* A. Juss.
58. *Melia azedarach* L.
59. *Soymida febrifuga* (Roxb.) A. Juss.

XXVII. CELASTRACEAE

60. *Celastrus paniculata* Willd.
61. *Maytenus emarginatus* (Willd.) Ding Hou

XXVIII. VITACEAE

62. *Ampelocissus latifolia* (Roxb.) planch.

63. *Cissus quadrangularis L.*

XXIX. RHAMNACEAE

64. *Zizyphus mauritiana Lam.*
65. *Z. nummularia* (Burm. f.) Wight & Arn.

XXX. SAPINDACEAE

66. *Sapindus emarginatus* Vahl

XXXI. ANACARDIACEAE

67. *Lannea coromandelica* (Houtt.) Merr.
68. *Mangifera indica* L.

XXXII. MORINGACEAE

69. *Moringa concanensis* Nimmo ex Dalz. & Gibs.
70. *M. oleifera* Lam.

XXXIII. FABACEAE

71. *Abrus precatorius* L.
72. *Alysicarpus monilifer* (L.) DC.
73. *A. procumbens (Roxb.)* Schindl.
74. *Butea monosperma* (Lam.) Taub.
75. *Crotalaria burhia* Buch. – Ham. ex Benth.
76. *C. medicaginea* Lam.
77. *Dalbergia sissoo* Roxb.
78. *Desmodium gangeticum* (L.) DC.
79. *Erythrina suberosa Roxb.*
80. *Indigofera cordifolia* Heyne ex Roth
81. *I. linifolia* (L .f.) Retz.
82. *I. linnaei* Ali
83. *Lathyrus aphaca* L.

84. *L. sativus* L.

85. *Medicago sativa* L.

86. *Melilotus alba* Medik. ex Desr.

87. *M. indica* (L.) All.

88. *Mucuna pruriens* (L.) DC.

89. *Pongamia pinnata* (L.) Pierre

90. *Pterocarpus marsupium* Roxb.

91. *Pueraria tuberosa* (Roxb. ex Willd.) DC.

92. *Rhynchosia minima* (L.) DC

93. *Sesbania sesban* (L.) Merr.

94. *Tephrosia purpurea* (L.) Pers.

95. *T. villosa* (L.) Pers.

96. *Trigonella corniculata* (L.) L.

97. *Vicia hirsuta* (L.) S.F. Gray

XXXIV. CAESALPINIACEAE

98. *Bauhinia racemosa* Lam.

99. *Cassia fistula* L.

100. *C. occidentalis* L.

101. *C. pumila* Lam.

102. *C. siamea* Lam.

103. *C. tora* L.

104. *Delonix elata* (L.) Gamble

105. *Parkinsonia aculeata* L.

106. *Tamarindus indica* L.

XXXV. MIMOSACEAE

107. *Acacia catechu* (L. f.) Willd.

108 *A. leucophloea* (Roxb.) Willd.

109. *A. nilotica* (L.) Wilid. ex Del. ssp. *indica* (Benth.) Brenan.

110. *A. nilotica* (L.) Willd. ex Del. ssp. *cupressiformis* (J. L.

Stewart) Ali & Faruqi

111. *Albizia lebbeck* (L.) Benth.

112. *A. procera* (Roxb.) Benth.

113. *Dichrostachys cinerea* (L.) Wight & Arn.

114. *Pithecellobium dulce* (Roxb.) Benth.

115. *Prosopis juliflora* (Swartz) DC.

XXXVI. ROSACEAE

116. *Potentilla supine* L.

XXXVII. COMBRETACEAE

117. *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guill. & Perr.

118. *A. pendula* Edgew.

119. *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.

120. *T. bellirica* (Gaertn.) Roxb.

XXXVIII. MYRTACEAE

121. *Syzygium cumini* (L.) Skeels

XXXIX. LYTHRACEAE

122. *Ammannia baccifera* L.

123. *Lagerstroemia parviflora* Roxb.

124. *Lawsonia inermis* L.

125. *Woodfordia fruticosa* (L.) Kuntz.

XL. TRAPACEAE

126. *Trapa natans* L.

XLI. CUCURBITACEAE

127. *Blastania garcinii* (Burm. f.) Cogn.

128. *Coccinia grandis* (L.) J.O. Voigt

129. *Cucumis callosus* (Rottl.) Cogn.
130. *C. setosus* Cogn.
131. *Momordica balsamina* L.
132. *M. dioica* Roxb. ex Willd.
133. *Trichosanthes bracteata* (Lam.) Voigt

XLII. MOLLUGINACEAE

134. *Glinus lotoides* L.
135. *Mollugo cerviana* (L.) Seringe

XLIII. APIACEAE

136. *Centella asiatica* (L.) Urban

XLIV. AIZOACEAE (FICOIDEAE)

137. *Trianthema portulacastrum* L.
138. *Zaleya govindia* (Buch. - Ham. ex G. Don) Nair

XLV. ALANGIACEAE

139. *Alangium salvifolium* (L. f .) Wangerin

XLVI. RUBIACEAE

140. *Adina cordifolia* (Willd. ex Roxb.) Hook. f. ex. Brandis
141. *Borreria articularis* (L. f.) Mill.
142. *Dentella repens* (L.) J. & G. Forster
143. *Mitragyna parvifolia* (Roxb.) Korth.
144. *Morinda tomentosa* Heyne ex Roth
145. *Oldenlandia corymbosa* L.

XLVII. ASTERACEAE

146. *Ageratum conyzoides* L.
147. *Blumea lacera* (Burm. f.) DC.

148. *Cotula hemisphaerica* (Roxb.) Wall. ex Benth. & Hook. f.
149. *Cyathocline purpurea* (Ham. ex D. Don) O. ktze.
150. *Echinops echinatus Roxb.*
151. *Eclipta alba (Linn.)* Hassk.
152. *Inula indica* L.
153. *Launaea aspleniifolia* (Willd.) Hook. f.
154. *L. procumbens* (Roxb.) Ramayya & Rajagopal
155. *Oligochaeta ramosa* (Roxb.) Wagenitz
156. *Parthenium hysterophorus* L.
157. *Pluchea lanceolata* (DC.) Clarke
158. *Pulicaria crispa* (Forsk.) Benth. & Hook. f.
159. *Sonchus arvensis* auct. plur. non L.
160. *S. asper* (L.) Hill.
161. *Sphaeranthus indicus L.*
162. *Tridax procumbens* L.
163. *Veronica albicans* DC.
164. *Vernonia cinerea* (L.) Less.
165. *Xanthium strumarium* L.

XLVIII. PRIMULACEAE

166. *Anagallis arvensis* L.

XLIX. PLUMBAGINACEAE

167. *Plumbago zeylanica* L.

L. SAPOTACEAE

168. *Madhuca indica* J. F. Gmelin
169. *Manilkara hexandra* (Roxb.) Dub.

LI. EBENACEAE

170. *Diospyros cordifolia* Roxb.

171. *D. melanoxylon* Roxb.

LII. SALVADORACEAE

172. *Salvadora oleoides* Decne.

LIII. APOCYNACEAE

173. *Holarrhena pubescens* (Buch. - Ham.) Wall ex G. Don
174. *Ichnocarpus frutescens* (L.) R. Br.
175. *Wrightia arborea* (Denst.) Mabb.
176. *W. tinctoria* (Roxb.) R. Br.

LIV. ASCLEPIADACEAE

177. *Calotropis gigantea* (L.) R. Br.
178. *C. procera* (Ait.) Ait. f.
179. *Pergularia daemia* (Forsk.) Chiov.

LV. PERIPLOCACEAE

180. *Cryptolepis buchananii* Roem. & Schult.
181. *Cryptostegia grandiflora R*. Br.
182. *Hemidesmus indicus* (L.) R. Br.

LVI. GENTIANACEAE

183. *Canscora decurrens* Dalz.
184. *Enicostema axillare (Lam.)* Raynal

LVII. BORAGINACEAE

185. *Heliotropium indicum.* L.
186. *H. ovalifolium* Forsk.
187. *H. supinum* L.
188. *Trichodesma amplexicaule* Roth

LVIII. EHRETIACEAE

189. *Cordia gharaf* (Forsk.) Ehrenb. ex Asch.
190. *Ehretia laevis* Roxb.

LIX. CONVOLVULACEAE

191. *Argyreia sericea* Dalz.
192. *Convolvulus arvensis* L.
193. *C. microphyllus* Sieb. ex Spreng.
194. *Evolvulus alsinoides* (L.) L.
195. *lpomoea aquatica* Forsk.
196. *l. fistulosa* Mart.
197. *l. nil* (L.) Roth
198. *l. sindica* Stapf
199. *l. triloba* L.
200. *Merremia aegyptia* (L.) Urban
201. *M. emarginata* (Burm. f.) Hall. f.
202. *M. tridentata* (L.) Hall. f.
203. *Quamoclit phoenicea* (Roxb.) Choisy

LX. CUSCUTACEAE

204. *Cuscuta reflexa* Roxb.

LXI. SOLANACEAE

205. *Datura innoxia* Mill.
206. *D. metal* L.
207. *D. stramonium* L.
208. *Physalis minima* L.
209. *Solanum nigrum* L.
210. *S. surattense* Burm. f.
211. *Withania somnifera* (L.) Dunal

LXII. SCROPHULARIACEAE

212. *Kickxia ramosissima* (Wall.) Janchen
213. *Limnophila heterophylla* (Roxb.) Benth.
214. *Lindenbergia indica* (L.) Vatke
215. *Lindernia antipoda* (L.) Alston
216. *L. ciliata* (Colsm.) Pennell
217. *Striga angustifolia* (D. Don) Saldhana
218. *Verbascum chinense* (L.) Sant.

LXIII. LENTIBULARIACEAE

219. *Utricularia aurea* Lour.

LXIV. BIGNONIACEAE

220. *Dolichandrone falcata* (Wall. ex. DC.) Seem.
221. *Millingtonia hortensis* L. f.

LXV. MARTYNIACEAE

222. *Martynia annua* L.

LXVI. ACANTHACEAE

223. *Adhatoda zeylanica* Medic.
224. *Andrographis paniculata* (Burm. f.) Wall. ex Nees
225. *Barleria prionitis* L.
226. *Elytraria acaulis* (L. f.) Lindau
227. *Justicia procumbens* L.
228. *J. simplex* D. Don
229. *Lepidagathis hamiltoniana* Wall. ex Nees
230. *Peristrophe paniculata* (Forsk.) Brumm.
231. *Ruellia tuberosa* L.
232. *Rungia parviflora* (Retz.) Nees

LVII. VERBENACEAE

233. *Clerodendrum phlomidis* L. f.
234. *Lantana camara* L.
235. *L. wightiana* Wall. ex Gamble
236. *Phyla nodiflora* (L.) E.E. Greene
237. *Vitex negundo* L.

LXVIII. LAMIACEAE

238. *Leucas aspera* (Willd.) Link
239. *L. biflora* (Vahl) R. Br.
240. *Ocimum basilicum* L.
241. *O. canum* Sims.

LXIX. NYCTAGINACEAE

242. *Boerhavia diffusa L.*

LXX. AMARANTHACEAE

243. *Achyranthes aspera* L.
244. *Aerva lanata* (L.) Juss. ex Schult.
245. *Alternanthera sessilis* (L.) R. Br. ex DC.
246. *Amaranthus hybridus* L.
247. *A. spinosus* L.
248. *A. viridis* L.
249. *Celosia argentea* L.
250. *Digera muricata* (L.) Mart.
251. *Gomphrena celosioides* Mart.

LXXI. CHENOPODIACEAE

252. *Chenopodium album* L.
253. *C. murale* L.

LXXII. BASELLACEAE

254. *Basella rubra* L.

LXXIII. POLYGONACEAE

255. *Polygonum barbatum* L.

256. *P. glabrum* Willd.

257. *P. plebeium* R. Br.

258. *Rumex dentatus* L.

LXXIV. ARISTOLOCHIACEAE

259. *Aristolochia bracteolata* Lam.

260. *A. indica* L.

LXXV. LORANTHACEAE

261. *Dendrophthoe falcata* (L. f.) Etting.

LXXVI. EUPHORBIACEAE

262. *Acalypha ciliata* Forsk.

263. *A. indica* L.

264. *Bridelia retusa* (L.) Spreng.

265. *Croton bonplandianum* Baill.

266. *Euphorbia dracunculoides* Lam.

267. *E. hirta* L.

268. *E. indica* Lam.

269. *E. nivulia* Buch. - Ham

270. *E. royleana* Boiss.

271. *E. thymifolia* L.

272. *Jatropha gossypifolia* L.

273. *Mallotus philippensis* (Lam.) Muell. - Arg.

274. *Phyllanthus fraternus* Webster

275. *P. maderaspatensis* L.

276. *Ricinus communis* L.

LXXVII. ULMACEAE

277. *Holoptelea integrifolia* (Roxb.) Planch.

LXXVIII. CANNABINACEAE

278. *Cannabis sativa* L.

LXXIX. MORACEAE

279. *Ficus benghalensis* L.

280. *F. hispida* L. f.

281. *F. microcarpa* L. f.

282. *F. racemosa* L.

283. *F. religiosa* L.

284. *F. virens* Ait.

LXXX. CERATOPHYLLACEAE

285. *Ceratophyllum demersum* L.

LXXXI. HYDROCHARITACEAE

286. *Hydrilla verticillata* (L. f.)

287. *Vallisneria spiralis* auct. non L.

LXXXII. LILIACEAE

288. *Asparagus racemosus* Willd.

289. *Asphodelus tenuifolius* Cav.

290. *Urginea indica* (Roxb.) Kunth

LXXXIII. PONTEDERIACEAE

291. *Eichhornia crassipes* (Mart.) Solms.

LXXXIV. COMMELINACEAE

292. *Commelina benghalensis* L.

293. *C. diffusa* Burm. f.

LXXXV. NAJADACEAE

294. *Najas graminea* Del.

LXXXVI. JUNCACEAE

295. *Juncas bufonius* L.

LXXXVII. ARECACEAE

296. *Phoenix sylvestris* (L.) Roxb.

LXXXVIII. TYPHACEAE

297. *Typha angustata* Bory & Chaub

LXXXIX. LEMNACEAE

298. *Lemna perpusilla* Torrey

299. *Spirodela polyrhiza* (L.) Schleid.

300. *Wolffia arrhiza* (L.) Horkel ex Wimmer

XC. ALISMATACEAE

301. *Sagittaria guayanensis* Kunth subsp. lappula (D. Don) Bogin

XCI. POTAMOGETONACEAE

302. *Potamogeton crispus* L.

XCII. CYPERACEAE

303. *Cyperus compressus* L.

304. *C. iria* L.

305. *C. niveus* Retz.

306. *C. rotundus* L.

307. *C. tenuispica* Steud.

308. *Fimbristylis ferruginea* (L.) Vahl
309. *Schoenoplectus articulatus* (L.) Palla
310. *S. littoralis* (Schrad.) Palla
311. *S. supinus* (L.) Palla.

XCIII. POACEAE

312. *Andropogon pumilus* Roxb.
313. *Apluda mutica* L.
314. *Aristida depressa* Retz.
315. *A. funiculata* Trin. & Rupr.
316. *Bambusa arundinacea* (Retz.) Roxb.
317. *Bothriochloa pertusa* (L.) A. camus
318. *Cenchrus biflorus* Roxb.
319. *C. ciliaris* L.
320. *C. setigerus* Vahl
321. *Chloris barbata* Sw.
322. *C. virgata* Sw.
323. *Chrysopogon fulvus* (Spreng.) Chiov.
324. *Cymbopogon martinii* (Roxb.) Waston
325. *Cynodon dactylon* (L.) Pers.
326. *Dactyloctenium aegyptium* (L.) Willd.
327. *D. scindicum* Boiss.
328. *Dendrocalamus strictus* (Roxb.) Ness
329. *Desmostachya bipinnata* (L.) Stapf
330. *Dichanthium annulatum* (Forsk.) Stapf
331. *Digitaria ciliaris* (Retz.) Koel.
332. *Echinochloa colonum* (L.) Link
333. *Eleusine india* (L.) Gaertn.
334. *Eragrostis pilosa* (L.) P. Beauv.
335. *E. viscosa* (Retz.) Trin.
336. *Heteropogon contortus* (L) P. Beauv

337. *Melanocenchris jacquemontii* Jaub. & Spach.
338. *Oropetium thomaeum* (L. f.) Trin.
339. *Panicum antidotale* Retz.
340. *P. turgidum* Forsk.
341. *Phalaris minor* Retz.
342. *Saccharum spontaneum* L.
343. *Setaria pumila* (Poir.) Roem. & Schult.
344. *Sorghum halepense* (L.) Pers.
345. *Sporobolus diander* (Retz.) P. Beauv.
346. *Themeda quadrivalvis* (L.) O. Ktze.
347. *Vetiveria zizanioides* (L.) Nash

SYNOPSIS OF THE INDIGENOUS FLORA

The present work enumerates 347 species belonging to 261 genera and 93 families of flowering plants (Table 6.2).

It is clear from table that the ratio of the total number of genera to species is 1: 1.32, which is rather low in comparison to a corresponding ratio for whole of India (1: 7), but it is more or less in conformity with this ratio for the Gangetic plain region (1: 2.2) and that of Delhi state (1: 1.63) as reported by Maheshwari (1963).

It is also interesting to note from Table 6.3 that the percentage occurrence of the genera (81.22%) and species (81.84%) of Dicotyledons is more or less identical. This similarity is also evident in Monocotyledonous genera and species (18.78%) and (18.16%).

A perusal of Table 6.4 reveal that family Leguminoseae (45 spp.) occupies the top position in the flora of Ramgarh Vishdhari Wild Life sanctuary. Family Poaceae (36 spp.) occupies the second position, Asteraceae

(20 spp.), Euphorbiaceae (15 spp.), Convolvulaceae (13 spp.), Malvaceae (11 spp.), Acanthaceae (10 spp.), Amaranthaceae, Cyperaceae (9 spp. each), Tiliaceae, Cucurbitaceae, Solanaceae and Scrophulariaceae (7 spp. each), Rubiaceae, Moraceae (6 spp. each) occupy third to tenth positions respectively.

Among the dicots, the Polypetalae group is the largest followed by Gamopetalae and Monochlamydae. In contrast to dicotyledons, monocots are poorly represented in the area. Out of 63 species of 49 genera, 45 species under 32 genera belong to Cyperaceae (9 sp. / 3 genera) and Poaceae (36sp. / 29 genera).

This pattern of distribution of genera and species confirm the general observation that within the same floral region, the smaller the flora, the smaller the species genus ratio. All 93 families are categorized according to number of genera and species and a list in alphabetical order is given in Table 6.2.

A list of 10 dominating families of the study area along with other region of country is listed in Table - 6.4.

TABLE – 6.2

Number of genera and species in different families of angiosperms

S. No.	Family	Genus/ Genera (Number)	Species (Number)
1.	Ranunculaceae	1	1
2.	Annonaceae	1	1
3.	Menispermaceae	3	4
4.	Nymphaeaceae	1	1
5.	Nelumbonaceae	1	1
6.	Papaveraceae	1	1

7.	Fumariaceae	1	1
8.	Brassicaceae	2	2
9.	Cleomaceae	1	2
10.	Capparaceae	3	4
11.	Cochlospermaceae	1	1
12.	Flacourtiaceae	1	1
13.	Caryophyllaceae	4	4
14.	Portulacaceae	1	1
15.	Elatinaceae	1	1
16.	Malvaceae	8	11
17.	Bombacaceae	1	1
18.	Sterculiaceae	3	3
19.	Tiliaceae	3	7
20.	Zygophyllaceae	1	1
21.	Oxalidaceae	1	2
22.	Rutaceae	2	2
23.	Simaroubaceae	1	1
24.	Balanitaceae	1	1
25.	Burseraceae	1	1
26.	Meliaceae	3	3
27.	Celastraceae	2	2
28.	Vitaceae	2	2
29.	Rhamnaceae	1	2
30.	Sapindaceae	1	1
31.	Anacardiaceae	2	2
32.	Moringaceae	1	2

33.	Fabaceae	20	27
34.	Caesalpiniaceae	5	9
35.	Mimosaceae	5	9
36.	Rosaceae	1	1
37.	Combretaceae	2	4
38.	Myrtaceae	1	1
39.	Lythraceae	4	4
40.	Trapaceae	1	1
41.	Cucurbitaceae	5	7
42.	Molluginaceae	2	2
43.	Apiaceae	1	1
44.	Aizoaceae	2	2
45.	Alangiaceae	1	1
46.	Rubiaceae	6	6
47.	Asteraceae	18	20
48.	Primulaceae	1	1
49.	Plumbaginaceae	1	1
50.	Sapotaceae	2	2
51.	Ebenaceae	1	2
52.	Salvadoraceae	1	1
53.	Apocynaceae	3	4
54.	Asclepiadaceae	2	3
55.	Periplocaceae	3	3
56.	Gentianaceae	2	2
57.	Boraginaceae	2	4
58.	Ehretiaceae	2	2

59.	Convolvulaceae	6	13
60.	Cuscutaceae	1	1
61.	Solanaceae	4	7
62.	Scrophulariaceae	6	7
63.	Lentibulariaceae	1	1
64.	Bignoniaceae	2	2
65.	Martyniaceae	1	1
66.	Acanthaceae	9	10
67.	Verbenaceae	4	5
68.	Lamiaceae	2	4
69.	Nyctaginaceae	1	1
70.	Amaranthaceae	7	9
71.	Chenopodiaceae	1	2
72.	Basellaceae	1	1
73.	Polygonaceae	2	4
74.	Aristolochiaceae	1	2
75.	Loranthaceae	1	1
76.	Euphorbiaceae	8	15
77.	Ulmaceae	1	1
78.	Cannabinaceae	1	1
79.	Moraceae	1	6
80.	Ceratophyllaceae	1	1
81.	Hydrocharitaceae	2	2
82.	Liliaceae	3	3
83.	Pontederiaceae	1	1
84.	Commelinaceae	1	2

85.	Najadaceae	1	1
86.	Juncaceae	1	1
87.	Arecaceae	1	1
88.	Typhaceae	1	1
89.	Lemnaceae	3	3
90.	Alismataceae	1	1
91.	Potamogetonaceae	1	1
92.	Cyperaceae	3	9
93.	Poaceae	29	36
Total	**93 Families**	**261 Genera**	**347 Species**

TABLE – 6.3

Proportional relationship of dicotyledonous and monocotyledonous taxa in Ramgarh Vishdhari Wild Life Sanctuary

Groups	**Families**		**Genera**		**Species**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Dicotyledons	79	84.94	212	81.22	284	81.84
Monocotyledons	14	15.06	49	18.78	63	18.16
Total	**93**	**100**	**261**	**100**	**347**	**100**

Out of the total 261genera, 43 are represented by two species each, 10 by three to four species each and 05 by five or more species each. On the whole the various genera are poorly represented as far as the number of species is concerned.

Following are the important genera containing 3 or more species each.

Genera	Number of species
Euphorbia	6
Ficus	6
Cassia	5
Cyperus	5
lpomoea	5
Acacia	4
Grewia	3
Indigofera	3
Heliotropium	3
Merremia	3
Datura	3
Amaranthus	3
Polygonum	3
Schoenoplectus	3
Cenchrus	3

TABLE – 6.4

SYNOPSIS OF THE INDIGENOUS FLORA

Ten dominant families of Ramgarh Vishdhari Wild Life sanctuary area

(Family Leguminoseae here includes the taxa of all the three families Fabaceae, Caesalpiniaceae and Mimosaceae taken together)

Position	Gangetic Plain (Hooker, 1907)	N. Gujarat (Sexton & Sedgwick, 1918)	Delhi (Maheshwari, 1963)	Jaipur (Sharma & Tiagi, 1979)	W. Rajasthan (Bhandari, 1990)	Ramgarh Vishdhari Wild Life sanctuary (Present Work)
1.	POACEAE	POACEAE	POACEAE	POACEAE	POACEAE	LEGUMINOSEAE
2.	LEGUMINOSEAE	LEGUMINOSEAE	LEGUMINOSEAE	LEGUMINOSEAE	LEGUMINOSEAE	POACEAE
3.	CYPERACEAE	CYPERACEAE	ASTERACEAE	ASTERACEAE	ASTERACEAE	ASTERACEAE
4.	ASTERACEAE	ASTERACEAE	CYPERACEAE	CYPERACEAE	CYPERACEAE	EUPHORBIACEAE
5.	SCROPHULARIACEAE	CONVOLVULACEAE	ACANTHACEAE	ACANTHACEAE	CONVOLVULACEAE	CONVOLVULACEAE
6.	MALVACEAE	EUPHORBIACEAE	EUPHORBIACEAE	EUPHORBIACEAE	MALVACEAE	MALVACEAE
7.	ACANTHACEAE	ACANTHACEAE	CONVOLVULACEAE	BORAGINACEAE	EUPHORBIACEAE	ACANTHACEAE
8.	EUPHORBIACEAE	MALVACEAE	MALVACEAE	MALVACEAE	ACANTHACEAE	AMARANTHACEAE and CYPERACEAE
9.	CONVOLVULACEAE	SCROPHULARIACEAE	AMARANTHACEAE	AMARANTHACEAE	CUCURBITACEAE	TILIACEAE CUCURBITACEAE SOLANACEAE and SCROPHULARIACEAE
10.	LAMIACEAE	AMARANTHACEAE	SCROPHULARIACEAE	CUCURBITACEAE	AMARANTHACEAE	RUBIACEAE and MORACEAE

TABLE – 6.5

Family Types and Number of Genera and Species

	Families (Total 93)					
	Family Types	**Dicots**		**Monocots**		**Total**	
		No.	**%**	**No.**	**%**	**No.**	**%**
1.	**Monotypic**	32	34.40	8	8.60	40	43.00
2.	**Monogeneric/ Bispecific**	7	7.52	1	1.08	8	8.60
3.	**Monogeneric/ Tri-multispecific**	1	1.08	_	_	1	1.08
4.	**Bigeneric/ Bispecific**	11	11.83	1	1.08	12	12.91
5.	**Bigeneric/ Tri-multispecific**	5	5.37	_	_	5	5.37
6.	**Trigeneric/ Trispecific**	3	3.23	2	2.15	5	5.38
7.	**Trigeneric/ Tetra-multispecific**	4	4.30	1	1.08	5	5.38
8.	**Four-multigeneric/ Four- multispecific**	16	17.20	1	1.08	17	18.28
	Total	**79**		**14**		**93**	

From the above statistics (table 6.5) it can be seen that out of 93 families, 49 families are represented by one genus only. The number of families along with the number of genera is given below :

No. of families	**No. of genera**
49	1
17	2
10	3
4	4
3	5
3	6
1	7
2	8
1	9
3	10 or more

TEN DOMINANT FAMILIES OF AREA AND THEIR RANK

A list of relative dominance of ten dominant families of study area are shown in Table – 6.6.

TABLE – 6.6

Ten dominant families of sanctuary

S.No.	Name of families	No. of genera out of total 261	No. of species out of total 347
1.	Leguminoseae	30 (11.49%)	45 (12.97%)
2.	Poaceae	29 (11.11%)	36 (10.37%)
3.	Asteraceae	18 (6.90%)	20 (5.76%)
4.	Euphorbiaceae	8 (3.07%)	15 (4.32%)
5.	Convolvulaceae	6 (2.30%)	13 (3.74%)
6.	Malvaceae	8 (3.07%)	11(3.17%)
7.	Acanthaceae	9 (3.45%)	10 (2.88%)
8.	Amaranthaceae	7 (2.68%)	9 (2.60%)
	Cyperaceae	3 (1.50%)	9 (2.60%)
9.	Tiliaceae	3 (1.50%)	7 (2.01%)
	Cucurbitaceae	5 (1.92%)	7 (2.01%)
	Solanaceae	4 (1.53%)	7(2.01%)
	Scrophulariaceae	6 (2.30%)	7 (2.01%)
10.	Rubiaceae	6 (2.30%)	6 (1.72%)
	Moraceae	1 (0.38%)	6 (1.72%)

ETHNOBOTANICAL STUDIES

Tribes of different parts of world played an important role in domestication of different plant species. These people came to know how to use the plants and what part should be used and what should not. A considerable part of the knowledge of early men about the utility of plants and people - plant relationships have been continued down to modern days and are survived by the ethnic societies through folklore and through faith and folk tradition. Different tribal and rural communities use a variety of plants and plant products on different occasions. Tribal societies offered particular plant or products to god on a particular religious occasion.

Only ethnobotanical studies can help locate and conserve such useful traditional varieties of different plants with useful genes which will otherwise be lost from the civilization. Ethnobotanical investigations of use of plants by the various ethnic societies have great socio-economic value. Hence major contribution of this study today is towards the understanding and bioprospecting of biodiversity which has assumed great economic, ecological, social and political significance for the modern civilization. There is a close link between ethnic diversity and biological diversity. Different ethnic societies use a particular plant species in their locality differently as a source of food or as a source of medicine or for both.

The Ramgarh Vishdhari Wild Life sanctuary areas are very rich in floristic and ethnobotanical knowledge. The tribal-rural people have their own life style, culture, tradition and belief. Since time immemorial and are evolved with a way of life style harmonious with the nature. Therefore it was hypothesized that the ethnic people has their unique traditions and ethnomedicinal uses. Which highlights their depending on forest and forest product as their resource base and some new ethnobotanical use must be recorded.

The study of ethnobotany has now become a critical need of the time. The ethnic people have protected the flora with which they have emotional and symbiotic relationship. The indigenous (ethnic) people and their communities have a vital role in maintaining environmental management and sustainable development in a region. Today lots of plants product have been patented therefore it is in the national interest to safeguard our traditional knowledge.

Considering the same objectives the ethnobotanical study of Ramgarh Vishdhari Wild Life sanctuary area has been done in this work. This chapter have been divided as per below mentioned sub units :-

(A) Ethnic communities of the area
(B) Socio-economic status of ethnic people of area
(C) Sacred groves of area
(D) Magico-religious beliefs
(E) Non Timber Forest Products :-
    (i) Ethnomedicinal plants
    (ii) Wild edible plants
    (iii) Plants for beauty care
    (iv) Plants of economic importance

ETHNIC COMMUNITY LIVING AROUND AND INSIDE RAMGARH VISHDHARI WILD LIFE SANCTUARY

The tribal and rural community residing in Ramgarh Vishdhari Wild Life sanctuary included Meena, Bhil, Raibaris, Bairwa, Gurjar, Kalbelias, Gadoliya Lohar, Kanjar, Sansis, Banjara and Mogiyas. The nomadic tribal's commonly travel in the area in different seasons. Most prominent of them are the Gadoliya Lohars and Kalbelias. Kalbelias are commonly seen in townships on road side and 'dearas'. Kanjar, Sansis and Mogiyas are semi nomadic community and they depend on forest for shelter and medicare. Other rural

communities of the area are Kir, Meghwal, Prajapat and Khatik. The present study is an addition to the knowledge of certain interesting plants species utilized by the tribal's and rural people of the locality not only for the treatment of various diseases but also for their substantial relevance as sacred groves and their association with places of worship held sacred. Besides there are some plants reported in the area which are used for mythological significance, taboos and sacred belief, by the tribal's and rural people of the area. As observed, the various tribes of sanctuary area demonstrate varied cultural and sacred beliefs and diverse traditions.

Major ethnic communities and their characteristics are as per below:-

(A) Meena :-

Meena is a scheduled tribe and main landlords of the area. They are agriculturists and keep cattle to support their economy. This tribe is politically powerful and has an aggressive approach towards the impact of the sanctuary. Their population in the area is very large. Their main dependency is for grazing, small timber and for building material. After this, they were categorised into 'zamindars' and 'chowkidars'. The former were favoured by the rulers, while the latter took up the jobs of village watchmen.

(B) Gurjar :-

This is a forest dwelling community and is mainly pastoralist. Gurjars do not have much lands and mostly dependent on animal husbandry for livelihood. Therefore their main dependency is for livestock grazing. Gurjars prefer grazing their cattle than stall-feeding. They keep large herds of cattle of poor quality, along with goats and sheep. Nearly, all of their livestock feed in the forest. The other dependency factors are building material for house and cattle-pen, fuel wood and fodder.

(C) Bhil :-

Bhils are mainly confined in remote and forest area of the sanctuary. Most Bhils earn their livelihood by serving as labourers in road, mines and forest operations or as agricultural labour in the fields of affluent tribal and non-tribal farmers.

(D) Banjara :-

The Banjara community is native to Rajasthan. They are wanderers and usually a group of 3-4 families stay together. Their chief food includes bajra (*Pennisetum americanum*), jau (*Hordeum vulgare*) and makka (*Zea mays*). They have faith in Hindu mythology.

(E) Gadoliya Lohar :-

The most prominent nomadic tribes of Rajasthan, Gadolia Lohars, are blacksmiths by profession. Malnutrition is found to be a major causative factor of diseases in adults and children, in this community. The houses of the Gadolia Lohars are their carts which are always exposed to health hazards. Besides, their close proximity to fire during long working hours of the day (while making tools) is a source of respiratory and allergic diseases. Occupational hazards and poor living conditions are the major problems for this community. With the arrival of the monsoon, they shift to rural areas and prepare agricultural implements for peasant communities. During the monsoon, they stay in the rural areas, and as soon as it is over, they start for another place. They decide their issues through their own panchayat. They worship several gods, goddesses and local deities.

(F) Kalbelias :-

The Kalbelias are traditional snake charmers-familiar figures with snake and been instrument (made of gourd), commonly seen in townships, on road sides and fairs. These nomadic tribes make their temporary settlements on the outskirts of villages and towns when needed. Kalbelias are proficient in the art of decoying and catching snakes. They are well versed in methods of treating snake bites and scorpion stings, for which they use various plants as an

antidotes. The main festival of this tribe is ‘Nagpanchami’ when they worship ‘Nagdevta’.

(G) Bairwa :-

This is scheduled caste and consists of mainly labourers. They provide labour for agriculture, grazing, mining and for departmental works of forest and other departments. This class supplements their economy with some cattle and goats. Their main dependency factors are small timber for house building.

(H) Kanjar :-

Kanjars are involved in criminal activities. While wandering, they attack traders and wedding parties, etc. and rob them dagger point. For solving disputes, they prefer their caste panchayats rather than law courts.

(I) Sansis :-

Sansis are a semi-nomadic criminal community having the profession of hunting and theft. Sansis families keep donkeys and dogs. They depend on forest for shelter and medicare.

(J) Raibaris :-

Raibaris are cattle traders who regularly visit the area along with herds of sheep and camels.

(K) Mogiyas :-

This is a landless nomadic tribe of the area. This community comprises of professional hunters and is a real threat to all kind of wild animals everywhere. Mogiyas do poaching of all kinds including commercial poaching for skin, flesh and bones, poaching for food and for crop protection. They are employed by farmer of all classes, to protect their crop from wild animals and

stray cattle. For this service they in turn are protected. Mogiyas are nomadic and move in camps depending upon availability of employment and availability of wild animals. This tribe is very small in number but negative community for conservation of wild life.

The ethnic people of the area are most backward in their livelihood, food habits, culture etc. This is because of the physiography, climate, vegetation and other environmental conditions.

SOCIO- ECONOMIC STATUS OF ETHNIC PEOPLE OF AREA

The population around the Ramgarh Vishdhari Wild Life sanctuary are mainly agriculturist, pastoralist, and agriculture labourers. They primarily depended on the natural resources of the sanctuary especially for fuel wood and grasses. The protected area also puts some negative impacts on the population. There is a general feeling among the people that the very existence of sanctuary is main reason for lack of development activities in the region. This is a serious problem of attitude in the region.

For evaluation of socio-economic status of ethnic people of the area, three types of villages are selected :-

(A) Villages inside the sanctuary
(B) Villages which are on the boundary of sanctuary
(C) Villages which are 2 to 10 Km. from sanctuary

The data of the human and cattle population in the villages which are inside and around sanctuary has been taken from Wild Life Division (Ramgarh Vishdhari Wild Life sanctuary) of Forest Department, Bundi. The maps of the concerning villages have also been taken from the same department.

(A) Villages inside the sanctuary -

This is zone of heaviest influence and for this reason it is selected as an area, which should immediately be taken into consideration for eco development to reduce the pressure from sanctuary.

There are 8 villages inside the Ramgarh Vishdhari Wild Life sanctuary. The forest dependency in this area is maximum. The villages were a source of considerable disturbance to the natural ecosystem and more evidently to the wild animals. The villages have a large number of cattle and are using the forest land extensively for grazing their animals. This had resulted in severe erosion of palatable grasses and most of the areas are highly degraded.

TABLE – 7.1

LIST OF VILLAGES WHICH ARE INSIDE THE SANCTUARY

S.No.	NAME OF VILLAGE	HUMAN POPULATION	CATTLE POPULATION
1.	BHERUPURA	593	1522
2.	KESHAVPURA	428	484
3.	BHIM GANJ	551	2231
4.	JAWARA	493	823
5.	HARIPURA	628	802
6.	GULKHERI	352	878
7.	GURA MAQDUKA	441	594
8.	DHUNDLA JI KA BADA	302	237

The main communities in these villages are Meena and Gurjars. Both these communities are forest dependent for grazing and for small timber and fuel wood, while other communities are dependent mainly for fuel wood and small timber for building purposes. The land holdings are very small in these villages. These villages are totally dependent on forest resources for fuel-wood, small timber and building material along with grazing.

The presence of these villages due to then dependency has depleted the habitat inside the sanctuary and has degraded the forest areas within 2 to 5 Km. radius from the village depending upon the population of the village and cattle population.

(B) Villages which are on the boundary of sanctuary –

As we go further from the boundaries of the Ramgarh Vishdhari Wild Life sanctuary, the dependency of the people on the sanctuary area decreases but the impact on the sanctuary is still there, with seasonal dependency. In the areas further than 2 Km. from sanctuary boundaries, the negative impacts of the sanctuary are not felt much. It is the political and social influence of this area which can affect the well being of Ramgarh Vishdhari Wild Life sanctuary.

TABLE – 7.2

LIST OF VILLAGES WHICH ARE ON THE BOUNDARY OF THE SANCTUARY

S.No.	Name of Village	Human Population	Cattle population
1.	JETPUR	794	757
2.	NAND GAON	352	1270
3.	PIPLIYA	1593	1073
4.	MOTIPURA	717	887
5.	LUHARPURA	726	758
6.	MANKCHOWK	244	432
7.	KHATKAR	3612	1750

8.	BALDEVPURA	51	304
9.	KHATTYARI	756	412
10.	RAJWAS	599	312
11.	AKHER	773	267
12.	HARIPURA	512	429
13.	JHAR BALAPURA	608	282
14.	NAYA GAON	352	157
15.	RATA BARDA	367	315
16.	GANPATPURA	414	423
17.	SHYOPURIYA	727	170
18.	BUNDI	258916	---
19.	DALELPURA	778	200
20.	THIKARDA	3238	9000
21.	DHANAWA	709	2000
22.	AKODA	757	4000
23.	FAJALPURA	233	1500
24.	DARA KA NAYA GAON	1315	1500
25.	DABETA	1221	350
26.	KALA NALA	553	2200
27	VISHDHARI	915	600
28.	MARRA	454	375
29.	MUNDALI	523	205
30.	FATAHPURA	421	527
31.	DEVPURA	431	250
32.	PALASTUNI	451	1125
33.	BARBAS	420	440

The revenue lands around the Ramgarh Vishdhari Wild Life sanctuary is totally cultivated and cannot provide much support to the sanctuary area to meet the demand of natural resources of the local people in the form of small timber, building material, fuel- wood and grazing.

There are 33 villages which are on the boundary of the sanctuary. The people of this zone consider the sanctuary as a regular source of supply to meet their demand of natural resources. The main demands are –

(i) Grazing of livestock.

(ii) Fuel - wood.

(iii) Non wood forest produce like fruits, leaves, thatching stone, sand.

(iv) Poles for building purpose, small timber and tools.

(v) Poaching for food by some communities like Mogiyas, Kanjar and others.

To meet the demand of above needs this zone puts maximum negative impact on the sanctuary area in following forms:-

(i) Heavy grazing reduces the regeneration of forest and disturbs the habitat.

(ii) Illegal removal of green fuel-wood reduces the forest cover and degrades the affected area.

(iii) Poaching affects the population of endangered wildlife species.

(iv) Removal of Non Timber Forest Product disturbs the habitat and the illegal presence of people in the sanctuary creates biotic disturbance.

(C) Villages which are 2 to 10 K.ms. from sanctuary –

In Ramgarh Vishdhari Wild Life sanctuary, 35 villages included as an area within 10 Km. distance from sanctuary boundary. The dependency of this area on the sanctuary is seasonal. The type of dependency is during monsoon for grazing of livestock but during winter it is for collection of fuel wood and small timber. The dependency of influence varies from area to area.

TABLE – 7.3

LIST OF VILLAGES 2 TO 5 K.M. FROM RAMGARH VISHDHARI WILD LIFE SANCTUARY

S. No.	Name of Village	Human Population	Cattle Population
1.	RAGUNATHPURA	615	500
2.	KABUL	604	1500
3.	RAM CHANDRA JI KA KHERA	618	2000
4.	BORDA	647	2000
5.	SIYANA	991	1000
6.	RAMPURIYA	170	200
7.	DOKOON	1023	225
8.	BHAMAR	277	85
9.	MANPURA	405	280
10	LEELDA	424	700
11.	SABBALPURA	693	350
12.	KUWAN GAON	403	560
13.	JOATI KALAN	1299	75
14.	KUNDALIYA	578	40
15.	KHARIBARA	380	100
16.	KESARPURA	428	100
17.	SAMARBA	563	160
18.	BHERUPURA OJHA	942	160

TABLE – 7.4

LIST OF VILLAGES 5 TO 10 K.M. FROM RAMGARH VISHDHARI WILD LIFE SANCTUARY BOUNDARY

S. No.	Name of Village	Human Population	Cattle Population
1.	ALOD	3513	1000
2.	DHABHION KA NAYA GAON	1274	1500
3.	BOR KHANDI	1171	50
4.	DUGARI	3910	3000

5.	BHAJNERI	2737	200
6.	DEOPURA	431	250
7.	DODI	1037	160
8.	BANSI	3414	3500
9.	URANSI	606	675
10.	BEEJANTA	320	600
11.	PHOLAI	426	250
12.	GOTHRA	4557	3716
13.	AJETA	319	412
14.	DEELUNDA	403	200
15.	LOHLI	507	200
16.	KALAMAL	572	2200
17.	SADERA	395	367

The average lands holding of people of the area are very small with a large number of marginal farmers having large families. Some communities are pastoralists. Landless communities are dependent upon labour work for livelihood. Other communities such as agriculturalist, pastoralists and land less labourers form the major portion of the society. All these communities have natural resource base economy, mainly dependent on rainfall resulting poor economy.

Status of Educational and Medical Facility in Ramgarh Vishdhari Wild Life Sanctuary Area:-

Educational/Medical facility	**No. of villages of inside and around the sanctuary where facility available**
Primary Education	21
Middle Education	29
Secondary Education	21
Higher Education	03
Allopathic Hospital/Dispensaries/Centres	23

Ayurvedic Hospital/ Dispensaries	05
Homeopathic Hospital/ Dispensaries	01

ECONOMIC PROFILE

The people of the area are mainly agriculturist and pastoralist, whose economy is totally based upon natural resources of lands and forest, supplemented with labour work in mines, Government development works and in the agriculture fields of other people. Agriculture is a seasonal work and does not provide employment throughout the year.

People of the area keep a large number of cattle. Due to heavy pressure of grazing the areas of the sanctuary are critically degraded and recovery is very difficult due to continuous pressure. The land holding in the villages are small and the quality of cattle is also poor which result in poor economy of the people in general. There is no large or small industrial set up in the area.

A large section of the remaining society in the area is labour class and landless. They do jobs in mining, agriculture fields, house building and all other type of labour which is available to them. The labour works are also seasonal, and job opportunities reduce during rainy season and in summers. The poor economy of the area tends to make people more dependent on natural resources, for meeting their livelihood demands from the sanctuary since the resources of other lands are already degraded and used up. This dependency leads to the degradation of the areas in many ways.

SACRED GROVES

Tribal’s living in isolation but in harmony with nature. Forests provide them with food, medicines and other material requirements and satisfy their deep sentiments, beliefs and convictions related to the forest ecosystem and biological wealth. Many author reviewed the cultural and religious perspectives

associated with sacred groves. It is intended to create an emotional bond between culture and conservation without being explicit.

People have always evolved many traditions and systems for the conservation of the ecosystem. The tree of *Prosopis cineraria* (Khejadi) is considered of high sacred value for the Bishnois in Rajasthan. They grow and conserve it as a result of which their villages are lush green and alive with black buck, chinkara, nilgai and peafowl. The concept of vegetational conservation via sacred groves is not new to India. The rich cultural heritage shows the presence of various plants in village and their use by the community. Many plants are commonly used in performing various rituals and are planted by them in country yard or farmyard. The first record of sacred groves in India belongs to Kosambi (1962). Most of the sacred groves reported from India are in the Western Ghats, North Eastern India and Central India (Gadgil and Vartak 1976, Burman 1992, Tripathi 2001, Khumbongmayum etal., 2005).

The basic idea behind the establishment of sacred groves is about fulfilment of dual purpose for villagers and tribal's. Firstly, vegetational conservation with an additional factor to provide scenic beauty to their sacred spots, soothing shade and cool breeze to pilgrims and spiritual peace to devotees; secondly, rational utilization of tree products having edible and medicinal value. A sacred grove is another unique tradition which has been responsible for preserving biodiversity pockets in various parts of the country. Usually a part of temple land, sacred groves are the areas which are important as they, represent the original flora of the locality preserved in its natural form without any outside disturbance. These are the patches of vegetation and some times of the fauna within, for example, snakes and monkeys are considered sacred and worshipped by people. Such groves occur in many parts of the country.

Most of these sacred groves are situated in remote areas, within or nearest the forest. These groves are almost undisturbed due to religious faith of

the local people. Comprising innumerable lofty trees, lianas, herbs, shrubs, parasitic plants and ferns, these well-preserved canopies of vegetation in the sacred groves is quite distinct and remarkable from that of surrounding areas. There should be focusing on ideologies and practices of conservation; such as– relationship between tradition and modernity for economic and social development; particular views of culture, nature, biocultural diversity for sustainable development; common guiding principles for recognition of indigenous- sacred sites. The tribe or other ethnic society who have mental connection with sacred groves will be the real expert.

Sacred groves are patches of natural vegetation demarcated by ancient societies and protected on the basis of religious practices and cultural traditions. They left patches of original vegetation undisturbed as an index of their reverence and declared them sacred and inviolable. Human activities like deforestation and hunting are restricted within the grove. These groves are distributed in many areas of this sanctuary. These are ‘Safety Forest’ and mentioned in this chapter.

Ethnic people are performed their social, cultural and ritual needs at this groves on occasions. Present status of sacred groves is on path of gradual decline due to advent of modern civilizations, old plants devastation and exotic weeds invasion. Taboos are begining to weaken. Appropriate institutional mechanisms are required to safeguard these natural gifts of ecological complexes. The status of the sacred groves in various parts of India is changing very fast and biodiversity maintained in them for hundreds of years is under threat due to contradiction and conflict in between tradition and modernity.

Some pockets of almost climax vegetation, preserved on religious ground as sacred groves in remote tribal areas, become endangered due to loss of traditional lore and beliefs. There is an urgent need to document and monitor these existing sacred groves in biodiversity from biological and socio cultural perspective. The valuable vegetation protected in the sacred groves is ruined. The loss of sacred groves is the loss of knowledge on rare, endangered and

threatened species, loss of certain special groups of plants which are endemic or have medicinal importance. Thereby, it may be deduced that appropriate institutional mechanisms are required to safeguard these natural gifts of ecological complexes which possess genetic variorum and true seed bank for the future. There should be sense of belongings in conservation interventions and have social and emotional attachment to place.

Nearly 29 Sacred groves from the forest tracts of the Ramgarh Vishdhari Wild Life sanctuary are studied. Aboriginal trees are mainly *Anogeissus pendula, Terminalia arjuna, Ficus benghalensis, Ficus religiosa, Lannea coromandelica, Holoptelea integrifolia* and *Mitragyna parvifolia*. Their heights are varying within 9.00 to 30.00 m and girth measuring 1.00 to 10.00 m.

Some important trees are devastated due to attacked by *Polyporus* fungus. Density of many plant species are controlled by the invasion of exotic weeds like *Lantana camara, Ipomoea fistulosa* and *Parthenium hysterophorus.* Some indigenous trees of these groves become threatened due to soil erosion.

Foot wear or any other leather wear is not permitted inside the grove of the region. Hunting is totally restricted in these sites. To break these rules is strictly prohibited in these groves. Neither trees can be cut down nor the branches can be axed at some site. The groves of the area are related with Teja Ji, Devnarayan Ji (Dev Ji), Mata ji, Mahadev Ji, Hanuman Ji, Goga Ji, and Sagas Ji. Some sacred mosques and edifices (Mazar) of Sufi saints are also observed in the area. The edifices (Mazar) of Meera Sahib and Jharpir are prominent example in the area. Sacred groves of Ramgarh Vishdhari Wild Life sanctuary area are presented in Table 7.5.

TABLE – 7.5

SACRED GROVES OF RAMGARH VISHDHARI WILD LIFE SANCTUARY AREA

1. Dobra Mahadev
2. Bala Ji Ka Nala
3. Amba Wala Nala
4. Ramjhar
5. Jamunia Deh
6. Kharia Nade
7. Bheru Ji Ka Deh
8. Banskhol Kui
9. Gend Ka Mahadev
10. Kheil Ka Mahadev
11. Baba Rawal Ji Ka Nala
12. Jawara Mata Ji
13. Jhar Mahadev
14. Jhar Pir
15. Meera Sahib Ki Dungari
16. Bilkeshwar Mahadev
17. Dundhala Ka Bada
18. Chot Mata Temple
19. Banganga Temple
20. Tilkeshwar Mahadev
21. Jhalkhoh Mahadev
22. Bad Ka Mahadev
23. Dhundhla Ji Ka Aasram
24. Rameshwar Mahadev
25. Mohali Ka Mahadev
26. Ghati Ka Mahadev
27. Patiyal Ka Mahadev
28. Piplaj Mata Ji Temple
29. RamgarhVishdhari Temple

These groves of area have been found conserving numerous plant species for example *Anogeissus pendula, Anogeissus latifolia, Butea monosperma, Salvadora oleoides, Aegle marmelos, Ficus benghalensis, Ficus religiosa, Ficus racemosa, Emblica officinalis, Musa paradisiaca, Calotropis*

gigantea, Gossypium hirsutum, Thespesia populnea, Syzygium cumini, Alangium salvifolium, Mangifera indica, Canna indica, Mitragyna parvifolia, Morinda tomentosa, Ocimum sanctum, Ocimum basilicum, Annona squamosa, Zizyphus mauritiana, Terminalia bellirica, Terminalia arjuna Lawsonia inermis, Bauhinia racemosa, Wrightia tinctoria, Lannea coromandelica, Diospyros melanoxylon, Ehretia laevis, Cordia dichotoma, Argyreia sericea, Datura metal, Barleria prionitis, Tamarindus indica, Vitex negundo, Santalum album, Jatropha curcas, Holoptelea integrifolia, Cannabis sativa, Asparagus racemosus, Phoenix sylvestris, Bambusa arundinacea, Cynodon dactylon, Dendrocalamus strictus, and *Desmostachya bipinnata.*

The ethnic people of the area preserve individual plants, forests and forest patches traditionally on religious grounds and worship forest gods in order to maintain a lasting relationship with nature. These sacred groves in this study area are worshipped for different religious functions and play an important role in social and cultural aspects.

MAGICO- RELIGIOUS BELIEFS

Indian culture preaches that all constituents of ambient nature are part of God, supreme power itself. Plants like *Ficus religiosa, Azadirachta indica, Ocimum sanctum and Cynodon dactylon* are known to divine qualities. Vedas and Upanishads all provides immense information about the importance of plant used in mythology. The study of plants, plant product and plant formation (such as forest and groves) associated with faith and tradition forms the discipline of Divine Botany. Hindu religion has cosmic believes for all happening in their life, including sickness and sufferings, besides also have a close association and respect for many animals and plants in religious activities. It is truly said that the trees are our ancestors. Though we use the parts of plants for worship but the entire tree is worthy to god as tree are the perception of god’s wonderful creation. Efforts should be made to save plants that are used in worship as traditional knowledge of rural communities clearly

reflect the importance of the plants in worship that proves to be bliss to human being on earth.

Occurrence and persistence of culture in tribal the communities are mostly due to certain taboos and strong beliefs supplemented with folklore. Plant species have become an integral part of tribal life and culture. It is but natural then that in tribal songs, folklore and beliefs, there are profuse references to trees, shrubs, climbers and their peculiarities. Trees and flowers are often personified and compared with most beautiful creations of God as symbols of good and bad omens. They thus become tools and means of witch craft and sorcery.

There are many folk-tales and beliefs about sacred groves and medicinal plants. There are also folk-tales who narrate how to behave with nature, during festivals, under difficult circumstances, etc. Many of these provide useful data on plant species of economic importance.

Keeping this view in mind, the efforts have been made during the course of studies to unveil mythological aspects and sacred beliefs among the tribals and rural people of Ramgarh Vishdhari Wild Life sanctuary. Along with material culture like food, medicine and shelter, plants have been closely associated also with many social customs and mythological rituals of man. Many flowers, fruits or whole plant have been used for offering in worship and some plants are themselves worshipped or considered sacred. Some plants are believed to possess magical properties, some plants are considered as essential on many social ceremonies and worship. People leave to eat brinjal (*Solanum melongena*) to remove certain disease like piles, skin spot etc. and with a great religious belief they serve Brinjal to particular god at particular places like Rameshwar and Gend Ka Mahadev in Ramgarh Vishdhari Wild Life sanctuary. Many plants species are used in removing the evil eye or ‘nazar’. The list of such types of plants of the area with their families are mentioned below :-

Name of Plant	Family
Abrus precatorius	Fabaceae
Abutilon indicum	Malvaceae
Acacia catechu	Mimosaceae
Acacia nilotica	Mimosaceae
Achyranthes aspera	Amaranthaceae
Aegle marmelos	Rutaceae
Actiniopteris radiata	Pteridaceae (Pteridophyte)
Annona squamosa	Annonaceae
Azadirachta indica	Meliaceae
Bambusa arundinacea	Poaceae
Balanites aegyptiaca	Balanitaceae
Brassica rapa	Brassicaceae
Butea monosperma	Fabaceae
Calotropis gigantea	Asclepiadaceae
Calotropis procera	Asclepiadaceae
Cannabis sativa	Cannabinaceae
Cassia fistula	Caesalpiniaceae
Capsicum annuum	Solanaceae
Citrus limon	Rutaceae
Crotalaria burhia	Fabaceae
Cynodon dactylon	Poaceae
Datura metal	Solanaceae
Dendrocalamus strictus	Poaceae
Desmostachya bipinnata	Poaceae
Echinochloa colonum	Poaceae
Emblica officinalis	Euphorbiaceae
Ficus benghalensis	Moraceae

Ficus religiosa	Moraceae
Lawsonia inermis	Lythraceae
Mangifera indica	Anacardiaceae
Moringa oleifera	Moringaceae
Mitragyna parvifolia	Rubiaceae
Nelumbo nucifera	Nelumbonaceae
Nymphaea nauchali	Nympheaceae
Ocimum basilicum	Lamiaceae
Ocimum sanctum	Lamiaceae
Phoenix sylvestris	Arecaceae
Polyalthia longifolia	Annonaceae
Ricinus communis	Euphorbiaceae
Santalum album	Santalaceae
Solanum melongena	Solanaceae
Syzygium cumini	Myrtaceae
Tamarindus indica	Caesalpiniaceae
Tinospora cordifolia	Menispermaceae
Trapa natans	Trapaceae
Tribulus terrestris	Zygophyllaceae
Zizyphus nummularia	Rhamnaceae

The taxonomic account of such types of plant species of mythological significance and importance in religious ceremonies of the Ramgarh Vishdhari Wild Life sanctuary are given. In this enumeration sacred and superstitions belief of the tribe and local people of the study area have been considered. Based on the investigation of the plants are having religious or totemic significance 19 species have been enumerated in alphabetical order along with their local names, families and mythological significance.

1. *Acacia nilotica* (Mimosaceae)

   Local name – Babool or Bulia

   Mythological significance – This tree is a major component of many sacred grove of area. These trees are strictly protected against cutting and grazing at certain places.

2. *Actiniopteris radiata* (Pteridaceae)

   Local name – Morpankhi

   Mythological significance – Among the tribes of study area, there is a common belief that fumigation or 'dhooni' of its dried leaves is useful for the remedy of 'nazar' or evil eye in case of babies.

3. *Aegle marmelos* (Rutaceae)

   Local name – Bel or Bello

   Mythological significance – Bel tree is considered to be very sacred because it is associated with Lord Shiva. It is said that Lord Shiva is pleased by offerings of leaves from the Bel tree, particularly in Sawan (rainy season).

4. *Anogeissus pendula* (Combretaceae)

   Local name – Dhokra or Dhok

   Mythological significance – This tree is a common feature of occurrence in many sacred groves of the area. In these areas, these trees are supposed to be conserved and protected at any cost.

5. *Azadirachta indica* (Meliaceae)

   Local name – Neem or Neemdo

   Mythological significance – In the bright half of the month of Chaitra (March-April) which is known as Nav-Ratra, special

importance is attached to it. The women worship it with offerings of flowers vermillion and other fragrant objects. Shitala the goddess of smallpox - is said to inhabit it. Leaves of it are used for remedy of chicken pox.

6. *Butea monosperma* (Fabaceae)

   Local name – Khakara or Dhak

   Mythological significance – *Butea monosperma* grows luxuriantly in the forest of sanctuary area. In many religious ceremonies its leaves considered sacred and used.

7. *Calotropis gigantea* (Asclepiadaceae)

   Local name – Safed Akda

   Mythological significance – The complete root of the plant is taken out and holy effigy of Ganeshji, is prepared. It is worshipped regularly.

8. *Calotropis procera* (Asclepiadaceae)

   Local name – Aak or Akra

   Mythological significance – Its leaves and flowers are considered sacred and offered to the gods. Flower and buds are used in worship of Lord Shiva particularly in sawan.

9. *Cynodon dactylon* (Poaceae)

   Local name – Doob or Dhob

   Mythological significance – The leaves are offered to Lord Ganesha especially on Wednesday. The women of the area worship Lord Shiva and Parvati along with Doob. It is used in all religious worship.

10. *Datura innoxia* (Solanaceae)

Local name – Dhatura

Mythological significance – The flowers and fruits are offered to Lord Shiva on every Monday of Shravan month and Shivratri in area.

11. *Echinops echinatus* (Asteraceae)

Local name – Oont Kateli

Mythological significance – Root piece of this plant is placed in or tied of pregnant women at the time of childbirth and as soon as delivery is over, this root piece is removed immediately.

12. *Emblica officinalis* (Euphorbiaceae)

Local name – Aanwla

Mythological significance – It is worshiped by women especially in the month of Kartik (October - November). The fruits are offered on "Dev Uthani Gyaras" and worshipped for arise the God.

13. *Ficus benghalensis* (Moraceae)

Local name – Bad

Mythological significance – This tree is one of the most holy trees under which religious preaching were imparted in certain area. It is worshipped everywhere in region on Vatpoojani Amavasya. Besides, there is strict prohibition on its cutting.

14. *Ficus religiosa* (Moraceae)

Local name – Peepali or Peepal

Mythological significance – The women of the area worship this tree on the Somavati Amavasya. The tree is treated as highly sacred and its cutting or destruction is strictly prohibited.

15. *Mangifera indica* (Anacardiaceae)

Local name – Aam

Mythological significance – On all auspicious occasions such as birth and marriage, etc. the leaves of the mango tree are used. Among the tribal of the area, the leaves of this tree are important in rituals. These are hung in laces in front of the gate of the house/hut.

16. *Madhuca indica* (Sapotaceae)

Local name – Mahua

Mythological significance – The tree has got cultural and economic importance. The tribes of the area consider this tree as highly auspicious.

17. *Musa paradisiaca* (Musaceae)

Local name – Kela

Mythological significance – The leaves are used to make the ceremonial pavilion and pooja. Banana fruit is offered to god and used as “Prashad”. The tree is worshipped.

18. *Ocimum sanctum* (Lamiaceae)

Local name – Tulsi

Mythological significance – Tulsi is one of the most sacred plants in complete area. There are two types of Tulsi worshiped in area. “Rama Tulsi” has light green leaves and is larger in size, while “Krishna Tulsi” has dark green leaves and is important for the worship of Vishnu. In the ceremony of Tulsi vivah, Tulsi is ceremonially married to Vishnu annually on the month of Kartika. Tulsi is considered to be effective for keeping away evil spirits.

19. *Saccharum officinarum* (Poaceae)

Local name – Ganna or Santha

Mythological significance – The plant is worshiped on the day of "Dev Uthani Gyaras" and Deepawali.

During the survey of the area, it has been observed that tribals of certain places directly or indirectly related with plants or their products. They worship the plants of the respective species and do not use them in any form. These types of plants species have been enumerated in Table 7.6. Plants or plant parts used for religious ceremonies in Ramgarh Vishdhari Wild Life sanctuary are given in Table 7.7.

TABLE – 7.6

List of the plants whi ch are prohibited to use in certain places

S.No.	Common Name	Botanical Name	Taboo
1.	Dhokra	*Anogeissus pendula*	Not damaged at sacred place, worshiped.
2.	Bans	*Bambusa arundinacea*	Do not use in fire and fuel.
3.	Bad	*Ficus benghalensis*	Do not use wooden item, worship.
4.	Gular	*Ficus racemosa*	Worship, never cut it.
5.	Peepal	*Ficus religiosa*	Worship, never cut it.
6.	Chandan	*Santalum album*	Worship the wood, never cut it.
7.	Began / Bhatta	*Solanum melongena*	Do not eat fruit till expectation is fulfilled.

TABLE – 7.7

PLANTS OR PLANT'S PART USED FOR RELIGIOUS CEREMONIES IN STUDY AREA

S.N.	Common Name	Botanical Name	Family
1.	Sita Phal	*Annona squamosa*	Annonaceae
2.	Kamal	*Nelumbo nucifera*	Nelumbonaceae
3.	Paras Pipal	*Thespesia populnea*	Malvaceae
4.	Kapas	*Gossypium hirsutum*	Malvaceae
5.	Bel	*Aegle marmelos*	Rutaceae
6.	Neem	*Azadirachta indica*	Meliaceae
7.	Bordi	*Zizyphus nummularia*	Rhamnaceae
8.	Aam	*Mangifera indica*	Anacardiaceae
9.	Moonphali	*Arachis hypogaea*	Fabaceae
10.	Chirmi / Ratti	*Abrus precatorius*	Fabaceae
11.	Amaltas	Cassia fistula	Caesalpiniaceae
12.	Imli	*Tamarindus indica*	Caesalpiniaceae
13.	Babool	*Acacia nilotica*	Mimosaceae
14.	Jamun	*Syzygium cumini*	Myrtaceae
15.	Mehndi	*Lawsonia inermis*	Lythraceae
16.	Singhada	*Trapa natans*	Trapaceae
17.	Kachari	Cucumis callosus	Cucurbitaceae
18.	Kakoda	*Momordica dioica*	Cucurbitaceae
19.	Safed Akda	*Calotropis gigantea*	Asclepiadaceae
20.	Akda	*Calotropis procera*	Asclepiadaceae
21.	Dhatura	*Datura innoxia*	Solanaceae
22.	Kala Dhatura	*Datura metal*	Solanaceae
23.	Tulsi	*Ocimum sanctum*	Lamiaceae

24.	Chandan	*Santalum album*	Santalaceae
25.	Aanwla	*Emblica officinalis*	Euphorbiaceae
26.	Bad	*Ficus benghalensis*	Moraceae
27.	Gular	*Ficus racemosa*	Moraceae
28.	Peepali / Peepal	*Ficus religiosa*	Moraceae
29.	Khajur	*Phoenix sylvestris*	Arecaceae
30.	Bans	*Bambusa arundinacea*	Poaceae
31.	Doob	*Cynodon dactylon*	Poaceae
32.	Kush	*Desmostachya bipinnata*	Poaceae
33.	Samma	*Echinochloa colonum*	Poaceae
34.	Santha / Ganna	*Saccharam Officinarum*	Poaceae

Non Timber Forest Product

Tribals and local people depend upon forest for their existence in several ways. The degree of dependence of tribals on forest depends upon various factors. These factors include their socio-economic conditions, distribution, cultural and religious norms, literarcy etc. The Non Timber forest products of sanctuary area are Tendu leaves (Bidi making), Dhak / Khakhara leaves (Pattal-Dona making), Gums, honey, fruits, grass, fodder, leaves of Khajur, medicinal herbs and shrubs etc. These minor forest produce are found over the entire forest of the sanctuary area. Among these minor forest produces, Tendu leaves (*Diospyros melanoxylon*) extracted departmentally where as others are collected by local people on contract, auctioned or by rural forest management samiti.

Major sources of revenue obtained through Non Timber Forest Product in Ramgarh Vishdhari Wild Life sanctuary area are :-

1. Medicinal plants
2. Leaves of *Butea monosperma* and *Diospyros melanoxylon*
3. Leaves and fruits of *Phoenix sylvestris*

4. Fruits of *Mangifera indica, Syzygium cumini, Tamarindus indica* and *Manilkara hexandra*
5. Gums of *Acacia catechu, Acacia nilotica, Anogeissus pendula, Anogeissus latifolia, Lannea coromandelica, Sterculia urens* and *Boswellia serrata*
6. Honey

Various non timber forest products of this area have been discussed in this chapter, such as ethnomedicinal plants, wild edible plants, plants for beauty care and plants of various economic importance. Status of Non Timber Forest Products (Bidi wrapping and Gums) in study area are given in Table – 7.8.

Procedure of collection of *Diospyros melanoxylon leaves* (Tendu patta) in area :-

The collections of Tendu leaves ***(****Diospyros melanoxylon)* initiate in the end of April and continue till first week of June, when leaves colour changes from red to bright green. Tendu leaves are available also after it but they become dry. So the work of collection has to be stopped. Then the work of separation of leaves is started.

One roll is made of fifty leaves. Roll of leaves are spread under sun to dry. After three days the leaves are turned to other side to dry. Leaves of Tendu become dry completely within 6 to 10 days. Dry leaves are filled in the bags of jute. Water is sprinkled on leaves in the evening to prevent them from dryness, so that their plybility can be preserved. The leaves are filled in the bags before sun rise. According to the marketing standard one bag of rolls consists one thousand roll of leaves, which weight is about 40 kg.

TABLE – 7.8

Status of main Non Timber Forest Products in study area

(Bidi wrapping and Gums)

S. No.	Non Timber Forest Products	Sources of plant species	Habitat	Method of collection	Type of destruction	Current status
1.	Tendu-Leaves	*Diospyros melanoxylon*	Hilly	Pruning of tree, collection of leaves, sundry	Insufficient operation	Less production
2.	Gums of Kadya Salar Gurjan Babool Khair Dhok	*Sterculia urens* *Boswellia serrata* *Lannea coromandelica* *Acacia nilotica* *Acacia catechu* *Anogeissus pendula*	Hilly/Slopy Hilly Hilly/Slopy Plains Hilly/plains All localities	Blazing the stems	Over exploitation of Gum	Heath of trees hampered

ETHNOMEDICINAL PLANTS

Modern medical facilities are not available to the tribal people, particularly those who live in hilly forested area of Ramgarh Vishdhari Wild Life sanctuary. Moreover, some of the villages that is in the remote area i.e. Jawara ki Jhopriya do not have any transport facilities. In this sanctuary there are 03 Hospital and 20 community and public health centres. Besides, there are 05Ayurvedic hospitals and dispensaries and 01Homeopathic hospitals in the area.

The economic conditions of the tribal and other non tribal rural people do not permit them to undergo modern medical treatment, which involves a lot of expenditure. This group of people therefore, is compelled to take the traditional ethno-medicines available in their areas for which they need not go to far away places. Traditionally and culturally they are habituated and prefer this type of indigenous healers. This is because of easy accessibility, low cost, culturally acceptable and long term family association. The information on plants species was collected by arranging meeting, dialogues and discussions with rural, tribal and knowledgeable people from study area. In the enumeration, the following aspects of plants are given. The collected plants are arranged alphabetically, and their botanical name, family, common name and ethno-medicinal uses are given:-

1. *Abelmoschus moschatus* Medic.

   Family: Malvaceae

   Common name: Muskdana

   Medicinal use: Seeds are stimulant, antispasmodic, cooling tonic, carminative and aphrodisiac. Seeds powders are given orally with honey in black cough.

2. *Abrus precatorius* L.

Family: Fabaceae

Common name: Ratti / Chirmi

Medicinal use: Decoction of root is used in cough and cold, colic pain and also in abortion. The seeds are purgative, tonic and aphrodisiac.

3. *Abutilon indicum* (L.) Sweet

Family: Malvaceae

Common name: Kanghi

Medicinal use: The seeds are laxative, its powder is used in constipation. Seeds are known antidote for the scorpion bite. The leaves of the plant are eaten, cooked for the treatment of bleeding piles, and juice is used for stone in bladder. Root powder is used in fever.

4. *Acacia catechu* (L. f.) Willd.

Family: Mimosaceae

Common name: Khair / Kattha

Medicinal use: Wood sap is digestive which eating with pan. This plants stem are cooling and digestive, useful to soothe throat, mouth and gum pain and as a cooling application to ulcers, boils and eruptions of skin.

5. *Acacia nilotica* (L.) Willd.

Family: Mimosaceae

Common name: Babool / Bulia

Medicinal use: Its properties are purgative and abortifacient. Young leaves and gum are used to cure urinogenital disease and used as a blood purifier. Bark is applied in sore throat and mouth ulcers. Twigs and barks are used in toothache.

6. *Acalypha indica* L.

Family: Euphorbiaceae

Common name: Kuppi

Medicinal use: Stem and root are used for constipations. Leaf juice is used for headache.

7. *Achyranthes aspera* L.

Family: Amaranthaceae

Common name: Aandhi jhara

Medicinal use: The juice of leaves is valuable in stomach disorders, kidney problem and is also applied externally over cuts and wounds. Root and seed powder are given as an antidote in scorpion sting, dog and snake bite. Seeds mixed with milk are used as tonic.

8. *Actiniopteris radiata* Link.

Family: Pteridaceae (Pteridophyte)

Common name: Morpankhi

Medicinal use: Crushed fresh leaves are taken orally with water as anthelmintic. Ash and paste of the leaves is used in bronchitis. It overcomes irregularity in menses period.

9. *Adiantum capillus – veneris* L.

Family: Pteridaceae (Pteridophyte)

Common name: Hansraj

Medicinal use: Leaf juice and decoction of leaves are used as expectorant in bronchitis.

10. *Adiantum incisum* Forssk.

Family: Pteridaceae (Pteridophyte)

Common name: Hansraj

Medicinal use: Leaves are used in cough, cold and bronchitis.

11. *Adhatoda zeylanica* Medic.

Family: Acanthaceae

Common name: Adusa

Medicinal use: Leaf decoction is used in bronchitis and cough. It is good medicine for Asthma. Leaf paste is used externally in nerve pain.

12. *Aegle marmelos* (L.) Corr.

Family: Rutaceae

Common name: Bel / Bello

Medicinal use: Leaves are used in ulcer, jaundice, diabetes and malarial fever. Fruit juices are used in stomach disease.

13. *Ailanthus excelsa* Roxb.

Family: Simaroubaceae

Common name: Arlu/ Gohda Neem

Medicinal use: Decoction of leaves and bark are taken in cure of malaria. Bark and leaves are applied to skin eruptions.

14. *Alangium salvifolium* (L. f.) Wangerin

Family: Alangiaceae

Common name: Ankola

Medicinal use: Seed oil is used in paralysis. It remove weakness and useful in skin disease. Root bark is used orally in treatment of snake bite, fever and skin disease.

15. *Albizia lebbeck* (L.) Benth.

Family: Mimosaceae

Common name: Siris

Medicinal use: Decoction of bark, leaves and fruit is given in case of anemia and for curing itch. The leaf paste is applied in snake bite and

scorpion sting. Flowers are used externally in treating boils, skin eruption and swellings.

16. *Alternanthera sessilis* (L.) R. Br. ex DC.
Family: Amaranthaceae
Common name: Bhiringi jhar / Matsyaksi
Medicinal use: Plant stem and leaves are applied in case of snake bite. Leaf juice is used in fever and increase the breast milk after delivery.

17. *Amaranthus spinosus* L.
Family: Amaranthaceae
Common name: Cholai
Medicinal use: Root and leaves are used in animal and insect bite.

18. *Andrographis paniculata* (Burm. f.) Wall. ex Ness
Family: Acanthaceae
Common name: Kalmegh
Medicinal use: The whole plant is used as febrifuge, tonic and anthelmintic. Leaves are used in stomach disorder and children colic pain.

19. *Annona squamosa* L.
Family: Annonaceae
Common name: Sitaphal
Medicinal use: The paste of seeds is used in bone fracture. Ripe fruit are very sweet and they enrich the blood. Leaves and young fruits are made into paste and used on the body of animals to kill insects.

20. *Argemone mexicana* L.
Family: Papaveraceae
Common name: Pili Kateli

Medicinal use: The root paste is applied externally to the scorpion sting. Seed oil is used externally for skin disease and dysentery.

21. *Argyreia sericea* Dalz.

Family: Convolvulaceae

Common name: Tamesari

Medicinal use: The decoction of roots purifies the blood. Poultice of leaves is used to cooling and reduce the swelling. The paste of the root is applied externally in snake bite.

22. *Aristolochia indica* L.

Family: Aristolochiaceae

Common name: Goriser

Medicinal use: Root powder used in uterine contraction, leucoderma, fever, snake-bite and anthelmintic disease.

23. *Asparagus racemosus* Willd.

Family: Liliaceae

Common name: Shatawari

Medicinal use: Root powder and juice are used in case of dysentery, acidity, weakness, headache, jaundice and urinary disorders.

24. *Azadirachta indica* A. Juss.

Family: Meliaceae

Common name: Neem / Neemdo

Medicinal use: The decoctions of the leaves are taken orally with inflorescence in cure of malarial fever. Leaves poultice are used locally in snake-bite. Juice of leaves are taken orally as blood purifier and prevent intestinal helminthes. Paste of seed are used in skin disease. Bark is used in malarial fever, cough, cold and ulcers. Leaves and seed are used in leprosy and skin disease.

25. *Balanites aegyptiaca* (L.) Del.

Family: Balanitaceae

Common name: Hingota

Medicinal use: Whole plants are used for wound healing and respiratory disorder. It has bactericidal properties. Dry powder of the mature fruit is used as anthelmintic. and prevents pregnancy.

26. *Barleria prionitis* L.

Family: Acanthaceae

Common name: Bajardanti

Medicinal use: Leaf paste is used in skin disease. Leaf juice is used for toothache, whooping cough, skin disease and urinary disorder. Dried root powder is given to mothers for increasing lactation.

27. *Bauhinia racemosa* Lam.

Family: Caesalpiniaceae

Common name: Jheenjha

Medicinal use: Seed and bark extract are used as insecticide. Its extract is used in weakness. Fruit are used in case of bronchitis and cough. Stem bark powder is given orally with milk and sugar after abortion.

28. *Blumea lacera* (Burm. f.) DC.

Family: Asteraceae

Common name: Kakronda

Medicinal use: Extract of leaves is applied internally to remove intestinal worms in children and used in wound healing.

29. *Boerhavia diffusa* L.

Family: Nyctaginaceae

Common name: Punarnava / Santi

Medicinal use: Root powder is effective in stomach pain, intestinal colic, worms and nervous weakness. Fresh juice is given as a blood purifier and gets relief from muscular pain. The whole plant is used in gastric problems. Dried of whole plants are used as antipyretic.

30. *Boswellia serrata* Roxb. ex Cocls.

Family: Burseraceae

Common name: Salai / Salar

Medicinal use: Stem bark paste used externally in all pain of bone. Powdered flowers cure cold and fever. The yellow coloured gum exudes from the bark is an effective stimulant, expectorant and diuretic.

31. *Butea monosperma* (Lam.) Taub.

Family: Fabaceae

Common name: Dhak / Khakhara

Medicinal use: Flower and gum are used for joining of bone. Leaves, flower and gums extract are useful in swelling. Seed oil is applied in leucoderma. Gums are taken for increase the semen.

32. *Calotropis gigantea* (L.) R. Br.

Family: Asclepiadaceae

Common name: Safed Akada

Medicinal use: Root bark paste is used in dysentery. Leaves paste used as poultice for inflammatory swellings. Latex applied externally to heal obstinate ulcers and wounds.

33. *Calotropis procera* (Ait.) f.

Family: Asclepiadaceae

Common name: Aak / Akada

Medicinal use: The root paste is applied externally on snake and scorpion bite. The latex is applied externally over swollen portion to reduce pain in piles and boils. It is also used as abortifacient.

34. *Capparis decidua* (Forsk.) Edgew.

Family: Capparaceae

Common name: Kair / Karil

Medicinal use: Root bark is given orally in fever. The fresh juice of the stem is cures ring worms disease. Dried powdered fruits are given for cough and heart disease.

35. *Capparis sepiaria* L.

Family: Capparaceae

Common name: Clat / Hains

Medicinal use: Decoction of leaf is used orally in blood purifier. The pastes of fruits are used externally on pain of joints.

36. *Cassia fistula* L.

Family: Caesalpiniaceae

Common name: Amaltas

Medicinal use: Bark paste is given orally by women for premature abortion. The bark and fruits are anti dysenteric tonic and eaten raw to treat stomachache. Bark and pods are used in fever.

37. *Celastrus paniculata* Willd.

Family: Celastraceae

Common name: Malkangani

Medicinal use: Seed oil is useful in epilepsy, skin disease and rheumatism. Crushed stem bark is given orally in case of snake bite. Decoction of whole plant is used in skin disease. Seeds powder is used

orally for increase the memory power, weakness of mind and increase the body power.

38. *Centella asiatica* (L.) Urban

Family: Apiaceae

Common name: Brahmi

Medicinal use: The leaf paste is used externally in headache and skin disease. Leaf juice is taken orally as memory tonic, cooling and blood purifier.

39. *Cissus quadrangularis* L.

Family: Vitaceae

Common name: Hadijod

Medicinal use: Crushed and poultice of stem is used for bone setting, wound healing and early cure of bone fracture.

40. *Cleome viscosa* L.

Family: Cleomaceae

Common name: Bagro / Hulhul

Medicinal use: The paste of whole plant is used externally to heal ulcers and wounds. Leaf juice is taken orally in fever. Powdered seed mixed with oil and used to kill head lice. The poultice of seed relieves chronic joint pains.

41. *Clerodendrum phlomidis* L. f.

Family: Verbenaceae

Common name: Arni

Medicinal use: Leaf paste is tide over stomach for reducing urinary inflammations. Root is acrid, astringent, cardio- tonic and carminative.

42. *Cocculus hirsutus* (L.) Diels

Family: Menispermaceae

Common name: Bajarbel

Medicinal use: Leaves are used for skin disease and joint pain. It has cooling effect. Leaf juice is applied externally on forehead to relieve headache, it is used orally with water for increase the semen.

43. *Convolvulus microphyllus* Sieb. ex Spreng.

Family: Convolvulaceae

Common name: Shank pushpi

Medicinal use: The whole plant is used as a brain tonic. The decoction of whole plant is used for increase the memory power and cooling.

44. *Crateva nurvala* Buch. - Ham.

Family: Capparaceae

Common name: Varna

Medicinal use: Decoction of leaf is used in case of dysentery. Leaf paste is used externally on the stomach after the delivery. Plants bark is used for urinary infection and liver disease.

45. *Cynodon dactylon* (L.) Pers.

Family: Poaceae

Common name: Dhob / Doob

Medicinal use: Juice of plant is used in fresh cuts and wounds, hysteria, epilepsy and insanity. The paste of whole plant is useful to get relief from burning sensation during urination. Plant juice is also used in stopping blooding nose.

46. *Cyperus rotundus* L.

Family: Cyperaceae

Common name: Motha

Medicinal use: Rhizome is used in stomach troubles. The tubers yield in an essential oil of antibiotic wound healing and cooling properties. It is taken internally to expel intestinal worms. The decoction of root is given orally in fever. Root juice is taken orally in snake bite.

47. *Dalbergia sissoo* Roxb.

Family: Fabaceae

Common name: Shisham

Medicinal use: Decoction of leaves are used in swelling and urinary problems. Leaf juice is given orally in blood leucorrhoea and diabetes.

48. *Datura metal* L.

Family: Solanaceae

Common name: Kala dhatura

Medicinal use: Dried leaves crushed into powder and used orally with lukewarm water for treatment of asthmatic bronchitis.

49. *Dendrophthoe falcata* (L. f.) Etting.

Family: Loranthaceae

Common name: Banda

Medicinal use: Decoction of whole plant is used orally with honey in bronchitis and respiratory problems. Leaf and flowers paste is used externally in swelling. Leaf juice is applied externally on wound.

50. *Desmodium gangeticum* (L.) DC.

Family: Fabaceae

Common name: Salparni

Medicinal use: Root and seeds are taken separately after grinding in water to get rid of intestinal worms. The leaves are applied externally in weakness due to diarrhoea and dysentery.

51. *Dichrostachys cinerea* (L.) Wight & Arn.

Family: Mimosaceae

Common name: Goya Khair

Medicinal use: Stem bark powdered is used in urinary complaints. Root powder is used in renal trouble, rheumatism, stone, urine and kidney disease.

52. *Diospyros melanoxylon* Roxb.

Family: Ebenaceae

Common name: Tendu

Medicinal use: Fruits are used in leucorrhoea, diabetes and blood purifier. Leaf is used in dysentery and acidity problems.

53. *Echinops echinatus* Roxb.

Family: Asteraceae

Common name: Oont kateli

Medicinal use: Plant is diuretic, used to treat cough and indigestion. Root piece is tied with hairdo of bearing women at the time of birth and soon as delivery is over, this root piece is to be removed immediately. Powdered root are applied over wound of cattle for early healing.

54. *Eclipta alba* (L.) Hassk.

Family: Asteraceae

Common name: Bhangra

Medicinal use: The juice of leaves is applied externally in snake bite. Decoction of leaves used to rinse hair to maintain the black colour. Fresh juice of leaves promotes growth of hair and stops the premature graying of hair.

55. *Ehretia laevis* Roxb.

Family: Ehretiaceae

Common name: Gondi

Medicinal use: Juice of leaves are taken orally with water in digestive problems and constipation.

56. *Elytraria acaulis* (L. f.) Lindau

Family: Acanthaceae

Common name: Patharchatta

Medicinal use: Root and inflorescence are used in kidney stone and paste of leaves is applied on boils.

57. *Enicostema axillare* (Lam.) Raynal

Family: Gentianaceae

Common name: Nav / Navri

Medicinal use: The whole plant is used in general fever and malaria disease. Plant infusion is given to treat intestinal worms.

58. *Euphorbia hirta* L.

Family: Euphorbiaceae

Common name: Badiduddhi

Medicinal use: The leaf paste and juice are used on ringworm and scabies. The milky juice of the plant is useful in promoting hair growth and in the treatment of warts and cracking of skin. Latex is used in skin disorders.

59. *Evolvulus alsinoides* (L.) L.

Family: Convolvulaceae

Common name: Neeli shankpushpi

Medicinal use: Decoction of whole plant are used as brain tonic. It is effective in fever, debility and hair growth. Its regular use helps in mental stress.

60. *Feronia limonia* (L.) Swingle

Family: Rutaceae

Common name: Ket

Medicinal use: Leaf juice is used in acidity. Fruits are given in diarrhoea. Gum is used for digest the food.

61. *Ficus benghalensis* L.

Family: Moraceae

Common name: Bad

Medicinal uses: Fresh latex of leaves are used orally in general debility and enhance the strength. Milky juice exuded is applied externally for pain in rheumatism and lumbago. Root fibers are given in gonorrhea.

62. *Ficus racemosa* L.

Family: Moraceae

Common name: Gular

Medicinal use: Latex is used in dysentery, genital disease, toothache and cough. Leaves are used in diabetes and mouth ulcers.

63. *Ficus religiosa* L.

Family: Moraceae

Common name: Peepali / Peepal

Medicinal use: Leaves and young shoots are used as purgative and skin disease. Decoction of leaves and juice of fruit are used in general fever.

64. *Fumaria indica* (Haussk.) Pygsley

Family: Fumariaceae

Common name: Pitpapara

Medicinal use: Plant is used as diuretic, laxative and an efficient liver tonic. It is also used in skin disease and to purify blood. The dry plant is given orally in jaundice and fever.

65. *Grewia tenax* (Forsk.) Fiori

Family: Tiliaceae

Common name: Gangren

Medicinal use: Stem bark decoction is given in cough and muscular pain. It has cooling effect. Decoction of leaves are use in diarrhoea.

66. *Helicteres isora* L.

Family: Sterculiaceae

Common name: Marorphali

Medicinal use: Powder grinding of fruit is used in dysentery, diarrhoea, colic pain, stomach disorder and amoebiosis. Dried powder of stem is taken orally with water in dysentery.

67. *Heliotropium indicum* L.

Family: Boraginaceae

Common name: Nelkanthi

Medicinal use: Leaf juice is used orally in case of scorpion stings. Root powder is used orally with water in cough, bronchitis and skin disease.

68. *Holarrhena pubescens* (Buch. – Ham.) Wall ex G. Don

Family: Apocynaceae

Common name: Kutaja /Kurchi /Kadwa indarjau

Medicinal use: The leaves are chewed and the juice is given in fever. Root, stem bark and seed are used in dysentery, diarrhoea, colic pains and remove worms from intestine. Stem paste is used as an antidote to snake bite poisoning. Seed are used in constipation, cholera and amoebiosis.

69. *Holoptelea integrifolia* (Roxb.) Planch.

Family: Ulmaceae

Common name: Churel / Bandar ki roti

Medicinal use: Bark is made into paste and applied on wounds to expel worms in animals. Boil leaves paste is used externally in skin disease.

70. *Indigofera linnaei* Ali

Family: Fabaceae

Common name: Bekario

Medicinal use: The juice of plant is diuretic, alternative and is also used to treat chronic venereal disease.

71. *Jatropha gossypifolia* L.

Family: Euphorbiaceae

Common name: Deshi jamalgota

Medicinal use: Leaf paste is used externally for swelling. Decoction of whole plant is used as antibacterial, anti-inflammatory, purgative and stomachache. Seed paste and powder is applied in leprosy, constipation and cattle wounds.

72. *Lawsonia inermis* L.

Family: Lythraceae

Common name: Mehndi

Medicinal use: Bark of plant is useful in liver enlargement. Flowers cure headache caused by heat of the sun. Leaf paste is also useful in skin problems, inflammatory swelling and baldness. It is used as a colouring agent.

73. *Leucas aspera* (Willd.) Link

Family: Lamiaceae

Common name: Goma

Medicinal use: Leaf decoction is applied over forehead to get relief from headache. Decoction of inflorescence is given in respiratory disorder, cough and cold.

74. *Madhuca indica* J. F. Gmelin

Family: Sapotaceae

Common name: Mahua

Medicinal use: Flowers juice is used orally with water in acidity, stomach disorder, high blood pressure and headache. Flower paste is applied externally in hydrocele. Seeds juice is taken orally for increase semen

75. *Marsilea minuta* L.

Family: Marsileaceae (Pteridophyte)

Common name: Jal buti

Medicinal use: Leaves are laxative and sedative. Its juice is used in insomnia.

76. *Maytenus emarginatus* (Willd.) Ding Hou

Family: Celastraceae

Common name: Kankero

Medicinal use: An ointment of leaves used in wounds .Stem is used as toothbrush and pain of teeth. Leaf paste is anti-inflammatory. Fruits are used in ulcer and piles, as a blood purifier. Leaves juice are useful in jaundice and liver disorder

77. *Merremia emarginata* (Burm. f.) Hall. f.

Family: Convolvulaceae

Common name: Musakani

Medicinal use: Whole plant is used for swelling and pain killer. It is used as antidote in snake bite.

78. *Mitragyna parvifolia* (Roxb.) Korth.

Family: Rubiaceae

Common name: Kalam

Medicinal use: Leaves are used in dysentery

79. *Mollugo cerviana* (L.) Seringe

Family: Molluginaceae

Common name: Parpat

Medicinal use: Decoction of the whole plant is used in urinary trouble and stomach disease. Seed juice is given orally with water for body cool during summer.

80. *Momordica dioica* Roxb. ex Willd.

Family: Cucurbitaceae

Common name: Kakoda

Medicinal use: Fruits are used in diabetes. Vegetable of fruits are used for increase the blood.

81. *Moringa oleifera* Lam.

Family: Moringaceae

Common name: Sahejna

Medicinal use: The oil obtained from seed is applied locally in acute rheumatism. A paste of leaves heals wounds. Flowers are used as tonic and diuretic. Unripe pod is eaten and useful in circulatory stimulant.

82. *Mucuna pruriens* (L.) DC.

Family: Fabaceae

Common name: Kaunch

Medicinal use: Seeds are nerve tonic and effective in leucorrhoea and paralysis. Seeds and hairs are considered a powerful aphrodisiac medicine. Decoction of the whole plants is used for increase the body power and mental disease.

83. *Nymphaea nauchali* Burm f.

Family: Nymphaeaceae

Common name: Kumud

Medicinal use: Rhizome is demulcent and useful for dysentery and dyspepsia. Seed powder is applied orally with water in cough.

84. *Ocimum canum* Sims.

Family: Lamiaceae

Common name: Bapchi

Medicinal use: Leaf paste is used externally on swelling and wound. Seeds are taken in malaria and heart disease. Decoction of whole plant is prescribed in cough and cold.

85. *Oxalis corniculata* L.

Family: Oxalidaceae

Common name: Tinpatiya / Khattibuti

Medicinal use: The juice extracted is taken after meals with the addition of common salt. Whole plant is useful for stomachache, piles, skin disease, cuts, wounds, snake bite and chronic cough.

86. *Pergularia daemia* (Forsk.) Chiov.

Family: Asclepiadaceae

Common name: Dudhi bel

Medicinal use: Latex used for quick relief of wounds and swelling. Decoction of leaf is prescribed in asthma. Plant extract is used for treating uterine and menstrual troubles.

87. *Phoenix sylvestris* (L.) Roxb.

Family: Arecaceae

Common name: Khajur

Medicinal use: Fruits are sweet and given for increase the semen. Fruits and plants juice is taken for build strong the nervous system.

88. *Phyllanthus fraternus* Webster

Family: Euphorbiaceae

Common name: Bhumi amnla

Medicinal use: Whole plant is crushed and taken with water to cure dysentery. Whole plant juice mixed with *piper* is given in diabetes. Its extract is used in viral hepatitis and as a diuretic. Decoction of plant is used in cold fever, jaundice and urinary infection.

89. *Pluchea lanceolata* (DC.) Clarke

Family: Asteraceae

Common name: Rasna

Medicinal use: Leaf paste is used in swelling and joint pain.

90. *Pongamia pinnata* (L.) Pierre

Family: Fabaceae

Common name: Karanj

Medicinal use: Fatty oil is taken out from seeds and applied in case of leucoderma and as used in antifungal and diabetes. Bark paste is useful in constipation and indigestion. Oil of seeds is a valuable drug for skin disease and rheumatism.

91. *Portulaca oleracea* L.

Family: Portulacaceae

Common name: Kulfa

Medicinal use: Decoction of the whole plant is used in urinary disorder, liver, kidney, spleen, hepatitis and bladder diseases. Seed powder is taken orally in pain of stomach and as a blood purifier. Whole plant paste is applied externally in snake bite.

92. *Pterocarpus marsupium* Roxb.

Family: Fabaceae

Common name: Bijasar

Medicinal use: Heartwood extract is useful in diabetes and obesity. Root paste is used externally on fracture of bone. Stem juice is given orally in mouth ulcer and stomachache Leaf paste is used externally in snake bite.

93. *Pulicaria crispa* (Forsk.) Benth. & Hook. f.

Family: Asteraceae

Common name: Soneli

Medicinal use: Leaf paste is applied for relief in headache. The young stem barks is tied as bandage over cuts and wounds for early healing.

94. *Ranunculus sceleratus* L.

Family: Ranunculaceae

Common name: Jal dhaniya

Medicinal use: Decoction of whole plant is applied in respiratory disorder. Leaf juice is taken orally in balance of hormonal system. Root powder is taken orally with water in acidity and arthritis.

95. *Ricinus communis* L.

Family: Euphorbiaceae

Common name: Arandi / Andoli

Medicinal use: Leaf paste is used externally in pain of joints, skin disease and swelling. Oil cures dandruff, dermatitis and other skin diseases. Oil from seeds is used for scorpion stings. Seeds are highly purgative and cure diarrhoea.

96. *Salvadora oleoides* Decne.

Family: Salvadoraceae

Common name: Jal / Pilu

Medicinal use: Leaves are used to cure cough and bronchitis. Leaf juice is taken orally with water in asthma and piles. Fruit is used in cool of the body.

97. *Sida cordifolia* L.

Family: Malvaceae

Common name: Bala / Kharanti

Medicinal use: Juice of root is used for healing wounds. Root bark powder with milk is used in nervous disease. Whole plants are used as mild expectorant.

98. *Sisymbrium irio* L.

Family: Brassicaceae

Common name: Asalio

Medicinal use: Leaves are used in the affections of the throat and hest. Seeds soaked in water over night and given to children as a cooling drink during summer. Seed powder is given in internal fever and bronchitis.

99. *Solanum nigrum* L.

Family: Solanaceae

Common name: Makoi

Medicinal use: Fruits powder is given orally in bronchitis. Decoction of plant and berries are used in fever, diarrhoea, eye disease and hydrophobia. Plant juice is given orally in chronic enlargement of the liver.

100. *Solanum surattense* Burm. f.

Family: Solanaceae

Common name: Bangani kateli

Medicinal use: Whole plant extract are effective in bronchial asthma. Root paste is given orally in snake bite and scorpion stings. Fruits are used in pain of stomach. Oil prepared from powdered fruits is used to treat skin eruption.

101. *Sphaeranthus indicus* L.

Family: Asteraceae

Common name: Gorakhmundi

Medicinal use: Whole plants are a tonic, deobstruent, alterative and aphrodisiac and paste is used externally on swelling and joint pain. Root and seeds are anthelmintic. Flowers are cooling, eaten to treat conjunctivitis. Fruits and whole plant is used in indigestion, blood purifier, liver and gastric disorder.

102. *Syzygium cumini* (L.) Skeels

Family: Myrtaceae

Common name: Jamun

Medicinal use: Seeds are used for treating diarrhoea, constipation, dysentery and diabetes. Leaf juice is used orally in dysentery and leucorrhoea.

103. *Tamarindus indica* L.

Family: Caesalpiniaceae

Common name: Imli

Medicinal use: Seeds paste is used in leucorrhoea, acidity and diabetes. Seed kernel is used as a mild purgative and stimulant. Poultice of fresh leaves is applied over swellings, bleeding piles and boils. Fruit pulp is considered as a refrigerant, digestive, carminative and laxative.

104. *Tephrosia purpurea* (L.) Pers.

Family: Fabaceae

Common name: Sarpunkha

Medicinal use: Root paste is applied externally in swelling and skin disease. Plant extract is given in liver disorder. It has cooling effect. The oil obtained from seeds is used in skin diseases and eczema.

105. *Terminalia arjuna* (Roxb. ex Dc.) Wight & Arn.

Family: Combretaceae

Common name: Kohda

Medicinal use: Bark is astringent, used in fever, fracture and also taken as cardiac tonic. Bark is used in heart disease, pain of chest, blood pressure and expectorant. Fruits are used in acidity, diarrhoea and dropsy.

106. *Terminalia bellirica* (Gaertn.) Roxb.

Family: Combretaceae

Common name: Baheda

Medicinal use: The oil obtained from seeds is used externally on skin disease and leucoderma. Fresh fruits are taken in weakness. Dry fruits are useful in stomach disorder such as indigestion and diarrhoea.

107. *Thespesia populnea* (L.) Soland. & Corr.

Family: Malvaceae

Common name: Paras pipal

Medicinal use: Decoction of bark is used orally for treatment of blood disorder and cooling. Powder of fruits are given in respiratory disease and cough. Bark and fruits are eaten in diabetes. Fruits and bark juice is given in abdominal pain.

108. *Tinospora cordifolia* (Willd.) Miers

Family: Menispermaceae

Common name: Giloy

Medicinal use: Stem powder is used orally with water in fever, diarrhoea and chronic dysentery. Juice of stem is useful in fever and diabetes. Root decoction is emetic and is used as an antidote to snake bite. Extract of the plant is prescribed in jaundice, urinary disease, and cough.

109. *Trapa natans* L.

Family: Trapaceae

Common name: Singhada

Medicinal use: Paste of leaves and seeds are applied on swelling and wounds. Seeds are given in weakness. Plant decoction is given in blood disorder and increase the semen.

110. *Trianthema portulacastrum* L.

Family: Aizoaceae

Common name: Santhi

Medicinal use: Decoction of plant is effective in night blindness. Plant decoction is also used in rheumatism, swelling, stomach, liver and kidney disorder.

111. *Tribulus terrestris* L.

Family: Zygophyllaceae

Common name: Gokhru

Medicinal use: Decoction of the whole plant is applied as a general health tonic. Decoction of fruit is taken as diuretic, demulcent, aphrodisiac and also as tonic. Paste of leaves and fruits are used in the treatment of stones in bladder. Decoction of leaves is useful as a gargle for mouth trouble.

112. *Trichodesma amplexicaule* Roth

Family: Boraginaceae

Common name: Andhahuli

Medicinal use: The whole plant paste is applied externally on swelling and wounds. Roots powder is taken orally with water in case of snake-bite.

113. *Tridax procumbens* L.

Family: Asteraceae

Common name: Kali mehndi / Mundi

Medicinal use: Leaf juice is used to treat bleeding in fresh wounds. Leaves are used for blood clotting.

114. *Urginea indica* (Roxb.) Kunth

Family: Liliaceae

Common name: Kolikanda

Medicinal use: Poultice of bulb is used to reduce the pain and swelling of gout. Alcoholic extract is considered in treatment of rheumatism, skin problem, dropsy and renal calculi. Bulb is used as expectorant, stimulant and cardiotonic.

115. *Vernonia cinerea* (L.) Less.

Family: Asteraceae

Common name: Sahadevi

Medicinal use: Root juice is used externally on the body in case of fever. Decoctions of plants are given in colic, acidity, diarrhoea and stomachache. Plant juice is given in incontinence of urination and to relieve piles.

116. *Vetiveria zizanioides* (L.) Nash

Family: Poaceae

Common name: Khas

Medicinal use: Root paste is applied externally on head for treatment of headache. Root juice is given orally with water in fever.

117. *Vitex negundo* L.

Family: Verbenaceae

Common name: Nirgundi / Nagad

Medicinal use: Seed oil is used for swelling as ointment. Leaves are used in headache and rheumatism. Root and leaf juice are taken in cough, swelling and paralysis. Flowers astringent applied in fever and liver complaints.

118. *Withania somnifera* (L.) Dunal

Family: Solanaceae

Common name: Asgandha

Medicinal use: Root is useful in sexual and general weakness and rheumatism. Root powders are effective in digestive disorder, rheumatic affection, insomnia, cold and cough. Leaves are applied in skin disease, wounds tumors and bone strengthens.

119. *Xanthium strumarium* L.

Family: Asteraceae

Common name: Adhasisi

Medicinal use: Leaf sap is dropped in to eye to cure conjunctivitis. Decoction of leaves are given in fever. Fruits are used externally for pain of glands.

120. *Zizyphus mauritiana* Lam.

Family: Rhamnaceae

Common name: Bada bor

Medicinal use: Leaves are taken to cure diarrhoea, cough and mouth ulcers. Seeds are used as antidote in snake bite. Seeds are sedative, antiemetic and relieve abdominal pain during pregnancy. Fruits are cooling anodyne and used as tonic, digestive and blood purifier. Leaf is used with *Emblica officinalis* for hair wash.

121. *Zizyphus nummularia* (Burm. f.) Wight & Arn.

Family: Rhamnaceae

Common name: Bordi

Medicinal use: Bark is used in dysentery, acidity, leucorrhoea and anemia. Dried leaves are applied in cough and cold. Paste of leaves is prescribed for healing cuts. The fruit are eaten.

Use of plants or plant's parts for various diseases by the rural people of study area is a common practice. This study depicts information on the medicinal uses of 121 taxa against the disease of the people of area suffer from. 117 Angiospermic and 04 Pteridophytic taxa represent these 121 medicinal plants under use.

The parts of medicinal plant used in the study area are shown percentage wise in Table 7.9. Parts of plants used as medicine is 52.06% leaves, 29.75% roots, 23.14% seed, 22.31% whole plant, 20.66% fruits, 14.04% stem, 13.22% bark, 7.43% flowers, 1.65% wood and 1.65% rhizome by local and tribal people of the study area.

TABLE – 7.9

PLANTS PARTS USED IN MEDICINE

No.	Parts used of medicinal plants	Percentage
1.	Rhizome	1.65
2.	Root	29.75
3.	Stem	14.04
4.	Bark	13.22
5.	Wood	1.65
6.	Whole plant	22.31
7.	Leaves	52.06
8.	Flowers	7.43
9.	Fruits	20.66
10.	Seeds	23.14

Nature (habit) of the studied medicinal plant of the area is shown percentage wise in Table 7.10. Maximum numbers of medicinal plant used in the studied area are herbs (37.19%). Thereafter Trees (33.88%), Shrub (11.57%), Under shrub (9.91%), Herbaceous climber (4.95%) and Lianas (2.48%) respectively in naturally habitat.

TABLE – 7.10

NATURE (HABIT) OF MEDICINAL PLANT

No	Habit of the medicinal plant	Percentage
1.	Herbs	37.19
2.	Herbaceous climber	4.95
3.	Lianas	2.48
4.	Under shrubs	9.91
5.	Shrubs	11.57
6.	Trees	33.88

Life form of the medicinal plants of the Ramgarh Vishdhari Wild Life sanctuary revealed that 121 species were observed during the year 2011 to 2014 (Table 7.11). 42.14% species belonged to Phanerophyte (Ph), while the percentage of Therophyte (Th), Hemicryptophyte (He), Cryptophyte (Cr) and Chamaephyte (Ch) were 35.54%, 12.39%, 5.79% and 4.13% respectively.

TABLE – 7.11

LIFE FORM IN MEDICINAL PLANTS OF STUDY AREA

No.	Life Form in Medicinal Plants of Study Area	Percentage
1.	Phanerophyte (Ph)	42.14
2.	Chamaephyte (Ch)	4.13
3.	Hemicryptophyte (He)	12.39
4.	Cryptophyte (Cr)	5.79
5.	Therophyte (Th)	35.54

Raunkiaer (1934) correlated the adaptation of various plants with the climate and emphasized the adaptations for survival, while classifying them in to categories known as life forms. He emphasized the position of the perennating buds and the protection afforded to them, as in his view these features would determine the survival of a species under extreme climatic conditions. The perennating organs are seeds, vegetative buds, rhizomes, tubers etc. These five major types of life forms are Phanerophyte (Ph), Chamaephyte (Ch), Hemicryptophyte (He), Cryptophyte (Cr) and Therophyte (Th). The percentage proportion of the species of different life forms represent as a 'biological spectrum'. In the present communication the study of life forms of medicinal plants of the area is reported. Phanerophytes were most prominent in the studied medicinal plant species of the area. It followed by Therophytes and Hemicryptophytes. Chamaephytes and Cryptophytes were poorly represented in the present study.

WILD EDIBLE PLANTS OF SANCTUARY AREA

Forest provided food and shelter to the man since ages. Man depended on forests for almost everything such as for food, for shelter and for meeting other basic needs. A number of plants from forest, yielded useful leaves, fruits, seeds, roots, rhizomes, etc. which could be eaten and provided subsistence to the human population. Most of the food materials obtained from the forest possess high nutritional values. Some of the species are excellent source of vitamin A (*Moringa oleifera*). Seeds of *Holoptelea integrifolia* and *Tamarindus indica* are rich in carbohydrate content.

Forests are the rich source of genetic diversity and they provide the store house of gene pool for many known and unknown plant species valued for food purposes. Some of the unknown plants can be the future food plants. The wild cultivars of the cultivated plants are important for breeding purposes introducing disease and pest resistant.

There are a large number of forest plants including trees, shrubs, herbs and climbers, which yield edible fruits. These fruits are eaten in a variety of forms. Some are eaten either riped or unriped, while other are consumed after cooking as curries. Some of the fruits are pickled and some are made into other products. Different parts of a fruit are edible may be the pulp, integument, etc. Stem and tubers of several plants are edible. Several forest plants produce leaves which can be consumed either raw or cooked. Several leaves are a good substitute for green vegetable. Some leaves make a good soup. Seeds of a large number of species are also edible. Some of them have a high market value. Flowers of several species form a part of human diet. Some flowers are used for making vegetables. Underground parts such as roots, rhizomes, tubers, etc. of several species are eaten and are nutritious. 'Kand' and 'Mool' (rhizomes and roots) were the traditional source of food for the tribals.

Important wild plant species of Ramgarh Vishdhari Wild Life sanctuary area those yielding edible fruits, stem and tuber, leaves, seeds, flowers and underground parts along with their common name and family are given. The study deals with 49 plant species consumed by tribals and other folk people of the sanctuary area.

Acacia catechu (Mimosaceae) Khair /Kattha. Gum is edible

Acacia nilotica (Mimosaceae) Babool. Gum is edible

Aegle marmelos (Rutaceae) Bel. Ripe fruit pulp is eaten

Agaricus campestris (Agaricaceae, Fungi). Kumbhi. Fruiting body is cooked and eaten as vegetable.

Amaranthus spinosus (Amaranthaceae) Cholai. Leaves are cooked and eaten as vegetable.

Amaranthus viridis (Amaranthaceae) Bhaji. Leaves are cooked and eaten as vegetable.

Annona squamosa (Annonaceae) Sitaphal. Fruits are eaten.

Anogeissus latifolia (Combretaceae) Safed Dhokra. Gum is edible.

Anogeissus pendula (Combretaceae) Dhokra. Gum is edible.

Asparagus racemosus (Liliaceae) Shatawari. Roots are eaten.

Azadirachta indica (Meliaceae) Neem. Leaves and Fruits are eaten

Bambusa arundinacea (Poaceae) Bans. Young shoots are cooked and eaten as vegetable.

Basella rubra (Basellaceae) Nakli kali mirch. Seeds are used.

Bauhinia racemosa (Caesalpiniaceae) Jheenjha. Fruits are eaten.

Boswellia serrata (Burseraceae) Salar. Gum is edible.

Bridelia retusa (Euphorbiaceae) Fruits are eaten

Capparis decidua (Capparaceae) Kair. Fruits are eaten as pickles.

Centella asiatica (Apiaceae) Brahmi. Leaves are eaten

Chenopodium album (Chenopodiaceae) Bathua. Leaves are cooked and eaten as vegetable.

Coccinia grandis (Cucurbitaceae) Kandori. Fruits are eaten as vegetable.

Commelina benghalensis (Commelinaceae) Leaves are eaten as vegetable.

Cucumis callosus (Cucurbitaceae) Kachari. Fruits are eaten

Dendrocalamus strictus (Poaceae) Bans. Young shoots are eaten as vegetable and also used in pickles.

Diospyros melanoxylon (Ebenaceae) Tendu. Fruits are eaten.

Ehretia laevis (Ehretiaceae) Gondi. Leaves are eaten.

Emblica officinalis (Euphorbiaceae) Amla. Fruits are eaten.

Echinochloa colonum (Poaceae) Samma. Seed are eaten.

Feronia limonia (Rutaceae) Kait. Fleshy aromatic pulp of fresh fruit is eaten and also made into Chatni.

Ficus benghalensis (Moraceae) Bad. Fruits are eaten.

Ficus racemosa (Moraceae) Gular. Fruits are eaten.

Holoptelea integrifolia (Ulmaceae) Churel / Bandar ki Roti. Fruits are eaten.

Lannea coromandelica (Anacardiaceae) Gurjan. Gum is edible.

Mangifera indica (Anacardiaceae) Aam. Fruits are eaten.

Manilkara hexandra (Sapotaceae) Raini. Fruits are eaten.

Momordica dioica (Cucurbitaceae) Kakoda. Fruits are eaten as vegetable.

Moringa oleifera (Moringaceae) Sahejna. Flower and fruits are eaten as vegetable.

Nelumbo nucifera (Nelumbonaceae) Kamal. Rhizome are cooked and eaten as vegetable.

Ocimum canum (Lamiaceae) Bantulsi. Leaves are eaten.

Oxalis corniculata (Oxalidaceae) Khatti-buti. Leaves are eaten.

Pithecellobium dulce (Mimosaceae) Jangal Jalebi. Fruits are eaten.

Phoenix sylvestris (Arecaceae) Khajur. Ripe fruits are eaten.

Physalis minima (Solanaceae) Fruits are edible.

Sterculia urens (Sterculiaceae) Kadya. Gum is edible.

Syzygium cumini (Myrtaceae) Jamun. Fruits are eaten.

Tamarindus indica (Caesalpiniaceae) Imli. Fruits are eaten and also made into souce and ‘Chatni’.

Terminalia bellirica (Combretaceae) Bahera. Gum is edible

Trapa natans (Trapaceae) Singhada. Fruits are eaten and powder of dry fruits is also used.

Zizyphus mauritiana (Rhamnaceae) Badabor. Fruits are eaten.

Zizyphus nummularia (Rhamnaceae) Bordi. Fruits are eaten.

PLANTS FOR BEAUTY CARE

Traditional use of plants (A check list) for beauty care by ethnic people of study area are given in Table 7.12.

TABLE – 7.12

Plant Name	**Family**	**Common Name**	**Part Used**	**Where Applied**
Aloe vera	Liliaceae	Gwar Patha	Leaves	Skin, Body
Azadirachta indica	Meliaceae	Neem	Leaves, seed and bark	Skin
Brassica campestris	Brassicaceae	Sarasoo	Seed	Skin
Butea monosperma	Fabaceae	Dhak, Khakhara	Leaves, bark	Smoothner of skin
Cannabis sativa	Cannabaceae	Bhang	Leaves	Face
Centella asiatica	Apiaceae	Brahmi	Leaves	Hair
Citrus limon	Rutaceae	Nimbu	Fruit	Face and Hair
Cymbopogon jwarancusa	Poaceae	Lemon grass	Leaves	Perfume, Body
Cucumis sativus	Cucurbitaceae	Khira	Fruit	Face
Curcuma longa	Zingiberaceae	Haldi	Rhizome	Skin and Face
Eclipta alba	Asteraceae	Bhangra	Whole plant	Hair
Emblica officinalis	Euphorbiaceae	Aanwla	Fruit	Hair
Foeniculum vulgare	Apiaceae	Saunf	Seed	Mouth
Hibiscus rosa-	Malvaceae	Gudhal	Leaves	Hair

sinensis				
Hordeum vulgare	Poaceae	Jao	seed	Skin
Lawsonia inermis	Lythraceae	Mehndi	seed	Hair, Skin
Mentha arvensis	Lamiaceae	Pudina	Leaves	Face
Medicago sativa	Fabaceae	Rhizka	Whole plant	Skin
Momordica charantia	Cucurbitaceae	Karela	Fruit	Skin
Musa paradisiaca	Musaceae	Kela	Fruit	Body
Ocimum sanctum	Lamiaceae	Tulsi	Leaves	Skin, Hair
Phoenix sylvestris	Arecaceae	Khajur	Seed	Face
Raphanus sativus	Brassicaceae	Munle	Leaves, root	Skin
Ricinus communis	Euphorbiaceae	Arandi	Fruit, leaves	Body
Rosa spp.	Rosaceae	Gulab	Flower	Face, Eye
Santalum album	Santalaceae	Chandan	Wood	Skin, Face
Sapindus emarginatus	Sapindaceae	Aritha	Fruit	Hair
Sesamun indicum	Pedaliaceae	Tili	Seed	Hair, Skin
Spinacia oleracea	Chenopodiaceae	Palak	Leaves Juice	Orally, Skin
Terminalia bellirica	Combretaceae	Bahera	Fruit, Powder	Hair
Tagetes erecta	Asteraceae	Hajara	Flower	Face
Trigonella foenum-graceum	Fabaceae	Methi	Seed, Powder	Skin, Hair
Vitex negundo	Verbenaceae	Negarh, Nirgundi	Leaves	Skin
Zingiber officinale	Zingiberaceae	Adrak	Rhizome paste and Juice	Skin

PLANTS OF ECONOMIC IMPORTANCE

The plant species, which are used by the rurals and folks of the study area for different purposes are listed down. The results pointed out that a number of plants are exploited for a variety of purposes which can be broadly categorised under 7 heads. These have been enumerated in Table 7.13.

TABLE – 7.13

Uses/Name of the Plant	**Family**	**Local Name**
Plants for House Building / Hut		
Aegle marmelos	Rutaceae	Bel
Bambusa arundinacea	Poaceae	Bans
Butea monosperma	Fabaceae	Khakhara / Dhak
Crotalaria burhia	Fabaceae	Jute
Dendrocalamus strictus	Poaceae	Bans
Eucalyptus citriodora	Myrtaceae	Safeda
Saccharum officinarum	Poaceae	Ganna / Santha
Saccharum spontaneum	Poaceae	Kaans grass
Trigonella foenum-graceum	Fabaceae	Menthi
Plants for Gums		
Acacia catechu	Mimosaceae	Kattha/ Khair
Acacia nilotica	Combretaceae	Safed Dhokra
Anogeissus latifolia	Mimosaceae	Babool
Anogeissus pendula	Combretaceae	Dhokra
Azadirachta indica	Meliaceae	Neem
Boswellia serrata	Burseraceae	Salar
Lannea coromandelica	Anacardiaceae	Gurjan
Sterculia urens	Sterculiaceae	Kadya
Plants for Fodder		

Anagalis arvensis	Primulaceae	Nilphuli
Anogeissus pendula	Combretaceae	Dhokra
Avena sativa	Poaceae	Jai
Azadirachta indica	Meliaceae	Neem
Calotropis procera	Asclepiadaceae	Aankda
Echinochloa colonum	Poaceae	Samma
Ficus religiosa	Moraceae	Peepal
Lathyrus aphaca	Fabaceae	Khasari
Medicago sativa	Fabaceae	Rizka
Melilotus alba	Fabaceae	Safed sanji
Melilotus indica	Fabaceae	Pili sanji
Pithecellobium dulce	Mimosaceae	Jangal Jalebi
Saccharum officinarum	Poaceae	Ganna/Santha
Sesbania sesban	Fabaceae	Dencha/Jayat
Wrightia tinctoria	Apocynaceae	Khirni
Plants for Beverages and Narcotics		
Aegle marmelos	Rutaceae	Bel
Cannabis sativa	Cannabaceae	Bhang
Madhuca indica	Sapotaceae	Mahua
Saccharum officinarum	Poaceae	Ganna / Santha
Plants as Dyes		
Acacia catechu	Mimosaceae	Kattha/khair (Wood dyes)
Butea monosperma	Fabaceae	Khakhara/Dhak (Flower dyes)
Eclipta alba	Asteraceae	Bhangra (Flower and Leaf dyes)
Lawsonia inermis	Lythraceae	Mehndi (Leaf dyes)
Mallotus philippensis	Euphorbiaceae	Rohini (Flower dyes)
Nyctanthes arbor-tristis	Oleaceae	Harsingar (Fruit dyes)
Plants for Fibres		
Bombax ceiba	Bombacaceae	Semal
Calotropis gigantea	Asclepiadaceae	Safed Aakda

Calotropis procera	Asclepiadaceae	Aakda
Crotalaria juncea	Fabaceae	Sun
Gossypium hirsutum	Malvaceae	Kapas
Saccharum bengalense	Poaceae	Munj
Typha angustata	Typhaceae	Aera
Plants for Miscellaneous Uses		
Butea monosperma	Fabaceae	Khakhara, uses as 'Pattal – Dona'
Crotalaria juncea	Fabaceae	Sun, uses as Biofertilizer
Diospyros melanoxylon	Ebenaceae	Tendu, uses as Bidi-wrapping
Ipomoea fistulosa	Apocynaceae	Angregi Akada, To check soil erosion
Lawsonia inermis	Lythraceae	Mehndi, uses as Biofences
Phoenix sylvestris	Arecaceae	Khajur, used for making broom
Saccharum spontaneum	Poaceae	Kaans, used for making "mudda" and broom
Vetiveria zizanioides	Poaceae	Khas, used for making broom, chatai, tati etc.
Wrightia tinctoria	Apocynaceae	Khirni, Latex uses as Curd making

It is apparent from the findings that the folk people of the Ramgarh Vishdhari Wild Life sanctuary are dependent on the plant resources in their vicinity, and these resources play a vital role in their routine life. They exploit the plant resources for house (hut) building, food, fodder, broom, mat, gum, beverage, dye, fertilizer, cosmetics and religious ceremonies. These multifarious uses of the rich raw materials available in the surrounding forest warrant the establishment of cottage industries in the area for the economic uplift of rural populations.

MANAGEMENT PLAN

The Ramgarh Vishdhari Wild Life sanctuary is spread in one district i.e. Bundi. The terrain is hilly, undulating and well wooded. There are a number of villages all round and inside the sanctuary. There is lot of movement of people in this region. To provide adequate protection to the wildlife, to manage the protected area and to conserve the flora proper management planning is of paramount importance. Conservation values of Ramgarh Vishdhari Wild Life sanctuary are :-

1. A bio-diversity rich area in the state.
2. An important corridor between Ranthambore Tiger Reserve and Mukundra hills in the south which in turn is part of Greater Hadoti landscape.
3. The biodiversity rich areas possess important scientific, educational, aesthetic and recreational value.
4. A large and representative example of Aravalli and Vindhyan ecosystem consisting of *Anogeissus pendula* forest.
5. Potential viable population of wild life.
6. Centrally located as a link between a chain of protected areas from Dholpur to Bhensrodgarh.

The Ramgarh Vishdhari Wild Life sanctuary is situated amidst high human density areas. Because of human activities, particularly the cattle, the villagers are dependent directly or indirectly on the sanctuary, thus causing adverse impact. Again, due to of legal formalities, wildlife damage occurring to their crops and livestock there is adverse impact of sanctuary on the people.

The presence of a protected area affects the lives of local people in various forms, which creates a negative impact of the sanctuary on the local people. The main issues are :-

(i) An opinion among the people that development has stopped due to the presence of the sanctuary like construction of roads, dams, electric lines making bore well for drinking irrigation which are not allowed inside the sanctuary area.

(ii) No major industry is allowed to develop in the area.

(iii) Crop raiding by wild ungulates and livestock lifting by carnivores has resulted in financial losses.

(iv) The restriction on entry into sanctuary for grazing and for forest products needs has resulted in loss of earning from the natural resources.

Management of sanctuary play an important role in conservation of biodiversity. The objective of present research work are :-

(i) To reduce negative impact of local people

(ii) To provide extensive support of local people for their mythological and religious belief

(iii) To develop the concept of sacred grove in effective manner.

(iv) To discuss with different ethnic and social groups of sanctuary area to receive their traditional knowledge.

(v) To provide relevant information of protected plants species within sacred groves of sanctuary

(vi) To study the social customs, ceremonies and mythological rituals of nomadic, tribal and rural people of area

(vii) To prepare a floristic list of this area along with the uses of plant species

(viii) To promote the herbal product

(ix) To provide an information regarding conservation and management of ecosystem of the area

(x) To recognise the value of biodiversity, causes of biodiversity loss and strategies for conservation

(xi) To utilize properly the Non Timber Forest Products of sanctuary

(xii) To receive knowledge about ethnomedicinal plants of the area

The Ramgarh Vishdhari Wild Life sanctuary has a potential to be extended as satellite area for Ranthambore Tiger Reserve. This sanctuary can be home for expanding population of Ranthambore Tiger Reserve. This also part of proposed Rajiv Gandhi Biosphere reserve. Ramgarh Vishdhari Wild Life sanctuary is important corridor connecting forest of Ranthambore and Mukundra Hills.

After intensive survey, field tours and interviews with local people the following appear to be the current situations in and around Ramgarh Vishdhari Wild Life sanctuary :-

(i) **Commercial Exploitation :** In the past commercial exploitation was done for gums, timber, kattha and other minor forest products . Due to this there has been acute degradation.

(ii) **Fuel Wood Pressure :** Demand for fuel-wood constitutes a major pressure on the sanctuary. The maximum consumption of wood is during winters. Availability of firewood is low in the area and the people are resorting to pollarding and cutting of live green trees.

(iii) **Over Grazing :** The cattle and goats belonging to the local villagers depend primarily on the forest for grazing. The buffer area in most of the places has been badly lopped and over grazed.

(iv) **Cattle Populations :** Increase in cattle population in villages is pulling immense pressure on the sanctuary. (Table 7.1 to 7.4)

(v) **Bio-Dependence :** Bio-dependence has been the way of life for people in the villages of area. People in the villages, even today are bio-dependent to a very large extent and do not really see the need to change.

(vi) **Quarrying the Resources :** Quarrying were rampant in the area for minerals and stone for building purposes which led to the destruction of large areas of forests.

(vii) **Poaching :** Poaching is mostly done because the wild animals stray out the agricultural fields.

(viii) **Encroachments :** The villagers have encroached upon the village pastures, which contributes to the grazing pressure on the forest.

(ix) **Forest Fire :** Forest fire is a threat to the area throughout the dry season. Fire occurs accidentally or may be caused deliberately by grazers.

After extensive survey and research the possible solutions of the major problems regarding the biodiversity conservations in the area are presented as per bellow :-

Eradication of invasive species

Certain areas of Ramgarh Vishdhari Wild Life sanctuary are heavily infested with *Prosopis juliflora, Parthenium hysterophorus, Lantana camara* etc. The dense growth of these species is degrading the natural habitat of the Ramgarh Vishdhari Wild Life sanctuary and surrounding area. This has resulted in reduced availability of fodder for the wildlife. If the situation is not controlled on a priority basis, The weeds might spread to other key habitat and will affect wild herbivores. It is suggested to eradicate the weeds and replant the areas with trees and grasses of palatable species.

Improve water availability

In the sanctuary area summers are very harsh and intense. This feature makes the protected area devoid of water and makes the water as the limiting

factor for the full potential growth of the sanctuary. Therefore, higher priority needs to be accorded to water conservation works in sanctuary area.

Relocation of villages from Ramgarh Vishdhari Wild Life sanctuary

In order to provide better livelihood opportunities for villagers and also to develop disturbance free areas within sanctuary few highly affected villages relocation plan should be implemented. Relocation of villages involves resettlement and rehabilitation of the villagers from the existing location to any nearby villages without affecting socio-economic life styles of the affected person.

Grazing control

Many domestic animals including cattle, sheep and goat graze inside the Ramgarh Vishdhari Wild Life sanctuary and surrounding forest areas. The grazing by domestic livestock has adversely affected the regeneration of plants in the sanctuary. The quality of grasses has deteriorated. More damage to the forest is caused by the goat grazers. These herdsmen lop heavily and sometimes fell fully mature trees for grazing their goats. In the area illegal goat grazing is occasionally done prevalent in Motipura, Bhimganj, Guda Magduka, Guda Sadawartiya, Khatkar, Bherupura, Nayagaon, Vishdhari and Kalanala.

Separate pasture land should be developed to ensure fodder availability for the cattle. Villagers should be encourage to reduce grazing within the sanctuary so that carnivores do not stray out. Carrying axes should be totally banned in the area.

Fire control

The forest fires are mostly experienced during summer months, from April to June. No major fire and consequent damage has been reported in the last three years. To prevent major fires and damage, a well co-ordinate and rated fire management is a prerequisite.

Rehabilitation of Mogiyas and other nomadic hunters

Poaching is mostly done because the wild animals stray out to the agricultural fields. Motipura, Bhimganj, Bherupura, Guda Sadawartiya and Ramgarh in the area which are prone to poaching. Dalelpura and Dara Ka Naya Gaon are the hyper sensitive areas. Mogiya is one of nomadic tribal community. The villagers employ these Mogiyas for crop protection whenever the wild animals come out from forest and raid the crops. The Mogiyas use fire arms and shoot them. The socio-economic condition of these tribes is very poor. They are landless and have no permanent dwellings. Hence rehabilitation of these tribes is very essential. The rehabilitation process has to be planned with careful thought about the needs of these people, their culture, education and the new skills that they will needs in order to survive.

Restriction of unauthorized movement in the sanctuary :-

A very large number of villagers tend to move in the sanctuary and surrounding areas. Many a time thus remain there for a number of days. Such movements are done in the pretext of grazing animals, wood gathering, worshipping etc. This should be closely monitored regulated and checked from time to time.

Encroachment

Encroachment is a typical problem in Ramgarh Vishdhari Wild Life sanctuary. The encroachment in the areas is primarily for agriculture. Adjoining forest land is cultivable, inviting the encroachers. The area is vulnerable for encroachment. Since Ramgarh Vishdhari Wild Life sanctuary starts at Bundi township, the problem of encroachment will be very high in the future due to expansion of urban areas. Boundary demarcation needs to be completed and immediate action should be taken to remove encroachment.

Management of Non Timber Forest product

Important factors associated with management of these products are:–

(l) Scattered distribution of important plants species
(m) Over exploitation
(n) Improper methods of collection and harvesting
(o) Lack of proper management strategy
(p) Poor yield
(q) Poor transport and storage facilities
(r) Poor marketing infrastructure
(s) Inadequate organisation

Suggested strategies for management of Non Timber Forest Products are as follows :-

(a) Inventory of non timber forest resources
(b) Preparation of proper management plans
(c) Plantation of species which yielding valuable non-wood products
(d) Germplasm protection, collection, storage and improvement
(e) Development of improved technologies
(f) Improving storage and transport conditions
(g) Improvement in processing
(h) Effective organisation
(i) Establishment of markets and marketing facilities of forest products

Ecotourism

Publicity, nature education and creation of awareness towards wildlife conservation create an environment for the benefit of the sanctuary. Currently tourism in Ramgarh Vishdhari Wild Life sanctuary is zero.

Following strategies can be incorporated in eco - tourism :-

(i) The tourism activity in the sanctuary should be thoroughly reviewed.

(ii) Suitable areas, lake etc. can be identified which may attract tourists. These areas should be managed with the help of villagers.

(iii) Bird-watching sites like Jait Sagar, Shambhu Sagar and Bherupura Pond etc. should be identified.

(iv) Local community participation and benefit sharing should be done.

(v) Revenue generated through ecotourism should be used for local development

There are many temple sites inside the sanctuary to which people have rights to visit. The biotic disturbance created by people visiting these temples is detrimental to the wildlife. The gifts and other wastes damage the habitat and pose threat to the health of wild animals in the area. It has been observed that polythene bags, food waste etc. are also eaten by the wild animals. Due to the disturbance created by the devotees in the temple zone, these areas become unavailable to the wild life.

Ramgarh Vishdhari Wild Life sanctuary apart from wild life is abode for regionally renowned deities. Many people visit temples inside the sanctuary during the year. The number of persons visiting these sacred places is increasing continuously. These huge numbers of people visiting the sanctuary are putting adverse pressure. These places are not adequately equipped to withstand the pressures. There are no basic minimum facilities to cater to the needs of these pilgrims. Proper management interventions are essential to reduce the negative impacts.

Ramgarh Vishdhari Wild Life sanctuary is fortunate to have richness of natural beauty. The forest of sanctuary has tremendous potential in the tourism sector. Ecotourism is a mode of eco-development which represents a practical and effective means of attaining social and economic improvement for

communities living around the protected areas. Ramgarh is the most appropriate for developing it as Eco camping site.

A part from historical Ramgarh Mahal there are two ancient and famous temples. The Ramgarh Vishdhari temple on the northern boundary and Rameshwar Mahadev mandir on the North West of the sanctuary. Besides the natural, archaeological, geological and cultural significances, the area has immense value in conserving water and acts as a life line for the survival of the local people around. A few water reservoirs have been constructed to harness the rain water flowing out of the reserve. A few of such reservoirs are Jait Sagar, Shambhu Sagar, Thikarda Talab, Bherupura Talab abd Phool Sagar. Aesthetical and Eco-tourism sites of Ramgarh Vishdhari Wild Life sanctuary area have been shown in Table 8.1.

TABLE – 8.1

Aesthetical and Eco–tourism sites of Ramgarh Vishdhari Wild Life Sanctuary area

1. Jait Sagar Lake
2. Sukh Mahal
3. Banganga
4. Choth Mata Temple
5. Taragarh Fort
6. Shikar Burj
7. Phool Sagar
8. Rameshwar
9. Ramjhar
10. Meera Sahib Ki Dungari
11. Jhar Mahadev
12. Jharpir
13. Khathar Meiz River
14. Gend ka Mahadev
15. Khel ka Mahadev
16. Ramgarh Mahal
17. Ramgarh Vishdhari temple
18. Dobra Mahadev

It has magnificent medieval forts and palaces, temples, streams, rivers picturesque lake. It holds immense fascination for the traveler and in a nutshell, offers virtually everything to a tourist. Phool Sagar is modern palace built in the 20th century A.D. It is well planned and laid out in the emblematic Rajput architecture. The Garh palace is the finest examples of Rajput architecture. It was during the region of Rao Raja Vishnu Singh that the magnificent palace with lush gardens was built. Jaita Meena built the pristine Jaita Sagar lake nested amidst verdant landscape.

The Terrace gardens and Smriti Kunj are some other attractions around the lake. The Shikar Burj is royal hunting lodge set amidst the lush surroundings. It is a favourite picnic spot. Ramgarh Vishdhari Wild Life sanctuary is 45 km away on the Ramgarh – Nainwa Road.

Following strategies should be taken for proper management :

(i) Carrying of plastic, Poly-bags should be totally banned

(ii) Local people should be encouraged to develop and manage the tourist facilities.

(iii) The fairs are the great opportunities to disseminate the messages of conservation.

(iv) An exhibition about the important medicinal plant of the area should be organized in these fairs.

To achieve the objectives of management the following zones are being proposed in Ramgarh Vishdhari Wild Life sanctuary

Core Zone

Eco-Development Zone

Ecotourism Zone

Buffer Zone

Corridor Development Zone

Habitat Improvement Zone

In my opinion suggested remedial measures are :-

(i) In eco-development scheme, micro plans should be prepared for comprehensive development in sanctuary.

(ii) Habitat is required for wild life. Hence planting of adequate and suitable species is required. Extensive plantation works should be taken up for all animals, bush cover is important. Shrub species should be included in the plantation.

(iii) Sanctuary area should be made free from biotic disturbances and encroachments.

(iv) Intensive soil and water conservations work have to be done.

(v) Effective protection and anti-poaching measures should be used.

(vi) Joint forest management should be promote.

The problems of protection in the Ramgarh Vishdhari Wild Life sanctuary are essentially due to the fact that day-to-day use of the forest resources-fodder, firewood, small timber weighs much heavier in human forest relationship than long term ecological significance for the surrounding area. The overall approach and methods used will have to be to involve the local people in the development of the communications and make the whole programme as participatory as possible.

SUMMARY

Rajasthan is quite rich in floristic diversity probably due to presence of different variable and diversified climatic, physiographic and edaphic and habitat conditions. The Haroti plateau has a rich floristic diversity suggests many kinds of plant species. The Ramgarh Vishdhari Wild Life Sanctuary lies in the south-eastern part of Rajasthan between 24º 59' 11'' to 25º 53' 11" north latitude and 75º 19' 30'' to 76 º 49' 30'' East longitudes. The sanctuary is almost elongated width approximate 10 Km. and length 50 Km. approx north to south and east to west respectively. The total area of the sanctuary is 307.00 Sq. Km.

Ramgarh Vishdhari Wild Life sanctuary is a single compact and large forest ecosystem in Haroti region. It is located in Bundi district of Rajasthan state and 45 km. away from it. Conservation values of Ramgarh Vishdhari Wild Life sanctuary are :-

(i) A bio-diversity rich area in the state.

(ii) An important corridor between Ranthambore Tiger Reserve and Mukundra hills in the south which in turn is part of Greater Hadoti landscape.

(iii) Watershed for the river Meiz and Machali which are tributaries of river Chambal. Many tanks in the local area are also fet from rivuletes for the sanctuary.

(iv) A large and representative example of Aravalli and Vindhyan ecosystem consisting of *Anogeissus pendula* forest.

(v) Potential viable population of wild life.

(vi) Important biological research area with considerable scientific, educational, aesthetic, tourism and recreational values.

(vii) Centrally located as a link between a chain of protected areas from Dholpur to Bhensrodgarh.

(viii) Historical and cultural importance

The submitted Thesis on the floristic and ethnobotanical study of Ramgarh Vishdhari Wild Life Sanctuary of Bundi district, south east Rajasthan was taken up to evaluate its on holistic basis. Earlier it had a larger forest cover, but due to environmental degradation quite a large number of plant species are threatened. The present investigation was made to holistic approach of ecosystem of area with reference to floristic diversity and also to enumerate the plant species being used by the local population for food, fodder, fuel, fibre, dyes etc. Along with economic value of various plant species, ethnobotanical uses of prevalent in tribal population have been assessed in the present study.

This is the only habitat in Haroti region which provide abode to tigers. It has been reported that tiger from Ranthambore tiger project area (from Swaimadhopur district) frequently move into the Ramgarh Vishdhari Wild Life Sanctuary via Kaul ji closed area corridor. Earlier this sanctuary was known as Sikargah of Bundi State.

Many plant species of area have ethnobotanical significance. Specific issued to be addressed through floristic and ethnobotanical research of Ramgarh Vishdhari Wild Life sanctuary are :-

(i) Sustainable uses of natural resources
(ii) Ethnic community development work
(iii) Participatory micro planning for improvement of socio-economic status of tribal and local people
(v) Management of the biodiversity of area
(vi) Conservation of medicinal plants of the area
(vii) Conservation of sacred groves of area
(viii) Eradication of exotic plant species
(viii) Plantation and conservation of indigenous plant species
(ix) Awareness about the herbal and non timber forest products

The Ramgarh Vishdhari Wild Life sanctuary covers the area of former Bundi state. Almost all the forests of this division were controlled by the states of Bundi by their Jagirdars under them. The rulers and Jagirdars had a keen love for Shikar Game was, therefore, well preserved and protected. This was a personal shooting area of Maharaja of Bundi state. No other person could hunt in those days in this area. His Highness and his authorized guests used to come here for the game of hunting every winter. They constructed a Building named Ramgarh Mahal as shooting camps. All local people used to take part in this game and get money in return. At that time Tiger population was high. The rulers of Bundi state did the hunting and use to observe certain rules.

The sanctuary is stretched as continuous double lines of Vindhyan hills from South-West to North-East direction over a length of approximate 50 km. The slopes are usually moderate to steep. Meiz river coming from Northern side of Ramgarh Pipliya block enters into sanctuary area and another river Machali which enters from North- East part of sanctuary. Both these rivers mix together near Ramgarh place and appear as a single river. This river comes out from the sanctuary at Khatkar village.

A comparison of the meteorological data of the region for the year January 2012 to December 2013 has been recorded in this work. It is evident that average temperature shows much fluctuation so far as minimum and maximum temperature range is concerned. So also the amount of relative humidity and precipitation rates reveal wide variations during different seasons of year 2012 and 2013. The amount of annual rainfall influences the vegetation. Annual rain fall determines the type of vegetation. The forest vegetation of area is described as ‘tropical dry deciduous’. It is also clear from these data that comparatively higher amount of precipitation increased humidity and congenial temperature regimes during the months of July to November in the area make the overall climate favourable for the growth of herbaceous vegetation especially moisture loving taxa.

In hills of Rameshwar and Ramjhar soil is eroded by heavy rain fall. By this running water percolates through the crevices of rocks thus great masses of soil and loose rocks lying on the steep slip downwards. Excessive grazing, deforestation, undesirable forest biota and mechanical practices by man are important factor which cause soil erosion. Deforestation and over grazing is the commonest factor which is responsible for soil erosion of the area. Goat and sheep during the summer season graze the forest vegetation and make the soil bare.

The dominant tree and shrub species of the area are *Anogeissus pendula, Butea monosperma, Acacia catechu, Acacia leucophloea Mitragyna parvifolia, Terminalia arjuna, Holoptelea integrifolia, Sterculia urens, Wrightia tinctoria, Lannea coromandelica, Adhatoda zeylanica, Grewia flavescens. Capparis sepiaria* and *Zizyphus nummularia.*

The *Boswellia serrata* zone is found on the tops of the hills. Almost all part of area is generally precipitous. The associates of *Boswellia serrata* are *Lannea coromandelica, Sterculia urens, Wrightia tinctoria, Anogeissus latifolia* and *Acacia catechu* etc. The intermediate zone of the hills is formed by *Anogeissus pendula* species. The common associates of *Anogeissus pendula* are *Acacia catechu, A. leucophloea, Bauhinia racemosa, Moringa oleifera, Wrightia tinctoria, Mitragyna parvifolia, Holoptelea integrifolia* and *Butea monosperma.*

Forest of moist banks consists of *Butea monosperma, Ficus racemosa, F. benghalensis, F. religiosa, Syzygium cumini, Phoenix sylvestris* and *Acacia nilotica.* The common shrubs of these areas are *Vitex negundo, Adhatoda zeylanica* and *Jatropha gossypifolia* etc. *Lemna perpusilla, Wolffia arrhiza, Spirodela polyrhiza, Hydrilla verticillata* and *Azolla pinnata* (an aquatic fern) formed a scum on water. The plant which was having emergent leaves were

Sagittaria guayanensis, Eichhornia crassipes, Ipomoea aquatica and *Marsilea minuta* (pteridophytes). Many areas consist of thorny shruby vegetation. The species found in these areas possess xerophytic character. The common species of these are *Salvadora oleoides, Euphorbia royleana, Acacia nilotica, Capparis decidua, C. sepiaria, Zizyphus mauritiana, Z. nummularia* and *Calotropis procera*.

Five sites of Ramgarh Vishdhari Wild Life Sanctuary were selected for the study of angiospermic plant community. These were Rameshwar, Ramjhar, Khatkar, Ramgarh and Jhar bala pura. Main types of vegetation and forest cover in the sanctuary area have been recorded in this work. Vegetation have been classified and observed on the basis of physical region wise distribution.

The present works enumerate 347 species belonging to 261 genera and 93 families of Angiospermic plants. A total of 06 genera and 08 species of Pteridophytes were also recorded. A perusal of Table 6.4 reveals that family Leguminoseae (45 spp.) occupies the top position in the flora of Ramgarh Vishdhari Wild Life Sanctuary. Family Poaceae (36 spp.) occupies the second position, Asteraceae (20 spp.), Euphorbiaceae (15 spp.), Convolvulaceae (13 spp.), Malvaceae (11 spp.), Acanthaceae (10 spp.), Amaranthaceae, Cyperaceae (9 spp. each), Tiliaceae, Cucurbitaceae, Solanaceae and Scrophulariaceae (7 spp. each), Rubiaceae, Moraceae (6 spp. each) occupy third to tenth positions respectively.

Among the dicots, the Polypetalae group is the largest followed by Gamopetalae and Monochlamydae. In contrast to dicotyledons, monocots are poorly represented in the area. Out of 63 species of 49 genera, 45 species under 32 genera belong to Cyperaceae (9 spp. / 3 genera) and Poaceae (36spp. / 29 genera). This pattern of distribution of genera and species confirm the general observation that within the same floral region, the smaller the flora, the smaller

the species genus ratio. All 93 families were categorised according to number of genera and species and a list in alphabetical order is given in a table.

From the statistical data it can be seen that out of 93 families, 40 families were monotypic and 49 families were represented by one genus only. The monogeneric families of the area are :- Ranunculaceae, Annonaceae, Nymphaeaceae, Nelumbonaceae, Papaveraceae, Fumariaceae, Cleomaceae, Cochlospermaceae, Flacourtiaceae, Portulacaceae, Elatinaceae, Bombacaceae, Zygophyllaceae, Oxalidaceae, Simaroubaceae, Balanitaceae, Burseraceae, Rhamnaceae, Sapindaceae, Moringaceae, Rosaceae, Myrtaceae, Trapaceae, Apiaceae, Alangiaceae, Primulaceae, Plumbaginaceae, Ebenaceae, Salvadoraceae, Cuscutaceae, Lentibulariaceae, Martyniaceae, Nyctaginaceae, Chenopodiaceae, Basellaceae, Aristolochiaceae Loranthaceae, Ulmaceae, Cannabinaceae, Moraceae, Ceratophyllaceae, Pontederiaceae, Commelinaceae, Najadaceae, Juncaceae, Arecaceae, Typhaceae, Alismataceae, Potamogetonaceae.

There are 41 villages located inside and on the boundary of the sanctuary. The entire economy of villages inside the sanctuary is based on cattle rearing and breeding. Revenue of the villages surrounding the sanctuary is largely based on agriculture economy. The ethnic communities residing in this region include Bhil, Meena, Kanjar, Sansis, Gurjar, Bairwa Mogiyas, Gadoliya Lohar, Raibaris, Kalbelias, Banjara, etc. Gadoliya Lohar and Kalbelia are most well known nomadic tribes. Kalbelia are commonly seen in townships on road side and ‘dearas’. They are well versed in methods of treating snake bites and scorpion stings, for which they uses various plants as antidotes. Kanjar, Sansis and Mogiyas are semi-nomadic criminal community and they depend on forest for shelter and medicare.

For evaluation of socio-economic status of ethnic people of the area, three types of villages were selected :- (a) Villages inside the sanctuary (b)

Villages which are on the boundary of sanctuary (c) Villages which are 2 to 10 Km. from sanctuary. This area is virtually an ecological island burdened with heavy pressure of human and cattle population. The economy and livelihood of local people depend to a large extent on the resources of Ramgarh Vishdhari Wild Life Sanctuary.

The forest dependency in villages inside the Ramgarh Vishdhari Wild Life Sanctuary are maximum. The villages are a source of considerable disturbance to the natural ecosystem and more evidently to the wild animals. The villages have a large number of cattle and are using the forest land extensively for grazing their animals. Due to heavy pressure of grazing the areas of the sanctuary are critically degraded and resulted in severe erosion of palatable grasses and recovery is very difficult due to continuous pressure. The land holding in the villages are small and the quality of cattle is also poor which result in poor economy of the people in general. The economy of the area is totally dependent on the natural resources of the land and the forest. There is no large or small industrial set up in the area.

The main communities in these villages are Meena and Gurjar with a mixed population of others. Both these communities are forest dependent for grazing and for small timber and fuel wood, while other communities are dependent mainly for fuel wood and small timber for building purposes. The population around the Ramgarh Vishdhari Wild Life Sanctuary is mainly agriculturist, pastoralist, and agriculture laboures, primarily depended on the natural resources of the sanctuary. Agriculture is a seasonal work and does not provide employment throughout the year. Most of their activities are dependent upon forest, thus the number of people visiting forest for illegal purposes increases tremendously.

A large section of the remaining society in the area is labour class and landless. They do jobs in mining, agriculture fields, house building and all

other type of labour which is available to them. The labour works are also seasonal, and job opportunities reduce during rainy season and in summers. The poor economy of the area tends to make people more dependent on natural resources, for meeting their livelihood demands from the sanctuary since the resources of other lands are already degraded and used up. This dependency leads to the degradation of the areas in many ways. The villages situated near the sanctuary are not well developed because of remoteness. Economic development of the villages is essential to reduce the eco-system degradation. Eco-development activities will reduce the gap between villagers and protected area management.

Nearly 29 Sacred groves from the forest tracts of the Ramgarh Vishdhari Wild Life Sanctuary were studied. These groves of area have been found conserving numerous plant species for example *Anogeissus pendula, Anogeissus latifolia, Butea monosperma, Salvadora oleoides, Aegle marmelos, Ficus benghalensis, Ficus religiosa, Ficus racemosa, Emblica officinalis, Musa paradisiaca, Calotropis gigantea, Gossypium hirsutum, Thespesia populnea, Syzygium cumini, Alangium salvifolium, Mangifera indica, Canna indica, Mitragyna parvifolia, Morinda tomentosa, Ocimum sanctum, Ocimum basilicum, Annona squamosa, Zizyphus mauritiana, Terminalia bellirica, Lawsonia inermis, Wrightia tinctoria, Bauhinia racemosa, Lannea coromandelica, Terminalia arjuna, Diospyros melanoxylon, Ehretia laevis, Cordia dichotoma, Argyreia sericea, Datura metal, Barleria prionitis, Tamarindus indica, Vitex negundo, Santalum album, Jatropha curcas, Holoptelea integrifolia, Cannabis sativa, Asparagus racemosus, Phoenix sylvestris, Bambusa arundinacea, Cynodon dactylon, Dendrocalamus strictus,* and *Desmostachya bipinnata.*

Sacred groves are patches of natural vegetation demarcated by ancient societies and protected on the basis of religious practices and cultural traditions. They left patches of original vegetation undisturbed as an index of

their reverence and declared them sacred and inviolable. Human activities like deforestation and hunting are restricted within the grove. The ethnic people of the area preserve individual plants, forests and forest patches traditionally on religious grounds and worship forest gods in order to maintain a lasting relationship with nature. These sacred groves in this study area are worshipped for different religious functions and play an important role in social and cultural aspects.

Along with material culture like food, medicine and shelter, plants have been closely associated also with many social customs and mythological rituals of man. Many flowers, fruits or whole plants have been used for offering in worship and some plants are themselves worshipped or considered sacred. Some plants are believed to possess magical properties, some plants are considered as essential on many social ceremonies and worship. It is helpful for the conservation of genetic diversity and ecosystem. The list of these plants has been mentioned in concerned chapter of the thesis.

The taxonomic account of such types of plant species of mythological significance and importance in religious ceremonies of the Ramgarh Vishdhari Wild Life Sanctuary are given. In this enumeration totemic uses, religious significance and sacred belief of the tribe and local people of the study area have been considered. Based on the investigation of the plants 19 species have been enumerated in alphabetical order along with their local names, families and mythological significance. During the survey of the area, it has been observed that tribal's of certain places directly or indirectly related with plants or their products. They worship the plants of the respective species and do not use them in any form. These types of plants species have been enumerated in this study. Plants or plant's part used for religious ceremonies in Ramgarh Vishdhari Wild Life sanctuary were mentioned in concerned chapter.

Tribals and local people depend upon forest for their existence in several ways. The degree of dependence of tribals on forest depends upon various factors. These factors include their socio-economic conditions, distribution, cultural and religious norms, literary etc. The Non Timber forest products of sanctuary area are Tendu leaves (Bidi making), Dhok / Khakhara leaves (Pattal-Dona making), Gums, honey, wax, fruits, grass, fodder, leaves of khajur, medicinal herbs and shrubs etc. These minor forest produce are found over the entire forest of the sanctuary area. Among these minor forest produces, Tendu leaves (*Diospyros melanoxylon*) extracted departmentally where as others are collected by local people on contract, auctioned or by rural forest management samiti.

Our knowledge of medicinal plants has mostly been inherited traditionally. There is a growing tendency all over the world to shift from synthetic to natural based products including medicinal plants. This study is concerned with the ways of ethnic perception and uses of plants influence in the natural environment; it covers the entire Ramgarh Vishdhari Wild Life Sanctuary of Bundi district. Though this study the plant species diversity of area have been explored. It is this holistic view that finally determines the sustainable uses of the resources and management plan of area. Special attention is given in this study to the factors that make plants a resource that sustains the rural people and how the management of this resource is vital to their survival and progress.

The traditional knowledge system of ethnic societies is fast eroding. There is an urgent need to inventories and record all ethnobiological information among the diverse ethnic communities before the traditional cultures are completely lost. Tribal people have thorough knowledge of herbal medicine. But they are gradually loosing their knowledge of herbal medicine. Their knowledge has to be safeguarded therefore a list have been prepared of

plants with their medicinal value found in area. This was the main objectives of this study.

The economic conditions of the tribal and other non tribal rural people do not permit them to undergo modern medical treatment, which involves a lot of expenditure. This group of people therefore, is compelled to take the traditional ethno-medicines available in their areas for which they need not go to far away places. Traditionally and culturally they are habituated and prefer this type of indigenous healers. This is because of easy accessibility, low cost, culturally acceptable and long term family association. The information on plants species was collected by arranging meeting, dialogues and discussions with rural, tribal and knowledgeable people from study area. In the enumeration, the following aspects of plants were given. The collected plants were arranged alphabetically, and their botanical name, family, common name and ethno-medicinal uses were given.

Use of plant or plant parts for various diseases by the rural people of study area is a common practice. This study depicts information on the medicinal uses of 121 taxa against the disease of the people of area suffer from. 117 Angiospermic and 04 Pteridophytic taxa represent these 121 medicinal plants under use. Plants part's used of medicinal plant in the study area were shown percentage wise in Table 7.9. Parts of plants used as medicine is 52.06% leaves, 29.75% roots, 23.14% seed, 22.31% whole plant, 20.66% fruits, 14.04% stem, 13.22% bark, 7.43% flowers, 1.65% wood and 1.65% rhizome by local and tribal people of the study area.

Nature (habit) of the studied medicinal plant of the area was shown percentage wise in a Table 7.10. Maximum area under the medicinal plant in the studied area is herbs (37.19%). Thereafter Trees (33.88%), Shrub (11.57%), Under shrub (9.91%), Herbaceous climber (4.95%) and Lianas (2.48%) respectively in naturally habitat. Life form of the medicinal plants of the Ramgarh Vishdhari Wild Life Sanctuary revealed that 121 species were

observed during the year 2011 to 2014. 42.14% species belonged to Phanerophyte (Ph), while the percentage of Therophyte (Th), Hemicryptophyte (He), Cryptophyte (Cr) and Chamaephyte (Ch) were 35.54%, 12.39%, 5.79% and 4.13% respectively.

Important wild plant species of Ramgarh Vishdhari Wild Life Sanctuary area those yielding edible fruits, stem and tuber, leaves, seeds, flowers and underground parts along with their common name and family were recorded. Forest and their products play an important role in daily life of tribals and folk people. The present studies deals with wild plant species which they collect and consume for edible purpose. The plants were arranged alphabetically by botanical name, followed by family and local name. Uses of plants as food were given in brief. The studies deal with 49 plants species consumed by tribals, nomadic and other folk people of the area. The numbers of plants were exploited during field trips for a variety of purposes, which were broadly categorised under 7 heads. These heads enumerated in a table. These plants have been mentioned which are used for house building, fodder, dyes, gums, fibres and other miscellaneous uses.

Certain areas of sanctuary are heavily infested with *Prosopis juliflora, Parthenium hysterophorus, Lantana camara* etc. The dense growth of these species is degrading the natural habitat of the sanctuary and surrounding area. Its result is reduced availability of fodder for the cattle. If the situation is not controlled on a priority basis, the weeds might spread to other key habitat and will affect wild herbivores. It is suggested to eradicate the weeds and replant the areas with trees and grasses of palatable species.

Ramgarh Vishdhari Wild Life sanctuary is fortunate to have richness of natural beauty. The forest of sanctuary has tremendous potential in the tourism sector. Ecotourism is a mode of eco-development which represents a practical and effective means of attaining social and economic improvement for

communities living around the protected areas. Ramgarh is the most appropriate for developing it as eco-camping site. The Ramgarh Vishdhari Wild Life Sanctuary has a potential to be extended as satellite area for Ranthambore Tiger Reserve. This sanctuary can be home for expanding population of Ranthambore Tiger Reserve. This also part of proposed Rajiv Gandhi Biosphere reserve. This sanctuary is important corridor connecting forest of Ranthambore and Mukundra Hills. Many angiospermic plant species of the area need conservation insitu, which could be achieved by identification and conservation of their localities. Reasons for threatening and endangerment of these taxa may be attributed to the deterioration of natural forest of the area there by, causing destruction of their natural habitat.

Due to environmental degradation growth of the angiospermic flora is threatened in this area. Biotic factor much influence the vegetation of area. Species diversity has been decreased due to biotic disturbances. Observations of the present study form base-line information of floristic diversity and ethnobotany of Ramgarh Vishdhari Wild Life Sanctuary and shall be helpful in conservation and management of ecosystem of the area. This area is facing main problem of anthropogenic activities, overgrazing, deforestation, agricultural activities and encroachment.

It is hoped that the present study will help in the understanding of the floristic diversity and ethnobotany of Ramgarh Vishdhari Wild Life Sanctuary (Bundi district) which is situated in the south eastern part of Rajasthan state.

The present work thus highlights :-

(i) The type of vegetation growing under the area of study.

(ii) Conservation and management of ecosystem of the area.

(iii) Create awareness for the need for conservation of plant habitat.

(iv) Ways to understand the biology of flora of Ramgarh Vishdhari Wild Life Sanctuary.

(v) Need for afforestation in the interest of the nation.

(vi) Provide the information of vegetation of different habitat.

(vii) Provide the information regarding the plants which can be used in different medicines, so they can be conserved.

(viii) Aware to promote the herbal product, which are more safe for current life style.

(ix) With the help of rural and tribes the list is to be prepared of such plants which have certain economic byproducts like fibres, gum, dye, fodder, etc.

(x) The contribution of different tribes, nomadic and rural mass of the region in the conservation of plants species diversity.

(xi) A management plan for sanctuary area for their sustainable development.

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Abortifacient – An agent that induces abortion.

Acne – A kind of skin eruption.

Adulterant – An impure ingredient introduced into a preparation.

Alternative – An agent causing a favourable change in the disorder functions of the body or in metabolism.

Anaemia – Condition where Red Blood cells count below the normal value.

Analgesic – Relieves pain without causing loss of consciousness.

Anodyne – A drug that relives pain.

Antacid – A substance which counteracts stomach acidity.

Anthelmintic – Destroying or expelling worms.

Antiallergic – Agents that counter allergic reactions.

Antidote – A medicine which neutralizes a poison.

Antifertility – A drug that inhibits formation of ova or sperm or interferes with the process of fertilization.

Antipyretic – Counteracting fever.

Antiseptic – An agent that destroys the pathogenic microorganisms or their toxin in blood or other tissue.

Aphrodisiac – A drug that stimulates sexual desire.

Appetiser – Stimulates appetite.

Arthiritis – A condition characterized by inflammation and pain of joints.

Asthama – A condition of lung biding to difficulty in breathing.

Astringent – Agents that cause condition of the tissue arrest the secretion or control the bleeding.

Blood pressure – The pressure caused due to flow and pumping of blood by heart on the walls of blood vessels.

Blood purifier – Agents believed to remove impurities or deficiencies from blood.

Blister – Thin vesicle on skin filled with serum caused by burn, friction, rubbing etc.

Boil – A localized pyrogenic infection originating in hair follicle.

GLOSSARY

Bronchitis – An illness caused by the inflammation of bronchial mucous membranes in the lungs.

Burning sensation – Includes feeling hot inside the body or in palms, soles, etc.

Calculus (Calculi) – An abnormal concretion occurring in the body, usually composed of mineral salts, such as gallstones or kidney stones.

Cancer – A malignant new growth or tumour in any part of body.

Cardiac complaints – Ailment relating to heart, Angina, cardiac tonic.

Carminative – A drug expelling the excessive gas in the stomach or intestine.

Cataract – Eye disease.

Cholera – An acute infectious diseases caused by Vibrio, resulting in diarrhoea, vomiting, cramps and suppression of urine.

Cold – Exposure to cold or sudden change of temperature indicated by sneezing or blowing nose.

Colic – Acute spasmodic abdominal pain often with painful twisting.

Conjunctivitis – Inflammation of the membrane lining the eyelids and covering the eye ball.

Constipation – Difficulty in passing faces.

Contraceptive – A drug or device to stop conception.

Cooling – Reducing temperature or thirst.

Cough – An effort of the lungs to throw off injurious matter accompanied by harsh sound from throat.

Demulcent – A substance used for its soothing and protective action and which allays irritation of surfaces, especially mucous membranes.

Dandruff – Scarf, dead, skin in small scales among the hair.

Debility – Weakness, relaxation of solid or muscular fibre.

Dermatitis – Inflammation of causing discomforts like eczema.

Diabetes – A metabolic disorder resulting in elevated blood glucose and discharged of large amount of glucose containing urine.

Diarrhoea – A common symptom of indigestion known as loose motion.

Digestive disorders – Includes conditions caused by eating indigestible food excessive or irregular eating, imbalanced diet, etc. resulting in symptoms like abdominal pain, acidity, biliousness, dyspepsia, colic, constipation, gastric, indigestion, loose motions and stomachache.

Diuretic – Having the power to promote the flow of urine.

Dropsy – An excessive accumulation of clear watery fluid in any part of body.

Dyspepsia – Impairment of functioning indigestion.

Eczema – An inflammatory disease of skin with itching and burning.

Epilepsy – A diseased condition wherein there is recurrent convulsive attacks.

Febrifuge – That which reduces fever.

Fertility – Capability to conceive or cause conception.

Fever – Abnormal bodily heat and quickening of pulse.

Gonorrhoea – An inflammatory diseases of the genitor-urinary passage causing pain on discharge, transmitted through sexual contact.

Germicide – Agents to destroy germs.

Gout – A constitutional hereditary condition of uric acid metabolism, resulting in painful inflammation of joints and other symptoms.

Gynaecological complaints – Aliments of women related to conception and delivery.

Hair care – Includes all of hair, boldness, lice problem, dandruff, hair tonic.

Hydrocoele – Pathological accumulation of serum fluid in a bodily cavity, peculiar to the testes.

Hydrophobia – Dread of water with convulsion from bite or rabid animal.

Infertility – Inability to conceive or cause conception.

Inflammation – Being inflamed or having sore, red and swollen or an irritation.

Injuries – Contusion, cut, wounds, braises, caused by external injury.

Itching – Sense of irritation on skin.

Jaundice – A condition where there is an excess bile pigment in blood with yellow colour of skin, eyes etc.

Laxative – An agent used to facilitate bowl movement.

Leprosy – Infectious bacterial disease of the skin.

Leucoderma – A condition in which there are white patches in the skin.

Leucorrhoea – An abnormal excessive mucous discharge from the vagina.

Migraine – A type of headache.

Narcotic – Agents which tend to paralyse nervous system producing stupor or even death.

Paralysis – Loss of the power of motion, sensation or function of any part of body.

Piles – Enlarged or dilated blood vessels or veins in swollen tissue of the anal canal or the lower portion of the alimentary tract.

Pneumonia – Inflammation or congestion in lungs.

Poultice – Fermentation, compress made of hot water and flour paste which is pressed on to an infected part draw out pus to relive pain or to encourage the circulation.

Psoriasis – A chronic inflammatory skin diseases characterized by reddish patches covered with white scales.

Purgative – An agent that causes evacuation of bowels.

Rheumatism – A general term indicating diseases of muscle, tendon, joint, bone or nerve resulting in discomfort and disability.

Scabies – A contagious skin diseases caused by invasion of the epidermis.

Sedative – A drug which quiets nervous activity.

Sore – A general term for a variety of boils and wounds.

Spasmodic – Periodic sharp attacks marked by spasms.

Stimulant – A substance that makes part of the body function faster.

Syphilis – A contagious venereal diseases.

Tonic – A drug that invigorates or improves the normal tone of an organ or the patient generally.

Tooth brush – Twigs crushed at end used for rubbing teeth and gems, a common practice in rural area, India.

Vermifuge – A drug which kills or causes the destruction and expulsion of intestinal worms.

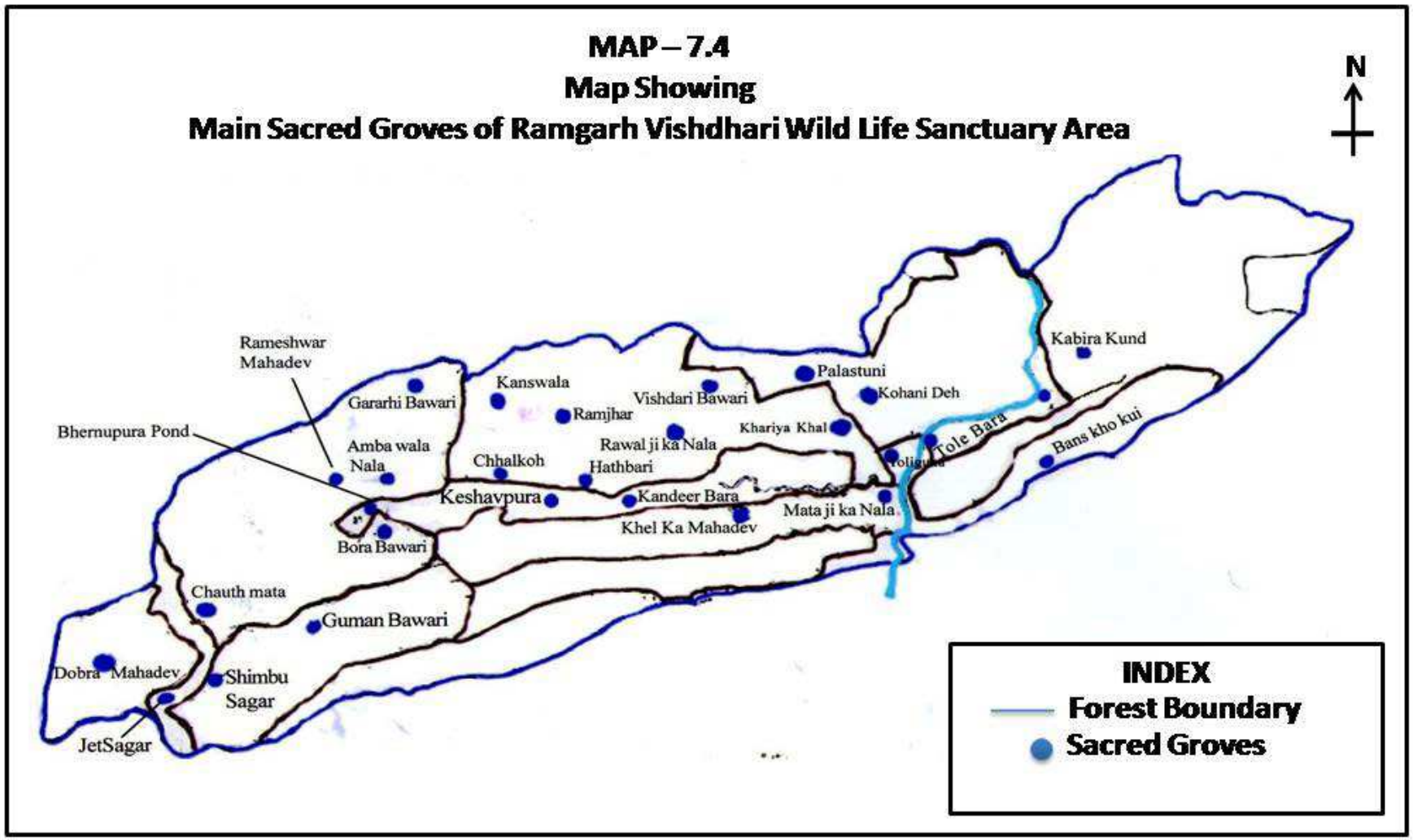
Vomiting – Throwing of the contents of stomach by the mouth, often with violence.

Worms – A variety of warms which are parasites on human body, mainly in the intestinal treat.

MAP – 7.4

Map Showing

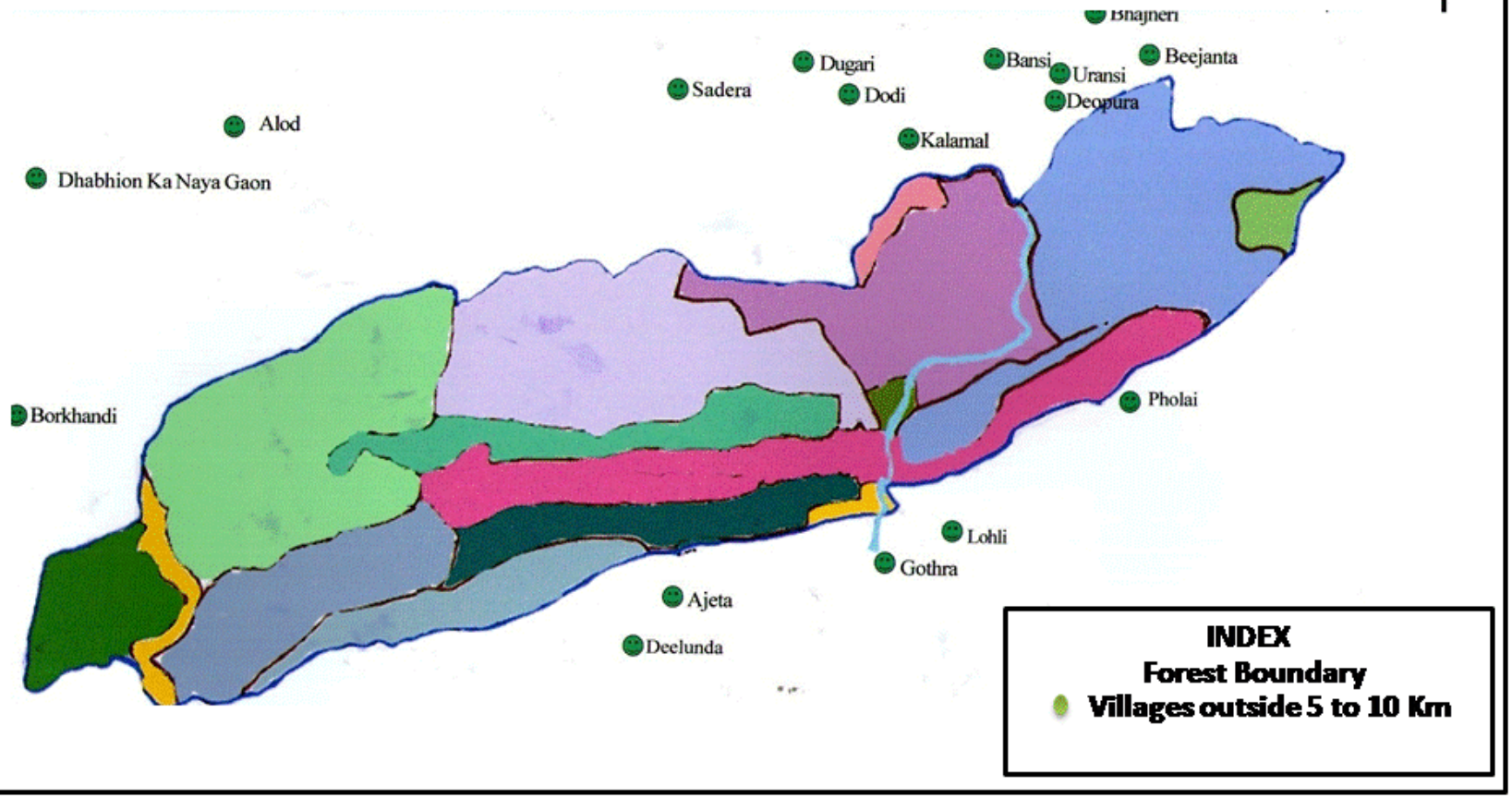
Main Sacred Groves of Ramgarh Vishdhari Wild Life Sanctuary Area



MAP – 7.3

Map Showing

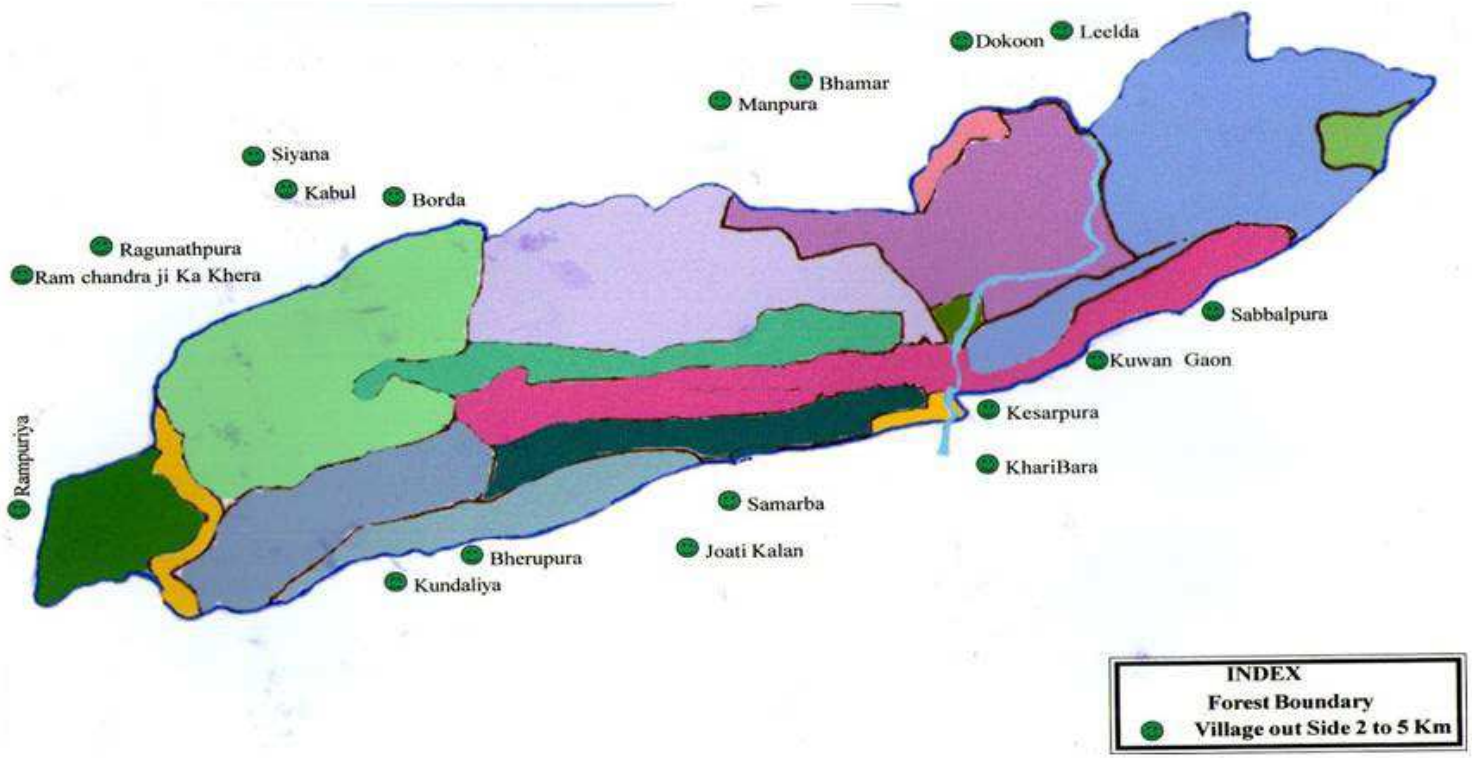
Villages 5 to 10 Km From Ramgarh Vishdhari Wild Life Sanctuary Boundary



MAP – 7.2

Map Showing

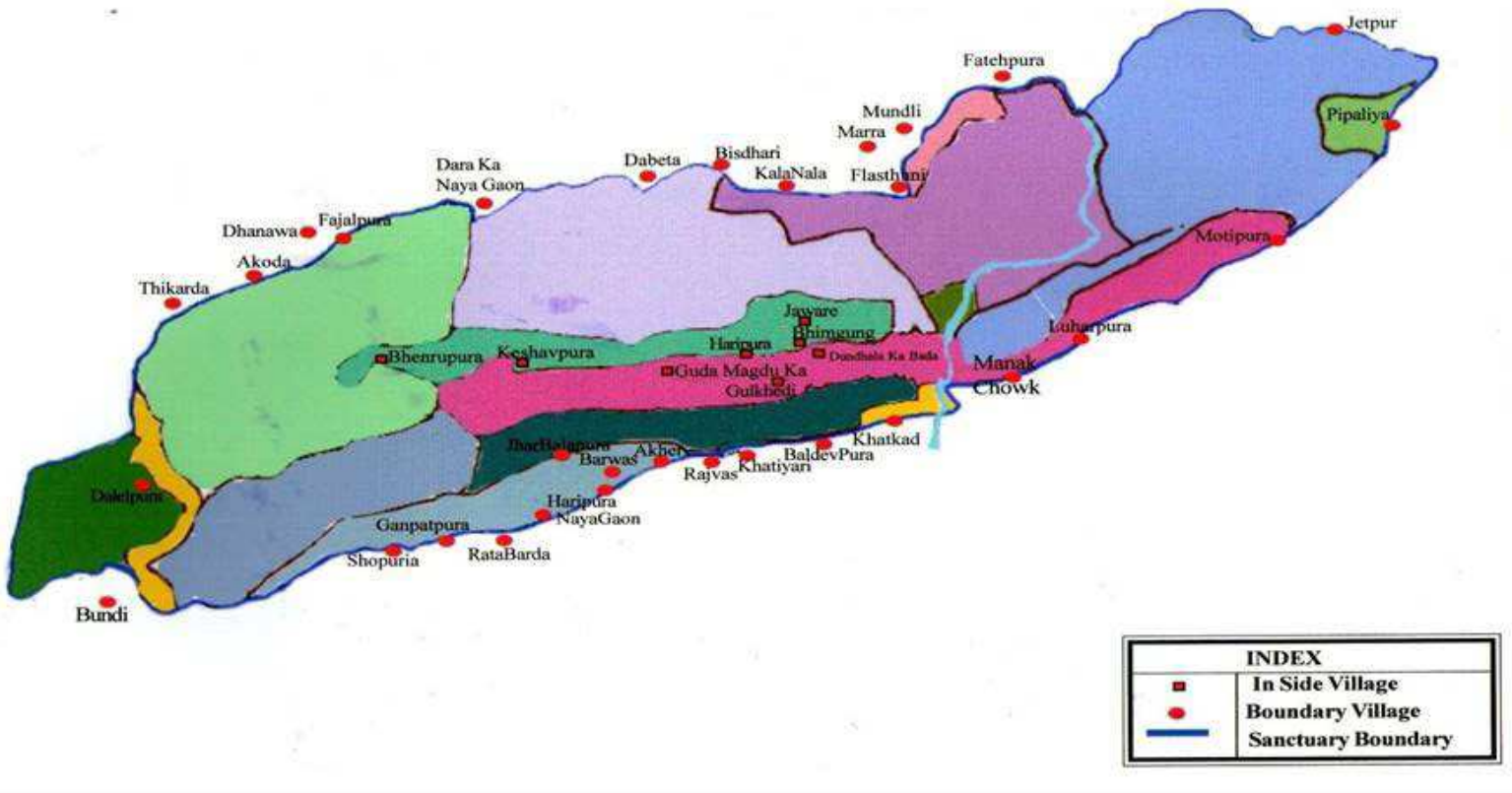
Villages 2 to 5 km From Ramgarh Vishdhari Wild Life Sanctuary Boundary



MAP – 7.1

Map Showing

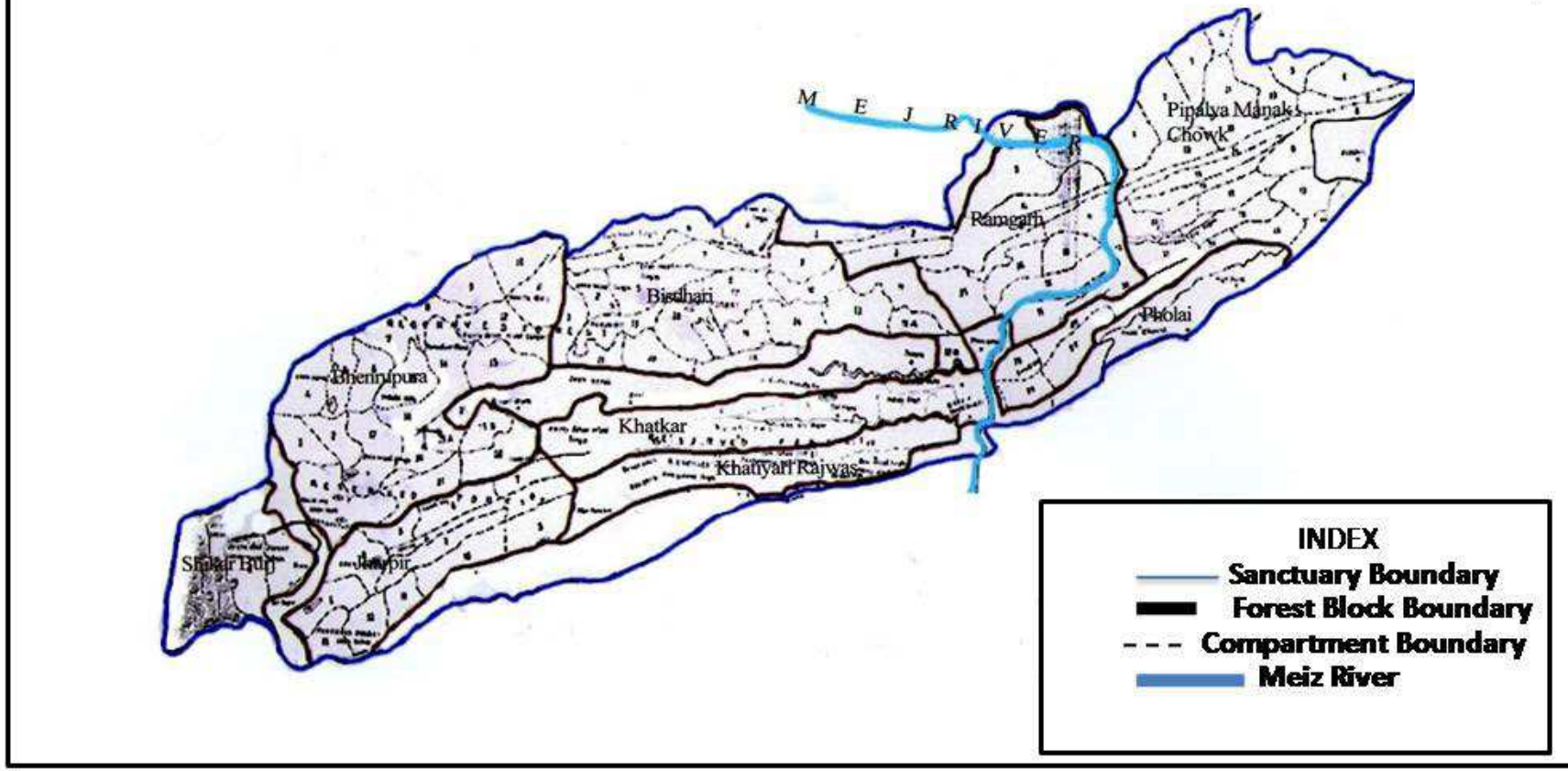
Villages inside and on the Boundary of Ramgarh Vishdhari Wild Life Sanctuary



MAP - 6.1

Map Showing

Forest Block and Compartments of Ramgarh Vishdhari Wild Life Sanctuary

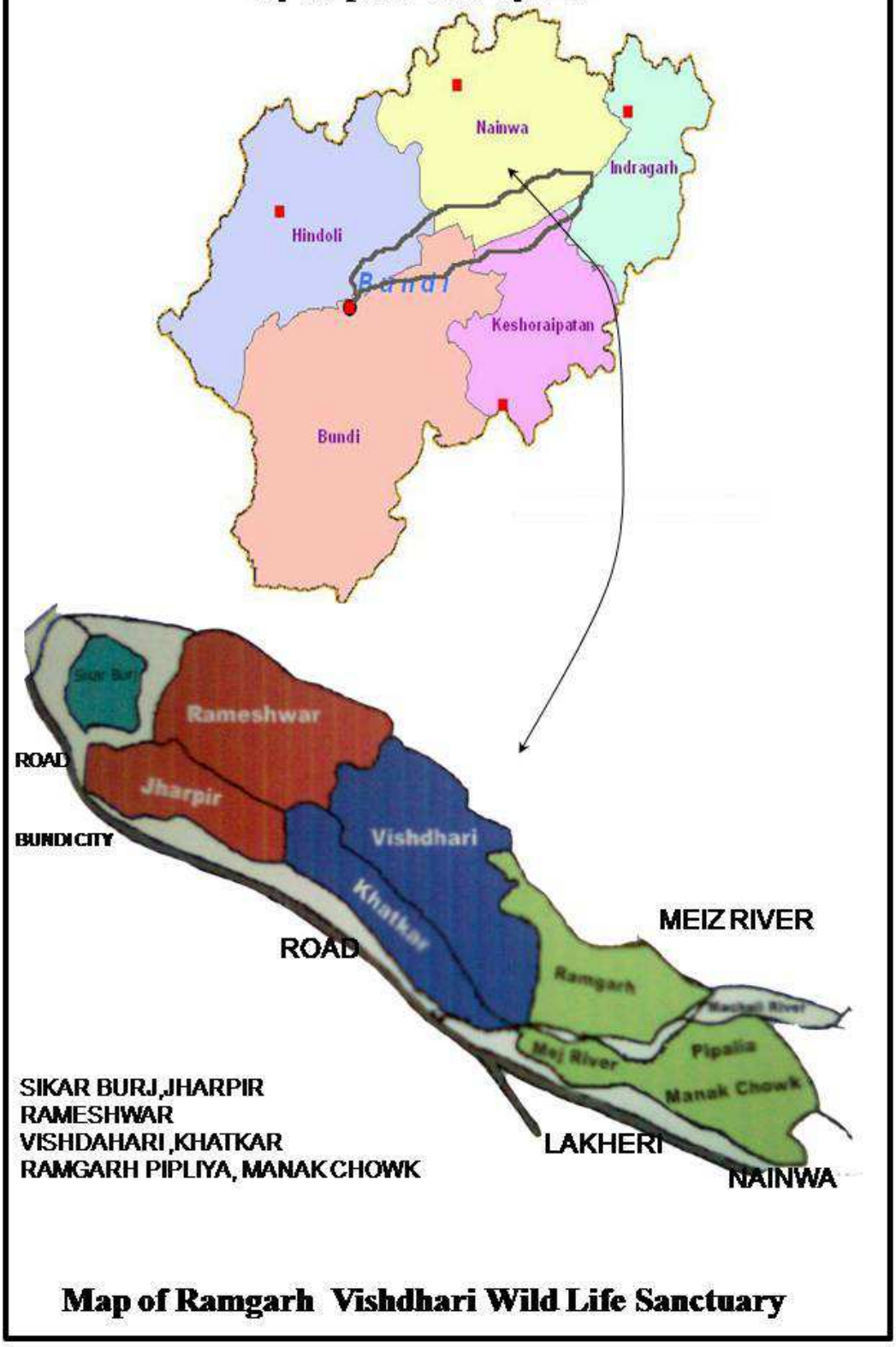


MAP - 3.1

Map Showing

Water Bodies and Wet lands in Ramgarh Vishdhari Wild Life Sanctuary

MAP -1.1 (b)
Map Showing
Key Map of the Study Area



Map of Ramgarh Vishdhari Wild Life Sanctuary

MAP - 1.1 (a)
Map Showing
Key Map of the Study Area

LOCATION OF BUNDI IN RAJASTHAN

PLATE -1
Different habitat of study area

Fig. 1.Rameshwar valley

Fig.2.The scene of green lush valley showingTaragarh fort hill, Jait sagar lake and beautiful Sukhmahalat the bank of the lake

Fig. 3.Meiz river flowing near the Ramgarh Mahal - the life line of sanctuary

Fig. 4.The view taken from the high hill of Ramjhar Showing the rich biodiversity

PLATE:-1

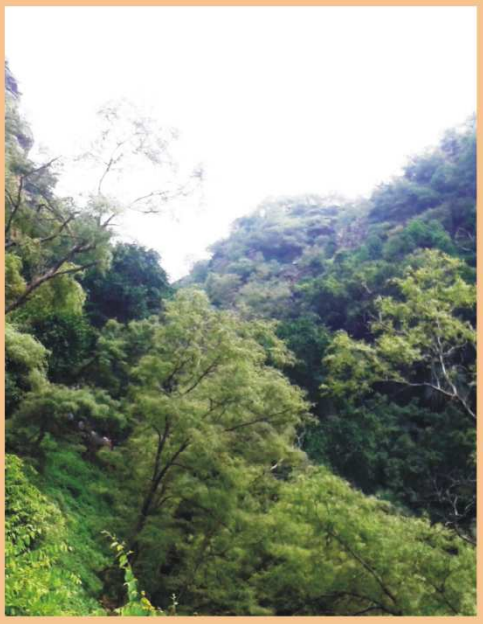


Fig. 1

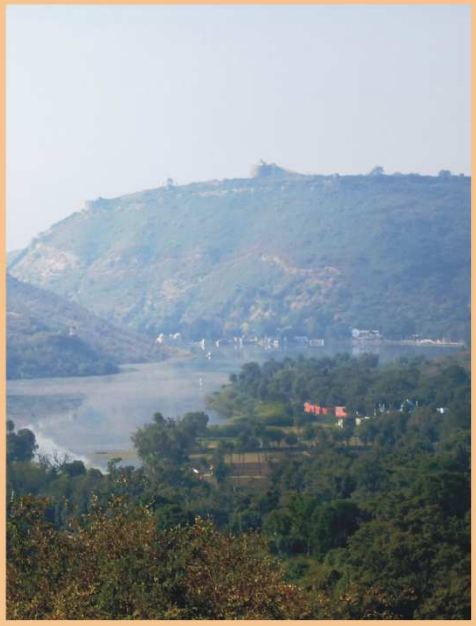


Fig. 2

Fig. 3

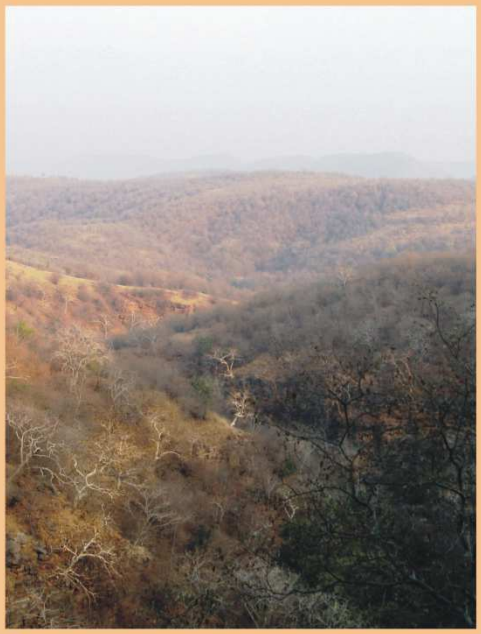


Fig. 4

PLATE -2

Fig. 5. Ramgarh Mahal

Fig. 6. Inside view of Ramgarh Mahal, personal shooting camps o Hig Highness of Bundi state

Fig.7. to Fig. 10. Different entrance sign board of sanctuary at Pipliya - Manak chowk

PLATE:-2

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

PLATE -3

Fig. 11. *Lantana camara*, an allelopathic species

Fig. 12. *Euphorbia royleana*, a xerophytic scrub species on slope at Rameshwar hills

Fig. 13. *Ipomoea fistulosa* near Jait sagar lake

Fig. 14. Degradation stage of *Anogeissus pendula* due to overgrazing

PLATE:-3

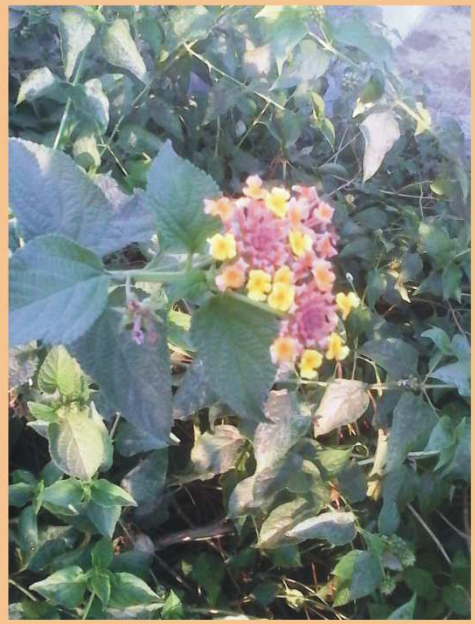


Fig.11

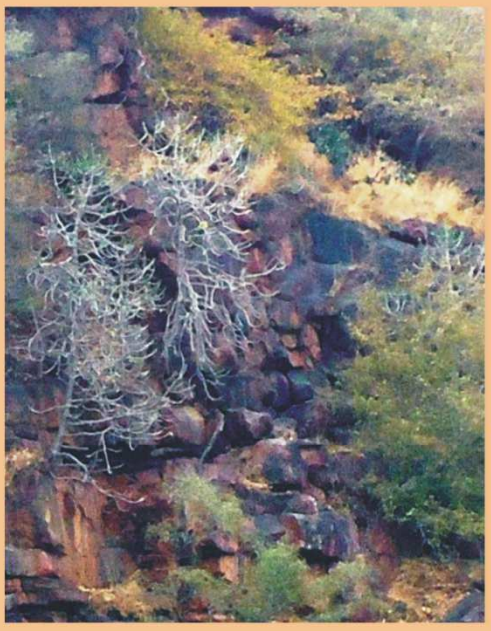


Fig.12

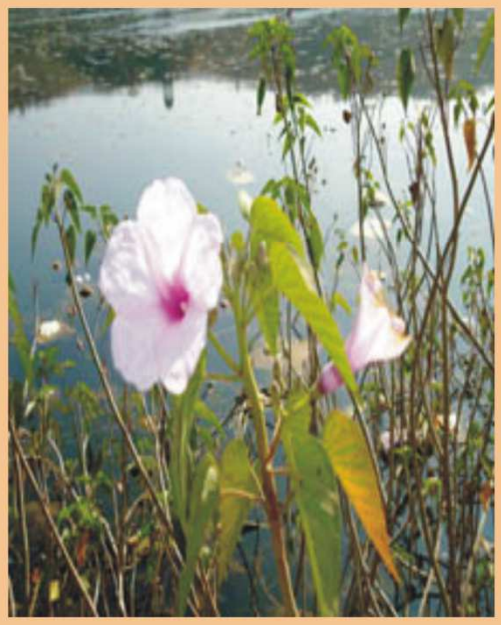


Fig.13

Fig.14

PLATE – 4

Ecological factors

Fig. 15. Trunk of *Acacia catechu* affected by termites near Phool Sagar

Fig. 16. Grazng by goats – resulting in the removal of ground cover

Fig. 17. A view of hills showing the result of soil erosion by water

Fig. 18. The woman having fire wood showing deforestation

PLATE:-4

Fig. 15

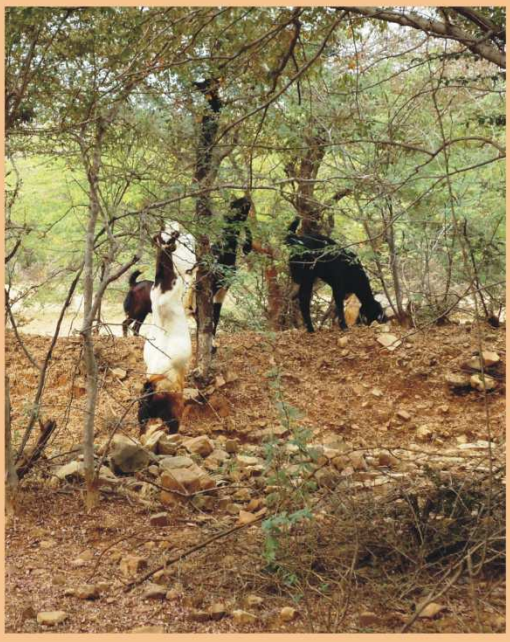


Fig. 16

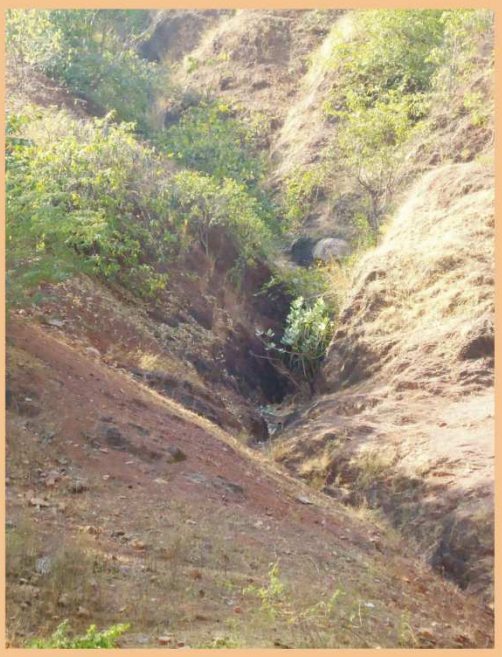


Fig. 17

Fig. 18

PLATE – 5

Different ferns of the locality show the availability of moisture throughout the year in few areas

Fig. 19. Mature plant of *Actiniopteris radiata*

Fig. 20. *Marsilea minuta*, an aquatic fern

Fig. 21. *Adiantum incisum* near Khatkar

Fig. 22. Association of *Christella dentata* and *Adiantum capillus-veneris*

PLATE:-5

Fig. 19

Fig. 20

Fig. 21

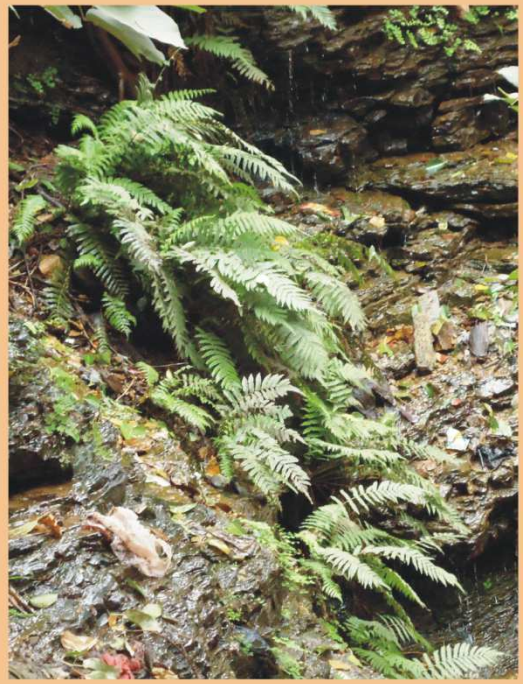


Fig. 22

PLATE – 6

Fig. 23. Dense growth of *Alangium salvifolium*

Fig. 24. *Diospyros melanoxylon* – Tendu tree, showing newly formed leaves

Fig. 25. Pure stand of *Butea monosperma*

Fig. 26. *Butea monosperma* – Flame of the forest, in flowering phase

PLATE:-6

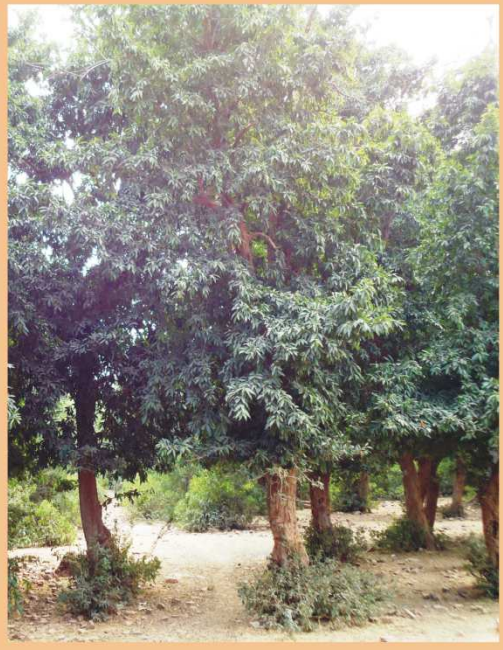
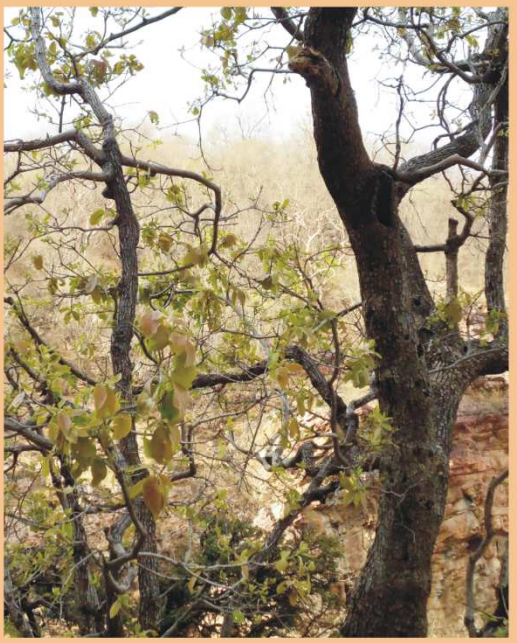


Fig.23



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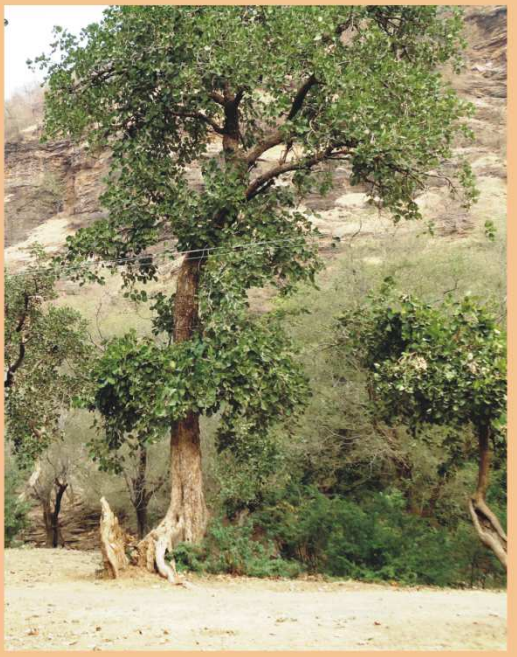


Fig.25

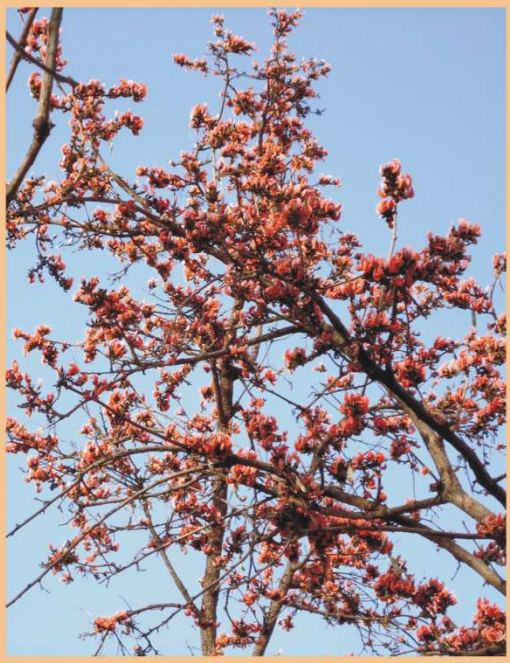


Fig.26

PLATE - 7

Fig. 27. Fruiting tree of *Zizyphus mauritiana*

Fig. 28. Fruiting phase of *Zizyphus nummularia*

Fig. 29. Community of *Anogeissus pendula*, *Capparis decidua* and *Adhatoda zeylanica*

Fig. 30. An association of *Capparis decidua* and *Salvadora oleoides* (xerophytic species) near Ramgarh Mahal

PLATE:-7

Fig.27

Fig.28

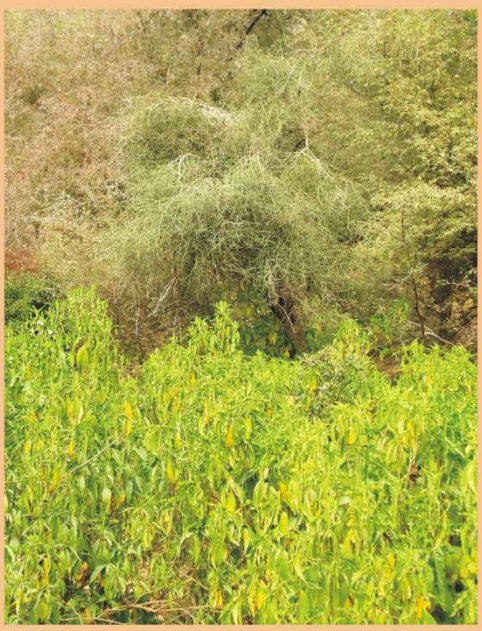


Fig.29

Fig.30

PLATE – 8

Fig. 31. Mature tree of *Mitragyna parvifolia*

Fig. 32. Fruits of *Mitragyna parvifolia*

Fig. 33. Mature tree of *Wrightia tinctoria*

Fig. 34. Fruits of *Wrightia tinctoria*

PLATE:-8

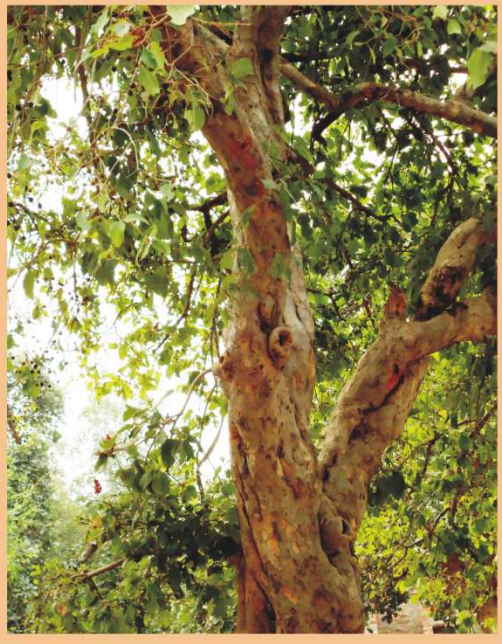


Fig.31

Fig.32

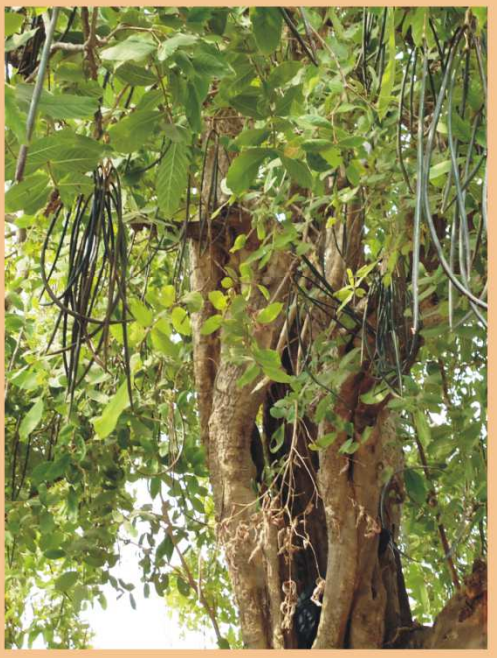


Fig.33

Fig.34

PLATE – 9

Fig. 35. *Dichrostachys cinerea*

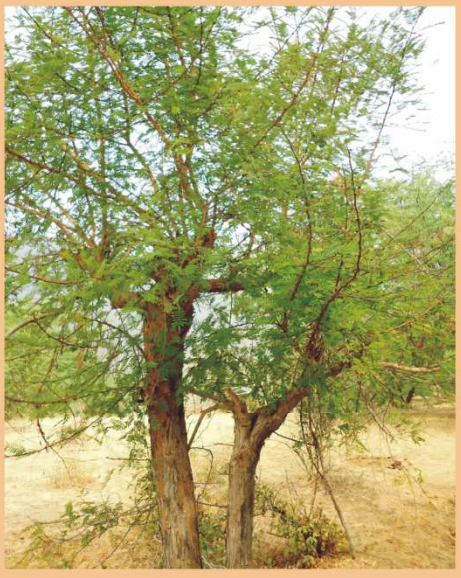
Fig. 36. *Acacia catechu*

Fig. 37. Mature tree of *Lannea coromandelica*

Fig. 38. *Balanites aegyptiaca*

PLATE:-9

Fig.35



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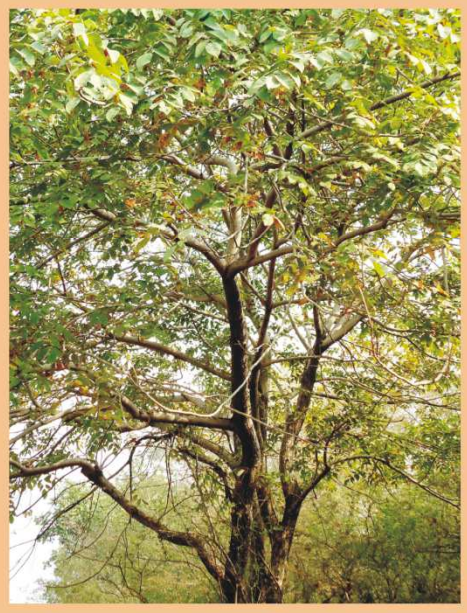

Fig.37

Fig.38

PLATE – 10

Fig. 39. *Sterculia urens*, a source of local ‘Kadya’ gum

Fig. 40. *Helicteres isora* in fruiting phase

Fig. 41. Fruiting tree of *Ficus racemosa*

Fig. 42. Mature tree of *Acacia leucophloea* with fruiting

PLATE:-10

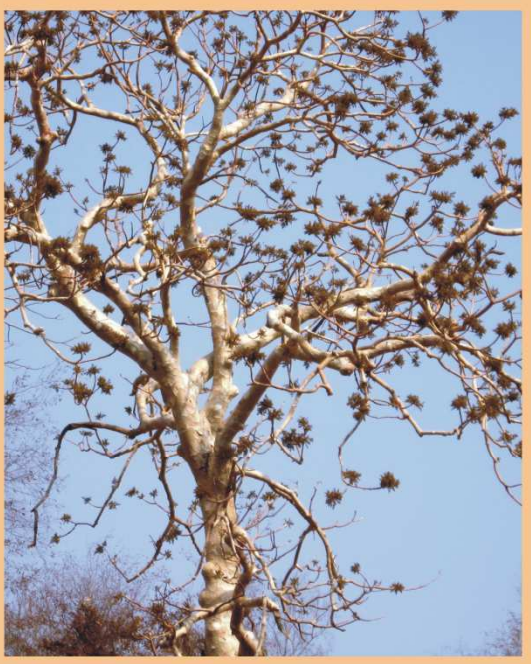

Fig.39

Fig.40

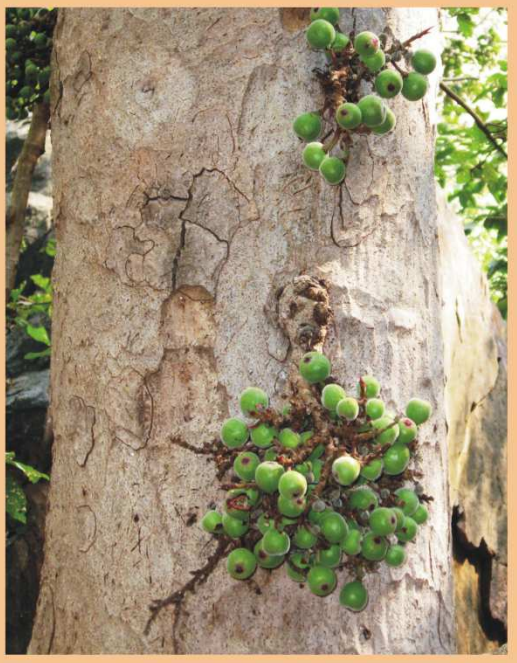

Fig.41

Fig.42

PLATE – 11

Fig. 43. *Salvadora oleoides* tree

Fig. 44. *Grewia flavescens* in flowering phase

Fig. 45. *Acacia nilotica* tree

Fig. 46. *Terminalia arjuna* in fruiting phase

PLATE:-11

Fig.43

Fig.44

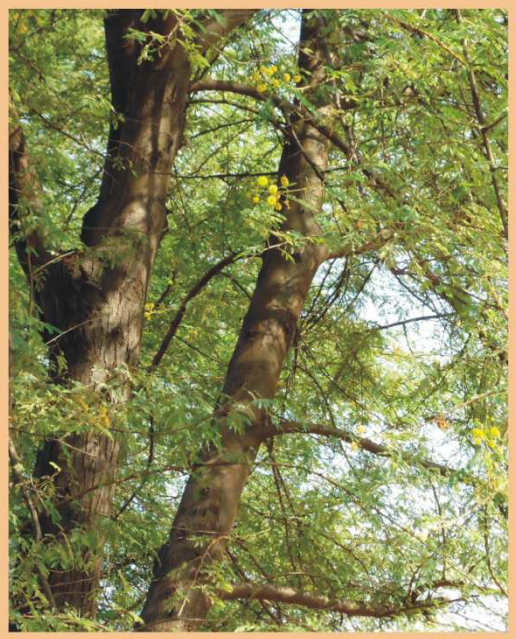

Fig.45

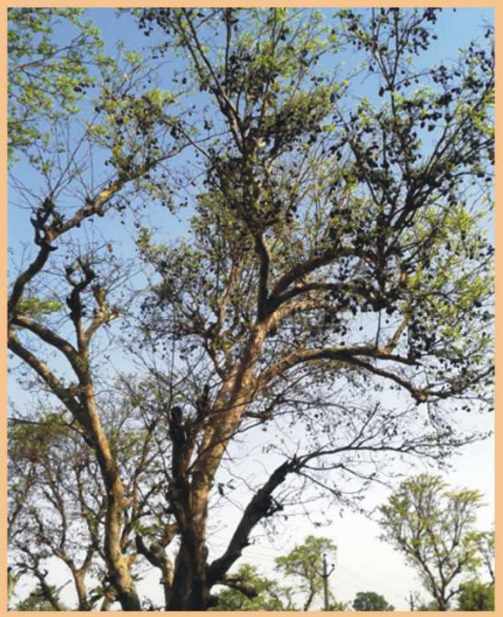

Fig.46

PLATE – 12

Fig. 47. *Cleome gynandra* in flowering and fruiting phase

Fig. 48. *Cryptostegia grandiflora* in flowering phase

Fig. 49. *Vitex negundo* tree with flowering

Fig. 50. Pods of *Mucuna pruriens*

PLATE:-12

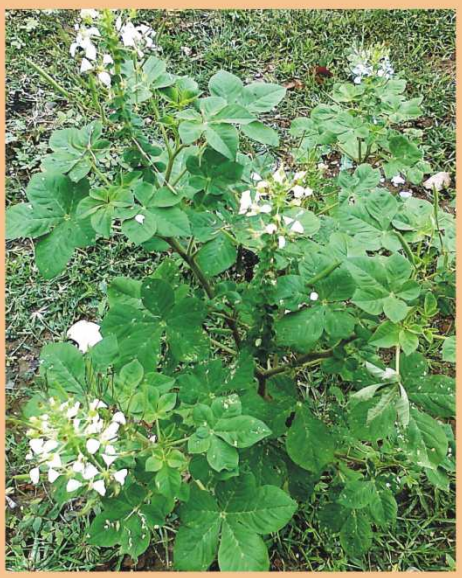

Fig.47

Fig.48

Fig.49

Fig.50

PLATE – 13

Fig. 51. Tree of *Parkinsonia aculeata*

Fig. 52. Pure stand of *Phoenix sylvestris*, near moist bank habitat

Fig. 53. Close up of flower of *Calotropis procera*

Fig. 54. Flowering plant of *Calotropis gigantea*

PLATE:-13

Fig.51

Fig.52

Fig.53

Fig.54

PLATE – 14

Fig. 55. *Quamoclit phoenicea*, common climber of the area

Fig. 56. *Adhatoda zeylanica* in flowering phase

Fig. 57. Close up of fruits of *Martynia annua*

Fig. 58. Flowering plant of *Clerodendrum phlomidis*

PLATE:-14

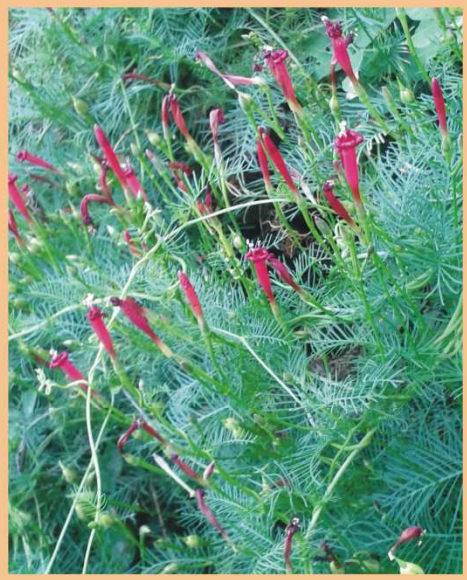

Fig.55

Fig.56

Fig.57

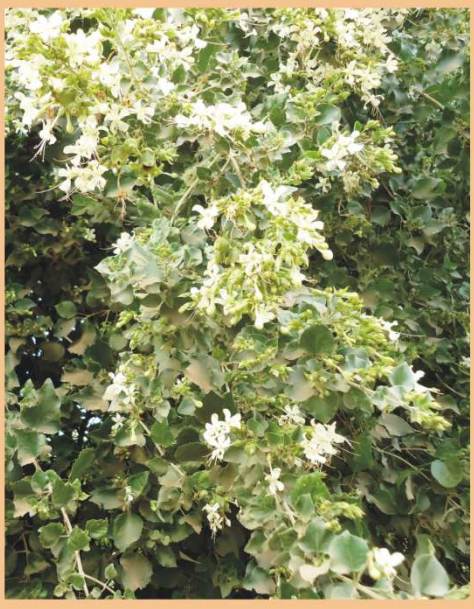

Fig.58

PLATE – 15

Medicinal plants of the area

Fig. 59. *Tribulus terrestris*

Fig. 60. *Commelina benghalensis*

Fig. 61. *Eclipta alba*

Fig. 62. *Ocimum sanctum*, a most common sacred plant

PLATE:-15

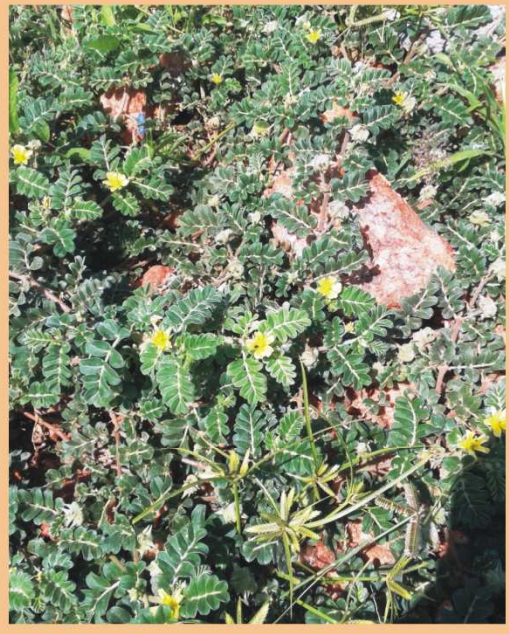

Fig.59

Fig.60

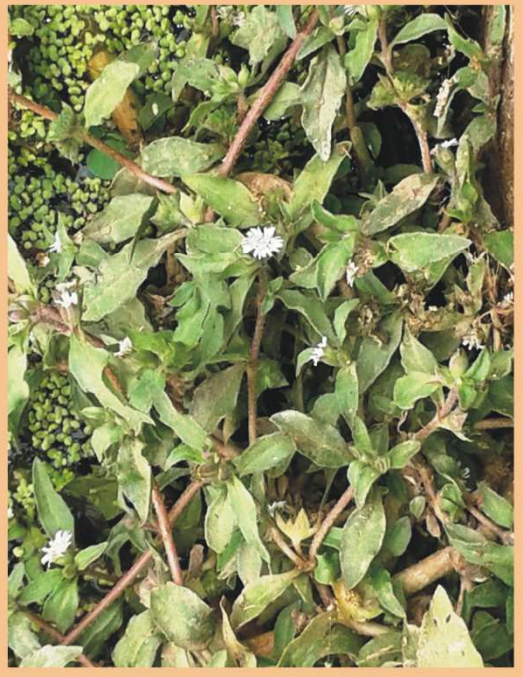

Fig.61

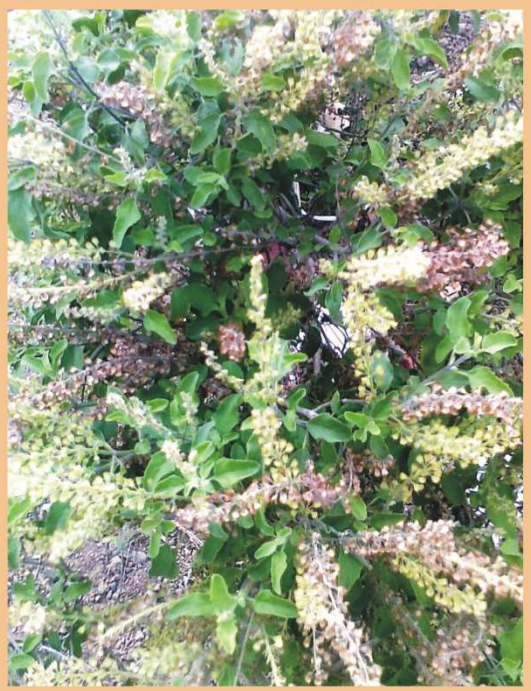

Fig.62

PLATE – 16

Medicinal plants of the area

Fig. 63. *Achyranthes aspera*

Fig. 64. *Barleria prionitis*

Fig. 65. *Ranunculus sceleratus*

Fig. 66. *Fumaria indica*

PLATE:-16

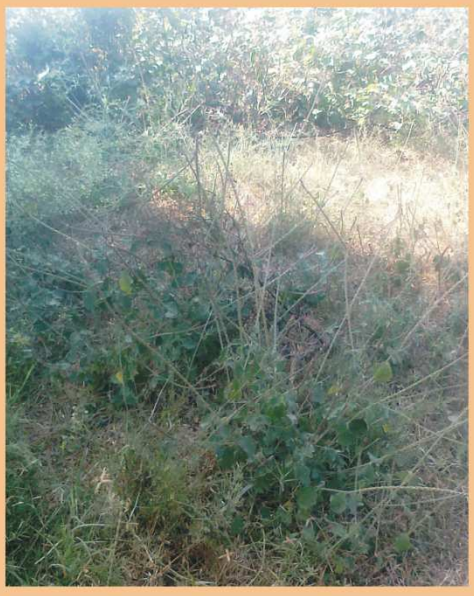

Fig.63

Fig.64

Fig.65

Fig.66

PLATE – 17

Fig. 67. A hut of ethnic people

Fig. 68. Rural women in local market

Fig. 69. Gadoliya Lohar or ‘Black smiths on carts’, a nomadic tribe preparing agricultural implements

Fig. 70.A ethnic man selling items for worship of goddess Laxmi

PLATE:-17

Fig. 67

Fig. 68

Fig. 69

Fig. 70

PLATE – 18

Fig. 71. Flowers of *Nelumbo nucifera*

Fig. 72. 'Pattal dona' – the traditional bowl and plateformed by leaves of *Butea monosperma*

Fig. 73. The worship articles showing *Calotropis procera*, *Phoenix sylvestris*, *Cucumis callosus* and *Cassia siamea* plant species

Fig. 74. Seeds comprise an important part of Laxmi puja during Deepawali, 'Kamalgatta' for worship

PLATE:-18

Fig. 71

Fig. 72

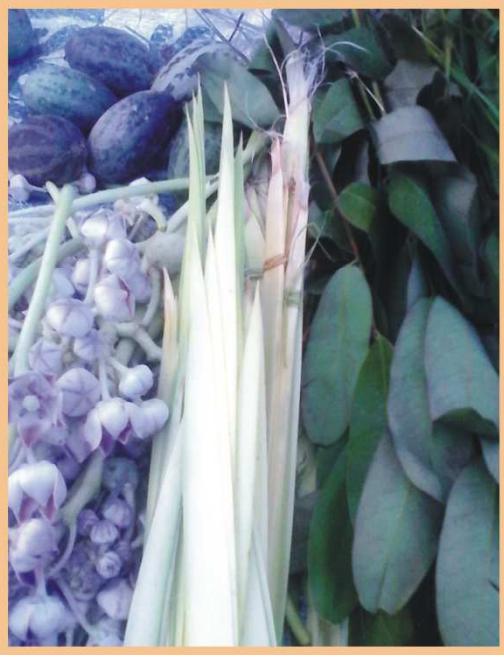

Fig. 73

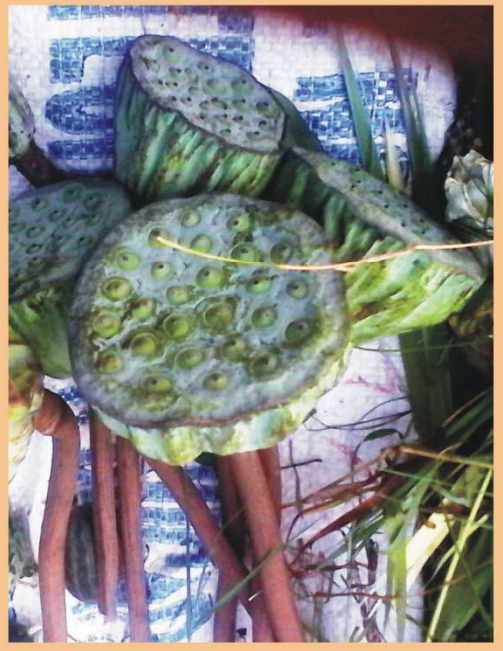

Fig. 74

PLATE – 19

Fascinating views of different sacred groves of the area

Fig. 75. Jharbala pura

Fig. 76. Rameshwar Mahadev

Fig. 77. Dhundhla Nath Aasram situated on the hill across the Meiz river at Khatkar

Fig. 78. Rameshwar water fall and the people taking sacred bath in the holly month of Sawan

PLATE:-19

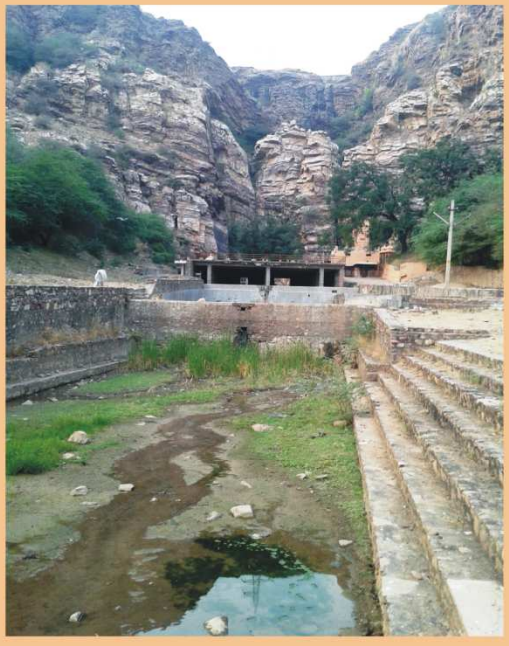

Fig. 75

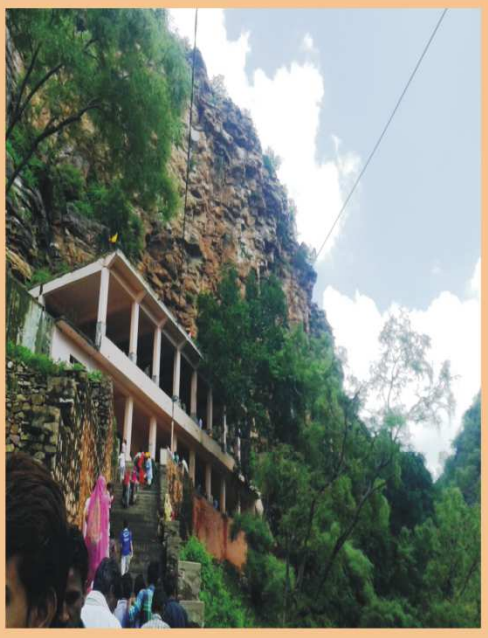

Fig. 76

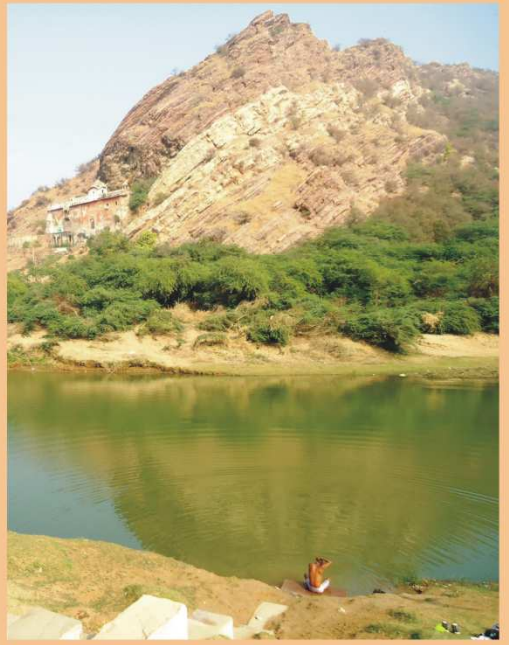

Fig. 77

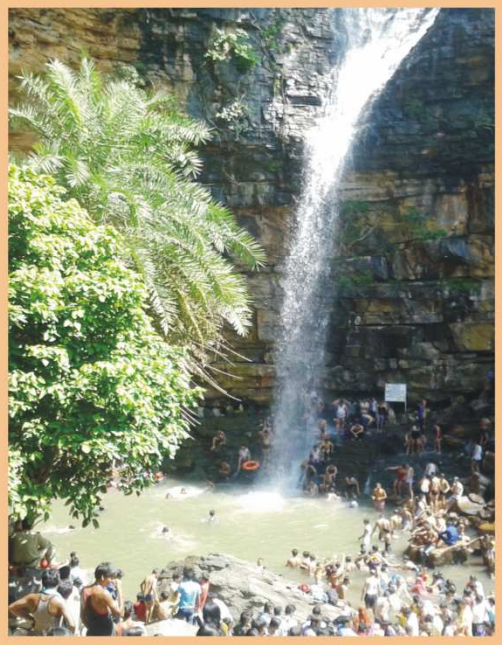

Fig. 78

PLATE – 20

Different sacred groves in study area showing the regional deities

Fig. 79. Dev Narayan Ji sacred grove

Fig. 80. Teja Ji

Fig. 81. Heeraman Ji Maharaj

Fig. 82. Shri Uat Ji

Fig. 83. Kalla Ji

Fig. 84. Ramgarh Mata Ji

PLATE:-20

Fig. 79

Fig. 80

Fig. 81

Fig. 82

Fig. 83

Fig. 84

PLATE – 21

Fig. 85. to Fig. 87.Sacred mosques and edifices (Mazar) of Meera Sahib and Jharpir

Fig. 88.Temple of Rameshwar Mahadev, sacred grove of ancient time

Fig. 89.Jharbala pura Mahadev

Fig. 90.Bheru Ji Ka Thanak

PLATE:-21

Fig. 85

Fig. 86

Fig. 87

Fig. 88

Fig. 89

Fig. 90

PLATE – 22

Sacred deities and beliefs

Fig. 91. Sacred deity under the *Butea monosperma* tree

Fig. 92. *Bauhinia racemosa* near Choth Mata temple

Fig. 93. Sacred deity under the *Holoptelea integrifolia* tree

Fig. 94. A large number of trees of *Anogeissus pendula* along the both side of the stairs of Choth Mata temple

Fig. 95. 'Shiv parivar' under the tree of *Anogeissus pendula*and *Salvadora oleoides* near Jawara Ki Jhopriya village

Fig. 96. The wish fulfillment bells outside a temple

PLATE:-22

Fig. 91

Fig. 92

Fig. 93

Fig. 94

Fig. 95

Fig. 96

PLATE – 23

Wild Edible fruits

Fig. 97. *Zizyphus mauritiana*

Fig. 98. *Zizyphus nummularia*

Fig. 99. *Annona squamosa*

Fig. 100. *Trapa natans*

PLATE:-23

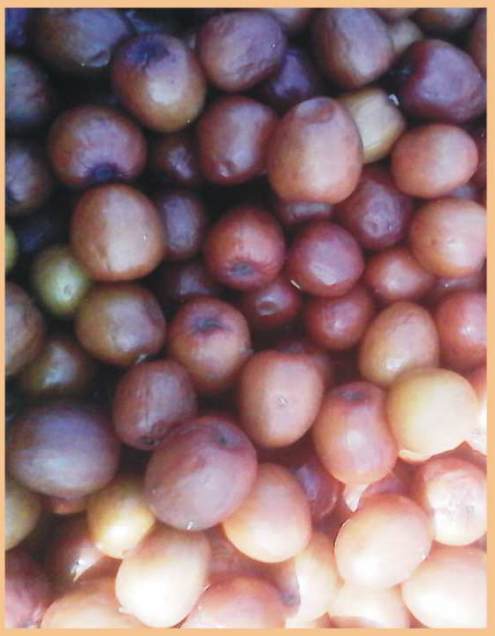

Fig.97

Fig.98

Fig.99

Fig.100