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**ETHNOBOTANY, BIODIVERSITY AND
CONSERVATION STATUS OF FLORA OF
SOON VALLEY
PUNJAB SALT RANGE**

BY

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**Department of Plant Sciences
Quaid-i-Azam University Islamabad**

2011

ETHNOBOTANY, BIODIVERSITY AND
CONSERVATION STATUS OF FLORA OF
SOON VALLEY
PUNJAB SALT RANGE

*A Thesis Submitted to the Quaid-i-Azam University in Partial
Fulfillment*

Of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

Plant Taxonomy (Ethnobotany & Biodiversity)

By

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Department of Plant Sciences

Quaid-i-Azam University

Islamabad

2011

DEDICATED
TO
MY LATE MATERNAL GRAND FATHER
HAFIZ GHULAM MUHAMMAD
AND
MY LATE FATHER
MALIK MUHAMMAD KHAN
MAY ALLAH BLESS THEM

CERTIFICATE

This is to certify that this dissertation submitted by Mr. Farooq Ahmad is accepted in its present form, by the Department of Plant Sciences, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan as satisfying the thesis requirements for the degree of Doctor of Philosophy (Ph.D.) in Plant Sciences.

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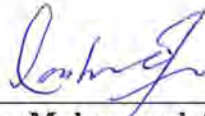
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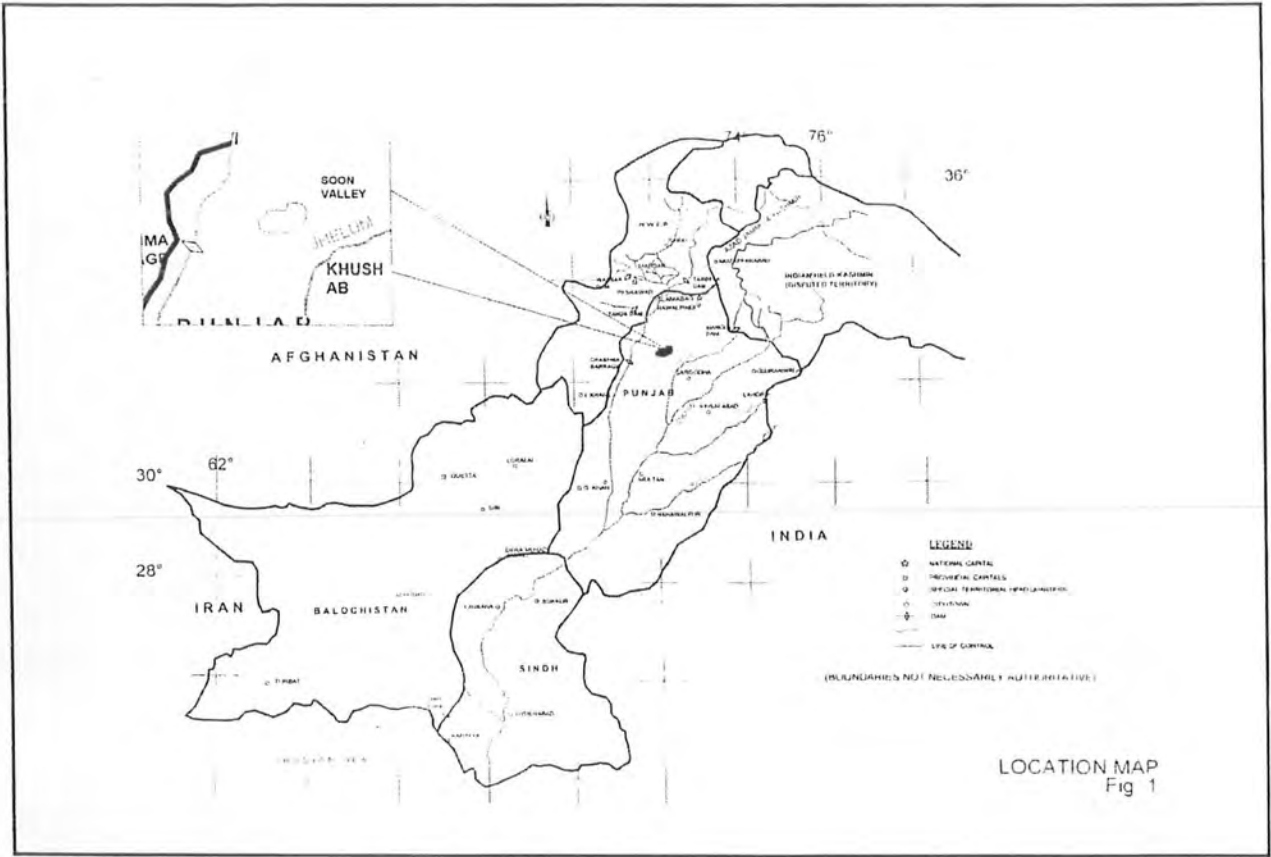
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LOCATION MAP OF SOON VALLEY



LOCATION MAP OF STUDY AREA

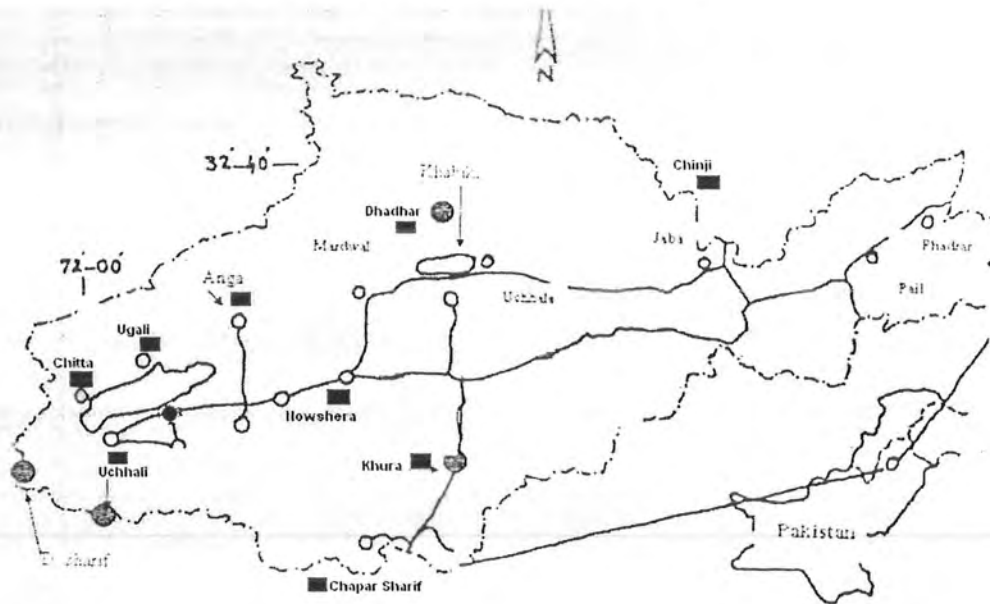
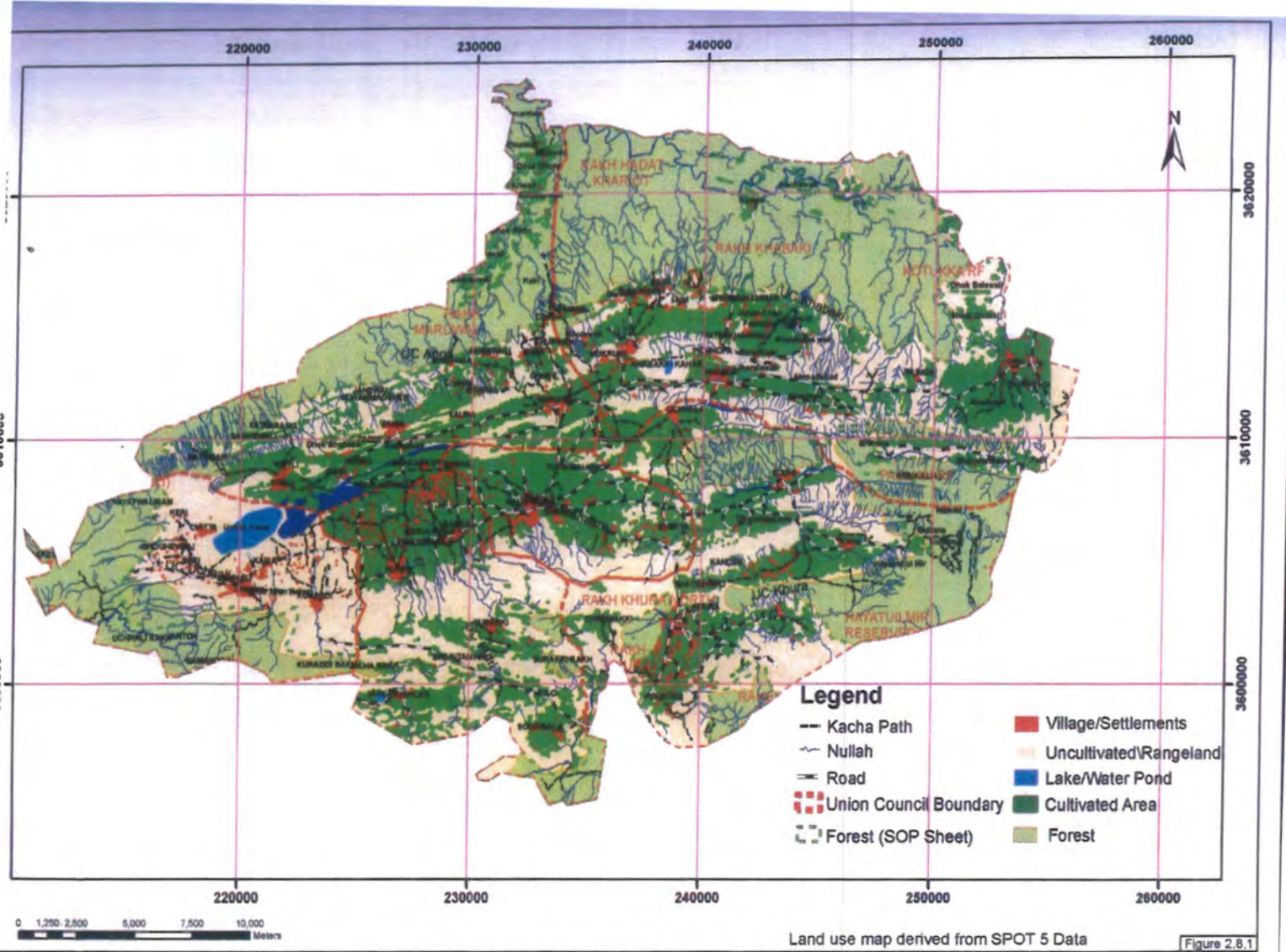


Fig. 1. Location of selected sites from Soon Valley.

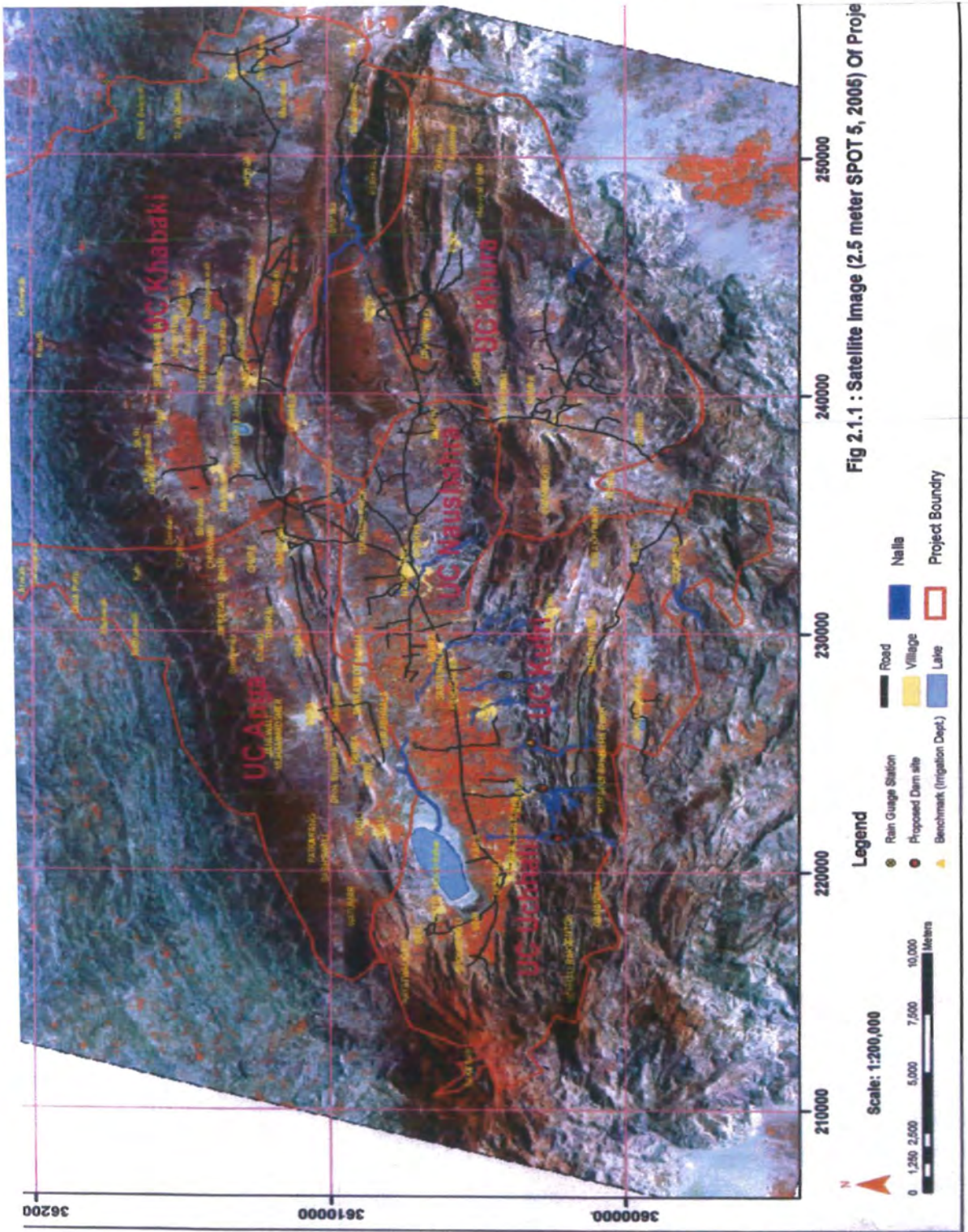
LAND COVER MAP OF SOON VALLEY



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ACKNOWLEDGEMENTS

All the deepest sense of gratitude to the most beneficent, and the merciful ALLAH who enabled me to write this desecration, and with all respect to his last messenger and blessings of the Holy Prophet Mohammad (PBUH) who is a source of Knowledge, wisdom and role model for humanity.

I am highly obliged to my family members, uncle Zahoor ahmad, brothers Malik Bashir Ahmad, Malik Iqbal Ahmad , Malik Mumtaz Ahmad and nephews Qasim Sultan Aahmad Waqas, Hamid Faraz, Nauman Hayat ,Maria Iqbal ,Mohmmad Arifeen, and father late Malik Mohmmad Khan and my mother and wife for their affection support and encouragement, along with my late grand father the first ever personality bringing me towards learning. I want to express my deep gratitude towards my supervisor, Dr. Mir Ajab Khan a role model whose constant support, guidance, encouragement and friendly behavior enabled to completer this task. Special thanks are due to Dr. Mushtaq Ahmad, Dr. Farooq Ahmad, Dr. Ghulam Ali Awan and Dr. Muhammad Zafar from Q.A.U.

These is a list of individuals in Soon Valley who practically assisted in my research work, these are Mr. Gulbaz Afaqi (SVDP), Late Haji Munsib Khan, Abdul Hameed (GRDP), Nasreen Malik, Zahida Parveen, Parveen Akhtar, Gul Sultan, Ahmad Khan and Ehsan-ul-Haq, Mukhtar ahmad, Mohmmad jalil and Hafiz javeed and Mukhtar ahmad from perfect computer centre. Thanks are also due to Mr. Ali Hassan Habib Director General WWF-P, Dr. Ejaz Ahmad, Dr. Ghulam Abkar, and Dr. Najam Khursid and Rahat Jabeen and Malik Mohammad Aslam Awan DDO, Agriculture, Tajamal Hussain chatta EDO, Agriculture, Hafiz Mohammad Baksh site manager SRWC. Special thanks are due to some of the Hakeems of area notably Late Master Karim Baksh, Mohammad Iqbal, Atta Mohammad, Mian Mazoor Elahi, Munawar Hussain Shah, Ghulam Ali, Saiful Khan, Aziz Ahmed.Thanks are also due to all those individuals who share valuable knowledge.

Farooq Ahmad

ABSTRACT

Salt Range is one of the major ecological zones of the Punjab province, and the Soon Valley is heart of this ecosystem. Ethno botany, biodiversity and conservation status of flora of Soon Valley was explored in Soon Valley, District Khushab of Punjab Province. Soon Valley area has undergone to major climatic and environmental changes due to which its flora and fauna have seriously affected. Deforestation, forest fires and grazing, non sustainable harvesting of the flora is responsible for the loss and decline of the indigenous knowledge .Different techniques were used for data collection these include field survey ,interview, focus group discussion and questionnaire. Nine villages of Soon Valley, Ugali, Chitta, Chaper Sharif, Ucchali, Angha, Dhadhar, Khura, Chinji and Nowshera were selected for documentation of the indigenous knowledge. The study was aimed to collect folk recipes of medicinal plants at village level and other ethno botanical uses of the plants, along with local myths. Marketing, social structure of local peoples, local men, women and children were identified plant collectors. Fifty six diseases are cured in study villages through medicinal plants, while 102 plant species are used for medicinal purposes in Chitta Village, 46 in Ugali Village, 82 in Dhadhar Village, 44 in Ucchali Village, 38 in Chinji Village. 50 in Khura Village and 42 in Nowshera Village in different recipes. 13 different plant parts including seeds, Root, Bark, leaves, Branches, fruit, whole plant, husk, Latex, Pulp, flowers and ash are used for medicinal purposes. 50 different plant species are used in Ethno veterinary medicine. 34 different major ethno botanical uses of the plants have also been identified. Conservation status of the flora was also part of study using IUCN Red Data categories and modified criteria, and flora was classified which include 34 species critically endangered, 16 as endangered,

34 Vulnerable and 71 as infrequent. Allerga (*Rhus Cotinus*), Choughan (*Caralluma tuberculata*) and Surajan Shirin (*Colchicum aitchisonii*) are critically endangered species in area.

Fodder species used in area includes 10 grasses, 38 herbs, 13 trees, 13 shrubs and 12 cultivated crop. Cultivation trials of the selected species were also carried out and 45 species were cultivated through seed sowing, 16 species through sapling transplanting and 19 species through vegetative reproduction. Major threats to flora include deforestation, forest fires grazing, mining, and invasive species. Marketing survey of the area revealed that 1 million rupees worth marketing of medicinal plant exists in area, while 6 major pansar stores are operating in area. Effect of harvesting on 5 selected sites on flora was studied and it was concluded that Allerga (*Rhus cotinus*), Bnafsha (*Viola canesens*) and Choughan (*Carralluma tuberculata*) are threatened due to harvesting. Dependence of wild animals and birds was also studied and it was concluded that 16 wild animal species and 13 wild birds are dependent on flora of Soon Valley. Plant species medicinal values were also investigated and it was concluded that 10 plant species are used against rheumatism, 10 against skin diseases, 10 in digestive related problems and 10 against constipation, 15 as astringent and 50 in animal diseases.

Floral habitat of the major wild life species also studied and it was concluded that Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*) are major floral species in Punjab Urial, Chinkara habitat and several other wildlife species. It has been concluded that control on deforestation, forest fires, development of vegetation enclosures and improved management of protected areas along with gene pool conservation are some of the measures which are quite helpful in floral diversity conservation. Awareness raising in local communities about flora and their involvement in conservation activities along with documentation and conservation of the indigenous knowledge is also crucial for biodiversity conservation in area.

CHAPTER 1

INTRODUCTION

ETHNOBOTANY AND BIODIVERSITY

INTRODUCTION

1.1 ETHNOBOTANY

The first published use of the term ‘Ethno botany’ was by John Harshberger in 1896, referring to a botanical culture revealed through archaeological research in the Mancos Canyon, Colorado, USA (Harshberger, 1896). It is a science that has been rapidly evolving, a state of affairs that will likely continue for some time. Many early studies, as some still are today, were largely or entirely descriptive, being concerned essentially with documenting the local names and uses of plants (Cunningham, 1997; Etkin & Meilleur, 1993; Fernandez, 2002; Fonseca, 2000; Martinez, 2002). Not infrequently, Ethnobotany has been used as a means of extracting knowledge of the uses of plants, especially as medicines, from communities, with the aim of developing new commercial products elsewhere.

Over the last decade in particular, ethnobotany has tended to become more analytical, quantitative, cross disciplinary and multi institutional. Ethnobotanists are now much more engaged with questions of conservation, sustainable development, cultural affirmation, and the intellectual property rights of local and indigenous people (Botanical Society of America, 1995; Fernandez, 2002; Martinez, 2002).

Jones (1941) and Ford (1978) redefined ethnobotany using modern ecological terms (Pei, 1995), from which ethnobotany was described as “The study of direct interaction between human and plant population through its culture, each human population classified plants, developed attitudes and beliefs and learnt the use of plants. While human behavior has a direct impact on plant communities with which they interact, the plants themselves also impose limitations on human. These mixture interactions are the focus of ethnobotany”. (Siraj, 2006)

The definition and vision of Harshbergers (1896) still provide the core for the science of ethnobotany. A slight change in emphasis can be seen through a review of current definition “ethno botany is considered to encompass all

studies which concern the mutual relationship between plants and traditional use. (Cotton, 1996)

At present the ethnobotany has shifted its focus from the use of plants by people the relationship between people and plants, which include use, cognition and ecology. Recent definitions of ethnobotany (Balick and Cox 1996; Cotton 1996; Ford 1994; Turner 1995) demonstrate consensus on the move to include more than just use by focusing on the relationship between people and plants. However, there is not consensus whether the discipline should focus on all people or traditional and indigenous peoples (Balick and Cox 1996; Cotton 1996). Neither Cotton (1996) nor Balick and Cox (1996) provide a clear argument as to why ethnobotany should be limited to traditional or indigenous peoples. These medicines have less side effects and man can get it easily from nature. Unani system is dominant in Pakistan but the ethnomedicinal practices are also seen in the remote areas (Wiliam and Ahmad, 1999).

Richard Evans Schultes one of the modern fathers of ethnobotany defined ethnobotany as “the study of human evaluation and manipulation of plant materials, substances, and phenomenon, including relevant concepts, in primitive or unlettered societies.

1.1.1 HISTORY OF UTILIZATION OF MEDICINAL PLANTS

The ethnobotanical pharmacology is as old as ethnobotany itself In Indo-pak first record of plant medicine were compiled in Rig Veda between 4500-1600 B.C. and Ayurveda between 2500-2600 B.C. This system traces its origin to Greek medicine, which was adopted by Arabs and then spread to India and Europe. About 80% population of the world depends on the traditional system of health care (Ahmad, 1999).

The use of plants for medicinal purposes is as old as human civilization (Hill, 1952). From the Ethnobotanical point of view the sub-continent is considered an extremely important area due to its ancient civilization (Paliwal & Badoni, 1988).

People have relied on plants for staying healthy and treating illness of millennia. In the New world Tropics for example archeological remains of plants used as medicine have been dated to 8000 B.C .(Balick et al, 1996).

Extensive written lists of herbal medicines have survived since antiquity, including the Pen Ts'ao, written by herbalist Shen Nung in 2800 B.C which lists 366 plants drugs including the familiar Ephedra. The history of Western medicine begins with the Greek physician Dioscorides, who wrote *De Materia Medica* in A.D 78, describing over 600 medicinal plants, including Aloe and Opium. (Johnson, 2009).

There are many traditional systems of medicine. Modified from a practice in China they may be classified into three broad categories (1) Traditional Scholarly Medical Systems, with written traditions of documentation of knowledge, pharmacopoeias for doctors and institutions for training doctors; (2) Traditional Medical Knowledge (Folk Medicine) which is orally transmitted and associated with households communities or ethnic groups and (3) Shamanistic Medicine with a strong spiritual element and which can only be applied by specialist practitioners (shamans). Traditional Scholarly Medical Systems are especially concentrated in Asia. Some of the more widely familiar are Chinese Traditional Medicine, Tibetan Medicine, Ayurveda, Siddha, Unani, and Western Herbal Medicine, the latter being rather ill-defined (Hamilton, 2003)

In China about 40% of the total medicinal consumption is attributed to traditional tribal medicines. In addition, in Japan, herbal medicinal preparations are more in demand than mainstream pharmaceutical products (Hamilton, 2003)

In Central America medicinal plants have been widely used by the Maya Indians in Mexico, the Ivfiskitos and Sumus in Honduras and Nicaragua, the Pech, Lencas, and Xicaques in Honduras, the Pipiles in El - Salvador, the Talamancas in Costa Rica, and the Guaymis and Kunas in Panama. In Europe, some 1500 species of medicinal and aromatic plants are widely used in

Albania, Bulgaria, Croatia, France, Germany, Hungary, Poland, Spain, Turkey, and the United Kingdom. The Maltese islands constitute an apt example where medicinal plants are widely used in every day life as part of folk medicinal remedies (Lanfranco, 1992).

The practice of traditional medicine is widespread in China, India, and Japan. Pakistan, Sri Lanka and Thailand. Medicinal plants fall in two broad categories. Those plants which are only used by local physicians in various crude formulations to provide some relief to the local population in developing countries. Secondly, those plants which are in demand by pharmaceutical companies for their active ingredients (Baqar, 2001). According to the World Health Organization (WHO) "a medicinal plant is plant which, in one or more of its organs, contains substance that can be used for therapeutic purposes, or which are precursors for chemo-pharmaceutical semi-synthesis"(Brussels, 2001).

1.1.2 WORLD WIDE SCENARIO OF MEDICINAL PLANTS

Plants provide the predominant ingredients of medicines in most medical traditions. The total number of species used worldwide may be 35,000-70,000 (Farnsworth & Soejarto, 1991) out of a total of more than 250,000. It has been estimated that 10,000-11,250 types of plants are used in China (He & Gu, 1997; Pei Shengji, 2002a; Xiao & Yong, 1998), 7500 in India (Shiva, 1996), 2237 in Mexico (Toledo, 1995) and 2500 traditionally by North American Indians (Moerman, 1998). The great majority of species of medicinal plants are used only in folk (orally-transmitted) medicine, the more formal medical systems utilising relatively few: 500-600 commonly in Traditional Chinese Medicine (Pei Shengji, 2001), 1106 in Tibetan Medicine (Pei Shengji, 2001), 1250-1400 in Ayurveda (Dev, 1999), 342 in Unani and 328 in Siddha (Shiva, 1996). Even in Europe, up to at least the 18th century, only the rich could afford to see formally trained medical practitioners (Griggs, 1981).

In Sub-Saharan Africa, the ratio of traditional healers to the population is approximately 1:500, while medical doctors have a 1:40,000 ratios to the rest

of the population (Richter, 2004). In fact, of the total pharmaceutical drug supply available worldwide, only 15% is consumed in developing countries (Lydecker *et al.*, 1992).

In nations with rich botanically based medical traditions, such as India and China, plant medicines predominate. Ayurvedic and other traditional healers in South Asia use at least 1,800 different plants species (Tuxill, 1999). In China where medicinal plant use goes back at least 4 millenia, over 5,000 medicinal plants have been recorded, and about 1,000 are used in current practice (Tyler in Balick *et al.*, 1996).

An inventory of medicinal plants compiled in 1990's by the WHO on the basis of literature from 91 countries, including the classical text on Auurvedic and Unani medicines lists 21000 species of medicinal plants. The Napralert database of University of Illinois documents ethno medical uses for about 9200 of 33000 species of higher plants and lichens (WHO, 1993).

Partly ill consequence, it is estimated that 70-80% of people worldwide rely chiefly on herbal medicine to meet their primary healthcare needs (Farnsworth & Soejarto, 1991; Pei Shen, 2001).

The use of 'alternative medicine', based largely on plants, will grow in industrialized countries due, in part to dissatisfaction with Western Medicine. The market for herbal medicine and related products (food supplements, etc.) has been growing extremely fast, at around 10-20% annually in Europe and North America in recent years (Ten Kate & Laird, 1999).

Out of 4,22,127 species of world flora, there are between 35,000 and 70,000 plant species, which have been used at one time, or another in different cultures for medicinal purposes globally. At least 6,500 species are used in Asia as home remedies (Karki and Williams, 1999). At the turn of the century, approximately 170 herbal drugs were officially recognized in the United States Pharmacopoeia and National formulary.

The World Health Organization (WHO) estimates that 4 billion people (about 80%) of the world population use herbal medicine for some aspect of primary health care (Farnsworth et al., 1985). Herbal medicine is a major component in all indigenous peoples' traditional medicine and is a common element in Ayurvedic, homeopathic, naturopathic, and traditional oriental, and Native American Indian medicine. The Indian subcontinent is a center for domestication and diversification of plants. India has about 15,000 species of higher plants occurring in 16 major vegetation types. About 33 per cent of species are endemic. It is treasure houses of wild economic plants, which are largely under-utilized, particularly wild edible and medicinal and aromatic plants (Arora, 1996).

According to World Health organization (WHO) estimates, the present demand for medicinal plants is about US \$ 14 billion a year, and projected demand by the year 2050 is like to be US \$ 5 trillion. Medicinal plant related trade in India is estimated to be around Rs. 550 Crore / year, value of global trade in medicinal plants has been put at over US\$ 60 billion per year.

In all, over 7,000 plants are known to be used for medicinal and aromatic purposes in India, The heritage of medicinal plants use in India has an ancient history dating back to the pre-vedic culture, at least 4,000 years. (Singh, 2002)

Medicinal plants harvested from the wild remain of immense importance for the well being of millions of people around the world. Providing both a relief from illness and a source of income, over 70,000 plant species is thought to be medicinal. Loss of habitat combined with over-harvesting threatens the survival of many of these plant species.

In India over 7000 plants are known to be used for medicinal purposes. (Singh, 2002).

Currently, it is estimated that the number of higher plant species used worldwide for medicinal purposes are more than 50,000 (Schippmann *et al.*, 2002).

1.1.3 MEDICINAL PLANTS IN PAKISTAN

According to the National Institute of Health (NIH), approximately 400 plant species are used extensively in traditional medicines. The Tibbi Pharmacopoeia of Pakistan (a pharmacopoeia of traditional drugs compiled by the Tibbi Board) has listed around 900 single drugs and about 500 compound preparations made of medicinal plants. There are about 27 large herbal manufacturing companies in Pakistan, which produce Unani medicines on a commercial scale. The number of herbal medicine manufacturers in the non-organized sector runs into the hundreds. The annual turnover of some large herbal manufacturers is comparable to multinational companies in Pakistan. Traditional healers (around 50,000 in numbers, including homeopaths) serve about 60% of the population, especially those living in the rural areas.

Pakistan has over 5700, species of flowering plants reported in the flora of Pakistan (Nasir and Ali, 1970) with around 400 endemic species and 4 endemic genera (*Douepia*, *Suleimania*, *Spiroseris*, and *Wendelboa*).

Medicinal plants are a major source of drugs for the treatment of various health disorders. Pakistan has around 6,000 species of wild plants (Stewart, 1972) out of which about 400-600 are considered to be medicinally important. An estimated 80% of the rural population of Pakistan depends on traditional medicinal system called Unani for their primary healthcare needs, the majority of which uses plants or their active ingredients.

In Pakistan four phytogeographical regions are recognized among the uniregionals, the Irano-Turanian elements is the most common (46%) followed by the Sino-Japanese (10%), Saharo-Sindian (9.5%) and Indian (4.5%) elements by far, the biggest territory, interms of the area, the density of uniregional elements is lowest in this region. In Pakistan, 70% species are uniregional and about 30% of the species are bi- or pluri regional (Ali and Qaisar, 1986).

A survey of naturally available plant wealth of Pakistan shows that medicinal plants grow in abundance in Hazara, Malakand Kurram Agencies, Murree

Hills, Azad Kashmir, Northern Areas and Baluchistan, or are cultivated on farmlands in Punjab, Sindh, Baluchistan, North West Frontier Province and Kashmir. According to the surveys carried out by the Pakistan Forest Institute (1989), 500 tons of medicinal plants are produced in Hazara and Malakand, 16 tons in Murree Hills, 38 tons in Azad Kashmir and about 24 tons in Northern Areas.

Pakistan obtains more than 80% of its medicines from higher plants. Medicinal plants are used for raw material for the pharmaceutical industry and herbal industry for extraction of essential oils, fixed oils, tannins, gums and resins and pharmacologically active constituents like alkaloids, flavonoids, etc. In addition, in culinary additions, spices and colorings as well as in natural cosmetics, perfumes and health foods either distributed through pharmacies under prescription or as “over the counter” medicines (Saeed, 1995).

Pakistan has a lush and diverse flora. It is rightly called the floral emporium of medicinal plant (Rizvi, 1998). Pakistan’s geography and quality of soil are particularly suitable for different kinds of medicinal plants.

There are 10 leading Dawakhana in Pakistan consuming more than 0.64 million kg of 200 medicinal plants annually while 95 species in Pakistan are found to be consumed 4.52 million kg (Shinwari, 2002)

Almost 90% of country’s medicinal herbs requirements are imported. It is important to mention that over 50% of the population in Pakistan, being cured using traditional medicines by almost 50,000 traditional herbal practitioners (Usmanghani et al., 2000). There are about 86 registered manufactures of herbal medicine, which consume most of the material. The major manufacturers produce 300-400 products plants raw materials. In this traditional medicine system most of the medicinal herbs consumed are collected from wild and very small numbers of farmers in Pakistan also import very large quantities of herbs for this purpose, however very small quantities are also exported. The trade in herbal material is monopolized by wholesale drug dealers, with the small shopkeepers, pansar stores, hakims relying on

wholesalers for their supply and almost 250 plant species of medicinal herbs are being traded (Zahoor, 2007).

About 90% of the total number of endemic species is confined to the western and northern mountainous regions (at altitudes of 1200 m or more) and only 10% of the total number of endemics is known from the southern regions of Pakistan.

Pakistan has almost half of its listed flora recognized as ethnobotanically important. Around 300 species are reported to be used in traditional medicine. However, 1010 species have been identified for their medicine properties, which make around 16.8% of the total listed flora (Shinwari, 2005). There are 86 registered organizations involved in preparing herbal / eastern medicine; offering around 300-400 products. There is a growing demand of raw material majority of which is imported (around 92% (Aslam, M 2008)).

In Pakistan, national and multinational Pharmaceutical companies import raw material of medicinal herbs, During 1999, the import medicinal herbs was worth of value US\$ 31.0 million whereas Pakistan exported medicinal herbs of only US, \$ 6.0 million (EPB, 1999). It indicates a huge imbalance between export and import of Pakistan regarding medicinal herbs. In Pakistan, production of medicinal herbs is very intermittent. The Medicinal herbs are not alternative to major crops however, based on their importance in health care, precious natural resource and economic value in trade; efforts are needed to enhance their production burden on import bill.

1.1.4 MEDICINAL PLANTS IN PUNJAB

The Punjab (Pakistan) has diverse vegetation types and major portion of the natural vegetation of Punjab comprises of tropical thorn forest. This type of vegetation is still occurring in isolated patches like graveyards, forest plantation and some prohibited areas under armed forces and salinity, sodicity affected soils (Khan, 1978; Hussain, 2002). Seasonally flooded areas, especially near Indus, Chenab and Jehlum rivers were transformed into riverians or bela forests, swamps and wetlands. Desert and semi-deserts

vegetation occurs in Cholistan and Thar areas, the mountain regions of Punjab; edges of Suleman Range near Rajan Pur have hot mountainous type of vegetation (Chaghtai et al., 1983; Khan, 1991). The southern edge of the Potohar plateau is demarcated by the famous salt range of Pakistan (Ahmad, 2002; Ahmad et al, 2007). Punjab has impressive share in plants which is 40% of Pakistan total flora.

Table No. 1 Punjab Floral Diversity

Life from	Endangered (No.)	World	Pakistan		Punjab	
			Total	World %	Total	Pakistan %
Plants	500	300.00	6000	2.0	2400	40

Source: (Iqbal & Khan Protected Areas workshop Report, 2002)

1.1.5 Medicinal Plants in Salt Range

Review of the medicinal flora of the Salt Range shows that more than 98 angiosperms are traditionally used as healing agents locally (Ahmad et al, 2002, Ahmad, 1999). These plants belong to 45 families. Hundreds of plant species belonging to different plant groups still needs pharmacognostic evaluation. Ahmad (2001) revealed that all the 29 plant species of medicinal importance in the Salt Range are exposed to variety of ecological stresses and are characterized according to their conservation status. Among them species were ranked as critically endangered, endangered, vulnerable and at low risk, respectively.

Ahmad (2001) surveyed the Salt Range medicinal flora and the results of the survey revealed that area has retained a treasury of valuable plant resources alongwith the traditional knowledge of plant use. All these resources are eroding speedily due to (1) community development at the expense of natural resoueces (2), the disintergration of traditional rules regarding the natural resources management and (3) unplanned population explosion. Survey of the drug market in terms of species and resources, it is therefore imperative to check human activities in the salt range forests for the prosperous lives of their

coming generation. Genera like *colchicum*, *litsea* and *neolitsea*, which are disappearing from the habitat, needs urgent rehabilitation its extraction may immediately be checked. Cultivation of *Litsea monopetala*, *Neolitsea chinensis*, *Pistcia integerrima* and *Colchicum aitchisonii* may be encouraged for rehabilitation of the species and as income generating sources of the communities. Base line data regarding conservation status and red list of the endangered species may be prepared. Collectors may be made aware regarding the life cycle of the desired plant and the impact of improper collection time on the quality and conservation of species. Improved culture and post harvest technologies regarding medicinal plants may be popularized, so that their farm cultivation may reduce pressure on natural forest.

Khan (2001) surveyed the resource base of medicinal plant of Potohar region and concluded that in Kallar Kahar and Choa Saiden Shah the typical medicinal plant are *Punica granta*, *Justicia adhatoda*, *Plantago lanceolata* L., *Morus alba* L., *Morus nigra* L., *Periploca aphylla*, *Capparis decidua*, *Verbasum thapsus* L. and *Rosa damascena* Mill. (Cultivated species). The people of this area are commercially utilizing the flowers of *Justicia adhatoda* and *Rosa domescena* for various medicinal products. Tilla Gogian in Jehlem district is a famous historical place having great potential for medicinal plants in this region. The typical medicinal plants in this area are *Justicia adhatoda*, *Coolebrokia oppositifolia*, *Luffa acutangula* Var. *amra* and *Neolitsia chinensis* (maida sak).

Ahmad (2004) surveyed medicinal plants potential and concluded that in Salt Range, more than 94 medicinal plants belong to 45 families are traditionally popular as healing agents. Plants are not only used for curing ailments ranging from mild infections to the chronic ulcers, the species of the *Litsea*, *Neolistea* and *Colchicum* in particular are exposed to severe collection and habitat loss pressure.

Zubiadah et al, (2004) studied the medicinal flora of Dhibbia Karsal in Mianwali is the part of Salt range, which is considered as the field museum of the Pakistan. Medicinal and economically important, naturally occurring

species of the Dhibbia Karsal Village were surveyed on the basis of the perception of local people. The local communities are extremely knowledgeable about the local plants but unfortunately this knowledge is going to be lost as a traditional culture is disappearing. Plants of thirty eight different species belonging to different families of angiosperm have medicinal importance. Due to the salinity of the soil dominating species are perennial. (*Olea ferruginea* Royle) and (*Acacia modesta*) are two medicinally important characteristic trees of this area. (*Olea ferruginea*) due to extensive cutting and grazing has become rare species of the area. (*Solanum nigrum*, *S. villosum*, *S. americanum*) and (*S. surattense*) are common species of the area and exhibit great diversity in morphology. These species are commonly used as the painkiller. They are very good source of tropane alkaloids. A trend of change in vegetation from forest to scrub and then to a treeless grassy area was observed. Factors responsible for loss of species diversity is mainly biotic and salinity of the soil.

Ahmad (2007) carried out investigation into the taxonomic parameters and traditional medicinal uses of 5 species; belonging of 5 genera of the Asclepiadaceae from the Salt Range . The species are (*Calotropis procera* (Ait.) Ait. f.), (*Caralluma edulis* (Edgew.) Benth. & Hook. f.), (*Ceropegia bulbosa* Roxb.), (*Periploca aphylla* Decne.) and (*Tylophora hirsuta* (Wall.) Wight). In Salt Range (*Ceropegia bulbosa*) is vulnerable due to over exploitation. In situ and ex situ conservation is suggested for this species.

Ahmad (2008) investigated the medicinal uses of the plants to determine the distribution pattern and growth of vegetation especially medicinal plant diversity at different sites and seasons and to assess the status of locally used medicinal plants indigenous to Soon valley. For this purpose, the valley was extensively surveyed and the available plant species at selected sites were enlisted. Meetings were arranged with local herbalists (called hakims, who cure various diseases with plant extracts), older peoples having traditional plant knowledge, government officials from Department of Forestry and Agriculture

and various non government organizations as Soon Valley Development Program (SVDP) to know about traditional uses of plants in the area. Large number of the species was being used by the local people for treating various diseases.

Ahmad (2008) studied medicinal uses of plants used by local communities and documented from Salt Range Kalar Kahar. The study included 29 species belonging to 18 families. It was found that common diseases such as fever, cold, cough and diarrhoe could be treated by simple herbal teas and herbal powders. Knowledge about medicinal plants has been obtained from their ancestors for generations. It was concluded that medicinal plant cultivation may be promoted and plant based industries and markets may also be developed.

1.1.6 Ethnobotany Applications

Plants provide us with a wide range of useful products from fuels such as wood, peat and charcoal, through building materials, to food, clothing and medicines.

There are many aspects of Ethnobotany, including the ways that people name and classify plants, the values placed on them, their uses and their management. It reaches across the natural and social sciences. Plants have always been of central significance to human welfare and always will be. Plants provide people with food, fuel and medicine, as well as materials for construction and the manufacture of crafts and many other products. Their chemical and genetic constituents are being increasingly explored for human benefit.

Ethnobotany can be applied for many practical purposes, among which McClatchey and his co-authors have listed landuse development, agriculture, forestry, cultural conservation, education and the development of the health food and herbal medicine industries (McClatchey et al, 1999). Among the particular challenges to which applied Ethnobotany can contribute are conservation of plants (including varieties of crops) and other forms of

biological diversity. (Campbell & Luckert, 2002; Cruells, 1994; Cunningham, 2001; Laird, 2002; Martin; 1995; Schultes & Von Reis; 1995). Botanical inventories and assessments of the conservation status of species, Sustainability in supplies of wild plant resources, including of non-timber products, Enhanced food security, nutrition and healthcare, Preservation, recovery and diffusion of local botanical knowledge and wisdom, Reinforcement of ethnic and national identity, Greater security of land tenure and resource ownership, Assertion of the rights of local and indigenous people, Agreements on the rights of communities in protected areas, Identification and development of new economic products from plants, for instance crafts, foods, herbal medicines and horticultural plants, contributions to new drug development.

Ethnobotany can certainly make important contributions to the development of more sustainable agriculture. This is most obvious so in the case of low input agriculture, where the 'conventional' approach of telling farmers what to do' has not been very successful, and where there is general recognition of the desirability of applying participatory methodologies for the identification and solution of problems (Jones & Garforth, 2002).

In summary, knowledge of Ethnobotany can be useful to agricultural scientists and extension workers to better learn about the perceptions, values and knowledge of farmers about their crops and other plants and to enable to co-experiment with farmers on new practices, including crop breeding and exchange of information between farmers.

Most plants used on a large scale are cultivated, principal exceptions being timber, fuel wood, rattans (canes) and most medicinal plants. Rural people in poor countries are often dependent on wild plants for additional uses, including wood for house building and for local crafts. In India, for example, out of about 16, 000 species of flowering plant, 5000 are used in some way by people.

Today, trade in products from plants worldwide is very extensive, with shipments of food, animal feed, timber and many other commodities. Some national economies are highly dependant on plant exports or imports.

At least 75, 000 plants species are believed to be edible. During the course of history some 12, 000 plants have been used for food, but only about 2000 have been domesticated, and only about 150 commercially cultivated. About 30 species of plant provide 90% of the world's nutritional needs. (WWF, Report 2001)

Cereals are the main source of carbohydrates. The most important cereals are wheat, rice and maize, followed by barley, sorghum (Africa and Asia), oats, millet (China, India, Africa and Asia) and Rye.

1.2 BIODIVERSITY

“The variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (CBD, 1992).

Biodiversity is recognized at three levels: the gene, the species and the ecosystem levels. Biodiversity refers to the variety of life on earth. Estimates of the total number of species in the world range from 2 to 100 million. It is estimated that only 1.5 million species have actually been studied.

The Canadian Biodiversity Strategy defines biodiversity as “the variety of species and ecosystems on Earth and the ecological processes of which they are a part including ecosystem, species, and genetic diversity components.”

In short biodiversity refers to the variety of life on earth. This variety provides the building blocks that allow adaptation to changing environmental conditions.

Over 5-30 million species of living form exist but only 1.5 million have been identified so far (Nosberger et al, 2001). Out of these, about 300,000 are green plants and fungi, 800,000 are insects, 40,000 are vertebrates and 360,000 are microbes. Species biodiversity is much higher in the tropics than in the temperate regions.

1.2.1 BIODIVERSITY IMPORTANCE & APPLICATION.

From socio-economic point of view, biodiversity is of interest for two fundamental reasons; first, biodiversity is valuable to society, that is, greater the biodiversity, we have the better standard of life; second choices made by society have effects on biodiversity. The socio-economic approach to the role of biodiversity is anthropocentric, in that it is fundamentally centered on people and society, and it is utilitarian, because it is focused on improving the wellbeing of people.

The benefits achieved from goods such as pharmaceuticals and agricultural products that are influenced by the prevalence of diversity and extent of bio resources.

The benefits generated by tourism and recreation activities that are dependent on biodiversity induced environment; this has a significant economic value.

Life support services such as flood control, climate stabilization, environment conservation and availability of wood for different purposes etc, all are benefits of biodiversity.

In a study published in 1985, 25% of physician prescribed pharmaceuticals currently in use contained active ingredients derived from plants (Farnsworth, 1985).

No subset of biodiversity is so closely linked to humankind's past and future as the plant kingdom, which provides our food supply and also furnishes oils, gums, fibers, timbers, dyes, and other products were use to clean, clothe, shelter, and refresh ourselves. Healthy assemblages of native plants renew and enrich soils, regulate out freshwater supplies, prevent soil erosion, and provide the habitat needed by animals and other creatures (Tuxill, 1999).

In Indian Agriculture, women use up to 150 different species of plants (which the biotech industry would call weeds) as medicine, food, or fodder. For the poorest, this biodiversity is the most important resource for survival. What is a weed for Monsanto is a medicinal plant or food for rural people. (Shiva, 2000)

According to latest estimates, over 60% of world population depends on the plant medicines for their primary health care and over 70% of the promising anti-cancer drugs come from plants. Biodiversity is a source of energy such as biomass. Other industrial products as oils, lubricants, perfumes, fragrances, dyes, paper, waxes, rubber, latexes, resins and cork, are derived from various plant sources. Supplies from animal origin include wool, silkfur, leather, lubricants, and waxes.

Biological diversity already supports agriculture we depend for 90 percent of our food on the 20 or so plant species and 10 animal species domesticated by our forebears 10, 000 years ago. Yet there are at least 3000 plant species, which have been used for food by human communities at one time or another. (WWF Report, 1993).

The Earth contains at least 75, 000 edible plants, of these only about 150 have ever been cultivating on a large scale. Vegetables are among the most promising of wild foods. About 80 of them are still growing only in wild forest habitats.

The conservation of biodiversity is fundamental to achieving sustainable development. It provides flexibility and options for our current and future use of natural resources. Almost 70% of the population in Pakistan lives in rural areas, and a large part of this population depend directly or indirectly on natural resources. Conservation of biodiversity is crucial to the sustainability of sectors as diverse as energy, agriculture, forestry, fisheries, wildlife, industry, health, tourism, commerce, irrigation and power. Pakistan's development in the future will continue to depend on the foundation provided by living resources and conserving the nation's biodiversity will ensure that this foundation is strong.

1.2.2 BIODIVERSITY OF PAKISTAN

Pakistan's general position in South Asia, the vegetation types that have evolved to occupy these environmental niches include elements of several of the world's major ecological regions. Udvardy's (1975) classification incorporated components of the Indo-Malayan and Palaeartic realms and

Roberts (1991) based on his work in Balochistan, included a third, the Ethiopian or African Realm. The country also includes four of the world's ten major biomes: desert, temperate grassland, tropical seasonal forest and mountain (PWP, 2003).

Between nine and twelve major plant ecological zones have been recognized within the country. Roberts' (1991) classification, which described twelve types, is the most widely accepted. The diversity of these habitat types has, resulted in a surprising level of speciation. In all, for example, fourteen species and sub-species of Caprinae have been identified within Pakistan's boundaries. The diverse zoogeographic origins of the indigenous fauna have resulted in eclectic assemblages of animals, such as bears, wolves, hyenas, cheetah and honey badgers, occurring within a radius of 50 km of one another. (PWP, 2003).

According to the Biodiversity Action Plan for Pakistan (2000) endemism rates of 7% for flowering plants, 3% for mammals and 15% for freshwater fish have been calculated. These low rates of endemism are a consequence of the reality that large sections the country's borders were drawn for political reasons, out of context with any natural barriers. From an ecological perspective, it makes more sense to evaluate endemism on a sub-regional basis in the vicinity of Pakistan.

Of the world's approximately 4,100 mammal species, 188 have been reported in Pakistan and 8,600 species of birds in the world, 666 species of migratory and resident birds occur in Pakistan.

Table No. 2 Summary of Pakistan's biodiversity

Type	Total Report	Endemic
Mammals	174	6
Birds	668	-

Amphibians	22	9
Reptiles	177	13
Fresh Water Fish	198	29
Marine Fish	788	-
Insects	>5000	-
Plants (Angiosperms)	>5700	380
Plants (Gymnosperms)	>21	-
Pteridophytes	189	-
Fungi	4500	2
Algae	775	20

Source: (Biodiversity Action plan for Pakistan, 2000)

1.2.3 HISTORY OF SALT RANGE VEGETATION

Little is known about the geological history of the Salt Range vegetation. Fossil records (Trived, 1946) indicate that the Angiosperms date back to the Tertiary Period and pre-tertiary fossils have little or no Angiospermic affinities.

In more recent times it is known that in 330 B.C. when Alexander the Great invaded India the vegetation of this area consisted of thick forests, which shielded the movement of Alexander, s army. There is considerable evidence that this area was covered with dense forests of wet type till quite recently. There are other reports and fossil evidence to indicate the presence of elephants and water animals in this area several fossils have been collected from Chinji, Kinhati, Chambal having large animal parts such as elephants. These facts speak volumes as to the luxuriance of the vegetation in the past.

Direct evidence to account for the present poor vegetation and aridity of the Salt Range is lacking. One explanation put forward by Randhawa (1945) is that the rainfall 2000 to 3000 years ago, was higher since then there has been

progressive desiccation of the area it is concluded that the forest has been destroyed both by the biotic influence and the resulting desiccation of the area as a result of deforestation. So according to this view the present arid conditions in this region are man made it might be pointed out here that there is no definite evidence to show that arid conditions are due to deforestation. Moreover, it is unlikely that there has been any progressive desiccation in the last two thousand years. The view held by Wadia (1953) that there has been a more or less rhythmic changes and fluctuations of moist climate and aridity ending with the preponderance of arid conditions, seems to offer a better explanation of the observed phenomena.

Champion (1936) has placed the vegetation of the Salt Range under the division Sub-tropical Dry Evergreen Forest. (*Olea ferruginea* Royal) and (*Acacia modesta* Wall) are the two characteristic trees of the area. Vegetation mostly consists of a mixed thorny scrub and trees appear only under protection. The development of the vegetation seems to have been arrested due to severe biotic influence in the past and the forests are not likely to get back to their true climax unless sufficient protection can be provided. There are frequent transitions of the Northern Thorn Forest of the plains on lower hot slopes and to the Sub-tropical Pine Forest at higher altitudes and cooler (northern and eastern) slopes.

The Cis Indus sanitarium is Sakesar (4992 feet) at the extreme of the District. Sakesar is very grassy and can boast of a number of small trees and shrubs. Phulai (*Acacia modesta*) and kaho olive (*Olea cuspidata*) are common. (District Gazetteer Bannu, 1883-84)

The flora in part of the western Punjab is a strong mixture of west Asian and even Mediterranean forms. The Salt Range at Kala Bagh has a flora of its own; the hills contain but scanty vegetation except on the top of the Sakesar hill. The common trees are the Phulai (*Acacia modesta*), Santha (*Dodonea burmanniana*), Kangan (*Crocus sativus*), Kaho or Olive (*Olea europea*), Dhaman (*Grevia elastica*), Kikar (*Acacia arabica*), Anar, Wild fig tree (*Ficus*

carica), Bohar (*Ficus indica*), Jal (*salvadora oleoides*). The hills are however rich in plants and shrubs of which some of the most important are Vina, Mastiara, (*Scutellaria lineari*), Hari (*Aremeniaca vulgaris*), Vithaman (*Celtis coneasica*), Gangar (*Sageretia brandrethiana*). (District Gazetter Mianwali, 1915).

The Salt Range division includes the Kala Chitta hills and the foothills of the Himalya west of the Jhelum. The Salt Range has several plants which extend into India from the west but do not cross the Jhelum. The salt range type of the forest is usually called scrub forest and it ascends to about 3000 feet. (Parker, 1921).

Soon Valley area is poorly known in terms of database on flora especially; their exit limited work on certain aspects of the flora, but no comprehensive work has been done on ethno botanical aspect of Soon Valley.

Parker described the forest flora of Punjab and enlisted 115 species in Punjab Salt Range belonging to 37 families. (Parker, 1921).

The Talagang reserve forest lie on the skirts of the Salt Range. These reserve forest are fairly wooded with shrubs and stunted trees, but timber trees very rare. Most common trees are Phualh (*Acacia modesta*), while the commonest hill wood is the Kao (*Olea europea*). (District Gazetter Attock, 1930).

Vegetation of the forests of Jhelum forest division is dry deciduous scrub type. Phulai (*Acacia modesta*) and kau (*Olea cuspidata*) are the two main species (Said, 1956)

Generally (*Olea ferruginea*) occurs on cooler northern aspects and sheltered places with some (*Acacia modesta*). On hotter southern aspects (*Acacia modesta*) is the principal tree species where (*Olea ferruginea*) may be found scattered and in sheltered places (Said, 1956; Sheikh, 1987).

Both the main tree species i.e. (*Olea ferruginea*) and (*Acacia modesta*) are slow growing. (*Olea ferruginea*) attains a height of about 3 meters in 30 years and (*Acacia modesta*) reaches about 3.5 meters height at this age.

(*Olea ferruginea*), (*Acacia modesta*) and other species generally occur in mixture (Said, 1956).

The vegetation of salt range comprises both legumes and non legumes (Ahmed, 1964, Hussain, 2002).

Scanty reports are available about the Vegetation of this region. According to Ahmad (1964) the vegetation of plains of salt range (Soon Valley) consists of an open low forest in which thorny usually hard woody species pre-dominate.

Different species of forbs (*Medicago polymorpha*), (*Solanum nigrum*) and (*Withania coagulens*) and (*Crotolaria sp*), were recorded many other repeated themselves in many quadrats, had low constancy. The predominant ground cover consisted of grasses from which the (*Cymbopogon jwarancusa*) was dominating. Schaller and Mirza (1974) reported for this area that the vegetation consisted of Acacia scrub woodland. Generally, (*Olea ferruginea*) occurs on cooler northern aspects and sheltered places with some (*Acacia modesta*). On hotter southern aspects (*Acacia modesta*) is the principal tree species where (*Olea ferruginea*) may be found scattered and in sheltered places (Said, 1956; Sheikh, 1987).

Trees of large dimensions may be seen in valleys and gullies where deep soils and some moisture are available. The main tree and shrub (non wood species are (*Olea ferruginea*), (*Acacia modesta*), (*Pistacia integerrirna*), (*Dodonaea viscosa*), (*Capparis aphylla*), (*Tecoma undulata*), (*Gymnosporia royleana*), (*Monothecha buxifolia*) and (*Zizyphuss nummularia*) (Sheikh, 1987 and 1993; Said, 1956).

The natural vegetation of the Soon Valley area is a mixture of sub tropical thorn forest with species such as (*Acacia modesta*), (*Adhatoda vasica*), (*Dodonaea viscosa*), (*Gymnopora royleana*), (*Olea ferrugenia*), (*Reptonia buxifolia*), (*Tamarix aphylla*), (*Wihania coagulans*), (*Zizphu mauritiana*), and (*Zizphus nummularia*). Most of the natural vegetation around the wetlands has been cleared for agriculture and that in the catchments areas seriously degraded

as a result of cutting for fuel wood and timber for small implements (Scott, 1989)

Under good site conditions a fully mature (*Acacia modesta*) tree can grow up to 9 m in height and a mature (*Olea ferruginea*) tree up to 9-12 meter tall in Salt range forest (Sheikh, 1993).

113 plant species were recorded in vegetation survey of the Chumbi Surla wildlife sanctuary including 28 shrubs / trees, 34 herbs, 41 grasses and single fern (*Acacia modesta*) was the only dominant tree species. (Chaudhry, 1995)

Main plant species of the Chumbi Surla wildlife sanctuary are Phulai (*Acacia modesta*), Kau (*Olea ferruginea*) and Santha (*Dadonea viscosa*) these provide food and shelter for wildlife of area. (WWF – Pakistan Report, 1996)

Vegetation in the Chinji National Park is typical of dry sub tropical broad leaved forest type consisting of (*Olea ferruginea*, *Acacia modesta*; *Sageretia thea*, *Zizphus nummularia*, *Ehretia aspera*, *Periploca aphylla*; *Gymnosporia sp.*, *Dodonea viscosa*, *Chrysopogon aucheri*, *Cymbopogon spp.*, *Heterogogon contoruis*, *Pennisetum sp.*, *Saccharum spp.*; *Asparagus sp.*). Kau (*Olea ferruginea*), Phulai (*Acacia modesta*), Santha (*Dodonea viscosa*) and Kikar (*Acacia nilotica*) are among main plant species found in the Sodhi Wildlife Sanctuary (WWF– Pakistan Report, 1996).

The Salt Range at Kala Bagh has a flora peculiar to the range areas of Indus. The hills reflect a barren face with scanty vegetation with the singular exception of the Sakesar hills. A few clusters of trees may be spotted in depressions and along the low-lying slopes of Bhangikhel. The common trees are the Phulai (*Acacia modesta*), Santha, Kangan, Wild Olive, Dhaman, Kikar (*Acacia arabica*), Anar or pomegranate, Khabari or wild fig tree, Tot or mulberry Bohar (*Ficus indica*), and Jand (*Prosopis spicigera*). (DCR, Mianwali, 1998)

Jhangar Valley area presents typical dry sub tropical broad-leave vegetation comprising of small to medium sized trees of Kao (*Olea ferruginea*) and Phulai

(*Acacia modesta*). The forest vegetation grows on the hills around the valley, while the wide and flat valley bottom is used for rainfed agriculture. An important shrubby associate is Snatha (*Dodonaea viscosa*), (WWF-Pakistan Report, 2000)

Vegetation survey of Lehri and Jindi reserve forest in Jhelum recorded 143 species belonging to 46 families. (*Acacia modesta*), Phulai is the most dominant surpassing all other species found in the region. Among shrubs the most dominant species is (*Dodonaea viscosa*), Santha followed by (*Zizyphus nummularia*), Mallah (Hameed, 2000)

Reserve forest are spread over an area of 88,578 acres constituting about 40% of the total land mass of Soon Valley with predominant species of Phulai (*Acacia modesta*), Kau (*Olea ferruginea*) and Santha (*Dodonaea viscosa*) (Khushab Forest Division, 2000).

Investigations were carried out in Salt Range area of Pakistan, regarding the morphology of grasses as an aid to their correct identification, their distribution and indigenous uses in the study area is globally known by its large salt reserves and it has rich floral diversity. From the area 62 species of grasses belonging to 11 tribes were collected. The largest tribe was Paniceae followed by Andropogoneae having 18 and 12 species, respectively.

Some grasses such as (*Eulaliopsis binata*) locally known as Bhaber (*Cymbopogon jwarancusa*) Khavi are abundant on mountains and rocky slopes and near sand stones. Sand stone and limestone are the common rock types of Salt Range (Ahmad and Waseem, 2004). (*Eulaliopsis binata*) that has very long and narrow leaves is used for making brooms, mats and ropes in the area. (Hameed, 2000).

The important plant species in Kala Bagh private game reserve are (*Acacia modesta*), (*Olea ferruginea*), (*Salvadora oleiodes*), (*Zizyphus nummularia*), (*Dodonaea viscosa*), (*Prosopis glandulosa*), (*Justicia adhatoda*) and (*Calotropis procera*). Shrubs are sparse mostly scattered (*Zizyphus nummularia*) and (*Maytenus royleanus*) except on some ravines and on the

higher ridges where (*Dodonea viscosa*) is prominent ground cover consists of grasses importantly (*Cymopogon jwarancusa*, *Eleusine compressa*, *Heteropogon contortus*, *Aristida adscensionis*, *Cynodon dactylon*) and *Saccharum* species. (Awan, 2001).

Punjab Uril was observed feeding on plant species and browse on Phuali (*Acacia modesta*), Malla (*Zizyphus nummularia*), Kau (*Olea ferruginea*) while graze Khabal (*Cynodon dactylon*), Khar (*Chrysopogon montanus*), Phariaon (*Digiatria bicornis*) and Khawi (*Cymbopogon Jawarancusa*). (Awan, 2001).

The mountains of the western end of the Salt Range are covered with sub tropical evergreen forests sub tropical semi evergreen forests and tropical thorn forests. The major trees constituting the forests are Kao (*Olea ferruginea*) and Phulai (*Acacia modesta*) (Zulfiqar, 2002)

Broadly two types of forests can be recognized sub tropical dry evergreen forests and Thorny sub tropical semi deciduous forests. The former comprising mainly of (*Acacia modesta*, *Olea ferruginea*, *Reptonia buxifolia* and *Dodonea viscosa*). This forest occupy most of the hill tract ranging from 450 up to 1200 m. The latter type being represented by the highly degraded thorny shrubs of (*Acacia modesta*, *Salvadora oleoides*, *Capparis decidua*, *Carisa apaca* and *Maytenus royleanus*). (Ahmed, 2002).

The natural vegetation of the region is a semi ever green forest and tropical thorn forest while species such as (*Cynodon dactylon*, *Justicia adhatoda*, *Dodonea viscosa*, *Maytenus royleanus*, *Olea ferruginea*, *Rhaza stricta*, *Tamarix aphylla*, *Withania coagulans*). Natural vegetation around the lakes in the valley bottom has been cleared for agriculture the forest vegetation on the surrounding hills is severely depleted. (Li and Mundakur, 2003).

Vegetation around wetlands recorded was dry deciduous scrub with kahu (*Olea ferruginea*) phulai (*Acacia modesta*) and santha (*Dodonea viscosa*) as dominant species. Good fodder grasses like Pharion (*Digitaria bicroni*) Palwan (*Bothriochloa pertusa*) and Khar (*Chrysopogon serrulatus*) were also found quite frequently in places where the incidence of grazing was less pronounced.

62 species of plants belong to 56 genera, 29 families and 11 orders. The percentage of occurrence of trees, shrubs, herbs, climbers and grasses was 20.99, 30.10, 16.13, 3.22 and 22.58 % respectively. (Ali, 2004).

62 species of grasses from salt range of Pakistan belonging to 11 tribes were collected; The 62 species of grasses belonging to 11 tribes constitute the major bulk of grasses of low mountainous areas and plains of northern Punjab of Pakistan. Majority of these grasses exists in the plains and low hill areas of India, Iran and Afghanistan. (Ahmed, 2007).

Azam et al, (2008) studied the water birds of Nammal Lake and vegetation of area. The aquatic vegetation consists of (*Carex fedia*, *Hydrilla verticillata*, *Juncos spp*, *Phragmites karka*, *Potamogeton crispus*, *Saccharum spontaneum*, *Typha angustifolia* and *Zannichellia palustris*). The terrestrial vegetation of the region is a mixture of subtropical semi-evergreen (*Acacia modesta*, *A. nilotica*, *Adhatoda vasica*, *Dodonaea viscosa*, *Gymnosporia royleana*, *Olea ferruginea*, *Prosopis cineraria*, *Reptonia buxifolia*, *Salvadora oleoides*, *Tamarix aphylla*, *T. dioica*, *Zizyphus mauritiana*, *Z. nummularia*, *Chrysopogon aucheri*, *Lasiurus hirstus*, *Heteropogon contortus*) and (*Panicum antidotale*), (*Prosopis glandulosa*) is introduced in the area. Most of the land adjacent to the lake has privately utilized for agriculture. (Azam, 2008).

1.3 INTRODUCTION TO STUDY AREA

1.3.1 Physiography

Valley Soon Sakesar is part of Salt Range hills and is located between longitude 72° 12 and latitude 37° 32. It forms a very prominent feature of Pakistan located between the Thal desert (800 ft above sea level) in the south and Potwar plateau (155–1800 ft) above sea level on the north forming an escarpment. The average height of the range is about 2200 feet above sea level. The highest point on the range is Sakesar (1510 meter) followed by Maram Dev I (1288 meter) Maram Dev II (1235 meter), Choti Sakesri (1125 meter), Hayat Al Mir (925 meter) (Farooq, 2003).

Salt Range hills runs into two parallel lines of hills separated by a distance of about five miles. Each of these hills consists of parallel ridges, which forms looped formation; these ridges intermix at Sodhi and then at Sakesar. These ridges form several valleys including Sodhi, Soon, Biakh, Khabeki, Parchun, Karang and Jahlar, these valleys are interlinked. Surplus water from the drainage of these hills accumulates in three independent salt wetlands out of these three Uchhali is spread over an area of 943 ha, Khabeki 283 ha, and Jahler 17 ha. Only Khabeki wetland has sweet fresh water and is suitable for fisheries. (Farooq, 2003)

The range of hills extending in an irregular arc from the river Jhelum on the east to the river Indus in the west comprises this salt range covering a length of about 150 miles it takes its name from the important salt deposits which are being quarried at present at Khewora, Warchha and Kala Bagh in the heart of this range lies the Soon Valley.

There are 7 Union Councils (Uchhali, Kufri, Anga, Naushahra, Khabakki, Pail and Khura) of Tehsil Khushab in Punjab. The total area of the seven union councils is about 737 square kilometers (with maximum length and width of 45 Km and 30 km, respectively) and is inhabited by about 102,194 people. There are 51 villages listed in revenue record and a number of small settlements Naushahra is the business and political headquarter of the entire valley

followed by Kufri and Khabakki as the second most populated villages. (DMPP, 2006).

The Soon valley is accessible to general public from village Jaba situated at Talagang Khushab road and via village Sodhi direct from Khushab. Soon is an amazing valley in terms of its culture, environment, climate and ecology. It is moderately populated and 60% of the population is engaged in farming. The place is known for its off-season vegetables, like cauliflower and popular fruits like oranges. (G.C.U, 2006).

Local population of the Soon Valley is settled in villages and also at scattered derajats locally called Dhokes and Dera. A large population of some villages is settled at the periphery of the state reserve forest. There are only two ethnic groups settled in Soon Valley, which are Awan (98%) and Arian (2%). Both the ethnic groups have similar life, beliefs, traditions, and cultural heritage. They have been utilizing the local plant resources over many generations. Local people remain dependant on plant resources for fodder, fuel, fruit and agricultural implements as well livestock rearing sources.

The valley suffers the problems like deforestation, droughts, and depletion of under ground water reservoirs and shrinking of lakes. The most remarkable feature of the valley is the presence and of CBOs working enthusiastically in the region. (G.C.U, 2006).

1.3.2 History

In spite of the some intensive archaeological work in the past, the early history of the salt range area still remains shrouded in mystery. Of all the antiquities found here coins have been the most prolific. (Rehman, 1989).

The area was once included in the dominions of the Indo- Greek, Scytho-Parthian and Kushan rulers till about the middle of the 5th century. The Salt Range comes more prominently into the limelight in the region of the Jayapala. Of the tribes of this range include Awans, Gujars and Jats; only Ghakhars, Janjuas and Khokhars have left their imprints on history. (Salim, 1992).

Local farmers while Ploughing their fields discovered many types of coins belonging to different periods. Some coins manifest the Muslim rule, while others mark the Hindu period of the valley.

1.3.3 Soil

According to the Said (1951) the weathering of pure limestone leaves no perceptible soil as calcium carbonate is carried away in solution by rain water. The weathered surface of the lime rock is left with sharp projections and numerous hallows and is exceeding irregular. Thus generally sheet rock and boulders are found on hillside. In places where the rock is not so pure being mixed with shale, clay or sand weathering produces some insoluble matters, which produce a small amount of soil. The soil in the limestone portions although thin and shallow is fertile due to nutritive properties of calcium carbonate. Weathering of sand stone produces very poor and infertile soil, which can support only a very poor type of vegetation.

In the valley the soil being formed by the gradual disintegration of the surrounding hills is very fertile and subject to the availability of good water, most of the land here is under cultivation. (Ahmed, 1964)

Soils lying near Uchali wetland and at several other places especially Gorab Nullah from Nowshera to Ugali are water logged and saline. During winter season white layers of the dust are common which mainly consist of Sodium Chloride. (Farooq, 2005).

Soil erosion is common in northern part of the Soon Valley near Kinhati where due to heavy erosion gullies have been formed and red marl is exposed at several places. A large area extending over 200 acres near Jahler wetland is eroded and a complex chain of gullies have been formed. (Farooq, 2005).

1.3.4 Climate

The climate of the Soon Valley is sub tropical continental. Hot dry winds and prolonged periods of the drought are frequent. Winter is accompanied by frost.

Annual rainfall pattern shows variation in salt range, as the average annual rainfall declines from east to the west (Said, 1956, Ahmed, 2001).

The valley climate is characterized by a relatively low annual precipitation (508 mm) and average minimum temperature of 1°C (January) while average maximum temperature is 36° C (June). Hot dry winds, prolonged periods of drought are frequent and winters are, accompanied by frost. Summer and winter both are cooler than those in the neighboring plains and the winter season is also longer than that in plains (Hussain, 2002).

The climate of the Soon Valley remains comparatively less hot and dry during the summer as compared in the central Punjab because the winds occasionally experienced here are accompanied with rainfall. The winter remains for a very short duration during which frost is expected at some places for a couple of weeks. Due to this considerable heterogeneity in the macro and micro-environments of the region large plant and animals are expected to be indigenous to it (GOP, 2003).

The climate of the area is sub tropical continental. The normal annual rainfall in Soon Valley is about 600 mm. The months of significant rainfall are July, August and September in a year. About 45% of the rainfall occurs in these months. (DMPP, 2006).

The climate of the Salt Range is characterized as sub-tropical monsoonal type with hot summers (44 degrees of centigrade) and cold winters (-2 degrees centigrade) (WWF-P, 1994).

1.3.5 Temperature

Record shows that January is the coldest month, while June is the hottest month. The absolute mean monthly temperature in the valley ranged from 1° C in January (2001) to 46° C in June (1992). November, December and January are the coldest months while May, June, July are the hottest months.

1.3.6 Rainfall

Rainfall in area is concentrated in two seasons the first in winter and the second in summer. Rainfall data for the period 1996 – 2008 shows that 67 % of the rainfall occurs during summer and the remaining during winter months. (DMPP, 2006).

Table No. 3 Climatic Data

Average Height from sea level	2500 ft
Summer Maximum Temperature	42 C ⁰
Average Maximum Temperature	33.8 C ⁰
Winter Minimum Temperature	-3 C ⁰
Average Minimum Temperature	1.96C ⁰
Average Rain fall	350-500mm

Table No. 4 Rainfall Data

Year	Total Rainfall (In Millimeter)
2000	450 mm
2001	516 mm
2002	450 mm
2003	868 mm
2004	536 mm
2005	400 mm
2006	650 mm
2007	600 mm
2008	548 mm
2009	377 mm
2010	680 mm

Source: (Horticulture Research Station Naushehra).

Summer rains are due to monsoon while the winter is due to various disturbances. On the account of the broken nature of the country several ridges and hills lie in the area there are many local variations within the region. Sakesar hill, though lying farther west receives higher rain owing to its increased elevation. Summer rains are crowded in a few months with long periods of drought before and afterwards; on the other hand the winter rain is generally distributed. Drought period immediately follows the monsoon and last till the winter rains in the region this period is of great importance in determining the type of vegetation, which can grow in the region. (Said, 1951).

Snowfall is rare but observed during cold years at Sakesar and recorded in 2002 and 2007.

1.3.7 Humidity

Humidity varies from 27–85 % and it is relatively high during three months of the monsoon rains, while in other months of the year it is low. Due to elevation fog phenomenon common in Punjab plains during recent years is very rare in soon valley area. (WWF-P, 1994).

1.3.8 Wind

Strong wind storms are common at the start of the summer and in July – August. Winter winds are common from North to the south and decreases temperature significantly. The prevailing wind is more frequent towards South–West and South – East, while winds from east to west are less frequent (WWF- P, 1994).

1.3.9 Geology

The Salt Range is an east west trending thrust about 175 Km long and contains the second largest mineral Salt (Sodium Chloride) deposits in the world. The salt deposits are due to evaporation of the ancient, Tethys Sea and formation of the Indus plains from a collision of the Indian Plate with the Asian plate resulting from continental drift 40 million years ago. (King and Vincet, 1993).

Sedimentary rocks and the fossils preserved in this region give a reasonably good record of the geological and biological history of this part of the earth. The rocks have been tilted vertically, even inverted in some places so that the older fossil strewn layers now lie on the surface (Shaw, 1989). Due to presence of complete sequence of Phanerozoic rocks the area is called Museum of Geology. (Awan, 2004)

The climate rock is rich in fossils generally amphibians and ferns. The oldest series in the Salt Range has been referred to Cambrian. (GCU ,2006).

Salt layers are exposed at several places including Warcha, Rukhla, Amb and Pir Masoom Mitha near Katha Saghral, mostly exposed layers are due to tilting of layers in past Pleistocene deformations.

Salt Range overall has been termed as field museum of Indo – Pakistan geology. Geological studies shows that soon Valley is confined all along the sedimentary rocks belonging to Charat group of lower Eocene which comprises mainly Sakesar limestone and Namal Formation. The valleys floors are formed by the deposition of alluvial material form the surrounding hills. In the southern side of the Soon Valley older rocks, lavender clays of lower Permian to Sakesar limestone of lower Miocene are exposed, where as in the north Sakesar limestone and Murree formation of Miocene comprising sandstone and shale are exposed. (DMPP, 2006).

Limestone layers occur in pure laminated and compact forms, while sand stone is laminated white or cream dark red or purplish brown. Brine springs are located at Kinhati and Khabeki while famous fresh water springs are Jalwatri, Gohra, Kinhati and Sodhi. Steep cliffs are common towards southern side while on the northern side hills descend gently into Pothwar plateau.

1.4 Literacy

Most of the adult male population is educated up to the primary level, but young boys continue their education up to matric. One incentive for completing high school is to qualify for the Pakistan Army. Lack of job opportunities and

small size of land holdings thus encourage permanent or seasonal migration to cities. The female literacy rate is 45% among adult women while it reaches 55% in younger male generation.

1.4.1 Health:

The medical facilities are not at all satisfactory in the valley. Most health complaints are from women. Lack of medical facilities and absence of local clinic often mean that pregnant women suffer from childbirth complications and even death in some cases. Majority of women from villages suffer from asthma, pain in joints, tuberculosis and eye diseases. Health covers in Soon Valley, public sector as well as private, is miserable. There is some health infrastructure existing in form of Naushehra Tehsil Head Quarter Hospital and Basic health unit and one Rural Health Center but doctors, paramedics and other facilities are not available adequately. Chest diseases, child diseases and anemia among women is a common phenomenon. Basic Health Unit give deserted look due to non-availability of required staff. Other health programs are also in bad shape. There is an emergent need of more doctors i.e. one Women Medical Officer, one Gynecologist, a chest specialist and a Child Specialist in Naushehra hospital. Fauji Foundation (day health care centre may also be upgraded to the level of full- fledged hospital.

1.4.2 Livelihood

The economy of the area depends on the remittances from armed forces personnel, civil services personnel, regular farming, small businesses and livestock rearing. There are no industries or large feudal land holdings in the soon valley. This is a prime recruiting area for the army and 45% of the households are supported by military service. The roads are well built and there are a number of health clinics. The area is peaceful and the crime rate is low. The local people exhibit none of the despair and acute malnutrition that one often comes across in many remote villages of Pakistan

The majority of people are farmers. There are agricultural fields around the villages. Historically they were totally dependent on rainfall, but after 1980

well irrigation started in area and now this land is used for cultivation of vegetables irrigated with water drawn from wells. The main crops grown in this area are wheat, maize, groundnut, millet, sorghum and cauliflower. Berseem and Lucerne are cultivated on irrigated land for fodder. Honeybee farming is also done on commercial level and is one of the sources of livelihood for people. The second popular profession after agriculture is government service. In almost every house of Soon Valley, there is an employee of Pakistan Armed Forces. Residents mostly depend on the forests for their fuel needs, generally carried by the women folk. Joint and extended family households are the norm in the village. On average there are nine people per household (Uchali Complex, WWF participatory Rural Appraisal Report, 1994).

The livelihood of the people of Soon Valley is largely dependent on agriculture and livestock. The Soon Valley mainly depends on groundwater use for irrigation, The biggest source of water for irrigation and human consumption is groundwater, which is recharged through rainfall. Part of this rainwater percolates and recharge the aquifer while mostly the rain precipitation drains through a number of nullahs into some small depressions and into the three natural lakes wetlands i.e Khabekki, Uchhali and Jhallar. Agriculture is the major source of income, which has grown rapidly over the last 30 years with the introduction of high payable vegetables such as cauliflower and Potato that has lead to gradual increase in the number of tube wells and further groundwater exploitation. In addition, other sources of income include small-scale businesses, construction, and transport and armed force. Although the area has not been marked by extreme poverty, however, household level of income is low and most households are dependent on a single earning member. Women's Literacy rates are around 45% and most of the smaller villages do not have girl's middle schools. Most families are restrained by the burdens and cannot afford sending their daughter's to main villages to obtain higher education. (Omar, 2001).

1.4.3 Livestock

The livestock in the Soon Valley includes cows, buffaloes, goats, sheep, horses, donkeys, and camels and poultry birds. Most households diversify their income through livestock ownership. Field surveys showed that 30% of the respondents owned livestock to supplement their income. As a result, grazing pressure in the area is extremely high and most communal grazing areas are now badly eroded.

Table No. 5 Existing livestock Population in Soon Valley

Union Council	Milch	Non Milch
Uchhali	9979	1,025
Kufri	11197	837
Anga	5987	1,341
Nauushahra	1761	143
Khura	11546	813
Khabakki	12634	1,163
Total	53104	5,322

Source: (DMPP, 2006)

1.4.4 Water Resources

The principal streams which traverse through the study area are Kurraddi, Kaila, Athal, Gusar, Saruli, Suckwan, Wanadha, Gub, Dape Sharif, Gohra, Kahuchara, Domel, Adhach, Kailia, Ghabir and tarapi nullahs. These streams nullahs mostly drop in to the lakes and smaller depressions.

1.4.5 Population

Soon Valley is comprised of six Union Councils including Uchhali, Kufri, Anga, Naushera, Kura, and khabeki with total population of 1, 32088 settled in 29 villages (DMPP, 2006).

According to District Census report of Khushab, in 1998 the population of the Soon Valley study area was 88,014 persons, which consisted of 41,069 male and 46645 female people, the survey carried out by Khushab District Government gave a total population of 100,292 persons in 2005, which shows a population growth rate of 1.88% per annum during 1998 to 2005.

1.4.6 Union Councils and Villages

The study area includes seven union councils: Uchhali, Kufri, Naushahra, Khabaki, Anga , Padhrar and Khura. There are total of 51 revenue villages, each covering a number of settlements. There are about 120 villages / settlements.

Table No. 6 Population of Soon Valley in 1998.

Union Council (UC)	Population		
	Male	Female	Total
Uchhali	6,758	7,347	14,105
Anga	6,550	7,973	14,523
Kufri	6,603	7,551	14,154
Naushahra (Urban UC)	6,431	8,208	14,639
Khura	7,536	7,868	15,404
Khabakki	7,191	7,998	15,189
	41,069	46,945	88,104

Table No. 7 Names of Major Villages

Sr. No	Union Council	No. Of Major villages	Village Name
1	Uchhali	3	Uchhali, Kuraddi, Chitta.
2	Kufri	5	Kufri, Sabhral, Surraki, Jhallar, Sodhi (Zareen & Bala)
3	Naushahra	5	Naushahra, Dhakka, Sirhal.
4	Anga	3	Anga, Shakerkot, Kotli, Ogali, Mardwal.
5	Khura	4	Khura, Sodhi Jay Wali, Uchala, Chamanaki, Biakh, Kaliial.
6	Khabakki	6	Khabakki, Dhaddar, Jaba, Ahmd Abad ,Jhunge Wala, Makrumi.

1.4.7 Agriculture

The dominant crops in the Soon Valley are Wheat, Mustard, Barley, Taramera, Millet, Sorghum, Maize, Fodder, Masoor, Cauliflower, Potato, Onion, Coriander, Chilli, Garlic and Capsicum. Digital image processing of 2005 satellite image shows a total cultivated area of 15,500 ha (38,301 acres). Based on the survey conducted by the Soon Valley Development Program (SVDP) the irrigated area is 2,841 ha (7020 acres), rest of the cultivated area is rainfed. 2071 tube wells are operating within the study area. These tube wells are mainly used for irrigation.

1.4.8 LAND TENURE SYSTEM

There are 2,071 irrigated farms with an average farm size of 1.37 ha, which is very small. According to distribution by size, the small farms are 91.3% of the total farms and occupy 78.6% of irrigated farmland with an average holding of meager 1.18 ha. Only 24 farms (1.1%) categorized as large have 4.2% of total irrigated farmland and have an average holding of 5.1 ha. 81% of the farmland is operated by the owners of the farms. Only 8.8% of the farms with 6.6% of farmland are managed by tenants. Therefore, it is predominantly owner operated farming. Agricultural lands are located mostly in valleys and fertile

lands exist in belt from Nowshera to Ucchali. Land holdings are small and usually average land holdings vary from 2 to 3 to Acres. (DMPP, 2006)

1.4.9 Forest

Reserve forest covers an area of 88,578 Acres constituting about 40% of the total land mass of Soon valley sustaining about 55, 000 population of cattle through grazing and grass cutting (Khushab Forest Division, 2001).

Community owned forest or Shamilat deh also known as unclassed forest are located in each village and are open for all type of activities grazing, fuel wood cutting and are highly degraded except in Biakh village local people own private Rakhs which are best managed having maximum species, but these forest are disappearing due to professional Afghan refugees wood cutters at an alarming rate. Forests in the Sakesar range are important to conserve since they play a vital role in watershed protection. Forests are maintained by the Punjab Forestry Department. Forests in the area are classified as community owned forests (Shamilat deh), government forest (Reserved), and privately owned forests (Rakh) (Omar, 2001).

Reserve forest comprise of 40 percent of the total land area of Soon valley that covers an area of 88,578 acres. Species predominate in the reserved forest are Phulai, Kahu, and Snatha that are collected mainly by women as a source of household fuel wood consumption. The Forestry Department issues permits for cattle grazing, grass cutting, and utilizing of tools for cutting branches (Khushab Forest Division, 2001). Broadly 3 different type of forest exist in Soon Valley, these are

1.5 Reserve forest

Owned by the forest department and provincial Government they have protected status and local communities have grazing, fuel woodcutting and grass collection rights.

1.5.1 Shamilat Deh forest

These are jointly owned by the local community of the village and are under the control of revenue department, there is no legal restriction on cutting of fuel wood.

1.5.2 Rakhs or Community protected areas

These forests are located on the private lands of local people, their entire management is related to owner or tribe to which they belong. (Farooq, 2006).

1.5.3 TOURISM

For most Pakistanis the ideal summer holidays still centres on Murree, Ayubia, Khagan and Lake Saif-ul-Malook. Most of the people are unaware of the existence of the beautiful valley of Soon Sakesar, which has the potential and all ingredients required for a good holiday resort (Rashid, 2000).

Soon Valley has a special attraction for visitors and tourist visiting to different places in Soon Valley has increased considerably after motorway construction. No official figures are available but according to the local estimates at least 10, 000 people visit area. Main tourist spot in valley includes Kinhati garden, Khabeki Uchali and Jahler wetlands. Amb Sharif temples, Dape Sharif, Akranda and Tulaja fort, Darbar Hazrat Sultan Mehdi, Nursing Poar, Sodhi garden, Phulwari and Sakesar areas.

Tourist facilities and infrastructure have not been improved due to lack of interest by Government departments. Rest houses constructed during British period are degraded and Kinhati, Kathwai and Nurewala rest houses are no more functional, while the other are also degraded due to poor management. There is a need to promote ecotourism in area.

1.6 Plant resources of Soon Valley

Major plant species include (*Acacia modesta*), (*Olea ferrugenia*), occasionally (*Tecomella undulata*), and on dry slopes (*Dodonea viscosa*), (*Monotheca buxifolia*), (*Adhatoda vasica*), (*Withania coagulans*). Plant resources of Soon Valley are enlisted below

Table No. 8 Plant resources of Soon Valley

Sr. No.	Life form	Number
1	Trees	38
2	Shrubs	40
3	Herbs	167
4	Cultivated crops	18
5	Cultivated vegetables	23
6	Cultivated fruits	21
7	Fern species	3
8	Climbers	3
9	Ornamental plants	26

1.6.2 Cultural Context with Ethnobotany in Soon Valley

Communities of the valley Soon Sakesar have a long-term association with the plant resources of the area. Historical record shows that once the area was fully covered of vegetation and even cultivated lands have good tree cover. Local people dependence on plant resources was multifold, large number of herds which were one of the main livelihood sources were also dependent on these plant. Especially Kahu (*Olea ferruginea*) branches and leaves have been used to feed goats and sheep as regular and stall-feeding. Phulai leaves and pods have also been used as fodder. Bhabber grass (*Euloliopsis binata*) has been used as forage during winter months. Its layers have been used as a carpet for different large-scale gatherings in homes. Bhabber grass was one of the favorite and strong ropes used in traditional dug wells to collect water due to its durability. Bhabber grass has also been used to weave beds and chairs. Its ropes have also been used for animals shed and other needs. Kahu (*Olea ferruginea*)

large branches (wargas) have been used in roof and as construction material and 25 years ago the entire roofs carry the Kahu plant in one form or the other. Smaller branches have been used still as handles in spades.

Branches of this plant have also been used in all implements used in different farming operations. Cultivated plants in irrigated places such as Toot (*Morus nigra*) and Dharek (*Melia azedarach*) wood has been used extensively in furniture, door windows, Ber (*Zizphus mauritiana*) trees wood is used in furniture, and its branches, leaves have been used as a stall feeding for livestock in extreme cold weather. Vina (*Rhazya stricta*), Dhaman (*Grewia optiva*), Akri (*Withania coagulens*) Vahekar (*Adhatoda vasica*) have been used in different recipes for the treatment of the livestock and human diseases. This dependence and association of the local people with plants has changed along with time. Due to better income generation opportunities crops 50% of the herds have reduced from state reserve forest. According to estimates 25% of the population of each village is directly dependant and associated with different plant resources. Fuel wood selling and collection is one of the main sources of income of 5% of the total population of area irrespective of the fact that it is legal or illegal. (Farooq, 2005)

Dependence and association of the local people on plant resources has changed with advancement of the technology and mechanization in different sectors. Kahu wood is now rarely used in roof and steel & iron have occupied the space. Due to reduction of the underground water table and drying of the wells Bhabber ropes are no more used in wells.

Big herds of the sheep, goats and cattle are kept by villagers in the Salt Range forest; usually people are dependent on forest in three ways. First Grazing for their cattle, sheep goats and camels & second Firewood for burning while the third major use is small timber for ploughs grazing permits and fuel wood collection rights of the local people have been determined in settlements. (Said, 1951)

The chief marketable products from reserve forests are fire wood, fodder grass and pasture and Bhabber grass while minor forest products like Phulai gum is also collected, minerals clays, Gypsum and limestone are also common. (Said, 1951)

Lopping of wood for grazing the domestic animals and cutting of woods and shrubs for fuel purpose are the two main disturbances to the local vegetation.

Kahu Wargas demand has reduced 80% in area, while it is use as tool handles still continuous and use is increasing day by day. Fuel wood collection has spread to the large scale and at non sustainable levels due to weak regulatory mechanism by forest department and fuel wood smuggling to the N.W.F.P Fuel wood cutting rate has increased 50% in area and even the well managed private Rakhs has not been spared due to involvement of the Afghan refugees in area by adopting fuel wood depots as major source of income. Another aspect of the use of the plant resources is medicinal plant. After the introduction of the new medicine and health system local people trend has decreased towards Hakeems and on herbs. Local knowledge about the medicinal use of the plant is decreasing due to non transfer the knowledge, 50 years ago each village has its own Hakeem but now total number of these traditional Hakeems does not exceed 15 in area, and out of these very few are those whose earlier generation were also involved in this sector. Local people aged up to 60–70 years know maximum about the uses of the local plants, their utilization and their proper identification, while the young generation aged up to 30–40 years know least about the plant and is ignorant of even the local names and proper identification of plants.

Analysis of the information about uses of the plant reveals that medicinal use of the plant still prevails in the area, and the trend is likely to increase due to heavy cost of the treatment of chronic diseases in private hospitals. Local people dependence on livestock and grazing trend is also likely to increase due to unemployment and poverty, so utilization of the plant resources in livestock sector does not seem to diminish in near future. Fuel wood demand is also

increasing due to population pressure and excessive cutting and export to other areas, there is a fear that acute fuel wood shortage is likely to hit area in near future if the present brutal trend of cutting of the natural vegetation continued. Plant resources in future context will play significant role and local people association and dependence will remain intact.

Association of the local people with flora can be accessed from the fact that in Uchhali village names of the tribes are similar with the name of the local floral species as Kahu and Kanira, as local people reveals that origin of the tribes is from the plant species name occurring commonly in area.

Review of literature revealed that there exist a strong relationship of the local communities as described by (Wilson, 1897) in Shahpur District Gazetter Phulahi is used by goats and sheep feed on it. The wood is dark, strong, heavy. Oil mills are made from the largest specimens, and ploughs, well-work and all manner of agricultural and domestic implements from the smaller wood.

Kikar timber is hard and durable, considering its quick growth, good for ploughs and well wheels, for cart making and a variety of other purposes, while it is also useful for burning. The bark and the pods are valuable tanning agents, the latter also affording excellent food for sheep and goats, and the leaves, too are freely eaten by all animals in times of drought. The gum that exudes from the tree is an astringent medicine.

Kahu (*Olea europea*) goats and sheep browse upon the leaves, which are useful for cattle also in times of scarcity. The wood is very hard and good, though small. Sticks, combs, charms and rosaries are made from it. The Beri (*Zizyphus jujuba*) is not uncommon. The leaves and young shoots are useful as fodder, and the wood for house-building and fuel. Beri Malla (*Zizyphus nummularia*), grows freely as a shrub in Tallagang, where it is cut over every year, the dried leaves mixed with chopped straw being considered a valuable fodder for cattle particularly milch. The branches are used for making hedges. The fruit too, though small, is eaten. Dhrek the wood is of very poor quality, but is used for light rafters also for plough-yokes (panjali). (*Capparis aphylla*)

the ripe fruit (*pinju*) is eaten, and the half rip is pickled (*dela*). The wood is used for fuel and for light lath-work in village houses. The Jhal (*Salvadora oleoides*), Lana It affords excellent grazing for camels, and cattle will eat it if very hard put to it for food. It is not to any extent burnt for "sajji" or carbonate of soda as is commonly in the adjoining district of Shahpur.

Similar observations and uses were recorded in Tala gang area adjacent to Soon valley in Attock District Gazetteer (1930) "Bhekar" (*Aldhatoda vasica*), Sannatha (*Dodonea burmaniana*). The shrub is useless except as fuel for native limekilns and to a small extent for making charcoal also used as fuel and light roof-work it is useless. AK plant stalks are burnt. goats browse on the bitter leaves, fiber can be got from its, and the cotton-like down in the pods is considered a luxurious stuffing for cushions. "Pohli" the seeds are edible and are often eaten in years of scarcity. "Bukat" "piyazi" Its black seeds are sometimes ground and eaten by the very poor in times of great scarcity. "Bhakhra" In times of drought these are ground and mixed with flour to make a black and sour substitute for ordinary wheat cakes. "Harmal" (*Peganum harmala*) a very useful weed. (*Diplotaxis griffithii*) grows freely in Tallagang in favorable years, and the seed is collected and sold for export to Amritsar at 9 to 12 seers per rupees. It is there known as "khub kalan", and is used as a drug in fever and debility.

Dub grass Khabal (*Cynodon dactylon*), Sawank (*Panicum colonum*) "Baran" "sarut" (*Saccharum munja*). It grows in large stools, often 12 feet high, the lower part being formed of thick reeds called kana, out of which springs the tilli thin part of the stalk, which carries the large feathery white flower and the whole is wrapped round by the leaf called "munj". Kana is used instead of rafters when wood is scarce, and from it are made the heavy baskets from which the cattle get their feed, as well as chair's stools and the like. The "tilli" is useful for all light basket work, while the munj is the common material for village rope-making.

Vegetation of the Salt range has been described in Shahpur District Gazetter (1897) as the Salt range has a vegetation of its own, very different in character from that of the plains, escarpments, is generally almost devoid of vegetation, but the northern sides of the hills which have a more gradual slope and retain more soil and moisture are covered, though scantily, with trees and bushes. Among the most characteristic trees are the Phulah (*Acacia modesta*) with its delicate leaves and little yellow globes of blossom; the wild olive, kau or kava (*Olea cuspidata*) with its glossy deep green foliage, often seen growing out of the cleft of a bare rock; a species of Oak (*Vari quercusincana*); the wild fig khabari (*Ficus carica*) with its edible fruit; the lahura or rahura (*Tecoma undulata*) with its beautiful large, bright orange colored flowers and useful timber; the Kular (*Bauhunia variegata*) with its large purple or white flowers; the Dhamman (*Grewia vestita*); the Vaitmman (*Celtis australis*) with an edible fruit; the kangar (*Pistacia integerrima*); and in the rocky torrent beds, the oleander kanhir (*Nerium odorum*) with its poisonous leaves and rose colored flowers. Among the trees which have been introduced lately with success are the mulberry (*Morus alba*), the Dhrek, bakain (*Melia azedarach*) with its strong scented lilac flowers, the poplar (*Populus alba*), Chil (*Pinus longifolia*); and in the gardens at Sohdi and Sakesar, the pomegranate, peach, loquat, apricot, almond and other fruit-trees. The leaves of the phulah and wild olive form good fodder for cattle in times of drought, and their wood makes excellent timber, that of the phulah being much used for agricultural implements and that of the wild olive for making combs and walking-sticks. A peculiar shrub found chiefly on Sakesar is the dwarf palm pathay from the leaves of which baskets and excellent matting are made. Among the shrubs that occur the hillsides, the most common are the vahekar (*Adhatoda vasica*), Santha (*Dodonoea viscosa*), the wood of which is as a fuelwood. Ivy and ferns are also found in moist places. On Sakesar a very common plant is the Masteara (*Scutellaria linearis*), an infusion of which is useful for rheumatism; and the Rennet plant (*Withania coagulans*) is also to be found. Reeds (Nar) grow in moist places along the

torrent beds, and are used for thatching, for pipe stems and for mouth pieces for musical instruments.

Among the most common grasses of the area the Khabbal (*Cynodon dactylon*), the dub of Hindustan, an excellent fodder for cattle and horses; the Chembar (*Eleusine fagellifera*), much the most common grass of all, eaten readily when green.; the Sawak (*Panicum colonum*) which affords an edible seed; the Murak which springs up very quickly to hollows after rains, but is of little substance, when ripe it is called dial; the fragrant Khavi, of a reddish color, not eaten by cattle except in hard times, commonly used to strew on the floor of mosques, the Palwah a tall grass good for cattle but not for horses; the Dhaman, perhaps the best of the milk-producing grasses; the Dabbh a poor fodder grass, used for making ropes; the Lunak, a tall graceful useful grass with a saltish, flavor; the Panni (*Andropogon muricatum*), a tall coarse grass, only eaten by cattle when green, Chinkhi, which grows in low tufts, the seed of which is also eaten in famine times.

1.6.2 Wood cutting for Fuel

Woodcutting for fuel is a dilemma of developing countries. Poverty stricken people are dependent on the forest for their livelihood and fuel requirements. Each day tons of wood is collected from the forests of the Salt Range. Daily, before dawn, groups of women emerge from the villages of the Soon Valley to cut and collect firewood from the forests. They form long queues before entering the forest area. After collecting the wood in huge bundles, by first light they are ready to return home. As part of the culture of Soon, all the heavy work the women carry out the reason wood is cut and collected before dawn is so that the women will confront minimum resistance from the forest guards deployed on duty. (Ahmad et al,2007)

Most of the villages are located at a height of 2,500 feet above sea level where the slightly lower atmospheric pressure increases the cooking time and the chill factor in winters, boosting the requirement for fuel wood.

Cutting of Kahu (*Olea ferruginea*) branches to make walking sticks is quite common. Kahu (*Olea ferruginea*) branches are quite in demand in the local markets. Each Kahu (*Olea ferruginea*) stick having diameter of 1 – 2 inches and a length of 4 – 5 feet may fetch up to Rs. 100. These branches are treated and finished into fancy walking sticks which are sold in the markets of big cities. Walking sticks of Kahu wood are very durable and naturally termite proof. Such branch cutting jobs are carried out by the local men, as they can expertly identify the right sized branches for making the walking sticks. Kahu (*Olea ferruginea*) trees stripped of branches are a common sight in the Salt Range in the soon valley having stunted growth. (Ahmad et al.2002)

The communities of the valley soon Sakesar Punjab Salt Range have centuries old traditional knowledge of use of plants as fuel as well as medicinal uses. Local people dependence on these plant resources has changed with the advancement of the technology as well as changes in the living standard of the people. Knowledge about the use of the plants has transferred from one generation to the other through different agents such as elders and Hakeems. Current system of the Eastern medicines such as Unani, Ayurvedic, and Homeopathy etc. are entirely based on the medicinal properties of these plants. Knowledge transfer rate is decreasing very fastly due to several factors.

Documentation of the traditional wealth of the plants uses is necessary in order to preserve the traditional uses. Indigenous knowledge of the plants is eroding fastly and very few plants uses are being transferred to the next generation. All the medicinal plants and their parts used in the medicines are collected from wild. Due to excessive man made threats and natural factors few species have declined in distribution range and some are at the verge of extinction. Threats to the medicinal flora include forest fires, deforestation, and grazing utilization as fuel wood. Over harvesting erosion and use of the land for agriculture purposes. Other factors contributing towards endangerment of the medicinal plants includes rapid colonization, roads, building, land leveling for agriculture and vegetation cutting as well as pollution, mining, use of herbicides in crops

and the Afghan refugees. Natural factors contributing towards endangerment are drought, Erosion, floods and climatic changes.

1.7 Previous Work Done in Soon Valley

In Shahpur district gazetteer describe the vegetation of Salt Range in Soon valley, as Phuali (*Acacia modesta*), Wild olive (*Olea cuspidata*), Oak (*Quercus incana*), Khabari (*Ficus carica*), Rahura (*Tecoma undulata*), Dhaman (*Grewia vestita*), Oleander (*Pistacia integerrima*). Among shrubs are Vahekar (*Adhatoda vasica*), Santha (*Dodonea viscosa*), Akri (*Withania coagulens*). Grasses are Khabal (*Cynodon dactylon*), Sawank (*Panicum colonum*), Sar (*Saccharum munja*), (Wilson. J, 1897).

The vegetation of the Soon Valley is under the "Sub Division" Sub tropical dry ever green forests" (*Olea ferruginea Royle*) and (*Acacia modesta Wall*) are recorded to be two characteristic trees of area. (Champion, 1936)

Said described the composition of the Salt Range forests of the Shahpur district as (*Olea Cupidata Wall*) and (*Acacia modesta*) of the Salt Range forests, while other subsidiary species found in these forests are (*Dodonea viscosa Linn*), (*Monothea buxifolia Decne*); (*Gymnosporica royleana Wall*), (*Pistacia integerrima Stew*), (*Nannorrhops ritchieana H. Wendl.*) and (*Adhatoda vasica Nees.*) (Said, 1951)

Iftikhar described the vegetation of the Salt Range and observed that total plant cover on northern aspect is 100%, while on southern aspect is 72% at Sakesar lime stone layers, while it is 80% on northern aspect, 51% on southern aspect on sandstone layers, while near the top of Sakesar hill on limestone various associates of a pure pine forest like (*Quercus incana Roxb*) and (*Rhus cotinus*) appear on sheltered places. (Ahmed, 1964)

Management plan for Uchali complex described that vegetation around the lakes is dry deciduous scrub type. The predominant species are Kau (*Olea ferruginea*), Phuali (*Acacia modesta*) and Santha (*Dodonea viscosa*) with Gurgura (*Monothea buxifolia*) and Pataki (*Gymnosporia royleana*) as the

chief auxiliaries. Grasses are abundant around the lakes. Good fodder grasses like Pharion (*Digitaria bicorni*), Palwan (*Bothriochloa pertusa*) and Khar (*Chrysopogon montanus*) are found in the places where the incidence of grazing is less. In areas subject to heavy grazing useless grasses like lamb (*Aristida depressa*), Khawi (*Cymbopogon jawarancusa*) and Deela (*Cyperus pilosus*) take places of good quality grasses. (Khan and Chaudhry, 1993).

Khan et al, (1993) reported that vegetation around the lakes is dry deciduous scrub with kao (*Olea ferruginea*), Phulai (*Acacia modesta*) and snaththa (*Dodonaea viscosa*) as dominant species. Gurgura (*Monothecha buxifolia*) and pataki (*Maytenus royleanus*) are present as chief auxiliaries.

Kaho is found throughout the area. In some places it occurs as pure strands while in others it grows mixed with phulai and snatha or other auxiliary species. Phulai is often found mixed with snatha and pataki; the mixture given a far better protection to the soil than the pure patches. Sanatha, occurs most frequently, practically everywhere. It provides very good protection to the soil against soil erosion. Abundant grass cover is present around the lakes. Some good fodder grasses like Pharion (*Digitaria bicorni*), Palwan (*Bothriochloa pertusa*) and Khar (*Chrysopogon serrulatus*) are also found quite frequently in places where the incidence of grazing is less pronounced. In areas subjected to heavy grazing less preferred grasses and forbs like Lamb (*Aristida adscensionis*), Khawi (*Cymbopogon jwarancusa*) and the sedge 'Deela' (*Cyperus pilosus*) dominate the scene and replace the preferred grass species. The recorded 62 species of plants belong to 60 genera, 29 families and 11 orders. The percentage of occurrence of trees, shrubs, herbs, climbers and grasses was 20.97; 30.10; 16.13; 3.22 and 22.58% respectively.

Ahmed in a research study while mapping dry scrub forest enlisted the main tree and shrub (*non woody*) species as (*Olea ferruginea*), (*Acacia modesta*), (*Pistacia integerima*), (*Monothecha buxifolia*) and (*Zizyphus nummularia*). (*Acacia modesta*) was also present in 100% of the degraded forest plots both in the east as well as in the west. (*Olea ferruginea*,) was present in 63% and 65%

of the degraded forest plots in west and east respectively. The rare shrub species (*Monotheca buxifolia*) occurred in plots and its population size was also not low which suggests that this shrub may not be a rare species at all. This may be true, since in some documents e.g. and Champion, Seth and Khattak, (1965) it is not listed as a rare species. (Ahmed, 2001).

Gully habitats could be richer in plant species diversity as in some gully transects few plant species e.g. naturally occurring (*Dalbergia sissoo*) a very important timber species that is mostly grown artificially and a wild almond species were observed. (*Pistacia integerrima*) tree, (*Tecoma undulate*) tree. and (*Monotheca buxifolia*) shrub. Whereas, (*Pistacia integerrima*) and (*Tecoma undulate*) were found in very few plots just 8% and 6% respectively, (*Monotheca buxifolia*) in many plots (58%) which suggests that this shrub may not be a rare species at all. (Ahmed, 2001)

The vegetation of salt range comprises both legumes and non legumes (Ahmed 1964), (Hussain, 2002). Of the herbaceous legumes, (*Medicago polymorpha*) and (*Melilotus indica*) were found more frequently and in the highest density than the others. They formed uniform occurrence in almost all the replicates. As regards woody legumes (*Acacia modesta*) occurred abundantly followed by (*Prosopis juliflora*) while (*Acacia nilotica*) was found with rare frequency. (Hussain, 2002).

The analysis of the pods and leaves of leguminous plants collected from the Soon Valley revealed higher protein content in the leaves and pods of (*Acacia modesta*). Greater energy in unit weight was recorded in the leaves of (*Acacia nilotica*) and more protein contents in the legumes of (*Dalbergia sissoo*) those examined in the respective plant organs of other leguminous plants. (Hussain, 2002).

Survey of Soon Valley, District Khushab, in the Punjab Province of Pakistan was conducted to explore the legume diversity endemic to it. Five sites viz. Anga , Khabeki, Sodhi, Uchali and Knotty Garden Site, were selected Keeping in view the topography, soil type, nature of prevailing disturbances, if

any, and other related ecological attributes. In addition to legumes, the commonly non-leguminous plants and grasses, as well as, sedges were also recorded. The leguminous woody species (*Acacia modesta*) was examined the most found species at almost all the study sites. At Sodhi and Knotty garden sites (*Acacia farnesiana*) also very commonly and in some habitats it formed mono species stands. At Khabcki and Sodhi sites (*Dalbergia sissoo*) also existed commonly in some habitats but it was mostly confined to wet places and along the roadside as natural as well as cultivated plantation. Among the herbaceous legumes (*Medicago denticulata*), and (*Melilotus indica*) were commonly found at all the study sites except Anga site but during winter season only. Nevertheless (*Vicia sativa*) was recorded from all the study sites, during 'the mid winter season only. It seems that during the summer season none of the legumes could resist the prevailing high temperature. Among the non-leguminous species (*Olea cuspidate*) formed good association with (*Acacia modesta*) at high altitudes. (*Zizyphus mauritiana*) and (*Zizyphus nummularia*) were also recorded commonly occurring trees at almost all the study sites. Among the shrubs (*Dodonaea viscosa*,) and (*Adhatoda vasica*) were recorded occurring very abundantly. These both species, to some extent resist the grazing pressure of cattle owned by local people and for fulfilling their fuel needs. As regards grasses they greatly varied in their frequency of occurrence, from site to site. However, (*Saccharum officinarum*), (*Saccharum spontanem*), (*Cynodon dactylon*) commonly Occurring grasses throughout the valley. (Hussain, 2002)

Data regarding the composition of plant diversity revealed that among the woody leguminous plants (*Acacia modesta*) was the most commonly occurring species. (*Prosopis juliflora*) occurred commonly and formed mono species stands while (*Dalbergia sissoo*) was absent altogether Among the herbaceous woody (*Medicago polymorpha*) and (*Melilotus indica*) were commonly found during the winter seasons. At higher altitudes (*Olea ferruginea*) formed a good association with (*Acacia modesta*). Throughout the examined sites. (*Dodonea viscosa*) and (*Justicia adhatoda*) occurred very commonly because both species

had resistance for grazing and fuel needs. Cutting of woody plants and shrubs for fuel purposes and their lopping for grazing the domestic animals are the two major threats to the entire local vegetation in this valley. Accidental fires caused by careless honey hunters also, sometimes become uncontrollable and wipe out most of the vegetation to a large extent. (Hussain, 2002)

Nutritional analysis of leaves legumes of some woody leguminous plants collected from Soon Valley indicated high protein content in (*Acacia nilotica*), greater fat content in (*Acacia modesta*) while more energy per unit weight basis was recorded for (*Dalbergia sissoo*.) Fat content in (*Acacia modesta*) legumes as well was recorded higher than the pods of remaining two legumes. (Hussain, 2002)

The inhabitants of Soon Valley seem very eager for the conservation of natural vegetation in general and some endangered leguminous (*Acacia modesta*) and non leguminous (*Olea cuspidata*) species in particular subject to the provision of some alternate fuel and fodder resource. (Hussain, 2002)

Leguminous plant species collected from the Khabeki site indicates that (*Acacia modesta*) Phulai was the most dominant species at this site in terms of both frequency and density. It was followed by two rarely occurring legumes i.e. (*Dalbergia sissoo*) Shisham or Tahli and (*Albizzia lebbec*) with more or less same frequency and density. However (*Dalbergia sissoo*) was mostly confined to moist places. As regards herbaceous leguminous plant species (*Vicia sativa*), (*Medicago denticulata*) and (*Melilotus indica*) were the most frequently examined species during winter at this site. (Hussain, 2002)

Among the non-leguminous plant species (*Adhatoda vasica*), (*Dodonea viscosa*), (*Zizyphus numularis*) and (*Otostegia limbata*) were densely occurring broadleaved, and (*Cynodon dactylon*), (*Saccharum spontaneum*) and (*Saccharum officinarum*) were found most frequently occurring species at this site. At some wet places during summer season (*Cyperus rotundus*) the only representative of sedges was also noted. (Hussain, 2002).

Among the woody legumes collected from Anga site include (*Acacia modesta*) was found as very frequently dominant species at this site and among the annuals only (*Vicia sativa*) was found as a rare species. The non leguminous plants commonly encountered at this site were, (*Dodonea viscosa*), (*Zizyphus numularis*), (*Zizyphus mauritiana*), (*Adhatoda vasica*), (*Olea cuspidata*) and (*Otostegia limbata*) while rarely occurring species encountered at this site were (*Capparis aphylla*) and (*Achyranthus aspara*). The most frequently occurring monocots at this site were (*Cynodon dactylon*) (*Saccharum officinarum*) and (*Saccharum spontaneum*) having frequency of occurrence ranging from 30 to 70%. (Hussain, 2002).

Leguminous and non leguminous plant species endemic to the Sodhi area (*Acacia farnesiana*) was examined the most frequently species with high density and followed by (*Acacia modesta*) with 60% frequency of occurrence among the woody legumes. Nevertheless (*Dalbergia sissoo*) occurred very rarely. In case of herbaceous legumes, (*Melilotus indica*) and (*Medicago denticulate*) often occurred with very low density in only 20 to 30% quadrates.

Among the non-leguminous species (*Adhatoda vasica*), (*Dodonea viscosa*) (*Buxus papilosa*), (*Gymnospora royleana*) and (*Olea cuspidate*) occurred very frequently whereas among the grasses (*Saccharum officinarum*), (*Saccharum spontaneum*) comprised 40 and 50% frequency of occurrence respectively. (Hussain, 2002).

Among the woody legumes at Uchali (*Acacia modesta*) was recorded most frequently occurring species while (*Dalbergia sissoo*) occurred in only 30% quadrates. (*Dalbergia sissoo*) was confined to wet places at low altitudes while (*Acacia modesta*) occupied the hill top positions. (*Medicago denticulata*), (*Melilotus indica*), and (*Vicia sativa*) among the herbaceous legumes also occurred very commonly. As regards non-leguminous plant species, (*Adhatoda vasica*), (*Buxus papilosa*) and (*Zizyphus mauritiana*) occurred with almost same frequency of occurrence but with varying density while in (*Dodonea viscosa*), and (*Gymnospora royleana*) as well frequency of occurrence was at

par with each other. Among shrubs (*Tecomella undulata*) occurred very frequently at this site. Nevertheless, the remaining two monocot species (*Saccharum officinarum* & *Cynodon dactylon*) examined at this site also comprised same frequency of occurrence. (Hussain, 2002)

At Kinhati garden site (*Acacia modesta*) and (*Acacia farnesiana*) in different habitats varying in their soil structure and soil moisture content formed mono-species stands with the same 60% frequency of occurrence while (*Dalbergia sissoo*) among the woody legumes occurred in only 20% quadrates. Among the herbaceous legumes (*Medicago denticulata*) and (*Vicia sativa*) occurred very rarely. (*Adhatoda vasica*) comprised the highest density (33.08%) and frequency (80%) among the non-legumes and was followed by (*Dodonea viscosa*) and (*Olea cuspidata*) with 60% and 50% frequency of occurrence respectively. As regards grasses, (*Pennisetum cenchroides*) and (*Saccharum spontaneum*) were the abundantly occurring and (*Saccharum officinarum*) was the rarely occurring species examined at this site. (Hussain, 2002)

Among the grasses, (*Cynodon dactylon*) showed the highest density and frequency of occurrence at all the habitats. It was followed by (*Saccharum griffithii*,) while the frequency of occurrence of (*Saccharum spontaneum*) was at par with that of (*Cyperus rotundus*,) The only sedge species (*Cyperus rotundus*) was recorded in 20% of the quadrates. Ahmad (1994) also observed the same while studying the vegetation of the Salt Range in terms of its frequency and density. He concluded that (*Acacia modesta*,) (*Dodonaea viscosa*) and (*Olea ferruginea*) was dominant species of the region and expressed his view about the imperfectness of the flora collected. Similar conclusion were also made by Hussain in 2002 and 2003.

Composition of plant diversity indigenous to the Soon Valley indicates that overall six leguminous and eight non leguminous plant species occurred very commonly. Three grasses and one sedge species were also found frequently.

A regards the composition of non leguminous species broad leaf plant species like (*Justicia adhatoda*) occurred abundantly, whereas (*Dodonea viscosa*) was

recorded as the dominant plant species, having the highest density as well as frequency of occurrence. (*Olea ferruginea*) formed a good association with (*Acacia modesta*) throughout the valley especially at higher altitudes. (*Ziziphus mauritiana*) occurred with 30% frequency of occurrence. (*Ziziphus nummularia*) dominated as it had higher density as well as frequency of occurrence. (Hussain, 2003).

Due to heterogeneity in the macro and microenvironment of the valley large plant and animal diversity is expected to be endemic to it. (Hussain, 2002, 2003).

Ghulam Ali identified total 21 plant species in the diet of Urial, the dominant grass genera occurring in the diet of Urial included *Cynodon*, *Paspalicium*, *Digitaria*, and *Eleusine*, forbs included *Medicago sp*, *polygala sp*, and *Tribulus sp* while shrubs and trees included *Acacia sp*, *Grewia sp*, *Olea sp* and *Ziziphus sp*. (*Olea ferruginea*) seeds were found in the urine of Punjab Urial in Salt Range including Soon Valley area. (Awan, 2004).

130 Plant species belonging to 46 families were recorded from Salt Range including Soon Valley, the largest family was Poaceae containing 31 grass species, while the other major families were Leguminosae comprising of ten species and Asclepiadaceae seven species. The reserves were occupied by grass species. (Awan, 2004)

Vegetation around Uchali Wetlands complex was dry deciduous scrub with Kao (*Olea feruginea*), Phulai (*Acacia modesta*), Santha (*Dodonea viscosa*) as dominant species. Gurgura (*Monotheca buxifolia*) and Pataki (*Maytenus royleanus*) were present as chief auxiliaries. Some good fodder grasses like Pharion (*Digitaria bicorni*), Palwan (*Bothriochloa pertusa*), and Khar (*Chrysopogon serrulatus*). In areas subjected to heavy grazing less preferred grasses and forbs like lamb (*Aristida adscensionis*), Khawi (*Cymbopogon Jawarancusa*) and the sedge "Della" (*Cyperus pilosus*) dominant the scene and replace the preferred grass species. The recorded 62 species of plants belong to 56 genera, 29 families and 11 orders. (Ali, 2004)

The dominant aquatic plants at Uchali wetland are (*Carex fedia*), (*Hydrilla verticillata*), (*Juncus sp.*), (*Phragmites karka*), (*Potamogeton crispus*), (*Saccharum spontaneum*), (*Typha angustata*), (*Vallisneria spiralis*) and (*Zannichellia palustris*). The natural vegetation of the region is a mixture of subtropical semi-evergreen forest and tropical thorn forest with species such as *Acacia modesta*, (*Adhatoda vasica*), (*Dodonea viscosa*), (*Gymnospora royleana*), (*Olea ferruginea*), (*Reptonia buxifolia*), (*Tamarix aphylla*), (*Withania coagulans*) and (*Zizyphus spp.*). The natural vegetation around the lake has been cleared for agricultural land. (Khan & Chauhdary, 2004)

The natural vegetation of the Khabeki Wetland region is a mixture of sub tropical semi evergreen forest and tropical thorn forest. The dominant aquatic plants are (*Carex fedia*), (*Hydrilla verticillata*), (*Juncus sp.*), (*Phragmites karka*), (*Potamogeton crispus*), (*Saccharum spontaneum*), (*Typha angustata*), (*Vallisneria spiralis*) and (*Zannichellia palustris*). The natural vegetation of the region is a mixture of subtropical semi-evergreen forest and tropical thorn forest with species such as (*Acacia modesta*), (*Adhatoda vasica*), (*Dodonea viscosa*), (*Gymnospora royleana*), (*Olea ferruginea*), (*Reptonia buxifolia*), (*Tamarix aphylla*), (*Withania coagulans*) and (*Zizyphus spp.*). The natural vegetation around the lake has been cleared for agricultural land (Ali, 2004)

The aquatic vegetation at Jahlar wetland includes (*Carex fedia*), (*Chara sp.*) (*Hydrilla verticillata*), (*Juncos sp.*) (*Najas marina*), (*Phragmites australis*), (*Potamogeton crispus*), (*Pectinatus*), (*Saccharum spontaneum*), (*Scirpus sp.*) (*Scirpus sp*) Tall (*Typha angustata*), (*Vallisneria spiralis*), and (*Zannichellia palustris*). The natural vegetation of the region is a mixture of sub tropical semi evergreen forest and tropical thorn forest with species such as (*Acacia modesta*), (*Asparagus gracilis*), (*Cocculus laeba*), (*Cynodon dactylon*), (*Adhatoda vasica*), (*Dodonaea viscosa*), (*Ehretia laenis*), (*Gymnosporia royleana*), (*Olea ferruginea*), (*Rhazya stricta*), (*Sageretia branrandethiana*), (*Reptonia buxifolia*), (*Tamarix aphylla*), (*Withania coagulans*), (*Zizyphus*

mauritiana) and (*Z. nummularia*). Most of the natural vegetation around the lake in the valley bottom has been cleared for agriculture, whereas the forest vegetation on the surrounding hills is severely depleted. (Ali, 2004)

Ecological study indicated that flora of soon Valley comprised of nineteen leguminous species along with some non leguminous plants. (*Acacia modesta*) was the most common plant, followed by (*Medicago laciniata*), and (*Vicia sativa*) grouped as the abundant plant species. On the other hand (*Acacia farnesiana*), (*Dalbergia sissoo*), and (*Meliolotus indica*) were the frequent species, (*Albizzia lebbeck*) categorized as occasional one, (*Acacia hydaspica*), (*Acacia nilotica*), (*Agyrolobium stenophyllum*), (*Medicago polymorpha*), (*Mellilotus alba*), (*Prosopis glandulasa*), (*Prosopis juliflora*), (*Prosopis spicigera*), (*Phyncohria minima*), (*Sophora mollis*), (*Trigonella monatha*) and (*Vicia monatha*) formed a group of rare species. (Ahmed, 2005)

Vegetation survey of soon valley area classified vegetation as Tree Layer, which usually grows in hills, watersheds and grow naturally while in the Valley trees are planted at certain places. These trees provide timber, fuel wood and grazing along with medicinal uses. (*Acacia modesta*) and (*Olea ferruginea*) are the two naturally occurring dominant species while other include Kikar, Ber, Rahura and Vatuman and flora in the cultivated lands is Shisham, Toot, Dhrek and Khabari

(Anjir). Phulai is preferred fuel wood, leaves of the Kahu are utilized as fodder. Ber, Toot, Kahu are also utilized as Timber and in construction purposes. (Farooq, 2005)

Vegetation survey of soon valley area recorded species in Shrub layer which mainly consist of the Papper (*Buxus papilosa*) Kaner (*Nerium odorum*), Santha (*Dadonea viscosa*), Valaker (*Justicia adhatoda*) Kander (*Maytenus royleanus*) Koher (*Monothea buxifolia*) besides many other. Santha is preferred fuel wood, Valaker is medicinal and fuel wood plant, Kander and Koher are utilized as fruit and for making Hedge. Papper is utilized in roof Kander and Koher

have good forage value, While Sanatha and Valaker are relatively less grazed, Papper and Kaner are poisonous and are not grazed. (Farooq, 2005)

Vegetation survey of soon valley area recorded species in Grass Layer is usually spread over the whole area it consist of Lamb (*Aristida adsceniunis*), Palwan (*Bothriochloa pertusa*) Anjan (*Cenchrus ciliaris*), Khar (*Chrysopogon jawarancusa*), Khabal (*Cynodon dactylon*), Deela (*Cyperus pilosus*), Dab (*Desmostachya bipinnta*), Bhabber (*Eulaliops binata*), Lumar (*Thysanoiaena agostis*). Bhabber and Khar are good grass for grazing; Bhabber is also utilized to make ropes. Livestock and wild Animals graze all these grasses. (Farooq, 2006)

During the field survey of medicinal plants by a local NGO in Soon Valley, 120 plants species were identified having medicinal value out of these 120 plants were classified and conservation status of the flora was listed four categories have been devised. The study classified 77 as Low Risk, 15 Endangered, 25 critically endangered out of 120 species. (STEP, 2006).

In the heart of this range lies the Soon Valley. The vegetation of the Soon Valley comprising of, leguminous as well as non-leguminous species, whereas the livestock grazed therein includes cattle, goats, sheep, horses and camels (Ahmad et al., 2007).

(*Adiantum capillus - veneris*) was found to be one of the rarest species as it was found at relatively fewer sites as well as seasons It was observed that Adiantum was found only at Knotti Garden during all the four seasons and at Dape Sharif only during spring season. (Ahmad et al., 2008)

Maximum dry matter was found at Knatti Garden during winter season follow by summer season. During spring season almost equal dry matter production was observed at Knatti Garden and Dape Sharif whereas lowest dry matter was observed at Knatti Garden during autumn season. (Ahmad et al., 2008)

The present study was planned to determine the effect of different sites and seasons on physiological attributes of Adiantum in Soon valley and to draw

relationships between different physiochemical attributes and the environmental variables (seasons and sites) (*Adiantum capillus veneresis*), one of the rarest species as it was found at relatively fewer sites as well as seasons. It was observed that *Adiantum* was found only at Knotti Garden during all the four seasons and at Dape Sharif only during spring season. It is clear that different physiological parameters varied significantly during different seasons and at different sites. (Ahmad et al., 2008)

Grasses of Salt Range have a wide range of diversity in the area. The 62 species; of grasses belonging to 11 tribes constitute the bulk of grasses of low mountainous areas and plains of northern Punjab of Pakistani. Majority of the grasses exist in the plains and low hill areas of India, Iran and Afghanistan. (Ahmed et al., 2008)

(*Cymbopogon jwarancusa*) has aromatic leaves and base of the stem, is used for curing chicken pox by the local peoples of the area. (*Vetiveria zizanoides*) has medicinal uses and also used in the perfume industry is almost near extinction in the area. It requires conservation in Salt Range. (*S. spontaneum*) is also used for medicinal purpose; its root decoction is given to cure eruptions on the skin. (Ahmed et al., 2008)

In the present investigation all the observed species were classified according to their frequency ranges, (*Acacia modesta*), (*Dodonea viscosa*) both of which were under the category of abundant. (*Acacia farnesiana*), *Dalbergia* only occasional species of this region. Remaining twelve species (*Acacia hydaspica*), (*Acacia nilotica*), (*Argyrolobium*), (*Medicago polymorpha*), (*Melilotus alba*), (*Prosopis glandulosa*), (*Prosopis Juliflora*), (*Prosopis spicigera*), (*Rhynchosia minima*), (*Sophora mollis*), (*Trigonella monantha*) and (*Vicia monantha*) can be placed in the category of rare. The criteria of classification fixed in the present study were strongly supported by the findings of Hussain, (2002) from Pakistan. (Ahmed et al., 2008)

Nutritional analysis of leaves of legumes of some woody leguminous plants collected from Soon Valley indicated high protein content in (*Acacia nilotica*.)

greater fat content in (*Acacia modesta*) while more energy per unit weight basis was recorded for (*Dalbergia sissoo*.) Fat content in (*Acacia modesta*) legumes as well was recorded higher than the pods of remaining two legumes. (Ahmed, et., al 2008)

Data regarding the composition of plant (*Acacia modesta*) was the most commonly occurring species. (*Prosopis juliflora*) occurred very commonly and formed mono-species stands, while (*Dalbergia sissoo*) was absent altogether among the herbaceous woody legumes (*Medicago polymorpha*) and (*Melilotus indica*) were commonly found during the winter seasons. At higher altitudes (*Olea ferruginea*) formed a good association with (*Acacia modesta*) throughout the examined site, (*Dodonaea viscosa*) and (*Justicia adhatoda*) occurred very abundantly, because both species had resistance for grazing and fuel needs. (Ahmed et al., 2008)

Composition of plant diversity indigenous to the Soon Valley indicates that overall six leguminous and eight non leguminous plant species occurred very commonly. Three grasses and one sedge species were also found frequently. Of the herbaceous legumes, (*Medicago polymorpha*) and (*Melilotus indica*) were found more frequently and in the highest density than the others. They formed uniform occurrence in almost all the replicates. As regards woody legumes (*Acacia modesta*) occurred abundantly followed by (*Prosopis juliflora*) while (*Acacia nilotica*) was found with rare frequency. (Ahmed et al., 2008)

As regards the composition of non leguminous species broad leaf plant species broad leaf plant species like (*Justicia adhatoda*) occurred abundantly, whereas (*Dodonaea viscosa*) was recorded as the dominant plant species, having the highest density as well as frequency of occurrence. (*Olea ferruginea*) formed a good association with (*Acacia modesta*) throughout the valley especially at higher altitudes. (*Ziziphus mauritiana*) occurred with 30% frequency of occurrence. (*Ziziphus nummularia*) dominated as it had higher density as well as frequency of occurrence. (Ahmed et al., 2008)

These native pastures comprise leguminous plant species (*Acacia farnesiana*), (*Acacia modesta*), (*Acacia nilotica*), (*Medicago denticulate*), (*Melilotus indica*), (*Sophora mollis*), (*Lathyrus aphaca*), (*Vicia sativa*) as the dominant but grasses (*Cynodon dactylon*), (*Saccharum munja*), (*Sacharum spontaneum*), (*Cyperus rotundus*) make up the bulk of herbaceous cover. Native pastures are the major sources of forage for different ruminants in the valley.

(Ahmed et al., 2008)

Soon valley of salt range in Pakistan was investigated to determine the distribution pattern of vegetation especially medicinal plant diversity at different sites and seasons. Six sites were selected on the basis of variation in their environment elevation, slope, aspect (western/northern), and altitude, topography and soil composition and community attributes habitat, vegetation type & plant community structure. Results revealed that most of the species were frequent during summer as compared to other seasons.

Among sites most of the species were more frequent in Khabeki and Khoora sites, which seemed to be associated with high macronutrient availability and field capacity. Salt and drought tolerant species were associated with Jahllar site. On the other hand, moisture loving and moderately moisture requiring species were found equally distributed between the Knotti Garden and Dape Sharif, (*Justicia adhotoda*) was the only frequently occurring medicinal plant during most of the seasons and at maximum sites, whereas the distribution of other species was mainly restricted to a particular season or site. It was concluded that soil moisture, salts and availability of macro-and micronutrients were the major determinants of species distribution in the studied area.

(Ahmed et al., 2009)

1.8 Biodiversity Importance of Soon Valley

Soon Valley area is important from biodiversity point of view, as it is located in extreme west portion of the salt range having maximum elevation from sea level, also supporting a diverse type of the Fauna and flora.

Soon Valley also has important medicinal plants, which are helpful in the cure of many ailments. Many sweet fruits of apple, almond, and grapes are grown in the area. It has been observed that the climate of this area is very suitable for the cultivation of many crops and flowers.

1.8.1 Mammals

Soon Valley is home of following mammals. Urial (*Ovis vignei punjabiensis*), Cape Hare (*Lepus capensis*), Wolf (*Canis lupus*), Civet (*Viverricula indica*), Jungle Cat (*Felis chaus*), Yellow-throated Marten (*Martes flavigula*), Jackal (*Canis aureus*), Porcupine (*Hystrix indica*), and Mongoose (*Herpestes edwardsi*).

1.8.2 Birds

Grey Partridge (*Francolinus pondicerianus*), Chukar Partridge (*Alectoris chukar*), See-see Partridge (*Ammoperdix griseogularis*), Black Partridge (*Francolinus francolinus*), Rock Pigeon (*Columba livia*), Red Turtle Dove (*Streptopelia tranquebarica*), Ring Dove (*Streptopelia decaocto*), Tree Pie (*Dendrocitta formosae*), Common Myna (*Acridotheres tristis*), Pied Myna (*Sturnus contra*), Common Babbler (*Turdoides caudatus*), Grey Heron (*Ardea cinerea*), Warbler (*Acrocephalus spp.*), the endangered White headed Duck (*Oxyura leucocephala*), Flamingoes (*Phoenicopterus spp.*) and birds of prey, like Peregrine Falcon (*Falco peregrinus*), Eurasian Kestrel (*Falco tinnuculus*), and Imperial Eagle (*Aquila heliaca*).

1.8.3 Reptiles

Indian Monitor Lizard (*Varanus bengalensis*), Spiny-tailed Lizard, and snakes like Indian/Oxus Cobra (*Naja*), Glossy bellied Racer (*Coluber ventromaculatus*), Cliff Racer (*Coluber rhodorachis*), Indian Krait (*Bungarus caeruleus*), and Russels Viper (*Vipera russelii*).

1.8.4 Uchhali Wetland Complex

Uchhali Complex is an outstanding site for wintering and breeding waterfowl in Pakistan. It is the only and most important White headed Duck roost with

internationally important numbers of White headed Ducks, Black necked grebes and Greylag geese. It also holds nationally important wintering and breeding populations of several other species of wildfowl and raptors. The Uchhali Complex is important for its Geological, Palaeontological, Ornithological values is especially important in view of the wintering waterfowl, in general and the White headed Duck, Ferruginous Duck, Greylag Goose and the Flamingoes in particular. The reptilian and amphibian fauna has not been well studied. The floristic and faunistic diversity of habitats calls for its maintenance and if possible, improvement. At least 4 bird species included in the Red Data Book are supported on these lakes:

i. *White headed Duck (Oxyura leucocephala)*

ii. *Cinereous vulture (Aegypius monachus)*

iii. *Imperial Eagle (Aquila heliaca)*

iv. *Sociable plover (Vanellus gregarius)*

Other species of importance include Ferruginous duck, Grey leg and Flamingoes. 56 Water birds species out of 192 in Pakistan are recorded from uchhali complex. Total species of birds in soon valley are 173 out of 729 in Pakistan which is 2% of world population and 5 % of Asian population .

The area is unique for a number of reasons, such as, this area is the only area in Pakistan where White-headed Duck still winters; the population unlike those of European wetlands is not under threat of future hybridization by the American Ruddy duck (Chaudary & Khan, 1993). Uchhali Lake covering an area of nearly 950 ha is the largest of them, where the water is brackish to saline fed by seepage from adjacent agricultural Lands and run off from the hills of the Salt Range. The water level and salinity level fluctuate according to the local rainfall, whereas the depth varies from 0.2 to 6.0 meter water is usually hyper-saline. (Afzal et al., 1998).

1.8.5 Paleontological & Geological Importance.

The area is also important for Palaeontological studies. It is included in the Siwalik formations, which are best; know for their vertebrate fossil fauna in the

Subcontinent. There are very unique geological formations present in the Salt range area.

Diverse habitats occurring in the area include: open deep to shallow brackish water body, with various densities of submerged aquatic vegetation, open salt pans, marsh lands, and prostrate marginal vegetation. Scarce typha, grasslands, pastures, agricultural fields, tropical thorn forests, and sub tropical broad-leaved scrub on the adjoining hills.

1.8.6 Scrub Forest

40 % of the area of the soon Valley is covered by scrub forest divided into three different types including state reserve forest, communal or Shamilat deh forest, Private owner or private Rakhs,

Sheikh (1987) and Champion, Seth and Khattak (1965) have classified Salt Range forests as dry sub tropical broad-leaved forest.

Said (1956) refers to them as dry deciduous scrub forests. Overall these are spread over an area of 68, 000 hectares in four districts of Salt Range Jhelum, Chakwal, Khushab and Mianawali. This cover 10% of the total forest area (63000 ha) of the Punjab province (Jan, 1992). Scrub forest in Soon Valley area is spread over an area of 99, 478 acres. These forests are habitat of wild flora and fauna of significant importance.

1.8.7 Punjab Urial

Punjab Urial is an internationally threatened species included in the IUCN Red data book as endangered, also included in (CITES) convention list and listed under Appendix II of the convention. This sub species is also protected in Punjab under the Wildlife protection and conservation Act of 1974.

(Awan, 2004)

Soon Valley is habitat of this endemic plant species and according to recent census its population is up to 150 animals in area.

1.8.8 Leopard (*Panthera pardus*)

The species was declared extinct in the Salt range but in 1995 the species made its reappearance when a leopard was sighted at the top of Mount Sakesar (Ahmed, 2000). Population is scattered and near extinction.

1.8.9 Protected Areas, Fishries & Gardens

In order to conserve biodiversity a significant area of the Soon Valley is declared under protected area categories. These include 1 National Park, 3 Wildlife sanctuaries, and 1 Game reserve. The protected areas includes Chinji National Park (6095 ha), Sodhi Wildlife Sanctuary (5820 ha) and Uchali Wetlands Complex comprising of Uchali wetland game reserve (943 ha), Jahler wetland wildlife sanctuary (17 ha), Khabeki wetland wildlife sanctuary (283 ha). Sakesar reserve forest which is home of flora of Salt Range and Kinhati garden also a potential local hot spot of biodiversity is not part of this protected area system also leaving Nurwari area previously part of Sodhi wildlife sanctuary in 1956. (Farooq, 2005).

(i) Fishries

Commercial fishries activity is being carried out in Kabekhi wetland where Silver carp, Grass carp, Mori, Thaila and Rohu have been stocked and the rights are auctioned on yearly basis. In water springs endemic fish species have been observed and documented these have no commercial value.

Fish fauna of the Soon Valley includes (*Barilius Vagra*, *Barilius Pakistani-cus*, *Garra gatyla*, *Cypririon watsoni*, *Tor putiora*, *Crosso-chelius Iratius*, *Schistura Punjabensis*, *Gambusia afiris*), while the commercial fish fauna introduced in area includes Mori (*Cirrhinus rigala*), Rahu (*Labeo rohita*), Common carp (*Cyprinus carpio*), Silver carp (*Hypophthalmi chthys molitric*), Grass carp (*Cteno pharyngodon*) idella) *Tilapia* (*Oreochromis massambicu*s), and Saul (*Channa maruls*). (PWP Report, 2007).

(ii) Gardens

These are 5 historical gardens in the area namely Kanhati (70 Acres), Sodhi (5 Acres), Phulwari (2 Acres), Nurwarai (0.5 Acre), Kathwai (4 Acres), these gardens were established in British era and contain some of the unique floral species which includes Pine (*Pinus roxburghii*), Bamboo (*Bambusa arundinacea*), Arjun (*Terminalia arjuna*), Anar (*Punica granatum*) in Sodhi-jai-wali, Late valentia, Washington Navel, Mango (*Mangifera indica*), Jaman (*Eugenia jambolana*), Pine (*Pinus roxburghii*) in Kinhati garden, Boher (*Ficus bengalensis*), Kachnar (*Bauhinia variegata*), Mango (*Mangifera indica*) in Nuwari garden and Pine at Phulwari garden, most of these species have been uprooted from Kathwai, Sodhi and Kinhati without any planning by agriculture research department. Nursing powar garden is located near Chamal village and it is one of historical Hindu temple, the garden also has some unique floral species which are Pipal, Bohir and several other species. All these sites contain floral species which are very rare in area and are also unique in the sense that these species were planted hundred years before. There is a need to declare these tree species a special protected status and their cutting may not be allowed in any case. Kanhati garden was established by Major W. Whet Burn, District Engineer, District Board Shahpur on 18th August 1933. More than 15 species of tall tree, 60 herbs, 20 shrubs and 15 grasses have been recorded. Punjan Urial is also present in close proximity of the garden in Khabaki & Dhadhar Reserve Forests. Grey and black partridges, golden oriole, wood pecker have also been recorded from the garden. It is also home of the largest Asian Parakeet population in the Punjab salt range. 06 different endemic fish species have been recorded from the water springs. Garden has 13 acres of areas, which is a typical range forest with 05 hill peaks. Several wild birds and animals use garden for feeding and water drinking. Garden is a breeding place for terrestrial birds. It has a blend of wild and ornamental flora, due to these unique features it is one of the local biodiversity hot spot. These unique biodiversity features of the garden need to be conserved.

Table No. 9 Protected Areas of Salt Range

Sr. No	Name of Protected Area	Status	Area Hectares	IUCN Category	Year of establishment	District
1	Chinji	National Park	6070	II	1987	Chakwal
2	Chumbi Surlah	Wild life Sanctuary	55,943	IV	1978	Chakwal
3	Jalalpur Sharif	Wild life Sanctuary	2236	----	1986	Jhelum
4	Kundal	Wild life Sanctuary	2964	IV	1986	Jhelum
5	Sodhi	Wild life Sanctuary	5750	IV	1958	Khushab
6	Jahlar wetland	Wild life Sanctuary	17	----	1993	Khushab
7	Khabeki wetland	Wild life sanctuary	287	IV	1967	Khushab
8	Uchali Wetland	Game reserve	932	----	1991	Khushab
9	Nambal wetland	Game reserve	480	IV	1970	Mianwali
10	Khalar Kahar	Game reserve	220	----		Chakwal
11	Kala Bagh	Private game reserve	1550	Private	1966	Mianwali
12	Diljaba Domeli	Game reserve	1,16136	IV	1972	Jhelum Chakwal
13	Tilla Jogian	Defense forces protected area	23,388	NA	NA	Jhelum
14	Sakesar reserve forest	Defense forces protected area	7020 Acres	NA	NA	Khushab
15	Lehri Jindi reserve Forest	Reserve Forest	17,313	NA	NA	Jhelum
16	Kinhati garden	Garden	70 acres	NA	NA	Khushab

Source (Protected Areas of Salt Range), (Farooq, 2005. WWF – P)



Plate No. 1 **over view of study area village**



Plate No. 2 **Over view of study area forest**



Plate No. 3 **Water shed and range lands**



Plate No. 4 **Khabeki Wetland International Ramsar site**



Plate No. 5

Prunus persica

Voucher No. 47



Plate No. 6

***Pyrus malus* Linn.**

Voucher No. 113

1.9 Background of the research problems to be addressed

Study area valley Soon Sakesar is part of the Salt Range Ecosystem and is located in the North central Punjab, the proposed study is designed to accurately determine the potential of flora of area with respect to medicinal and other uses by local communities.

Pakistan exhibiting a variety of geophysical and phytoecological conditions, has a rich resource base of plants (Stewart, 1972), particularly the medicinal plants. The number of medicinal plants growing here may reach upto 3500 species, out of which 500 species are actively used in health care practices and 350 are traded for billions of rupees to the national and international markets. Most of the work done on medicinal plants of Pakistan generally covers the northern uplands of temperate and alpine forests of Kashmir, Hazara, Malakand and northern areas (Amin, 1961; Chaudri, 1958; Chaudri, 1961; Ikram and Husain, 1978; Zaman and Khan 1972 and Zaman et al, 1971). It is really hurting to note that neither any baseline data exists on medicinal flora of the dry tropical and lower sub tropical forests of Pakistan, nor the literature tells us anything regarding the conservation status of species in these forests two protected areas, i.e, the Salt Range in the lower sub tropical forests of the Punjab and the dry tropical desert of Tharparkar which retain the floral diversity of their respective ecosystems. These areas are exposed to the severe habitat losses due to human interference around the sanctuaries, which will ultimately lead into the accelerated depletion of physical and biological resources of the protected area systems. (Ahmed, 2002).

Review of the literature (Khan, 1985; Awan, 1978; and Khan, 1951) shows that, medicinal flora and knowledge base regarding herbs and their potential use in salt range has not been explored. So that means and ways for the development of local communities have not been developed through its sustainable use. Due to heavy deforestation, forest fires, expansion of the agricultural fields towards rangelands and heavy grazing a large number of herbs and shrubs having ethnobotanical potential have lost their habitat and are

facing threats of the extinction. There has been no documentation of indigenous knowledge especially related to the medicinal plants. A lot of valuable information of plant uses has been lost due to non-transfer of this knowledge from one generation to the other. The species which were abundant 15 years ago are now have very limited distribution, and due to constant occurrence of the forest fires incidents the remaining pockets are also under threat.

A research study was conducted in the two villages KoraDhi & Dhaddar and it was concluded that valuable Knowledge regarding different species in forests and their usage. Knowledge on medicinal plants has been decline as their collection from forests. It would be tragic to see that traditional knowledge are not passed on to the next generations in case of Dhadar village where women claimed that low level of knowledge on medicinal plants is what they have inherited initially from mothers. Women use of medicinal plants is amongst the lowest in six categories of forest use. Lack of sufficient knowledge, species scarcity, and lack of interest in their collections were the main reasons given for low levels of collection. There was generally a positive attitude towards forest conservation among women in both villages. However, the general knowledge of how they could help to conserve forests was very limited.

(Tahri, 2007).

The medicinal herbs were collected by local people living in the study area on daily payment basis from local herbal practitioners without any consideration of age and size of the plants resulting in depletion of their natural resources from the area. Due to migration of young people search for better jobs in cities use of plant is slowly declining it is very important that the emphasis should be on organized cultivation which will involve and provide jobs for local community.

Shamilat deh and private community forest in area have been degraded due to arrival of Afghan refugees and export of the fuel wood to other areas such as N.W.F.P, mining and stone quarrying are also playing havoc with plant resources. The long drought spell have negative impact on different species

keeping in view the level of increasing threats and limited information on the plant resources of the area, the study will fulfill the existing gaps along with bringing new facts about plant resources of the area.

Medicinal plants of the Soon Valley are facing great threat due to deforestation, forest fires increasing human pressure and vanishing of the knowledge of the medicinal plants. Due to non transfer of the folk knowledge and lack of commercial cultivation of the medicinal plants at farm level. One of the viable sectors of the non timber forest products is very poorly utilized and under estimated, although a lot of the medicinal plants exist, and if they are cultivated on the farmer fields they will contribute towards farmer economy. Conservation of the medicinal plants resources is essential for the gene pool conservation and will contribute towards the biodiversity conservation in area. Medicinal plant resources also contribute towards the livestock and human health and are playing a significant role in the health sector of the soon valley. The study will document the existing knowledge of the medicinal plants and will lead towards commercial cultivation of the medicinal plants at farm level. It will lead towards promotion of the cultivation of herbs, and processing of the products for better marketing.

The study will access the potential flora of Son Valley having economic importance, will document the traditional indigenous uses of these plants. along with the present distribution in area, it will establish the conservation status of the flora, it will involve the different stakeholders such as CBO's local Hakeems, graziers and collectors and will create awareness among local communities as well will build the capacity of the local communities to promote sustainable utilization of the plant resources.

Anthropogenic disturbances like intensive deforestation to open new land for agricultural purposes and unlimited expansion of urban has markedly reduced the size of natural plant communities in different parts of the world. The remaining plant communities are also facing several threats.

Soon Valley in District Khushab, Punjab Province, Pakistan, is regarded as the heart of Salt Range. It falls within of subtropical region. Topography of the Soon Valley is very varied, average height of its hills varies from 2500 to 3000 feet from sea level. Its highest peak is, (5010 feet) being at Skaser along-with undulating lands and natural springs imparts it a special ecology in the region.

The study is designed to accurately determine the ethno botanical potential of the Soon Valley area, it will document the local knowledge about plants which is vanishing very rapidly, it will also analyze the potential threats current harvest level, and will mobilize the different stakeholders to develop a sustainable resource utilization strategy for the plant resources, it will also promote in situ and Ex. Situ conservation of the selected plant species.

1.9.1 Hypothesis of research

Indigenous knowledge about local plants having medicinal and economic value is eroding fast due to various factors along with the plants, due to habitat degradation, forest fires, deforestation, heavy grazing and population pressure many wild species are critically endangered, thus resulting in the loss of gene pool of the flora, the proposed research is designed to document, evaluate the ethnobotanical knowledge of the medicinal plants at one hand and study distribution, ethnobotanical uses and classification of the flora from conservation point of view.

1.9.2 OBJECTIVES OF THE PRESENT STUDY

1. To document existing plant uses.
2. To preserve and document indigenous knowledge regarding economic uses of plants.
3. To explore the conservation status of flora and practices available in area.
4. To analyse potential threats to flora in soon valley.

CHAPTER 2
MATERIALS AND METHODS

Material and Methods

Literature was collected about medicinal plants, biodiversity and study area from different sources, and it was analyzed and surveyed thoroughly. Valley Soon Sakesar area including Pakar and Mohar both northern and southern fringes of the area were surveyed for whole year. Summer and winter season flora studied differently due to different growth pattern and life cycle. Summer season flora was particularly studied from July to September while winter season flora from December to April months. In order to study biodiversity relevant documents, research papers, project reports and other documents also collected and study area surveyed. Biodiversity component of the study includes wetlands, wildlife of the area and field trips were organized to forests critical habitat of wildlife, protected areas and wetlands for data collection. Research study was completed in different phases working simultaneously, the first phase include field level data collection and the second one consist of documentation of the traditional local knowledge about different plants and assessment of their conservation status.

2.1 Field work

Field level data collection exercise consists of different techniques, which includes survey of forest, Rangelands, wetlands, wildlife in different villages and sub valleys of the area.

2.1.1 Observation

Extensive field visits were made throughout the area in different villages, reserve forests, shamilat deh forest, wetlands and agricultural fields. These trips particularly focused on observation such as plant diversity, method of plant collection, part used, storage, drying, harvesting processing, recipe formulation and method of use. Field level observation relevant to animal biodiversity includes verification of the targeted species, their habitat population status and threats, and dependence of different animals and birds on flora.

2.1.2 Interviews

Extensive interviews were carried out both formal through questionnaires and informal through discussion.

Data collection exercise includes the use of different plants, their availability; part used fuel wood and fodder species. Specific information related to the animal biodiversity includes current and past distribution, habitat, threats, population levels and interaction of the local people with plants and animals. Following members of the society were part of the interview and data collection.

- | | |
|-------------------------------|---|
| 1. Plant collectors | 2. Local Hakims. |
| 3. Pansar store owners | 4. Plant Suppliers |
| 5. Tribe elders | 6. Traditional livestock expert |
| 7. Elder women | 8. Forest guards |
| 9. Wildlife watchers | 10. Hunters |
| 11. Graziers | 12. Farmers |
| 13. Religious leaders | 14. Peer and Gadi nashin |
| 15. School teacher | 16. NGO / CBO,s activist |
| 17. Nature conservation staff | 18. Mohabasi |
| 19. Sanisai and jogis | 20. Representatives of different
Departments |

2.1.3 Field Surveys

Different field surveys were organized with respect to life cycle of the plants and season of collection also processing and utilization of the plant products for the local community. These trips were organized form 2004 to 2010 in different months of year, guided transect walk was also part of the survey.

(Ibrar, 2003)



Plate No. 7 **An over view of study area**



Plate No. 8 **Author collecting information from local peoples**

2.2 Study of plant diversity

Different diverse sites were selected for the collection of the plant specimen during different season. Area was divided into different sub sectors and the sites were visited regularly. These specific sites includes Kinhati garden, Dhoke Tilli, Nursing Powar, Darbar Hazrat Sultan Mehndi, Sodhi Garden, Hayat al Mir, Tulaja, Chapar sharif, Sodhee Kawad, Jahlar, Amb Sharif, Dape Sharif, Angha, Nowshera, Karang, Sakesar Anara Wali, Rakh Khariot, Khabeki, Uchhali, Mardwal, Katha Saghral, Chinji, Padhrar some plant species have specific restricted distribution and locality which were also visited other than the above mentioned sites, different diverse micro habitat and areas were surveyed broadly these includes.

1. Reserve forest
2. Shamilat deh forest
3. Local Community owned rakh
4. Water springs
5. Old Archeological sites
6. Watersheds
7. Steep cliff
8. Historical gardens
9. Water logged areas
10. Wetlands catchments area
11. Agricultural fields
12. Afghan Refugees settlement
13. Range lands
14. Waste lands
15. Graveyards
16. Roads
17. Water ponds
18. Depressions and caves
19. Wells
20. Eroded area gullies.

(Farooq, 2005)

2.2.1 Plant collection

Different herbs, shrubs and samples of tree parts were collected for elaborating plant species diversity. These plant specimens were collected during different season of the year. The collected plants species were pressed and mounted in herbarium sheets. All the collected specimen were identified with the help of

available literature (Stewart, 1967, Nasir & Ali 1971 – 91, Ali and Qaisar. (1991- 2004).

Plant specimens were collected from the whole area at regular intervals. The specimens were identified with the help of available scientific material. (Stewart, 1972; Cope, 1982).

2.2.2 Photography

Photography of all the species recorded from the area was taken during flowering season whenever the flowers, leaves and fruits were available in good shape. The cameras used were Olympus 4.0 Mega Pixel 3x zoom and Sony digital handy cam most of the pictures were directly arranged while few scanned through HP scanner, vouchers numbers were given to collected specimen and given to the pictures in the table for easy access in future, families were arranged in the sequence in which they are published in flora of Pakistan. A complete list is also made and given in the results. Due to wide scope of the animal biodiversity component a few indicator species were selected for detailed study while all other recorded birds / animals are enlisted as reported in literature and also observed recorded during field surveys. Video clips of the certain plant and animal species were also taken for identification and habitat assessment.

2.3 Study of Animal Biodiversity

Survey of reserve forest habitat of certain wildlife species, was carried out wetlands were also surveyed for migratory birds.

2.3.1 Documentation of indigenous knowledge / plant uses / Recipes

Indigenous knowledge was documented through formal and informal way. Different questioners were used to document this knowledge, while different recipes products, and plant uses were also recorded with different groups, of community involving all stakeholders. Indigenous knowledge collection exercise focus on following broad themes.

1. Specific Medicinal uses of plant species in the form of single recipe.
2. Multiple uses of plant species and inclusion of different recipes.
3. Economic use classification of different species.

Following villages in the Soon Valley area were part of the research study.

- | | | |
|--------------------|-----------------|----------------|
| 1. Uchali | 2. Chitta | 3. Ugali |
| 4. Kotli | 5. Angha | 6. Koradhi |
| 7. Kufri | 8. Sabhral | 9. Manahwan |
| 10. Suraki | 11. Jahlar | 12. Sodhee |
| 13. Khura | 14. Kalyal | 15. Biakh |
| 16. Sodhi Jai Wali | 17. Chambal | 18. Uchali |
| 19. Mustafa Abad | 20. Jalewali | 21. Nowshera |
| 22. Sirhal | 23. Shakar kot | 24. Mardwal |
| 25. Dhaddar | 26. Khabeki | 27. Ahmed Abad |
| 28. Jhugewala | 29. Pail | 30. Jabba |
| 31. Kinhati | 32. Dhoke Tilli | 33. Makromi |
| 34. Kamra | 35. Kawad | |

In Mohar areas following villages / settlements were selected for the study.

- | | | |
|------------------|---------------|---------------|
| 1. Chapar Sharif | 2. Katha | 3. Nali |
| 4. Kund | 5. Amb Sharif | 6. Sara Miani |

In Pakhar areas following villages / settlements were selected for the study.

- | | | |
|-----------|----------------|------------|
| 1. Chinji | 2. Dhoke Miani | 3. Bhaloti |
|-----------|----------------|------------|

Indigenous knowledge about medicinal plants was collected from these different villages. As field level survey of the medicinal plants was also carried out, so the daily life routine, and practices, everyday life challenges local people interaction with natural resources was also closely observed. This

participant observation will preserve the “ Naturalness of the setting” and give the opportunity of seeing the real happenings of everyday normal routines. (Denscombe, 2007). All this interaction assisted in selection of the proper participants, later on following other stakeholders were also selected.

- | | |
|-------------------------|---------------------------------|
| 1. Local Hakeems | 2. Elders of the village |
| 3. Pansaris | 4. Saniasi |
| 5. Graziers | 6. Livestock disease specialist |
| 7. Forest guards | 8. Wildlife watchers |
| 9. Fuel wood collectors | 10. NGO's / CBO's activist. |

Out of these villages following 9 villages were selected for documentation of indigenous knowledge

- | | | |
|-----------|------------------|-------------|
| 1. Chinji | 2. Khura | 3. Dhaddar |
| 4. Ugali | 5. Chapar Sharif | 6. Nowshera |
| 7. Chitta | 8. Uchhali | 9. Angah |

Criteria for the selection of villages is based on following important points

1. Representation of specific local area distribution such as Soon, Mohar and Pakhar having different micro habitat.
2. Presence of hakim families.
3. Richness in indigenous knowledge.
4. Historical centre of old traditional collectors and knowledgeable persons such as Saniyasi, Jogi, and local herbal experts.
5. Strong affiliation with local flora.

2.3.2 Seed Collection, Cultivation trials of selected plant species

Seed collection and cultivation trials of the selected plant species was also part of the research study. Cultivation trial of the selected species was carried out investigating the mode of reproduction of the plant spices. Three different

methods were used keeping in view the three different mode of reproduction of the plant species.

1. Seed sowing in case of plant species where mode of reproduction is through seeds.
2. Saplings transplanting in species where mode of reproduction is through saplings.
3. Cultivation through vegetative parts including cuttings, root transplanting tuber planting or any other form.

2.4 RESEARCH METHODS

2.4.1 Questionnaire

Questionnaire is one of range of traditional approaches used for obtaining information from people. Questionnaire can be both qualitative and quantitative with closed or open-ended questions. Questioner are a cost effective way of collecting data, they are time saving, and can help to find trends and patterns to test hypothesis. Nevertheless, a questionnaire can be considered as a sound research tool as long as questions are carefully designed to avoid biased and leading results. (Denscombe, 2007).

Structured questionnaire were the predominant method used in order to obtain quantitative data on general background and different sub sectors of research study. Such as use of plants, recipes, threat to the plant diversity, forest use pattern, marketing of medicinal plants, overview of the fauna of the area and interaction of the local people with animal and plants. Targeted focused group discussion with Hakeems in study area provide further in depth qualitative information on their perception towards, forest resource conservation, future of medicinal plants, trends and causes of degradation of the biodiversity. In addition focus groups discussions gave the opportunity of understanding reasons behind the specific trends discovered through quantitative data collection.

There are many ways of delivering the questionnaire to the selected sample population, face to face delivery was chosen for this study. Face to face delivery is when the researcher is present while the questionnaire is being answered. One of the most important advantages of being present at the survey is the chance for observations such as facial expressions, type of house, respondent's age and other details that can help when interpreting the data. Nevertheless; one major drawback of face to face approach is the length of time it takes to collect the data (Gillham, 2004). This can get further lengthy when door-to-door approach is taken at people's houses and local tea is served.

2.4.2 Questionnaire Design

Initial questionnaire was designed prior to the field visit Pilot study was carried out with modifications were made and the questionnaire was finalized. The changes were largely made by including local terms that represents plants collected by and also local names of particular species asked in the questionnaire an introduction section was designed at the beginning of the questionnaire with the purpose of introducing background and the aims of the research to build trust with interviewees. In addition, the environment and the presence of other people at the time of interviews influenced the respondents' level of concentration and quality of answer. For example, in some cases the presence of children in the house playing and making noise distracted the person that was interviewed, in addition, person that was interviewed. In addition, presence of older male member a round made the younger respondent hesitant in giving opinions due to the culture of respecting elderly people's point of view.

50 questionnaire were carried out in whole study area during 2005 - 2007 periods. Initial questionnaire was designed prior to the field visit. This questionnaire was later on shared with different stakeholders and redefined. Pilot study was carried out in two different villages Dhaddar and Ugali. Changes were largely made by including local names of the flora and fauna and others terms commonly used in area.

The questionnaire was designed to obtain quantitative data on dependence on natural resources, specific use of Plant species, fuel wood species and use pattern, NTFPs, livestock grazing, medicinal plants, forest resources, forest management, threats to biodiversity.

Three different type of the questionnaire were used to collect data on following aspects. Each questionnaire deals with different members of the society, Data collection exercise focused on

1. Fuel wood species, trend, source preferred species, dependence on forest.
2. Specific medicinal uses of the plant species, NTFPs and recipes.
3. Animal grazing, Flora, Fauna, Threats to flora, fauna, status of species.
4. Natural resource management, current system, perceptions and future options.

Second questionnaire was designed for local Hakeems to collect data on following aspects.

1. Back ground to the profession.
2. Trend of local people toward herbal medicine.
3. Raw material source.
4. Market of medicinal plants.
5. Opinion about status, conservation of the medicinal plants.

Third questionnaire was designed to collect data on marketing of the medicinal plants and markets, following important aspects covered.

1. Source of Raw material of plants used in medicine.
2. Local level medicinal plant species production and uses.
3. Cultivation of the plants.

4. Medicinal plant markets.

2.4.3 Targeted Focus Group Discussions

Focus group discussions provide the possibility of gathering together a small number of people in order to explore their perception. Ideas, and feelings of local peoples towards a particular issue. Focus group discussions are based on group dynamics and the interactions within the groups. In this case, participants share their experiences and perceptions and are exposed to other people's point of views. The facilitator or the researcher's role is important in focus group discussion. The researcher is responsible for creating a comfortable environment for discussion, keeping the discussion focused and on track. Encouraging everyone to participate, and avoid sensitive topics that have the possibility of leading to chaos and discrimination towards some individuals (Davies, 2007)

2.4.4 Purpose and Design

Focus group discussions were also used to obtain qualitative information; the purpose of conducting focus group discussions was to understand community perception towards medicinal plants and economics uses of the plants. Forest resource conservation, future of forests in the area, and causes of forest degradation. Additionally, the aim was to follow up on trends observed through individual questionnaires. Topics of discussions were identified in advanced and formatted in to open ended questions in order to generate more in depth discussions.

Focus group discussion was designed with the aim of obtaining data on the followings. Initially the aim was to have the same participants from the survey questionnaire were interested in the research to join for focus group discussions. This however, was not possible since the attempt was to have a diverse age group of people's with different background to have various perceptions and view points, Total six focus group discussions were carried out, three per village, with eight participants per group

2.4.5 Samples and participants

Initially the aim was to have participants from the survey questionnaire that were initially involved. This was not possible in all cases as target group for each questionnaire type were different, so it was decided to include different stakeholders in order to have diverse and critical views.

(i) Locations and Time

In each village a local resource person was identified who helped with logistics and gathering of participants. Focus group discussions were held at common place where different people have no issue and feel comfortable and at ease. Usually a day was spent for each focus group discussion at one place. Each discussion was designed to last for 2 hours. Focus group discussions were designed with the aim of obtaining data on the following aspects.

1. Status of the flora and fauna.
2. Attitude of the local community, their role in plant conservation and fauna.
3. Wetlands biodiversity issues, management conservation.
4. Forest use pattern, issues, management threats and conservation.
5. Local plant uses, current trends and indigenous knowledge.
6. Cultivation of the medicinal plants.
7. Overview of the biodiversity.

2.4.6 Limitations of this method

The major challenge of the focus group discussion was to persuade all different stakeholders to gather at one place and to listen other view point potentially without interference. Lack of trust from the people on government projects institutive and frustration also restrict people to have positive view point and constructive dialogue overlapped by the political differences. In order to avoid these complications discussions were chosen according to the participant's

preference and comfort. Secondly assurance was given to the local people that the research findings would not bring any negative out comes such as restriction on their access to the forests and that it is a research study and having no links with wildlife or forest department or any other Government department.

2.4.7 Selection of the study sites

Different factors were identified for the selection of the study area, consultation was held with different stakeholders before finalizing the study sites. As there were three different sub themes so the criteria varied differently to each factor.

2.4.8 Indigenous knowledge

In order to document indigenous knowledge practices following important factors considered.

1. Presence of Hakim family in village.
2. Presence of Pansar store in village.
3. Local livestock herbal specialist.
4. Famous local elder in village.
5. Specific presence of medicinal herbal product, recipe or drug.
6. Specific treatment of the village for disease.

2.5 Vegetation, Medicinal Flora

Valley Soon Sakesar is part of the Salt Range hills which runs in east west direction and at the same time are made up of the sand stone and lime layers predominately hence the vegetation is different on different layers and also due to Northern and Southern aspect. On the Northern and southern fringes towards Thall and Pothowar plateau due to less elevation and climatic difference vegetation is different hence the Mohar area located on the southern side and Pakar area located on northern side were also selected for the research study. In between the valleys certain other different factor affects the vegetation and

forms specific habitats which were also taken into account. In brief following major aspect were considered.

1. Geological layers sand stone / lime stone.
2. Altitude variations such as 100 - 250m elevation from sea level Mohar and Pakar Area.
3. 1000 – 1500 m hill tops, 800 – 1000 m cultivated lands, sub valleys.
4. Geological and physical features and their associated habits such as
 5. Water sheds
 6. Springs
 7. Depressions
 8. Caves
 9. Wells
 10. Cliffs
 11. Gullies
 12. Waterlogged area
 13. Forest lands
 14. Barren lands
 15. Range lands
 16. Degraded areas
 17. Protected areas
 18. Private lands
 19. Reserves areas
 20. Gardens
 21. Archeological sites

2.6 Biodiversity Fauna component

Following important factors were selected for this component.

1. Wetlands
2. Water springs
3. Water ponds
4. Mini dams
5. Wells
6. Forest
7. Range lands
8. Rock crevices
9. Water sheds
10. Caves
11. Depressions

2.7 Selection of participants of the study

Participants of the study were selected through a process in which the initial entry point was the CBO's implementing the nature conservation projects and interventions of the WWF – Pakistan. Initially five important projects were selected for this purpose.

1. Community based protection of the Sakesar Range forest implemented by Falahi Tanzeem Dhammadar funded by UNDP, GEF / SGP
2. Community based project Fire Brigade in Soon Valley implemented by Ugali Welfare and development Society (OWDS) funded by UNDP GEF / SGP.
3. Wetlands conservation project (1997 to 2007) in Pakistan implemented by WWF – Pakistan.
4. Pakistan wetland program (PWP), STEP project.
5. DMPP project implemented by SVDP and funded by PPAF.

Activist of these projects were the primary contacts as these communities are living at the periphery of the reserve forest, so they are more aware of the natural resource issues as compared to other people. Later on the other stakeholders were also involved in the study.

2.8 Sampling process

As the aim of the study was to collect indigenous medicinal plant knowledge, status of the flora, wildlife populations, their habitat and other allied issues hence probability or random sampling selection of the households or local people was not suitable for this research study. Therefore non probability snow fall sampling was used in order to find the interviews, snowfall sampling approach is mainly used in "Difficult to reach populations" and cases that probability sampling are not possible to conduct (Gorard, 2004). In this case for each particular study intervention some individual were identified through the connection of the CBO's / NGO's.

Snow fall sampling is used to locate key informants with rich information on particular area or population. In this approach a few potential respondents are asked whether they know of candidates best suited for the requirements of the research study. (Patton, 1990).

Furthermore, the respondents were asked if they know of other possible candidates in the village that could be interviewed. This approach may result in some biased sample which could potentially single out candidates with similar back grounds and thus not representative of the whole village. Nevertheless the attempt was to have the diverse sample as geographically.

2.9 Conservation Status Scale Assessment

Conservation status was determined according to modified formula. The categories were ranked in accordance with the ground realities. The realities are: there is no baseline available for the Soon Valley, even no single scientific report regarding the natural resources of the area exists. For elaborating conservation status of the flora of the area, frequent visit were made to every corner of the area covering all the aspects, altitude, direction and slopes. The aged people of the community were consulted and the pertinent information regarding the spots of availability, their distribution and abundance at present and the past 10-20 years were obtained. In light of these information's and personal observations, the parameter for the assessment were selected. These are area of occupancy, availability, exploitation level and the sub parameter like deforestation, loss of habitat, pollution and overgrazing. Three ranks of conservation importance were identified. These are;

1. Global rank denoted by (G) rank (Internationally recognized status)
2. Regional rank as (R) rank (status for the country)
3. Sub regional rank (SR) rank (status at a specific locality, like Soon valley)

The conservation status of a specific taxon with in these three ranks were designated by specific number ranging from 0-6. The ranks are:

- | | |
|------------|--------------------------|
| 0. Extinct | 1. Critically endangered |
|------------|--------------------------|

- | | |
|---------------|--------------------|
| 2. Endangered | 3. Vulnerable |
| 4. Infrequent | 5. Near threatened |
| 6. Frequent | |

Keeping in view the above categorization, Status (1) means critical endangerment of a taxon with in sub regional jurisdiction like Soon Valley of its status elsewhere.

The scale for conservation status was developed on the basis of above mentioned the ranks were given to each species collected with in that area. The number counted of each species at different localities was added and divided by the total number of places visited. Thus

$$\text{Conservation status scale (CSS)} = \frac{\text{Total number of individuals of a species at all localities}}{\text{Total number of localities visited}}$$

The CSS value of each species should fall in the following categories range.

Extinct = 0	Critically endangered = $0 < CE < 1$
Endangered = $1 < E < 2$	Vulnerable = $2 < V < 3$
Infrequent = $3 < IF < 4$	Near Threatened = $4 < NT < 5$
Frequent = $5 < F < 6$	

2.9.1 Modified Categories

2.9.2 Extinct (Ex)

A taxon is considered extinct in the area where there is no report of collection from that area and the local people also got the same point of view. Field trips for collection should be over a time frame appropriate to the taxon's life cycle and life form.

2.9.3 Critically Endangered (CE)

A taxon is Critically Endangered when the best available evidence indicates that it is facing an extremely high risk of extinction in the wild. The population

size reduction of > 90% has been observed, estimated, inferred or suspected over the last 10 years or three generations whichever is longer.

2.9.4 Endangered (EN)

A taxon is endangered when the best available evidence indicates that the population size reduction of > 70% has been observed, estimated, inferred or suspected over the last 10 years or three generations whichever is longer.

2.9.5 Vulnerable (VU)

A taxon is Vulnerable when the best available evidence indicates that the population size reduction of > 50% has been observed, estimated, inferred or suspected over the last 10 years or three generations whichever is longer.

2.9.6 Infrequent (IF)

A taxon is Infrequent when the best available evidence indicates that the population size reduction of > 20% has been observed, estimated, inferred or suspected over the last 10 years or three generations whichever is longer.

2.9.7 Near threatened (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future if the existing condition prevails.

2.9.8 Frequent (F)

A taxon is frequent when it has been evaluated against the criteria and does not qualify for threatened category or it qualifying for or is likely to qualify for a threatened category in the near future if the existing condition prevails. Widespread and abundant taxon is included in this category. (Siraj, 2006)

CHAPTER 3
RESULTS

3.1 SOCIAL STRUCTURE OF THE PEOPLE OF THE SOON VALLEY PUNJAB SALT RANGE

Information on social structure of the people of the soon valley was collected through interviews from 100 household randomly selected in the different villages of the area. The parameters selected were family status, source of income, literacy ratio, and occupation of the family head. The data obtained from different classes of respondents is analyzed and presented below.

3.1.1 Source of income

Data analysis of the area shows that the agriculture, livestock, trade and services are the major source of the income. Major cash crops are off-season vegetables like cauliflower, coriander, Potato and chilies contributing 80% of the income from agriculture sector. The crop cauliflower contributes 35%, potato 40%, while coriander, chilies along with other minor vegetables contributing rest 25% of the income. Local household economy dependence on agriculture sector has increased from 40% to 75% in recent 10 years due to introduction of potato crop along with cauliflower. Most households diversify their income through livestock ownership, 30% of the respondents owned livestock to supplement their income. Livestock pressure is high especially on reserve forest.

A significant proportion of the people are also employed in armed forces. Women community is mostly employed in education sector and 60% of the employed women are in teaching profession while rest 10% in embroidery and other related minor income source professions. Small scale business such as shops, construction, transport, and poultry are also other source of income.

Local people also extract honey and other forest products to supplement their income. Other occupation in the area includes labor in off season vegetable crops, fuelwood selling, livestock rearing at commercial scale both for meat and for sacrificial purposes are also dominant economic activity.

The source of income of the people of the area is presented in figure 1.

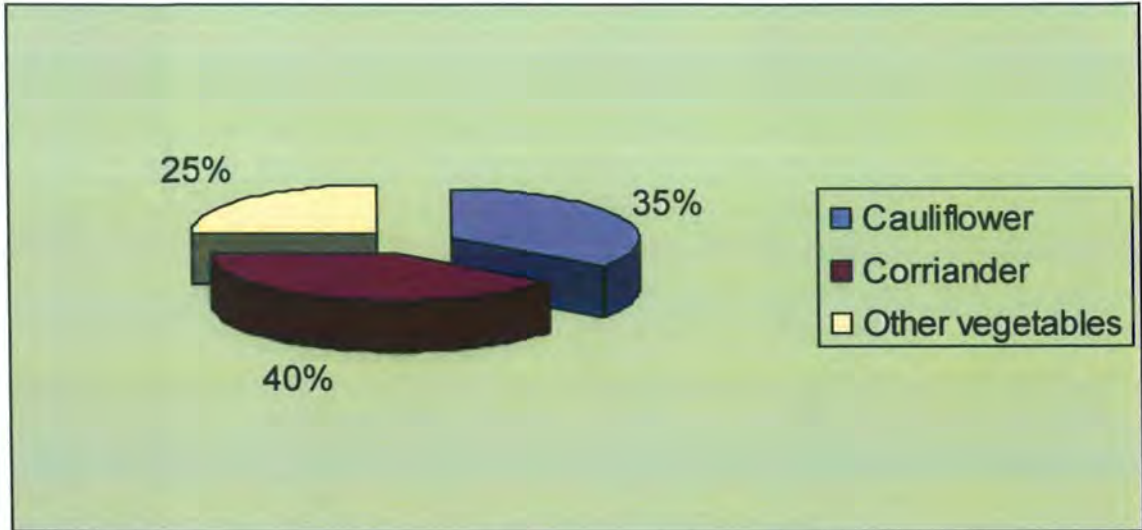


Figure 1: Source of Income from Agriculture

3.1.2 Occupation of the family head

The analysis of the data revealed that out of the total 100 sample household 48% were agriculturalist by profession, 26% government servants and 26% were doing other jobs including small business and other profession like poultry farming, wood cutting, labour.

Major crops grown in the area are wheat in winter and vegetables in the summer. Agriculture is mainly rain fed while turbines provide a crucial source of irrigation for irrigated agriculture.

Irrigation is a crucial need partly a result, of prolonged drought and partly due to the introduction of high income yielding vegetables that are cultivated for the urban market e.g. cauliflower and potato . This trend has grown particularly for the last 10-15 years leading to gradual increase in the number of turbines. Other profession of the family head includes off season vegetable labour, transport and livestock. Percentage of major professions of the people of the area is given in figure 2.

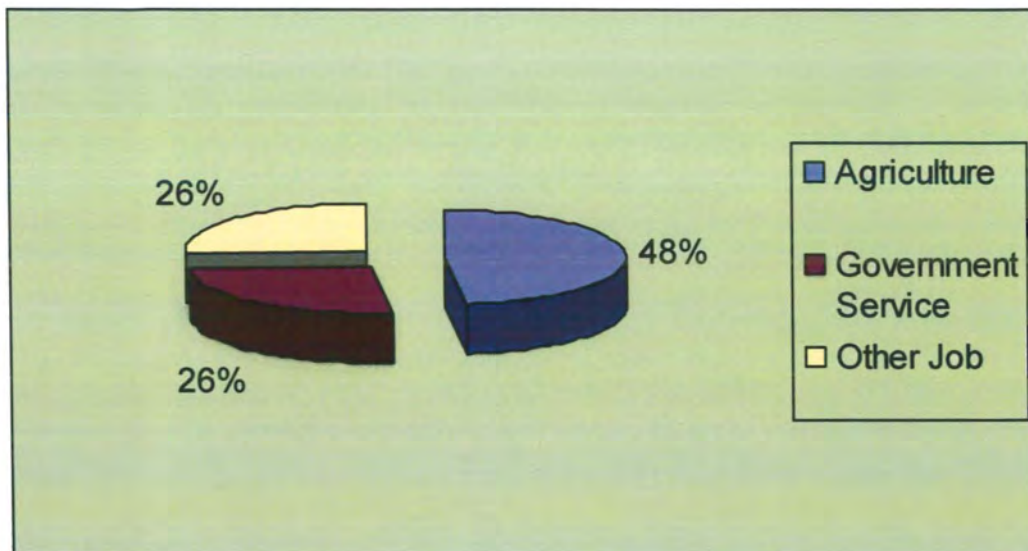


Figure 2: Major Profession of Family Head

3.1.3 Literacy Ratio

Survey of the local communities reveals that 30% household heads are illiterate. 70% of the remaining population is literate, out of these 26% are primary 10% middle, 10% Matric, 22% inter, 12% graduate and postgraduate . Literacy ratio of different categories is given in figure 3.

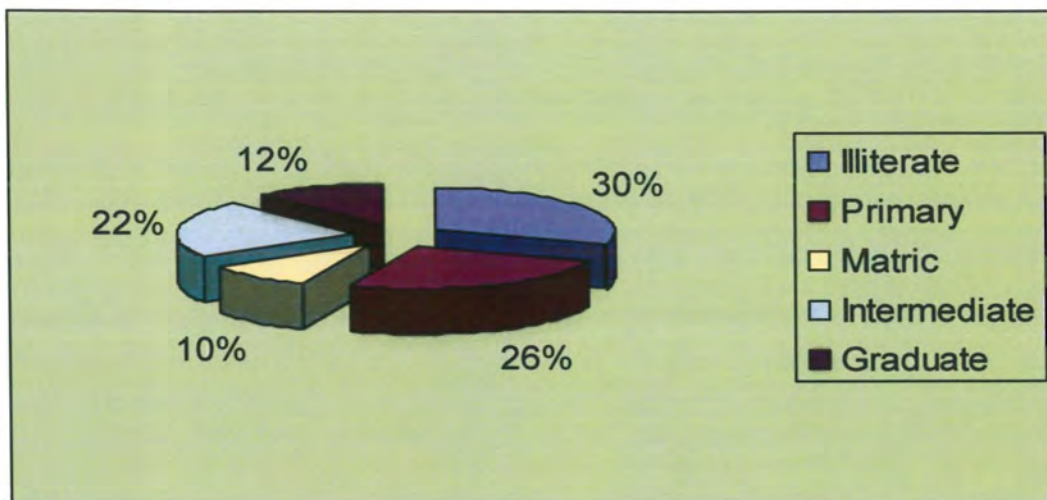


Figure 3: Literacy Ratio



Plate No. 9

A natural water stream vanadha sabhral



Plate No. 10

Vegetable cultivation in area

3.1.4. Family Status

The average household size in study area was calculated as 6.3% of the sample population respondents living in the form of the single families, and 70% have joint families system. Furthermore, 85% household are headed by men, while 15% are women headed household, where male member has died or has gone away to other areas for job.

3.1.5 Household Source of Income

Data analysis of the Information obtained from Soon Valley shows that agriculture, livestock and trade are the major income sources of the sample population. Some people are dependent on the employment also. It is also noted that people of the area do not depend a single source of income; they usually have two or three source of income. Major source of the income are agriculture, livestock, business, services, labour, pensions, remittances and others. Percentage of the major source of the income is presented in figure 4.

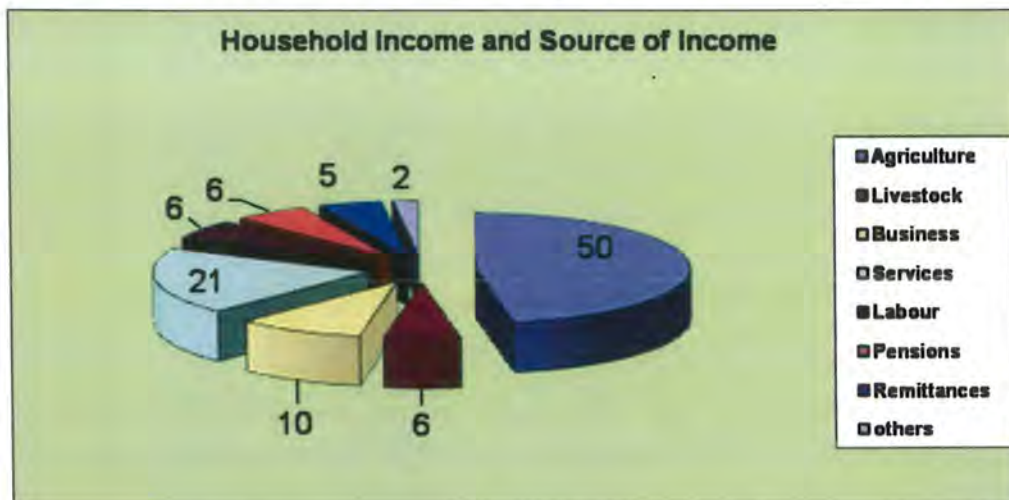


Figure 4: Household Source of Income

3.2 DATA ON NATURAL RESOURCE MANAGEMENT

3.2.1 THREATS ON FOREST

The significant threat to the forest seems to be fuel wood cutting by the residents of villages in Soon Valley. Fire is a significant threat. Fuel wood harvesting via timber mafia has increased according to the dialogue held by the community members. Livestock grazing is also a threat as there is commercial rearing of cattle by afghan refugees. Local herds and herds of afghan refugees

are major threat to the vegetation. Deforestation is the major threat to the forest of the Soon valley, followed by forest fires and grazing. Other significant threat include cultivation and mining activities taking place without any consideration of flora and fauna of area. Threat on forest flora is shown in figure 5.

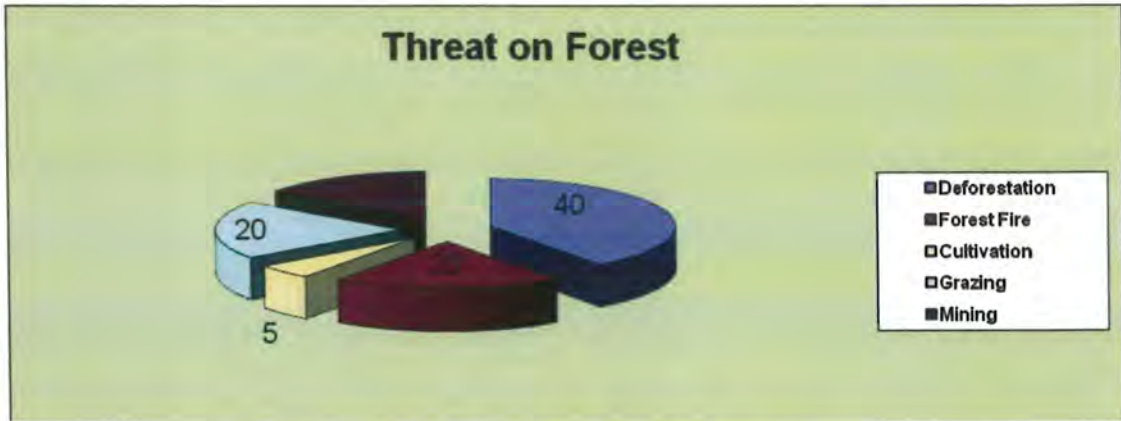


Figure 5: Threat on Forest

3.2.2 PRESSURES ON FOREST

The major pressure in the forest area in the form of cutting of vegetation as fuel wood. Non availability of fuel wood resources has compelled the community to rely on the fuel wood from the forest. However, according to the stakeholders, fuel wood harvesting has increased as compared to the past. The number of fire incidents in the forest has remarkably increased because there is no system in place to control these incidents and due to non effective policies. Live stock grazing cannot be considered a major pressure as livestock keeping is a seasonal activity and is diminishing in the area since people are shifting to agriculture for livelihood; however afghan refugees and migratory herds of Gujar tribes are a major threat to natural vegetation of area. Mining activities are also one of major pressure on forest resources of area. Various threats on forest flora is indicated in figure 6.

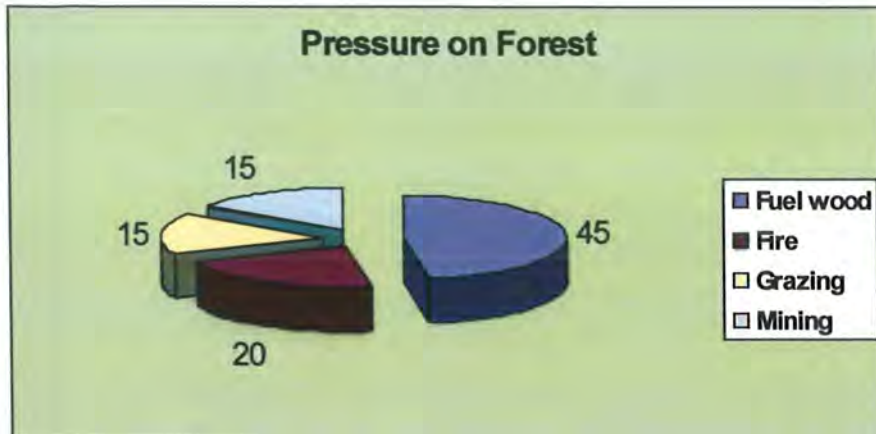


Figure 6: Pressure on Forest

3.2.3 BIOLOGICAL IMPORTANCE OF THE AREA

The protected areas of soon valley contain high level of biodiversity. The area is hotspot for rare or threatened species of flora and fauna. According to the local stakeholders, due to destruction of habitat (forest and wetlands) the fauna of the area is suffering badly. In case of flora the two species Kahu (*Olea ferruginea*,) Phulai (*Acacia modesta*) are exported in the form of fuel wood. There is a high level of migratory birds visiting the Protected Area (Ucchali wertland Complex). The historic norms of the ecosystem are not greatly diminished although slightly disturbed. Disturbance regimes refer to the patterns of natural disturbances, which can create changes in landscape's structure, and pattern. The area have a large tract and cover of reserve forest and three international wetlands at the same time it is habitat of Punjab Urial, White headed duck and Chinkara. Other important species include grey partridge, Chukor, common leopard, green pigeon and many floral species which are unique feature of this area. Biological importance of the area is presented in figure 7.

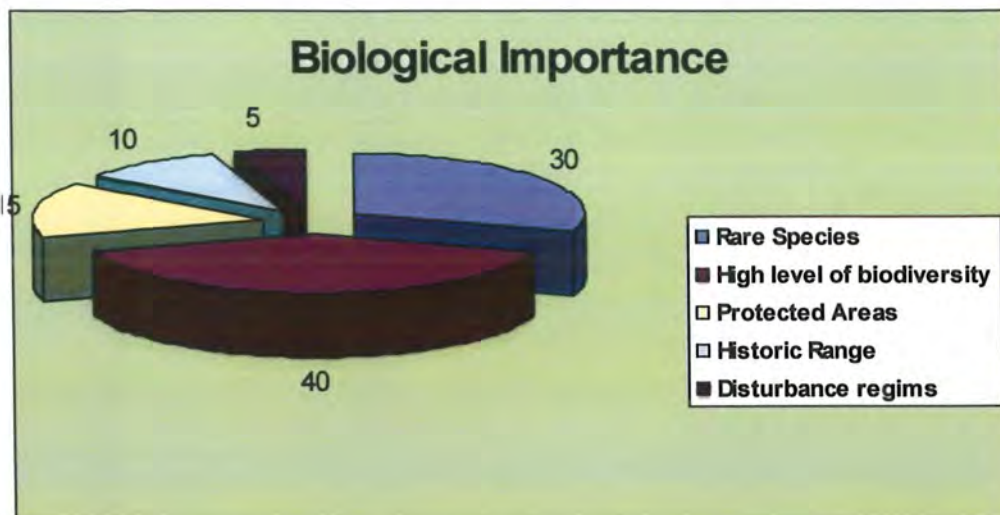


Figure 7: Biological Importance

3.2.4 FUEL SOURCES

Four types of fuel sources are found in Soon Valley, which include fuelwood, LPG, cow dung and kerosene oil. The dependency on fuelwood as a fuel source is found maximum (55%) while LPG is found second major fuel resource (35%). Use of kerosene oil and cow dung is also found in traces. Data analysis shows fuel wood as the major source of fuel in union council Anga, Naushera and Khura but LPG is also used as alternate fuel source. In union council, Kufri and Uchali dependency on Fuel wood are less than other union councils as people frequently use LPG as well. Cow dung and kerosene oil are also used as fuel source in different union councils of Soon valley. Major fuelwood sources in area is presented in figure 8.

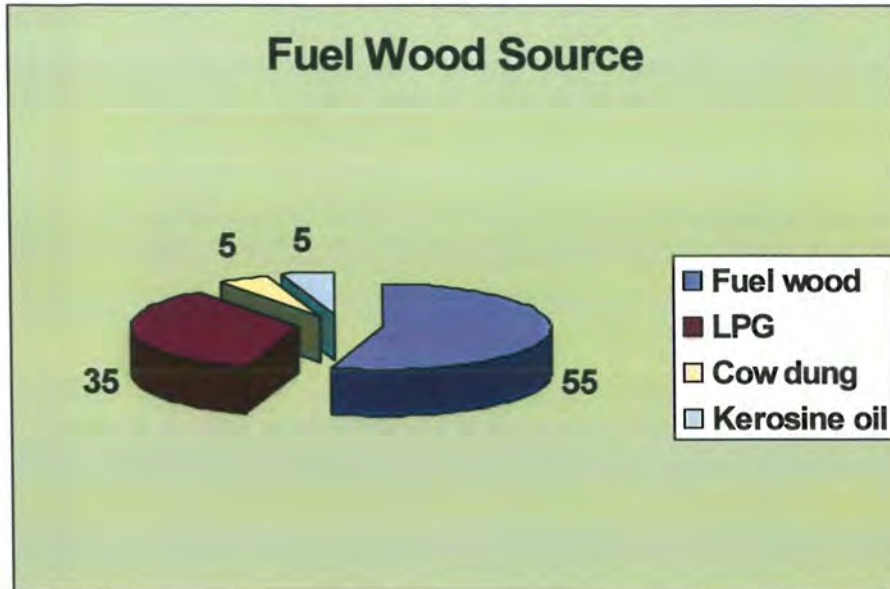


Figure 8: Fuel Wood Source

3.2.5 PREFERABLE FUEL WOOD

Phulai (*Acacia modeta*), Santha (*Dodonea viscosa*) and Kahu (*Olea ferruginea*) are found as preferable fuel wood source in different union councils. Phulai is most preferable fuel wood due to its sustain heat people prefer to use this as fuelwood, while Kahu is also used as fuel wood in Ugali Chitta and other villages but due to slow growth its supply is decreasing. Santha is used second most preferable fuel wood due to its easy cutting and vigorous growth. All other tree species are used in less quantity Dharek (*Melia azedarach*) and Toot (*Morus alba*) are used as fuel wood at derajats. Other important species used as fuelwood are Papper (*Buxus pappilosa*), Kikar (*Acacia farnesiana*), Awani (*Otostegia limbata*), Ber (*Zizphus nummularia*). Local preferences for fuelwood is presented in figure 9.

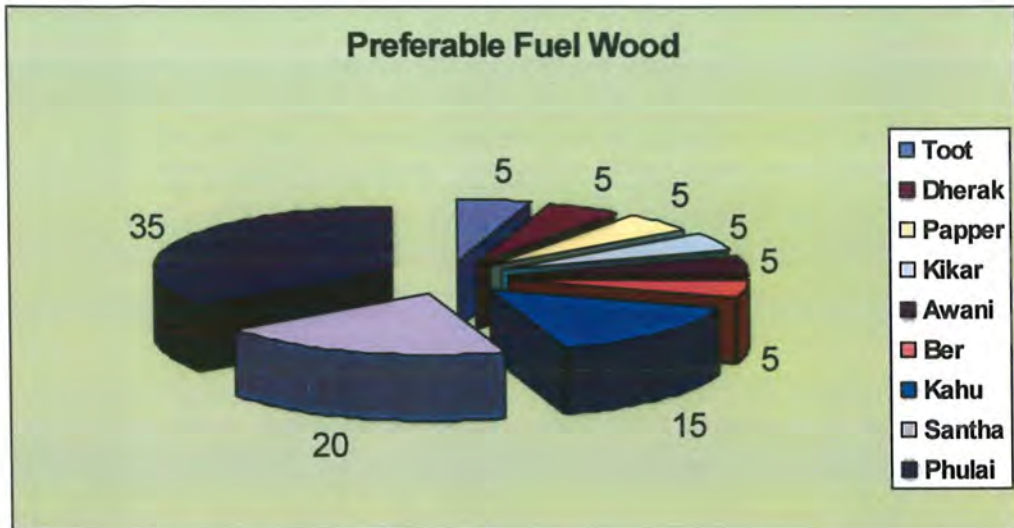


Figure 9: Preferable Fuel Wood

3.2.6 FUEL WOOD SUPPLY SOURCE

The analysis shows that fuel wood is collected from all the three forest types of the Soon Valley, Reserve forest; Shamilat deh and Private rakh are the major fuel wood source in the Soon valley. Analysis shows the dependence of peoples on all the three forest types i.e., Reserve forest, Shamilat deh and Private rakh found in all union councils of the Soon Valley for their fuel wood. Local peoples collect fuel wood from reserve forest although they have only legal right to collect dry fuel wood but usually green trees are also cut as fuel wood. Peoples also collect fuel wood from private rakhs as these are also source of fuel wood. In large villages local people also purchase fuel wood from fuel depots and especially at the occasion of marriage and death events, fuelwood is collected in bulk amount. The fuelwood supply sources are presented in figure 10.

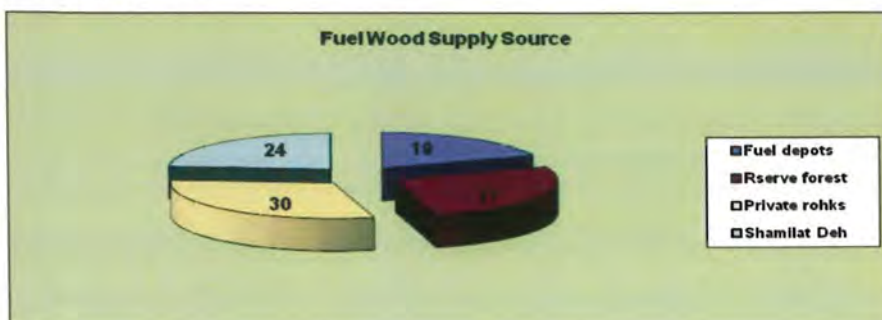


Figure 10: Fuel Wood Supply Source



Plate No. 11

Fuel wood cutting from reserve forest



Plate No. 12

Fuel wood depot set up afghan refugees

ETHNOBOTANICAL ANALYSIS OF DATA

3.2.7 Village Wise Type of Diseases Cured By Medicinal Plants

Village level recipes have been analyzed with respect to different diseases cured by medicinal plants. Different recipes data of village level have also been enlisted with respect to cure of different diseases. 56 different diseases have been documented from village recipes and these include cold, flu, piles, fever, stomach, digestion, power tonic, muscle pain and female diseases. Data shows variation about use of the different plants as medicinal purposes in different villages, number of plants used to cure different diseases varies considerably. Following major diseases have been used as indicator from village level recipes. These include.

- | | | |
|----------------------------|----------------------|-----------------------|
| 1. Toxic | 2. Cough | 3. Dysentery |
| 4. Diabetics | 5. Fever | 6. Blood purification |
| 7. Narcotic | 8. Menstrual cycle | 9. Constipation |
| 10. Digestion | 11. Kidney stone | 12. Swelling |
| 13. Asthma | 14. Jaundice | 15. Diarrhoea |
| 16. Joint and muscle pains | | 17. Skin Diseases |
| 18. Sex diseases | 19. Cooling effect | 20. Stomach |
| 21. Cold, flu | 22. Antidote | 23. Eyes |
| 24. Power Tonic | 25. Beauty | 26. Piles |
| 27. Cancer | 28. Wormicide | 29. Heat tonic |
| 30. Bandage | 31. Pimples | 32. Heart Problems |
| 33. Blood Pressure | 34. Muscle Stiffness | 35. Headache |
| 36. Back Bone | 37. Tuber culosis | 38. Body Heat |
| 39. Male Sex diseases | 40. Vomiting | 41. Small Pox |
| 42. Throat | 43. Urine | 44. Intestine |
| 45. Mental disorders | 46. Belly Pain | 47. Nose Bleeding |
| 48. Hair loss | 49. Vaginal problems | 50. Male infertility |
| 51. Tumors | 52. Rhemumatism | 53. Insecticide |
| 54. Skin conditioner | 55. Cleaning Agent | 56. Wounds |

3.2.8 VILLAGE WISE VARIATION ABOUT USE OF MEDICINAL PLANTS

Their exist considerable variation among use of different plant species in villages. Analysis of recipes collected from different villages indicated that some medicinal plants are collected and utilized more in certain villages, while use of the certain plants is very rare in some villages. Data indicated that 103 plant species are used in Chitta village, 46 in Ugali village, 80 in Dhaddar Village and 54 in Chapar Sharif village, 45 in Ucchali village, 39 in Chinji area, 50 in Khura, 45 in Nowshera village and 67 in Angha vilage. Village wise number of speices for cure of different diseases varies in each village depending on availability of spciemis and knowledge level about specific use of these plants species. Data is presented in figure 11 about village wise diseases cured by medicinal plants and number of species used in table 10 in different villages..

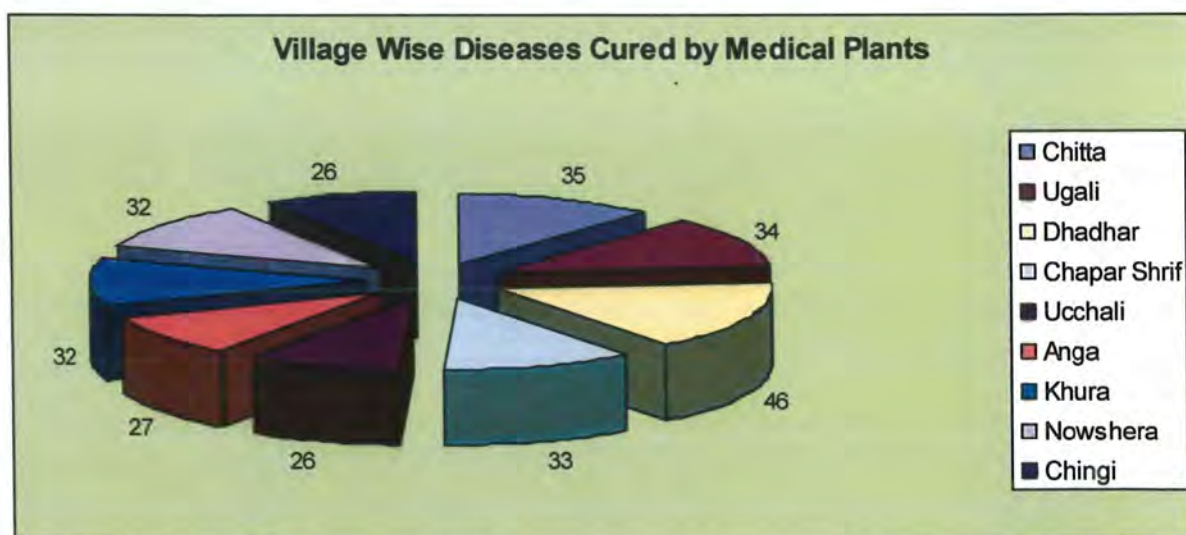


Figure 11: Village Wise Disease Curred by Medical Plants.

Table No. 10 VILLAGE WISE SPECIES AND DISEASES CURED BY MEDICINAL PLANTS

Sr. No	Name of Village	Total Species Utilized	No. of Diseases cured
1	Chitta	103	35
2	Ugali	46	34

3	Dhaddar	80	46
4	Chapar Sharif	54	33
5	Uccahli	45	26
6	Angha	67	27
7	Khura	50	32
8	Nowshera	45	32
9	Chinji	39	26

Village recipes analysis is presented in table 10, which indicated that 35 diseases are cured in Chitta village, 34 in Ugali, 46 in Dhaddar, 33 in Chappar Sharif, 26 in Uccali, 27 in Angha, 32 in Khura, 32 in Naushera and 26 in Chinji village.

Table No. 11 VILLAGE WISE USE VARIATION OF PLANT SPECIES FOR DIFFERENT DISEASES

Major Diseases	Khura	Chinji	Nowshera	Angha	Uccali	Ugali	Chitta	Dhaddar	Chapper
Stomach Diseases	4	4	1	1	7	1	4	8	6
Blood purification	6	8	1	1	1	2	2	1	4
Piles	3	6	1	1	2	1	1	1	4
Asthma	1	3	5	1	1	2	1	6	2
Cold / Flu	1	1	1	1	1	1	2	4	2
Joint Pains	3	1	3	1	2	1	3	4	3
Skin infections	1	1	4	3	6	1	2	6	2
Power tonic	3	4	1	2	2	6	2	2	6
Fever	2	4	1	3	1	1	1	7	2
Male / Female sex Diseases	4	2	3	1	2	1	3	3	2

Recipes data is presented in table No. 11 which indicates that species used in each village for 10 major diseases varies considerably.

3.2.9 PERCENTAGE OF PLANT PARTS USED BY LOCAL PEOPLE IN DIFFERENT VILLAGES

Different recipes collected from villages also shows that different parts of the plants are used in villages. There is a considerable variation among use of different plant parts used in medicines and also in other uses. In order to classify the use of different plant parts following categories have been used. These include.

- | | | |
|----------------|----------|----------------|
| 1. Whole plant | 2. Seed | 3. Leaves |
| 4. Flowers | 5. Latex | 6. Fruit |
| 7. Pods | 8. Roots | 9. Stem / Bark |
| 10. Branches | 11. Bulb | 12. Pulp |
| 13. Ash | | |

**Table No. 12 SUMMARY OF PERCENTAGE PLANT PARTS
USED FOR MEDICINAL PURPOSES**

Sr. No.	Plant parts	Total Number	Percentage
1	Seeds / Grains	124	22.50%
2	Root	32	5.80%
3	Bark/ Stem / Wood	28	5.08%
4	Leaves	107	19.41%
5	Branches / Buds	34	6.17%
6	Fruit	106	19.23%
7	Whole plant	46	8.34%
8	Bulb	10	1.81%
9	Pods / husk	4	0.72%
10	Latex / juice / oil	29	5.26%
11	Pulp	12	2.17%
12	Flowers	16	2.90%
13	Ash	3	0.54%

Use of plant parts data is presented in table 14 and it indicates that 13 different plants are used in medicines. These include 22.50% for seed and grains while leaves use percentage is 19.41 followed by fruit 19.23%.

3.3 SPECIES WISE USE VARIATION EXTENT ABOUT USE OF MEDICINAL PLANTS

Analysis of the recipes data shows that use of the different plant species varies in different villages. In order to classify the use of plant species following categories have been used, these include.

1. Commonly utilized species used in at least 10 villages.
2. Frequently utilized species used in 5–8 villages.
3. Rarely utilized species used in at least 3 villages
4. Excessively utilized species used in all area.

Species wise use variation about plant species is presented in figure 12, which indicated that there are 10 plant species which falls under the category of the commonly utilized species, 12 plant species which falls under the category of frequently utilized species 10 plant species as rarely utilized species, 13 plant species as excessively utilized species. Species use variation data is presented in figure 12.

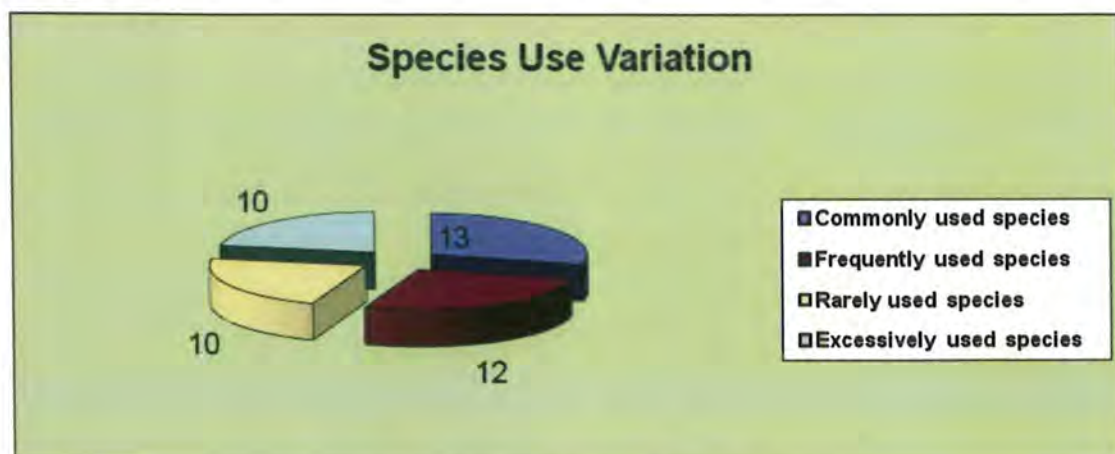


Figure 12: Species Use Variation

3.3.1 EXCESSIVELY UTILIZED SPECIES

<u>Sr. No.</u>	<u>Local Name</u>	<u>Botanical Name</u>
1.	Phulai	<i>Acacia modesta Wall</i>
2.	Kahu	<i>Olea ferruginea Royle</i>

3.	Vahekar	<i>Adhatoda zeylanica</i> Medik.
4.	Santha	<i>Dodonea viscosa</i> (Linn.) Jacq.
5.	Vena	<i>Rhaza stricta</i> Decne.
6.	Akri	<i>Withania coagulens</i> Dunal
7.	Dhaman	<i>Fagonia indica</i> Burm. f.
8.	Aksan	<i>Withania somnifera</i> (Linn.) Dunal
9.	Chich Maj	<i>Solanum nigrum</i> L.
10.	Ajwain	<i>Carum copticum</i> L.
11.	Mahori	<i>Solanum surratense</i> Burm.f.
12.	Aak	<i>Calotropis procera</i> (Aitch.) Aitch f.
13.	Podina	<i>Mentha royleana</i> Wall. ex. Bth .

3.3.2 FREQUENTLY UTILIZED SPECIES

<u>Sr. No.</u>	<u>Local Name</u>	<u>Botanical Name</u>
1.	Kanir	<i>Nerium oleander</i> L .
2.	Kunwar Gandal	<i>Aloe barbadensis</i> L .
3.	Mastiara	<i>Swertia panicualta</i> Wall .ex.C.B. Clarke.
4.	Chirata	<i>Swertia cordata</i> Wall.
5.	Akas Bel / Dhari	<i>Cuscuta reflexa</i> Roxb.
6.	Giloh	<i>Tinospora cordifolia</i> (Wild.) miers
7.	Awani	<i>Otostegia limbata</i> (Bth.) Boiss.
8.	Kalonji	<i>Nigella sativa</i> L.
9.	Gorakh Pan	<i>Heliotropium strigosum</i> Willd.
10.	Saunf	<i>Foeniculum vulgare</i> L.
11.	Alsi	<i>Linum usitatisimum</i> L.
12.	Thoom	<i>Allium sativum</i> L.

3.3.3 COMMONLY UTILIZED SPECIES

<u>Sr. No.</u>	<u>Local Name</u>	<u>Botanical Name</u>
1.	Bershasha	<i>Adiantum capillus - veneris</i> Linn.
2.	Allerga	<i>Rhus cotinus</i>
3.	Bathu	<i>Chenopodium album</i> L.
4.	Jaledhar	<i>Grewia villosa</i> Willd.
5.	Boher	<i>Ficus bengalensis</i> L.
6.	Harmal	<i>Peganum hermala</i> L.
7.	Kur Tumba	<i>Citrullus colocynthus</i> (L.) Schrad
8.	Khawi grass	<i>Cympogon jawarancusa</i> (Jones.) Schultz
9.	Choughan	<i>Caraluma tuberculata</i> N.E. Brown
10.	Isam Gol	<i>Plantago lanceolata</i> (Linn.) Pier

3.3.4 RARELY UTILIZED SPECIES

<u>Sr. No.</u>	<u>Local Name</u>	<u>Botanical Name</u>
1.	Rahura	<i>Tecomella undulata</i> (Roxb.) Seeman
2.	Pathay	<i>Nannorrhops ritchienna</i> (Griff.) Aitch.
3.	Rukh	<i>Tammarix aphylla</i> (L.) Karst.
4.	Jangli Tori	<i>Luffa acutangula</i> L.
5.	Harnoli	<i>Ricinus communis</i> Linn.
6.	Kakar Singhi	<i>Pistacia chinensis</i> Bunge
7.	Dhaman	<i>Grewia optiva</i> Drum ex. Burret
8.	Deela	<i>Cyperus rotundus</i>
9.	Bata	<i>Peripolca aphylla</i> Decne.
10.	Mushki Bathu	<i>Chenopodium ambrosioides</i> Linn.

3.3.5 TOP TEN MEDICINAL VALUES OF PLANTS

Top 10 medicinal values of the plants were calculated based on use of these species in each village and at least 80% utilization of these species from local communities in whole area. These values were also confirmed through interviews with local community and local Pansar storeowners. Based on these criteria it is concluded that following 10 species are classified as top 10 medicinal plants of the area.

Table No. 13 TOP TEN PLANT SPECIES MEDICINAL VALUE

Sr. No.	Botanical Name	Local Name	Use percentage Value
1	<i>Adhatoda zeylancia</i>	Vahekar	30%
2	<i>Dodonea viscosa</i>	Santha	10%
3	<i>Acacia modesta</i>	Phulai	15%
4	<i>Olea ferruginea</i>	Kahu	15%
5	<i>Withania coagulens</i>	Akri	15%
6	<i>Rhaza stricta</i>	Vena	5%
7	<i>Fagonia indica</i>	Dhamian	5%
8	<i>Withania somnifera</i>	Aksan	4%
9	<i>Mentha longifolia</i>	Podina	5%
10	<i>Carum copticum</i>	Ajwain	6%

Top ten medicinal plant values is presented in figure 13.

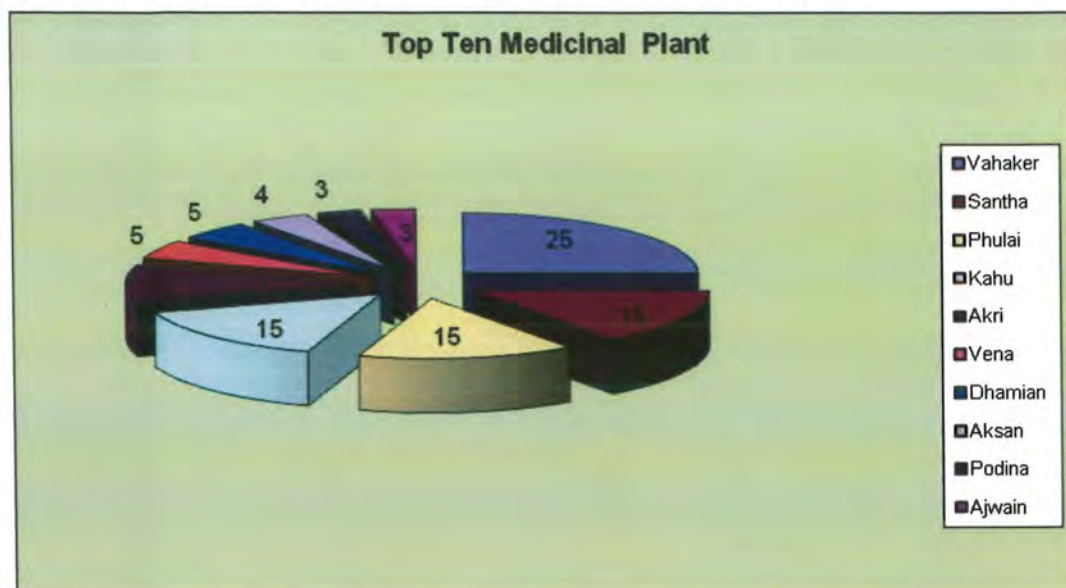


Figure 13: Top Ten Medicinal Plants

3.3.6 PLANT USED IN ANIMAL DISEASES

<u>Sr. No.</u>	<u>Local Name</u>	<u>Botanical Name</u>	<u>Name of Diseases</u>
1.	Alsi	<i>Linum usitatissimum L.</i>	Vigour, Wounds, Fracture
2.	Methi	<i>Trigonella foenum-graceum L.</i>	Vigour, Weakness
3.	Tulsi	<i>Ocimum basilicum L.</i>	Digestion
4.	Harmal	<i>Peganum harmala L.</i>	Digestion
5.	Tabbaco	<i>Verbascum thapsus L.</i>	Digestion
6.	Til	<i>Sesamum indicum L.</i>	Digestion
7.	Bhang	<i>Cannabis sativa L.</i>	Bone Fracture
8.	Santha	<i>Dadonea viscosa (Linn.) Jacq.</i>	Blood Purifier
9.	Mahori	<i>Solanum nigrum L.</i>	Worms Killer
10.	Aksan	<i>Withania somnifera (L.)</i>	Dunal Digestion
11.	Kasni	<i>Cichorium intybus L.</i>	Digestion
12.	Dharik	<i>Melia azedarach L.</i>	Worm Killer
13.	Akri	<i>Withania coagulens L.</i>	Flu, Cold
14.	Vena	<i>Rhazya stricta Decne.</i>	Digestion
15.	Dhaman	<i>Fagonia indica Burm. f.</i>	Digestion

16.	Ajwain	<i>Carum copticum L.</i>	Worm killer
17.	Halia	<i>Pimpinella stewartii (Drum.)</i> <i>E.Nasir</i>	Body Pains
18.	Vahekar	<i>Adhatoda zeylanica Medik</i>	Indigestion
19.	Choughan	<i>Caralluma tuberculata</i> <i>N.E.Brown</i>	Digestion
20.	Lahsan	<i>Allium sativum L.</i>	Stomach disorder
21.	Phulai	<i>Acacia modesta Wall.</i>	Tonic
22.	Kahu	<i>Olea ferruginea Royle.</i>	Tonic
23.	Podina	<i>Mentha royelana Wall ex.Bth.</i>	Digestion
24.	Gloh	<i>Tinospora cordifolia L.</i>	Digestion
25.	Kiari	<i>Gloriosa superba L.</i>	Worm killer
26.	Zohr	<i>Sauromatum venosum</i>	Worm killer
	Mohra	<i>(Ait.)Schott.</i>	

3.4 ETHNOBOTANICAL PROPERTIES OF THE PLANT SPECIES OF SOON VALLEY

Flora of soon valley has been analyzed with respect to ethnobotanical uses and 37 different uses has been recorded which enlisted in table 14.

Table No. 14 Ethnobotanical uses of Flora

<u>Sr. No</u>	<u>Ethnobotanical uses</u>	<u>Number of Species used</u>
1.	Medicinal	160
2.	Fodder	32
3.	Fuel wood	24
4.	Wild Fruit	10
5.	Wild Vegetables	6
6.	Timber	10
7.	Gum	3
8.	Fiber	2
9.	Agriculture tools	12
10.	Hay fodder	3
11.	Construction	10

12.	Poison	4
13.	Shade tree	12
14.	Beverage	2
15.	Brooms	3
16.	Perfume	3
17.	Soil Fertilizer	2
18.	Baskets	2
19.	Wind Break	5
20.	Ornamental	31
21.	Miswak (Tooth brush)	6
22.	Dye	1
23.	Pot herb	12
24.	Beads	3
25.	Spices	5
26.	Flavoring agent	4
27.	Stick / handle	4
28.	Fence	8
29.	Packing / Roping	2
30.	Narcotic	3
31.	Ethno veterinary	50
32.	Landscape & beautification	10
33.	Kitchen Gardening	10
34.	Insecticide	3
35.	Apiculture	10
36.	Sericulture	2
37.	Spiritual uses	1
38.	Sacred uses	4
39.	Graveyard things	5
40.	Music instruments	1
41.	Food Items	2
42.	Cleaning Agent	2

43.	Food crops	12
44.	Fruit crops	12
45.	Vegetables	22

3.4.1 ETHNO BOTANICAL USES OF FLORA OF SOON VALLEY

1. Medicinal Plants

Flora of the Soon Valley is used in different medicines from the time, when civilization started in area probably during Budha age. 160 plants have been identified which has medicinal uses. The principal medicinal plants of area includes Vahekar (*Adhatoda zeylancia*), Kahu (*Olea ferruginae*), Vena (*Rhaza stricta*), Allerga (*Rhus cotinus*), Ajwain (*Carum copticum*). These species are used in each home of the area for different ailments.

2. Fodder

Fodder species are playing an important role in economy of the area overall 10 grass species, 38 herbs, 13 trees, 13 shrubs and 12 cultivated crops are used as fodder. Principal fodder species are Berseme (*Trifolium alexandrinum L.*), Maize (*Zea mays L.*), Sorghum (*Sorghum bicolor L.*) Bhabar grass (*Eulaliopsis binata*), while the other species are used as hay, secondary, food supplement and in different forms as fodder and feed for livestock.

3. Fuel Wood

Local communities are chiefly dependent on fuel wood due to non-availability of Sui Gas and high fuel price of the LPG. 24 different floral species have been identified which are used as fuelwood. Principal fuel wood species include Phulai (*Acacia modesta Wall.*), Kahu (*Olea ferruginea Royle*), Santha (*Dadonea viscosa*), Papper (*Buxus papillosa*), Kikar (*Acacia nilotica*), Toot (*Morus alba*), Dharek (*Melia azedarch*) All other species are used as fuel wood, but depends upon their availability and need.

4. Wild Fruit

10 different species have been used as wild fruit. principal species includes. Amlah (*Zizpus mummularia*), Ber (*Zizpus mauritiana*), Pipal (*Ficus religiosa*), Bohar (*Ficus bengalensis*), Gurhal (*Maytenus royleanus*), Jahl (*Salvadora oleoides*), Khajoor (*Phoenix dactylifera*), Pathay (*Nannorhops ritchieanna*).

Karir (*Cappris decidua*), Kahu (*Olea ferruginea*). These species are used by human being as well as by wild birds and animals.

5. Wild Vegetables

5 Different species used as wild vegetables, these include

Dusan (*Asparagus gracilis*), Choughan (*Caralluma tuberculata*), Jangli Karela (*Momordica dioica*), and Chichmaj (*Solanum nigrum*) and Chaleri (*Amaranthus viridis*).

6. Timber

Scrub forest vegetation is very poor in terms of providing timber, but still few species are used as timber these include Shisham (*Dalbergia sisoo*), Dhruk (*Melia azedarach*), Toot (*Morus nigra*) and Ber (*Zizphus mauritiana*). Overall 10 different species are used as timber.

7. Gum

Certain floral species are used for obtaining gum from the plants, these includes, Phulai (*Acacia modesta Wall.*), Kahu (*Olea ferrugine Royle*), and Ber (*Zizphus mauritiana*). Gum of these three different species is used in preparation of different medicines.

8. Fiber

Only one plant traditionally cultivated as minor crop is used as fiber, this is Cotton (*Gossypium hirsutum L.*) crop. Traditionally Desi cotton is used, another wild plant Aak (*Calotropis procera*) is also used for obtaining fiber but at very limited scale.

9. Agricultural Tools

12 different plant species are used for making agricultural tools. However Phulai (*Acacia modesta Wall*), Kahu (*Olea ferruginea Royle*), Toot (*Morus alba*), Ber (*Zizphus mauritiana*), Dharek (*Melia azedarach*) and Santha (*Dadonea viscosa*) are principally used for making different agricultural tools.

10. Hay Fodder

Three principals species are used as hay fodder, these are Maize (*Zea mays*), Sorghum (*Sorghum bicolor*), and Rice (*Oryza sativa*). (Parali) only rice is

imported from outside of the area where as the other two items are available in area.

11. Construction

10 different species are used as constructions material in area; these include Phulai (*Acacia modesta* Wall), Kahu (*Olea ferruginea* Royle), Papper (*Buxus papillosa*), Santha (*Dadonea viscosa*) and Dharek (*Melia azedarach*).

12. Poison

4 plant species are considered poisonous plants in area, there are Aak (*Calotropis procera*), Dhatura (*Datura metel*), Kanir (*Nerium indicum*), Papper (*Buxus papillosa*), these are toxic in nature and especially kanir is highly poisonous for livestock.

13. Shade Tree

12 different species are used as shade trees in area; major shade trees are Toot (*Morus alba*), Dharek (*Melia azedarach*), Kabahari (*Ficus glomerata*) and Shisham (*Dalbergia sisso*).

14. Beverage

2 species are used as beverage these are Allerga (*Rhus cotinus*) and kahu (*Olea ferruginea* Royle) soft drink of these plants in used in different diseases.

15. Brooms

Grasses are especially used for making brooms, however, Santha (*Dodonea viscosa*), Sar (*Imperata cylindrica*) and (*Saccharum spontaneum*) are used for making brooms.

16. Perfume

Desi Gulab (*Rosa indica*), Chambeli (*Jasminum humile*) and Motia (*Jasminum grandiflorum*) species are cultivated and are used as perfume by local people.

17. Soil Fertilizer

Guara (*Cyamopsis tetragonoloba*) and Moong (*Vigna radiata*) two species are used as soil fertilizer but the practice is very rare and limited.

18. Baskets

Pathay (*Nannorhops ritchieana*) leaves are used to make baskets and other items, at the same time Kunder (*Typha domingensis*) is also used to make

baskets mats and other decoration items. Toot (*Morus nigra*) branches are used to make baskets for poultry

19. Wind break

Popular (*Populus alba*) and Eucalyptus (*Eulyptus camulodensis*) is used as windbreak, while Toot (*Morus alba*), Dharek (*Melia azedarach*) and Khabari (*Ficus carisa*) are also used for the same purposes.

20. Ornamental

31 different floral species have been identified in local communities as ornamental plants. Principal species used as ornamental are Saru (*Cupressus semepervirens*), Gulab (*Rosa indica*), Motia (*Jasminum grandiflorum*), Chambeli (*Jasminum humile*) and Sunflower (*Helianthus annus*), while several indoor plants and flowers are also cultivated as ornamental plants.

21. Miswak / Tooth brush

6 different traditional plants are used for miswak (Teeth cleaning purposes), these are Phulai (*Acacia modesta*), Kahu (*Olea ferruginea*), Jahal (*Salvadora oleoides*), Tahli (*Dalbergia sisso*), these are used and more popular in area.

22. Dye

Bhatal (*Launea procumbens*) is used as dye its extracts is used by traditional earthen pot makers to print lines and designs on pots.

23. Pot herbs

12 Different plant species have been identified which are used as pot herb most popular among them is Pather chat (*Bergenia ciliata*) and Tulip (*Tulipa stellata*).

24. Beads

Wood of the Phuali (*Acacia modesta*), Kahu (*Olea ferruginea*) and Shisham (*Dalbergia sisso*) is used to make beads traditional bead charpai is usually made up of Kau and Phuali, However Shisham wood is also used.

25. Spices

Saunf (*Foeniculum vulgare*), Ajwain (*Carum copticum*), Lahsun (*Allium sativum*), Piaz (*Allium cepa*), Soye (*Trigonella foenum-graecum*) are used as spices in different foods for good taste.



Plate No. 13

A traditional broom



Plate No. 14

Oil extracting unit



Plate No. 15 **Traditional food basket made from Mazri plant**



Plate No. 16 **Traditional food basket**



Plate No. 17

Typha angustifolia

Voucher No. 140



Plate No. 18

Typha uses wetland product

26. Flavoring agent

Sabz Mirch (*Spinacia oleraceae*), and Shimla mirch (*Capsicum annum*) along with podina (*Mentha longifolia*), and Niazbo (*Ocimum basilicum*) are used as flavoring agent in different food dishes.

27. Sticks / Handle

Straight branches of the Kahu (*Olea ferruginea*) and Phuali (*Acacia modesta*), along with Toot (*Morus alba*), Dharek (*Melia azedarach*) and Ber (*Zizphus mauritiana*) are used to make sticks and handles. However handles of the Kahu are more popular and due to heavy demand even outside of the area its straight and soft branches are cut regularly and this is one of the major threat to Kahu (*Olea ferruginea*) due to excessive use and demand.

28. Fence

Santha (*Dodonea viscosa*), Khabari (*Ficus glomerata*), Popular (*Populus alba*), and Dharek (*Melia azedarach*) are used as fence at different places, however branches of the Ber (*Zizphus mauritiana*), Phuali (*Acacia modesta*), Kander (*Maytenus royleanus*), Muscat (*Prosopis juliflora*) are more popular due to pricks, as these restrict entry of the livestock as well as other animals, Kahu (*Olea ferruginea*) and Phulai (*Acacia modesta*) wood is used to make walk ways and entry point.

29. Packing / Roping

Bhabber grass (*Eulaliopsis binata*), Kunder (*Typha domingensis*) and Pathay (*Nannorrhops ritcheiana*) leaves along with Sun hemp (*Crotalaria juncea*) are used for making ropes.

30. Narcotic

Bhang (*Cannabis sativa*) and Tobacco (*Nicotiana tabacum*) are used as narcotic plants. Bhang grows naturally its soft drink is made while tobacco leaves are dried, grinded and used in "Huqqa" which is one of the tradition of the local community centers (Daras), the practice is common in whole area. Affine was made in past from cultivated poppy (*Papaver somniferum*).

31. Ethno veterinary

50 different plant species have been identified which are used in different medicines for livestock diseases. However Alsi (*Linum usitatisimum*), Til (*Sesamum orientale*), Ajwain (*Carum copticum*), Halia (*Pimpenella anisum*) and Akri (*Withania coagulens*) are traditionally used in large quantities as compared to other plants.

32. Landscape / Beautification

10 Plants species have been identified which are used for beautification and landscape. These species are Rose (*Rosa indica*), Gul-Khaira (*Althea rosea*), Angor (*Vitis vinifera*), Anar (*Punica granatum*), Podina (*Mentha longifolia*) and Mor pankh (*Thuja orientalis*).

33. Kitchen Gardening

10 Plants species are usually used as Kitchen gardening these includes Podina (*Mentha longifolia*), Niazbo (*Ocimum basilicum*), Mako (*Solanum nigrum*) and Tomato (*Lycopersicon esculentum*) along with several different vegetables in local community homes and gardens.

34. Insecticide

Leaves of the Dhatura (*Datura metel*), Aksan (*Withania somnifera*), and Dharek (*Melia azeadarach*) are used as insecticide spray. These plants are mixed in water, crushed and their juice extract is used to spray different crops.

35. Apiculture

10 different species have been identified whose flowers are used for Bee keeping activities. These are Vahekar (*Adhatoda zeylanica*), Kahu (*Olea ferruginea*), Phulai (*Acacia modesta*), Ber (*Zizphus mauritiana*) and Kikar (*Acacia nilotica*). Honey of Phulai and Ber is in great demand and especially ber honey is exported outside of the area.

36. Sericulture

Once there was a great economic activity in area, all the Mulberry (*Morus alba*) trees leaves were sold by local people for rearing silkworms, due to massive cutting of the mulberry trees, trend of using these trees have declined to a great extent in area.

37. Spiritual uses

Harmal (*Peganum harmala*) plant leaves and branches are cut and are placed in centre of the room and are burned smoke is used as effective treatment for people who are ill, usually used by the traditional healers for warding of evils.

38. Sacred uses

Some trees and floral species are considered sacred, as they are located in certain Shrines and mosques, these trees are never cut, while at some places their wood is not even used if they fell, these species include 300 years old Kahu (*Olea ferruginea Royle*) trees in Sabhral village at Darbar (Kahu wala), 300 years old Ber (*Zizphus mauritiana*), Pipal (*Ficus religiosa*) trees at Baba Savi Beri Wala Nowhsera, 300 years old Boher (*Ficus bengalensis*) at Dhaddr village at a place known Bohri Wala Faqir, while one phuali (*Acacia modesta*) tree near Darbar Hazrat Sultan Mehdi at Bhanaka village is spread over an area of 0.5 Acres and is considered sacred also known as (Pir Phuali). (Sarwar, 2006)

39. Graveyard uses

Vahekar (*Adhatoda zeylanica*) is usually found in all graveyards along with Kahu (*Olea ferruginea Royle*), Phuali (*Acacia modesta Wall*) and Harmal (*Peganum harmala*) usually leaves of the Kahu green are collected and are placed on graveyards it is belief that these leaves bring relief to the person in grave until these remains green. Leave of the ber (*Zizphus mauritiana*) and dhrek (*Melia azedarch*) are used in funeral rituals. These are used in washing body, perhaps due to antigermlal properties.

40. Music instruments

Outer cover of the Kadu (*Cucurbita pepo*) vegetable is used in locally manufactured music instruments known as tambora.

41. Food Items

Maize (*Zea mays*) and Sorghum (*Sorghum bicolar L.*) grains are soaked and are used along with sugar as confectionary item.

42. Cleaning Item

Inner cover of the vegetable tori (*Luffa actugnla*) is used for washing utensils while plant of the Lani (*Sueda fruitcosa*) were used as a local soap in early periods for washing clothes.

43. Food Crops

Wheat (*Triticum aestivum*) Maize (*Zea mays*), are the major food crops of the area overall, 12 species of the crops are used as food.

44. Fruit Crops

Loquat (*Eriobotrya japonica*), Peach (*Prunus persica*), Mulbary (*Morus alba*), Apple (*Pyrus malus*), Orange (*Citrus reticulata*) are the principal cultivated fruit crops in area, overall, 12 fruit plants are used in area.

45. Vegetables

Potato (*Solanum tuberosum*), Dhania (*Corriandrum sativum*), Cauliflower (*Brassica oleraceae*), Garlic (*Allium sativum*), Onion (*Allium cepa*) are the principal vegetable crops of the area, overall, 22 vegetable crops are used in area.

3.4.2 Ethnobotanical uses of floral species of the Soon Valley

Plant species have been used in making different household items from time immemorial, some of these items are now part of the past, while some of these items are still made from these plant species these items have been enlisted.

1. Maal (Rope)

A rope made of Bhabber (*Eulaliopsis binata*) grass used to draw water from wells.

2. Warian (Small ropes)

Also made of Bhabber (*Eulaliopsis binata*) grass used to tie earthen pots with maal.

3. Boi (Mouth Cover)

A small rope structure made of Bhabber (*Eulaliopsis binata*) grass to cover the mouth of animals in order to refrain them from grazing in crops.

4. Boray (Transportation Kit)

It is also made of the Bhabber (*Eulaliopsis binata*) grass and is used to transport items from one place to other on Camels and Donkey.

5. Hall (Wooden Plough)

Used previously for ploughing in the field made of Kahu (*Olea ferruginea*) and Phulai (*Acacia modesta*) tree.

6. Wargay (Roof item)

Used to cover roof and made of Kahu (*Olea ferruginea*), Toat (*Morus alba*), Dharek (*Melia azedarach*) tree thick in size and having length of 8-10 feet.

7. Thum (Wooden Support)

Usually made of Kahu (*Olea ferruginea*) and Phulai (*Acacia modesta*) to support roof at weak places horizontally.

8. Chaper (Cottage)

Made of branches and shrubs for shelter and livestock.

9. Chakor (Bread basket)

Made of Pathay (*Nannorhops ritchieana*) and used to keep bread.

10. Tringle (Winnowing item)

Used to separate grains from bhusa through air pressure in wheat crop.

11. Wajay (Tool handles)

Made of Kahu (*Olea ferruginea*) branches and used in all tools such as spade, sickle, axe and hammer.

12. Pankay (Fan)

Made of Pathay (*Nannorhops ritchieana*) branches and used as fan, usually decorated and colored and important element of derajats households.

13. Karahi (Winnowing tool)

Made of Kahu (*Olea ferruginea*) or Ber (*Zizhpus mauritiana*) wood and used to clean grains in wheat crop.

14. **Mosala (Prayer mat)**
Used to place on ground for praying, made of Pathay (*Nannorhops ritchieana*).
15. **Boker (Broom)**
Made of Sanatha (*Dodonaea viscosa*) branches to clean homes.
16. **Manja (Little Broom)**
Made of grasses such as Sar (*Saccharum spontaneum*) and Bhabber (*Eulaliopsis binata*) used to clean homes.
17. **Taranger (Transportation Kit)**
A larger kit made of rapes of Bhabber (*Eulaliopsis binata*) especially for camel and donkey, usually used to transport bhusa from one place to other.
18. **Chhat (Transportation Kit)**
A square shaped kit also made of Bhabber (*Eulaliopsis binata*) and used for transportation.
19. **Shahtir (Roof Wood)**
Large size wood made of Toot (*Morus alba*) and Ber (*Zizphus mauritiana*) placed on roof and bear all the weight of roof items.
20. **Saqar (Grain storage bin)**
Door of the earthen bin usually made of decorated wood.
21. **Chaq (Well foundation item)**
Made of Toot (*Morus alba*), a circular structure placed in wells underground, over which the whole wall of stone stands.
22. **Kruka (Wodden trap)**
Made of wood of different species to trap rats and other birds.
23. **Sangal (Support Item)**
Made of Ber (*Zizphus mauritiana*) tree a U shaped to transport tree branches used as folder.
24. **Punjali (Yok)**
Made of Toot (*Morus alba*) tree to tie bulls in row for ploughing.

25. **Patra (Special bed for deceased Person)**
A wooden bed used for funeral sites bath for deceased person.
26. **Panghora (Kids playing bed)**
A little bed like structure used for little kids entertainment made of wood and Khabal grass.
27. **Chakli (Well item)**
A circular structure which rotate in traditional well for lifting water.
28. **Khara (Well item)**
A large circular structure over which the whole water drawn machinery of the well moves.
29. **Naicha (Smoking pipe)**
A long pipe like structure made of Nuri (*Arundo donax*) plant used for smoking in traditional huqa.
30. **Jhalaner (Well item)**
A long wood pipe placed horizontally on well.
31. **Kanjai (Well item)**
A long wood pipe place horizontally on well raised above ground and fixed in other structure.
32. **Beir (Well item)**
Also used in wells, large circular made of wood in old times.
33. **Khurlian (Livestock feeding structure)**
A basket type structure for feeding livestock.
34. **Patri (Food utensils)**
A wooden tray used as food transfer from large utensil to smaller one.
35. **Chaj (Household item)**
A basket made of large shrub Kana is used to separate particles form grain.
36. **Toopa (Measuring item)**
Measuring basket for grains usually made of Toot (*Morus alba*) wood.
37. **Propy (Measuring item)**
Small size measuring basket made of wood for grains measurements.

38. **Soti (Stick)**
Stick usually made of Kahu (*Olea ferruginea*) branches.
39. **Mola (Large wooden stick)**
A large wooden stick to crush grains made of Toat (*Morus alba*) wood.
40. **Ramba (Spade)**
A small spade like implement used for hoeing.
41. **Kalwatri (Saw)**
A small sickle whose handle is made of Kahu (*Olea ferruginea*)
42. **Datri (Sickle)**
Used for cutting grasses and fodder handle is made of Kahu (*Olea ferruginea*).
43. **Khari (Basket)**
A round circular basket used for transportation usually placed on head.
44. **Churka (Thread weaving item)**
A circular shape structure used for making ropes and also to clear seeds from cotton.
45. **Tilhora (Rope)**
A specific rope made of Bhabber (*Eulaliopsis binata*) grass to control animals.
46. **Wan (Ropes)**
Ropes made of Bhabber (*Eulaliopsis binata*) grass used in beds.
47. **Pangora (Kids item)**
A smaller bed like structure for kids playing also used to shift bridegroom from home to vehicle at the time of marriage.
48. **Killa (Livestock item)**
A round circular wood placed in soil and used to tie animals with rope, preferably made of Kahu (*Olea ferruginea*) wood.
49. **Chokri (Wooden chair)**
A small square like wood structure used for sitting in kitchen, usually made of Toot (*Morus alba*) and Dhrek (*Melia azedarach*) trees.

50. Piri (Wooden chair)

Like chokri but large in size having four corners and made of Kahu (*Olea ferruginea*) and toat (*Morus alba*) tree.

51. Kanas (Utensil item)

A wooden long structure fixed in wall for placing utensils, usually made of Kahu (*Olea ferruginea*) tree and very decorated.

52. Tadi (Large mat)

A mat made of pathy (*Nannorhops ritchieana*) and used for sitting in Homes.

3.4.3 LOCAL MYTHS & CONCEPTIONS ABOUT PLANTS

Local people have different myths, conceptions and believe about plants. A local proverb enlisted some of these myths. Khabari (*Ficus glomerata*) is considered a good indicator of plenty of underground water resources. Similarly Dab (*Desmostachya bipinnata*) is also considered an indicator of water near the surface. Kanir (*Nerium indicum*) is also considered an indicator of water spring in hills or watershed area. Jahl or Jandi (*Salvadora oleoides*) was the sacred tree of the Hindu tribes, there is a myth that place where there is a group of these plants, the place may have remained a battle ground in past and it grows well in place where the human blood fell in abundant quantity. There is a believe that if Pohli (*Carthamus oxycantha*) grows in large areas and bear good fruit, that year is dry year, less rains occur in area. Similarly if Harmal (*Peganum harmala*) plant has plenty of fruit then there are good rains. Boher (*Ficus religiosa*) and Pipal (*Ficus bengalensis*) plants are considered home of evils and ghost.

Similarly Harmal is used to sterilize homes usually by traditional pirs, Ber (*Zizphus mauritiana*) and Aak (*Calotropis procera*) are also considered home of the giant. Little kids are directed in the early age not to urinate under Ber tree and near Harmal and Aak Plant. These believe and myths are prevalent in area from old generations, there has been no attempt to investigate the truth of these myths. These myths and conceptions are transferred to the next generation. Uptill now local people have firm belief on these myths.

Local wisdom, proverb poetry and social terms indicate that there exist strong relationships of peoples with flora. Awan tribe did not use Shisham (*Dalbergia sisso*) Tahli wood in homes and it was a strong belief that it is not good for family, but in recent years this tradition has broken and now peoples have started use of this wood.

Local peoples also resemble physical structure of man with certain floral species, for example they say that if person have good hair, it is like branches of Shisham tree. While color peoples were resembled with wheat grains color, similarly good eyes are like Badam (*Prunus amygdalus*), tall person is also resembled with Saru (*Cupressus semipervirens*) Good fingers are resembled with beans of Rawan (*Vigna sinensis*) a vegetable.

Person having abnormal body structure is resembled with Jhala Toat (*Broussonetia papyrifera*) and person having below average mind is resembled with Vahekar (*Adhatoda zeylanica*) similarly a person having more emotions or bitter is resembled with Papper (*Buxus papillosa*) which is highly bitter in taste. Family having large size is resembled with Bata (*Periploca aphylla*) as it grows very rapidly. A person who repeat words is resembled with Suriala (*Heteropogon contortus*) Prickles as it is quite difficult to get rid of these pickles.

A local proverb is related with Ber (*Zizphus mauritiana*) as it narrate in local words

“Berī Aa Ber ta Sajan Dher
Berī Aa Boor ta Sajan Door”

This is one of the classical example of local wisdom, meaning of the proverb is if Ber plant (Man) has fruit (Wealth) he has a lot of friends (Sajan), and if the Ber (Man) has only (Boor) flowers (average wealth) then all friends (Sajan) remains at a distance. Flowers and fruit of the plant have been used to explain local wisdom and nature of man. Two other proverbs are related with local preferences to food and fuel wood.

These are

“Balìa phula Tora Mudhi Howay
Khavia Kanck Tora Bhugi Howay”

“Khaia Saaj Naal
Haddi aa Naaz Naal”

In the first sentence local preference for Phulai (*Acacia modesta*) is described that it should be used as fuel wood even it is a piece, and always eat wheat (*Triticum aestivum*) grains, as they may be very old and not fine. Second proverb explains that Saaj (Vegetable paste) may be eaten as food but the man should live a decent life.

Local poetry of the valley is also full of the description of the local flora, in this regard only two lines of the Song are described which is

“Phutti Phulai Hosi
Kuch Sadi Masti, Kuch Amar Elahi Hosi”

“Sawi Sur Mahia
La Kay yaari Door Phawia Ghar
Mahia”

The first explains that Phulai (*Acacia modesta*) may have new leaves, and it was our own leisure and some were good will.

The other song described that these may be green Sar (*Saccharum spontaneum*) remembering his beloved one that after friendship you have constructed your home for away. All these examples show that local relationship with flora is as old as civilization in Soon Valley. Furthermore these local proverbs describe deep understanding, affection with local peoples.

Dab (*Desmatochata bipinnata* (L.) Stapf) is considered indicator of good underground water reservoirs, Kanir (*Nerium oleander* Linn.) is an indicator of water spring in nullahs and hilly areas, Kunder (*Typha domingensis* Pers.) is also symbol of waterlogged areas. Van or Jahl (*Salvadora oleoides*) cluster is usually considered an indicator of battlefield where a bloodshed occurred in past.

Khaberi (*Ficus Virgata* Wall. ex. Roxb.) is also an indicator of underground water reservoirs. Pohli (*Carthamus M. Bieb.*) if grow abundantly is considered of onset of drought and less rains in rainy season.

3.4.4 RESPONSE OF LOCAL PEOPLE ABOUT THE PLANT COVER

During field survey local people response about plant cover was assessed through various questions. This data provides a look in to the awareness level of the people about conservation of the plant resources. Four different categories were used about plant cover and local people response was documented, these categories include:-

1. 10 – 20 % Decrease
2. 20 – 50 % Decrease
3. Above 50 % Decrease
4. Unchanged

Table No. 15 Response of the local people about plant cover

Sr. No.	Village Name	Plant Cover			
		10 – 20 %	20 – 50 %	Above 50%	Un changed
1	Sakesar	10	40	20	30
2	Ucchali	0	50	10	40
3	Chitta	0	60	5	30
4	Ugali	0	70	5	20
5	Angha	0	65	10	25
6	Chapar Sharif	2	55	10	35
7	Khura	20	60	10	10
8	Nowshera	2	56	22	20
9	Dhaddar	2	64	19	15
10	Chinji	1	50	30	20

3.4.5 AWARENESS PERCENTAGE OF THE LOCAL PEOPLE ABOUT CONSERVATION STATUS OF MEDICINAL PLANTS

Local people awareness percentage was calculated regarding conservation status of the flora of the Soon Valley. Local community response revealed that overall 20% floral species are facing threat of extinction while 25% are

endangered, and 35% are threatened due to several factors, while 20% species are facing no serious threat to survival.

Awareness percentage of the local people about conservation status is presented in figure 14.

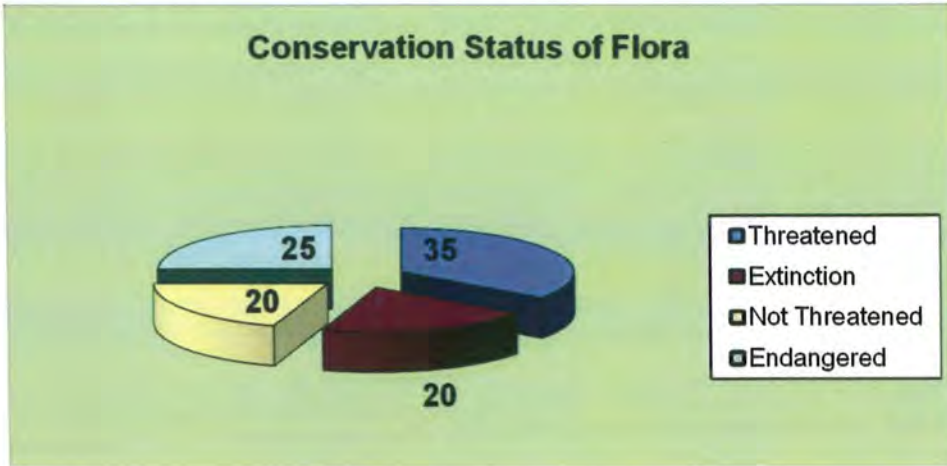


Figure 14: Conservation Status of Flora

3.4.6 COLLECTION OF MEDICINAL PLANTS

Medicinal plants are usually collected by male community due to the fact that it is difficult and time consuming task, 60% men are involved in collection, while 10% children, 10% women are also involved in the collection of medicinal plants. During recent years afghan refugees are also observed in collection of medicinal plants 20% Afghan refugees are involved this activity.

Subcollectors include 5% non resident men 5% herdsmen. Percentage of the medicinal plant collectors is presented in figure 15.

Medicinal Plant Collectors

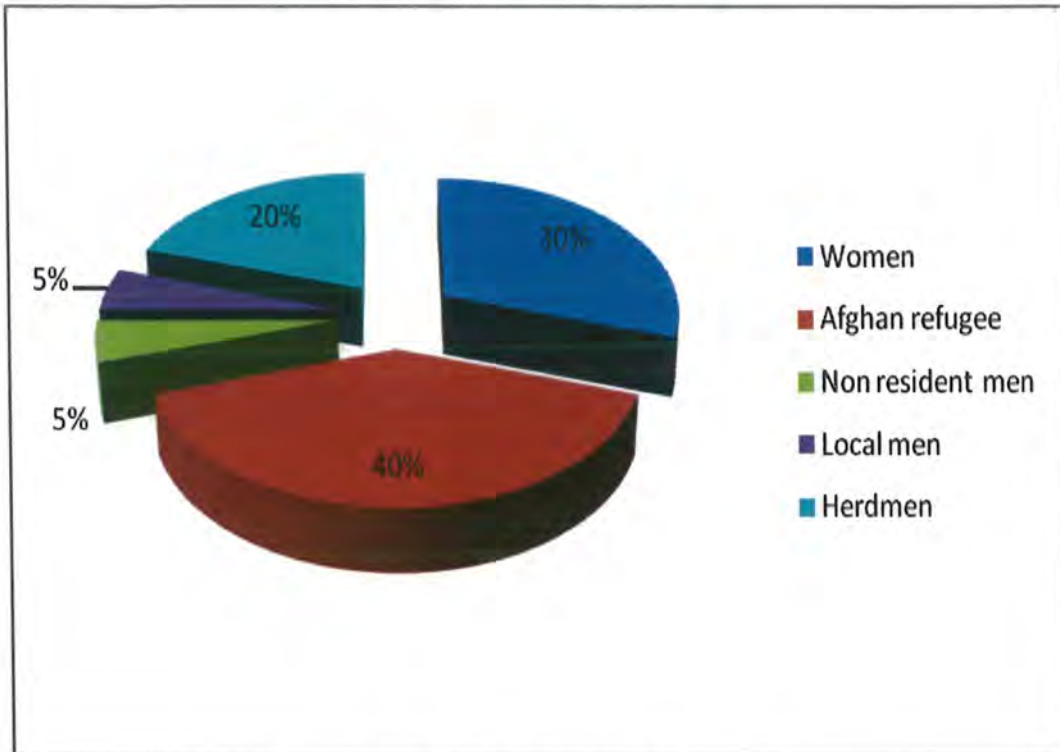


Figure 15: Medicinal Plant Collectors.

3.4.7 THREATS TO MEDICINAL PLANTS

During study various threats to the medicinal plants were also documented, these include forest fire, over harvesting, drought, mining activities, cultivation, grazing, development activities, forest fires and deforestation. These threats were ranked according to their scale. Threats were analyzed separately for watershed flora, reserve forest flora & in private Rakhs area.

Threats to medicinal plant in watershed area are presented in figure 16 and these include mining, erosion, deforestation and grazing. In private rakh area threats are presented in figure 17 and major identified threats are commercial sale, protection, grazing, fires, fuelwood and grazing.

Overall threats to biodiversity of area are presented in figure 18 which are erosion, mining, deforestation, and grazing, invasive species and forest fires.

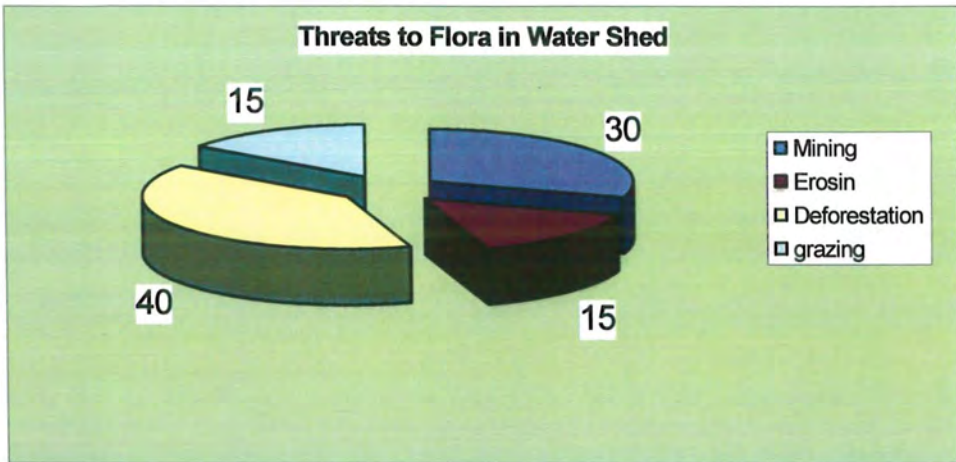


Figure 16: Threats to Flora in Water Shed

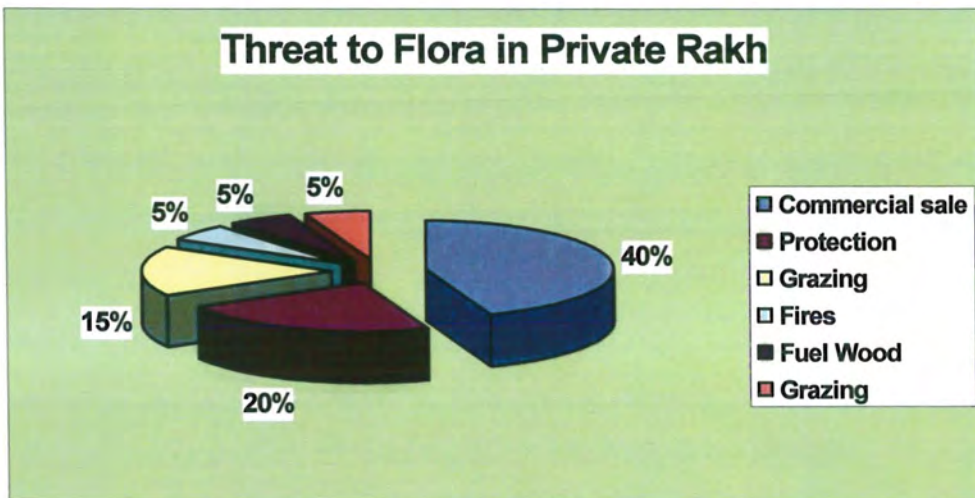


Figure 17: Threat to Flora in Private

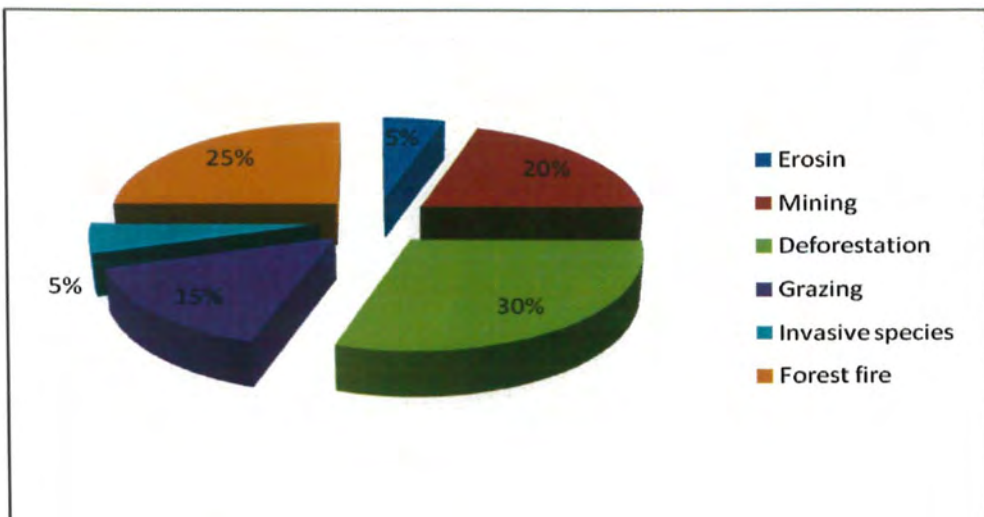


Figure 18: Major Threats to Biodiversity

3.4.8 PERCENTAGE OF KNOWLEDGE OBTAINED FROM DIFFERENT GROUPS

Indigenous knowledge about medicinal plants was collected from different groups. In this regard Hakeems, village elders, livestock herbal experts, pansari, sanasi, graziers, fuel wood collectors, forest guard, watchers, Mahabasi kushta saz were involved in research study. Knowledge obtained from these different groups was ranked according to their contribution in knowledge sharing. Percentage of knowledge obtained from different groups is presented figure 19.

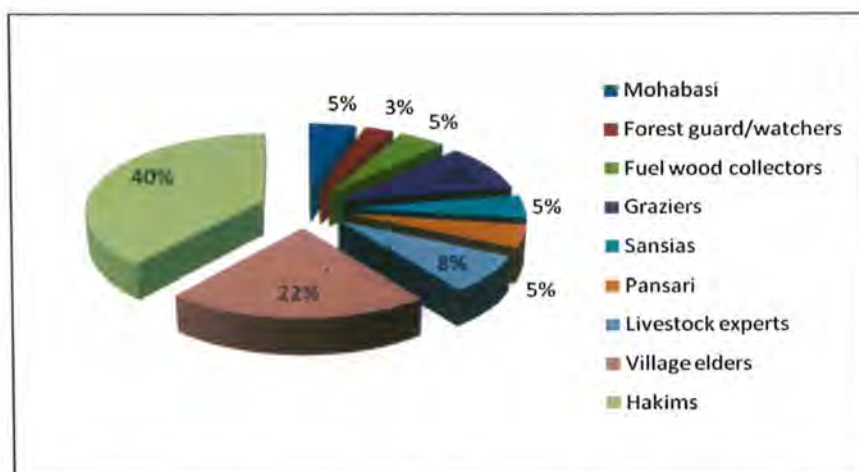


Figure 19: Percentage of Knowledge obtain from different Groups

3.4.9 WILD BIRDS & ANIMALS UTILIZATION OF FLORA

An important component of the study was to observe the use of different fruits and vegetables by wild birds and animals. In this regard field surveys of the forest areas and Rakhs were carried out fruit trees and vegetable species were closely monitored and different birds and animal species were recorded while feeding on fruits and plants. Results of the survey revealed that 25 plants species exist in wild whose fruit are used by animals and birds. 14 different birds species were recorded feeding on wild fruits, while 14 wild and domestic animals species were also recorded feeding on plant species. Field observation shows that there is close association of the flora and fauna and survival of many wild animals is linked with plant species as an important part of their

diet, hence conservation of certain plant species is also useful in wildlife conservation. Animal and bird species dependent on plant species is presented in figure 20.

Table No. 16 Animal species dependent on flora

Name of plant	Dependant / utility animal	Part Used
1. Jangli Anjir (<i>Ficus virgata</i> Wall. ex Roxb.)	Wild Boar, Jackal, Wolf, Fox, Hedghog, yellow throated Marten, Palm Squirrel	Fruit
2. Gurhal (<i>Maytenus royleanus</i> Wall. ex. Lawson) Cufodont)	Fox, Jackal, goat, Sheep. Hedge hog, porcupine, palm squirrel, Punjab Urial, Chinkara.	Fruit
3. Wild olive, Kahu (<i>Olea ferruginea</i>)	Fox, Jackal, Porcupine, Hedge Hog, palm Squirrel yellow throated Marten, Urial	Fruit
4. Gunger (<i>Monotheca buxifolia</i>)	Jackal, fox, palm, squirrel, Porcupine	Fruit
5. Amlah Ber (<i>Zizphus nummularia</i> Burm. f. Wight & Arn)	Wild boar, Jackal, wolf Punjab Urial, Chinkara, Yellow throated Marten, palm squirrel, porcupine, hedge hog	Fruit
6. Ber (<i>Zizphus mauritiana</i> Lam.)	Wild boar, Jackal, wolf Punjab Urial, Chinkara, Yellow throated Marten, palm squirrel, porcupine, hedge hog	Fruit

7. Karira (<i>Capparis decidua</i> (Forssk.) Edgew.)	Jackal, fox, Porcupine Palm Squirrel, Hedge hog, wild boar	Fruit
8. Jaledher (<i>Grewia villosa</i> Willd.)	Jackal, Fox, Porcupine palm squirrel, Hedge hog, yellow throated marten	Fruit
9. Jangli Piaz (<i>Allium griffithianum</i>)	Porcupine, Wild boar, Indian Hare, Hedge hog, rat	Bulb
10. Jangli Lahsan (<i>Allium jacquemontii</i> Kunth)	Jackal, Porcupine, Indian hare, Rat, ants	Bulb
11. Papper (<i>Buxus papillosa</i> C. K. Schneid)	Fox, Indian hare, palm squirrel, porcupine Jackal.	Fruit
12. Dhaman (<i>Fagonia indica</i> Burm. f.)	Fox, Jackal	Fruit
13. It Sit (<i>Boerhavia procumbens</i> Bank. Ex. Roxb)	Wild boar, Porcupine, fox	Root
14. Vina (<i>Rhaza stricta</i> Decne.)	Jackal, Porcupine, Fox	Fruit
15. Akri (<i>Withania coagulans</i> Dunal)	Jackal, Porcupine, Rate	Fruit
16. Dhaman (<i>Grewia optiva</i> (Forssk.) Fiori.)	Jackal, porcupine, Fox, jackal, wild boar	Fruit
17. Koher (<i>Sageretia thea</i> (osbeck) M. C. johnston)	Jackal, fox, porcupine, Indian hare	Fruit
18. Van/Jahl (<i>Salvadora oleodies</i>)	Jackal, fox, porcupine, Indian hare	Fruit

19. Pipal (<i>Ficus religiosa</i> Linn.)	Jackal, Hedgoge, porcupine Indian hare	Fruit
20. Sagger (<i>Ehretia Obtusifolia</i> Hockst. Ex. D.C.)	Jackal, Hedgoge, Porcupine, Indian hare	Fruit
21. Black Toot (<i>Morus nigra</i> L.)	Jackal, fox, porcupine, Indian hare	Fruit
22. Boher (<i>Ficus bengalensis</i> L.)	Jackal, fox, Porcupine, Indian hare	Fruit
23. Jalekri (<i>Debregeasia saeneb</i> (Forssk.) Hepper & Wood)	Jackal, fox porcupine, Indian hare	Fruit
24. Khajoor (<i>Phoenix dactylifera</i> Roxb.)	Fox, jackal, Porcupine	Fruit
25. Pathay (<i>Nannorrhops ritchieana</i> Griff.) Aitch.	Fox, jackal, Porcupine	Fruit
26. Peelian (<i>Grewia tenax</i> (Forssk.) Fiori.)	Bulbul, little dove, sun bird	Fruit

Table No. 17 Wild birds dependent on flora

Name of plant	Wild birds	Pat Used
1. Jangli Anjir (<i>Ficus virvata</i> Wall. ex Roxb.)	Crow, common Myna, bulbul, Koel Sparrow, Grey partridge.	Fruit
2. Gurhal (<i>Maytenus royleanus</i> Wall. ex Lawson) Cufodont	Jungle Babblor, little dove, spotted dove, Rose ringed parrot, Magpie, Robin, house sparrow purple sunbird.	Fruit

3. Wild olive, Kahu (<i>Olea ferruginea</i> Royle)	Crow, Common myna, Bulbul, koel, and house sparrow little dove, spotted dove, magpie, Robin, purple sunbird.	Fruit
4. Gunger (<i>Monotheca</i> <i>Buxifolia</i>)	Bulbil, little dove, spotted dove, common myna.	Fruit
5. Amlah Ber (<i>Zizphus</i> <i>nummularia</i> Burm. f. Wight & Arn)	Bulbil, little dove spotted dove, common myna Purple sun bird, see see partridge, gray partridge.	Fruit
6. Ber (<i>Zizphus</i> <i>mauritiana</i> Lam.)	Bulbil, little dove spotted dove, common myna Purple sun bird, see see partridge, gray partridge.	Fruit
7. Karira (<i>Capparis</i> <i>decidua</i> (Forssk.) Edgew.)	Bulbul Little dove spotted dove, common myna.	Fruit
8. Jaledher (<i>Grewia</i> <i>villosa</i> Willd.)	Little dove, spotted dove, common myna Magpie Robin.	Fruit
9. Jangli Piaz (<i>Allium</i> <i>griffithianum</i> Boiss.)	Grey Partridge	Bulb
10. Jangli Lahsan (<i>Allium</i> <i>jacquemontii</i> Kunth)	Grey Partridge	Bulb
11. Papper (<i>Buxus</i> <i>papillosa</i> C. K. Schneid)	Bulbul little dove.	Fruit
12. Dhaman (<i>Fagonia</i> <i>indica</i> Burm. f.)	Bulbul	Fruit

13. It Sit (<i>Boerhavia procumbens</i> Bank. Ex. Roxb)	Bulbul	Fruit
14. Vina (<i>Rhaza stricta</i> Decne.)	Bulbul	Fruit
15. Akri (<i>Withania coagulans</i> Dunal)	Bulbul	Fruit
16. Dhaman (<i>Grewia optiva</i> (Forssk.) Fiori.)	Crow, Bulbul common myna, house sparrow	Fruit
17. Koher (<i>Sageretia Thea</i> (osbeck) M. C. Johnston)	Bulbul, Little dove, sun bird	Fruit
18. Van / Jahl (<i>Salvadora oleodites</i>)	Bulbul, Little dove, sun bird	Fruit
19. Pipal (<i>Ficus religiosa</i> Linn.)	Bulbul, Little dove, sun bird	Fruit
20. Sagger (<i>Ehretia obtusifolia</i> Hockst. ex. D.C.)	Bulbul, little dove, sun bird	Fruit
21. Black Toot (<i>Morus nigra</i> L.)	Bulbul, little dove, sun bird	Fruit
22. Boher (<i>Ficus bengalensis</i> L.)	Bulbul, little dove, sun bird	Fruit
23. Jalekri (<i>Debregeasia saeneb</i> (Forssk.) Hepper & Wood)	Bulbul, little dove, sun bird	Fruit
24. Khajoor (<i>Phoenix sylvestris</i> Roxb.)	Rose ringed parrot, little dove	Fruit

25. Pathay (<i>Nannorrhops ritchieana</i> Griff.) Aitch.	Rose ringed parrot, little dove	Fruit
26. Choughan (<i>Carallum tuberculata</i> N. E. Brown)	Chakor, black partridge	Root & Branches
27. Gilot (<i>Ceropegia bulbosa</i> Roxb.)	Chakor, black partridge	Bulb, Stem
28. Jangli Karela (<i>Momordica diocia</i> L.)	Bulbul, little dove, sun bird	Fruit
29. Peelian (<i>Grewia tenax</i> (Forssk.) Fiori.)	Bulbul, little dove, sun bird	Fruit

Table No. 18 Cultivated crops used by Animal and Birds as feed

Name of Plant	Animal Species	Bird Species
1) Wheat (<i>Triticum aestivum</i>)	Urial, Chinkara Indian hare, Mongoose	Blue rock Pigeon Crow, Sparrow,
2) Ground nut (<i>Arachis hypogea</i>)	Porcupine, Jackal Rat, Fox, Hedhoge, Mongoose	Sparrow, Blue rock Pigeon, Little dove
3) Sorghum (<i>Sorghum vulgare</i>)	Parcupine, Rat Fox, Hedhoge, Mongoose	Little dove, House Sparrow, Sun bird Parakeet
4) Millet (<i>Penisetum americanum</i>)	Porcupine, Rat, Fox, Indian Hare, Mongoose	Little dove, House Sparrow, Sun bird Parakeet

5) Maize (<i>Zea mays</i>)	Porcupine, Rat, Fox, Indian Hare, Mongoose	Little dove, House Sparrow, Sun bird Parakeet
6) Mung (<i>Phaseolus aureus</i>)	Porcupine, Rat, Fox, Indian Hare, Mongoose	Little dove, House Sparrow, Sun bird Parakeet

3.5 Observations on floral habitat of the wild birds

Wild birds are dependent on floral species for food, shelter and nesting. Observation was made on birds species in order to access their association with floral species with respect to feed and shelter.

Nesting of the birds was also observed and it was concluded that their, exist a unique relationship of birds species with certain plants. Wild populations of the birds are closely associated with these floral species, drastic changes in cover of these plants is also critical for birds, their distribution, population and survival is closely linked with these floral species. Threats to the flora also pose significant challenge to the survival of these birds. Floral diversity conservation is directly linked to the survival and population level of birds. There is a need to conserve flora for birds conservation. Different animal and bird species which are dependent on flora as feed has been described in figure 20.

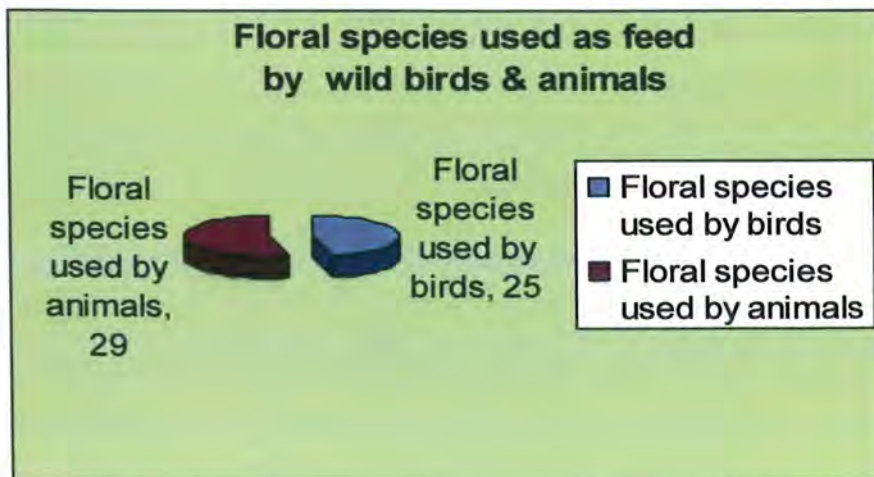


Fig. 20 Floral Species observed in birds habitat

Table No. 19 Floral Species observed in birds habitat

Name of Bird	Floral Species observed in Habitat
(1) Black partridge	Bhabber (<i>Eulaliopsis binata</i>), Santha (<i>Dodonea viscosa</i>), Vahekar (<i>Adhatoda vasica</i>)
(2) Chukor	Batta (<i>Periploca aphylla</i>),
(3) See-see partridge	Koher (<i>Monothea buxifolia</i>), Awani (<i>Otostegia limbata</i>)
(4) Gray partridge	Awani (<i>Otostegia limbata</i>), Santha (<i>Dodonea viscosa</i>), Papper (<i>Buxus papillosa</i>)
(5) Crow pheasant	Bhabber (<i>Eulaliopsis binata</i>), Awani (<i>Otostegia limbata</i>), Vaheker (<i>Adhatoda vasica</i>)
(6) Red Vented Bulbul	Phuali (<i>Acacia modesta</i>), Kahu (<i>Olea ferruginea</i>), Awani (<i>Otostegia limbata</i>)
(7) White Cheeked Bulbul	Vaheker (<i>Adhatoda vasica</i>) Grass and shrubs
(8) Rose Ringed parakeet	Phuali (<i>Acacia modesta</i>), Kahu (<i>Olea ferruginea</i>), Karira (<i>Capparis decidua</i>)
(9) Common Quail	Phuali (<i>Acacia modesta</i>), Kahu (<i>Olea ferruginea</i>)
(10) Black Kite	Fruit Plants
(11) Blue Rock Pigeon	Sorghum crop (<i>Sorghum vulgare</i>)
(12) Green Pigeon	Phuali (<i>Acacia modesta</i>), Kahu (<i>Olea ferruginea</i>)
(13) Eagle owl	Kahu (<i>Olea ferruginea</i>), Phulai (<i>Acacia modesta</i>) near rocks
(14) Wood Pecker	Kahu (<i>Olea ferruginea</i>), Phuali

(15) Indian Tree Pie	<i>(Acacia modesta)</i> , Toat (<i>Morus alba</i>), Ber (<i>Zizphus mauritiana</i>) Garden flora Phuali (<i>Acacia modesta</i>), Dhrek (<i>Melia azedarach</i>)
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3.5.1 Water birds/ wetland birds and their association with vegetation

Wetlands of Ucchali complexe including Khalaki, Ucchali, Jahler flora was studied and it was observed that certain species have close association with different type of vegetation growing near water or in water. These birds use these species for protection, nesting and as feed. It was observed that vegetation around wetlands is quite important and its burning or cutting have negative impacts on distribution range of certain species. Hence these floral species are integral part of the wetland ecosystem and needs to be conserved for water birds for their protection, breeding. Following birds species observed associated with these floral species. Ucchali complex wetlands are important wintering ground for waterfowl. Birds arrive in 3 wetlands at the end of September and migrate back in first week of March to early days of April. There has been considerable variation in number of birds visiting Ucchali complex wetlands. Previous years data recorded by WWF-P and PWRI shows that maximum number of birds recorded From Ucchali followed by Khabeki and Jahlar.

103 different bird species both resident and migratory have been recorded from wetlands during various surveys. (Ali, 2003)

Tabel No. 20 Floral Species observed in water birds / wetland habitat

Name of water Bird	Floral species
(1) Little Grebe	Nesting and hiding in Kunder (<i>Typha domingensis</i>), Nari
(2) Great crested Grebe	<i>(Arundo donax)</i> Kunder (<i>Typha domingensis</i>), Nari

(3) Black necked Grebe	<i>(Arundo donax)</i> Kunder (<i>Typha domingensis</i>), Nari <i>(Arundo donax)</i>
(4) Common Coot	Shisham (<i>Dalbergia sisso</i>), Phulai <i>(Acacia modesta)</i> , Kunder (<i>Typha domingensis</i>), Resting
(5) Indian Cormorant	Kunder (<i>Typha domingensis</i>) for protection
(6) White Pelican	Kunder (<i>Typha domingensis</i>), Nari (<i>Arundo donax</i>)
(7) Night Heron	Kunder (<i>Typha domingensis</i>), Nari <i>(Arundo donax)</i>
(8) Pond Heron	Nesting Shisham (<i>Dalbergia sisso</i>)
(9) Cattle Egret	Toat (<i>Morus alba</i>)
(10) Little Egret	Kunder (<i>Typha domingensis</i>) for protection
(11) Grey Heron	Kunder (<i>Typha domingensis</i>) for protection
(12) Purple Heron	Kunder (<i>Typha domingensis</i>) for protection
(13) Moorhen	Kunder (<i>Typha domingensis</i>), Nari <i>(Arundo donax)</i>
(14) Purple Gallinule	Kunder (<i>Typha domingensis</i>)
(15) Black winged Stilt	Kunder (<i>Typha domingensis</i>)
(16) Red Wattled lapwing	Kunder (<i>Typha domingensis</i>)
(17) White Headed duck	<i>(Vallisneria spiralis)</i> , <i>(Cyperus eleusinoider)</i>
(18) Marsh Harrier	Kunder (<i>Typha domingensis</i>)

3.5.2 Birds nesting on floral species

One of the important uses of the flora for birds is nesting, in which birds make nest on these trees, shrubs or bushes. Removal of these trees has negative impact in these nesting birds population. Hence future re production of these birds is linked with conservation of these species. Following birds were observed making nests on following floral species.

Tabel No. 21 Bird nesting on floral species

Name of Birds	Floral Species
(1) House Crow	Toat (<i>Morus alba</i>), Eulyptus (<i>Eucllyptus camuldensis</i>), Dhrek (<i>Melia azedarach</i>)
(2) Common Myna	Fig (<i>Ficus carica</i>), Dhrek (<i>Melia azedarach</i>)
(3) Red vented bulbul	Chambeli (<i>Jasminum humile</i>), Toat (<i>Morus alba</i>), Dhrek (<i>Melia azedarach</i>)
(4) Common vulture	Shisham (<i>Dalbergia sisso</i>)
(5) Eagle owl	Toat (<i>Morus alba</i>)
(6) Rose ringed Parakeet	Ber (<i>Zizphus mauritiana</i>), Toat (<i>Morus alba</i>), Dhrek (<i>Melia azedarach</i>)
(7) Red turtle dove	Phulai (<i>Acacia modesta</i>), Ber (<i>Zizphus mauritiana</i>), Kahu (<i>Olea ferruginea</i>), Jahal (<i>Salvadora oleoides</i>), Karira (<i>Cappris aphylla</i>)
(8) Gray partridge	Awani (<i>Otostegia limbata</i>), Bhabber (<i>Eulaliopsis binata</i>) grass
(9) Chukor	Awani (<i>Otostegia limbata</i>), Bhebber (<i>Eulaliopsis binata</i>), Vaheker (<i>Adhatoda vasica</i>)

(10) Partridge	Awani (<i>Otostegia limbata</i>), Bhabber (<i>Eulaliopsis binata</i>)
(11) Common Kite	Shisham (<i>Dalbergia sisso</i>)
(12) White Cheekd Bulbil	Imlah (<i>Zizphus nummalaria</i>), Ber (<i>Zizphus mauritiana</i>), Phulai (<i>Acacia modesta</i>), Dhamnm (<i>Grewia optiva</i>)
(13) Black Drongo	Toat (<i>Morus alba</i>)
(14) Quail	Toat (<i>Morus alba</i>)
(15) Golden Oriole	Dhamn (<i>Grewia optiva</i>), Phulai (<i>Acacia modesta</i>), Kahu (<i>Olea ferruginea</i>)
(16) Crested larke	Grasses
(17) Black Kite	Phulai (<i>Acacia modesta</i>), Kahu (<i>Olea ferruginea</i>)
(18) Gray Shrike	Imlah (<i>Zizphus nummalaria</i>), Ber (<i>Zizphus mauritiana</i>)
(19) Rufous Backed Shrike	Imlah (<i>Zizphus nummalaria</i>), Ber (<i>Zizphus mauritiana</i>)
(20) Common Babbler	Dhrek (<i>Melia azedarach</i>), Toat (<i>Morus alba</i>)
(21) Weaver bird	Khajoor (<i>Phopnix dactylifera</i>), Toat (<i>Morus alba</i>), Ber (<i>Zizphus mauritiana</i>)

3.5.3 Birds use of floral species as Shelter protection

Bird's species also use certain floral species for protection and shelter, as these species provide them the necessary cover where they remain safe form hunters, predates and also weather extremes especially during cold weather. Thousands of the crows have been observed daily traveling during evening time to spend night in thick cover green trees. Following bird species have been observed which spent night usually on certain floral species.

Tabel No. 22 Bird use of floral species as shelter / protection

Name of Bird	Floral species
(1) Grey partridge	Phulai (<i>Acacia modesta</i>), Ber (<i>Zizphus mauritiana</i>), Kahu (<i>Olea ferruginea</i>)
(2) Chukor	Santha (<i>Dodonea viscosa</i>), Vaheker (<i>Adhatoda vasica</i>), Phulai (<i>Acacia modesta</i>)
(3) See-see partridge	Awani (<i>Otostegia limbata</i>), Bhabber (<i>Eulaliopsis binata</i>)
(4) House crow	Phulai (<i>Acacia modesta</i>), Shisham (<i>Dalbergia sisso</i>)
(5) Eagle owl	Ber (<i>Zizphus mauritiana</i>), Toat (<i>Morus alba</i>)
(6) Red vented Bulbil	Imlah (<i>Zizphus nummalaria</i>), Phulai (<i>Acacia modesta</i>)
(7) White Checked Bulbil	Imlah (<i>Zizphus nummalaria</i>), Phulai (<i>Acacia modesta</i>)
(8) Rose Ringed Parakeet	Eualyptus (<i>Eucllyptus camuldensis</i>)
(9) Black Drongo	Toat (<i>Morus alba</i>), Dhrek (<i>Melia azedarach</i>)
(10) Black Kite	Phulai (<i>Acacia modesta</i>), Ber (<i>Zizphus mauritiana</i>)
(11) Kestrel	Phulai (<i>Acacia modesta</i>), Awani (<i>Otostegia limbata</i>)
(12) Warbler	Phulai (<i>Acacia modesta</i>)
(13) Crow Pheasant	Dhrek (<i>Melia azedarach</i>), Phulai (<i>Acacia modesta</i>)
(14) Tree Pie	Toat (<i>Morus alba</i>), Ber (<i>Zizphus mauritiana</i>)
(15) Red turtle dove	Ber (<i>Zizphus mauritiana</i>), Morpank

(16) Common dove	(<i>Thuja orientalis</i>) Toat (<i>Morus alba</i>)
(17) House sparrow	Taot (<i>Morus alba</i>), Dhrek (<i>Melia azedarach</i>)
(18) Indian Roller	Toat (<i>Morus alba</i>), Dhrek (<i>Melia azedarach</i>)

3.5.4 Floral habitat of wild life and survey of animal biodiversity of area

Birds and animals are dependent on flora for survival both as shelter and food in order to study this relationship observation were made to access there dependence and association. Animals and birds were observed while feeding on plant. Observation was also made on potential habitat of certain wild animals and birds and flora of the area was also observed. Following field observation were made with reference to habitat and status of wild animal species.

Indian wolf was observed in area and its habitat was also monitored with respect to the flora, it was concluded that this wild animal usually lives in caves in nullahs where tall shrubs are present.

It was observed that wild animals are closely associated with certain floral species, as these species provide them shelter for hiding. Removal of these trees, shrubs and grasses is a significant threat to the survival of these animals. There is a need to conserve these flora species in order to conserve wildlife of the Soon Valley area. Observation on habitat of the wild animals clearly indicate that survival of the wild animals is dependent on presence and good cover of these certain floral species, so the threats to floral species are directly affecting the population, distribution range and status of these wild animals.

1. Indian wolf (*Cannis lupus Linnaeus*)

Wolf is spread over the whole area, due to livestock predation hunting is widespread, population is confined to Sodhi, Khabeki, Sakesar and Mohar area. It is threatened due to hunting and habitat degradation, during research observed in Khura and Dhaddar forest. Papper (*Buxus papillosa*) is common, as

this shrub provide ideal shelter to the wild animal, hence this floral species is part of the habitat of this wild animals facing threat of extinction.

2. Asiatic Jackal (*Canis aureus Linnaeus*)

Population is confined near settlements and poultry farms, road mortality is one of serious threat, however population is quite stable and there is no considerable threat to this animal. Habitat of the Asiatic Jackal was studied it was observed that this animal ideally lives in caves and depressions having thick vegetation of Papper (*Buxus papillosa*) Santha (*Dodonea viscosa*), Awani (*Ototesgia limbata*), Vahaker (*Adhatoda vasica*) and top tree caves of Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*).

3. Common Red fox (*Vulpes vulpes*)

Its population size and habitat both have shrinken during pervious years. population is confined to watersheds, and due to habitat degradation its survival is under threat. Habitat of the Common Red fox was observed, it was also observed that this animal also lives in caves these are covered of Papper (*Buxus papillosa*), Awani (*Ototesgia limbata*) and Santha (*Dodonea viscosa*) bushes or grasses.

4. Yellow throated Marten (*Marten flavigula*)

Population is confined to water streams and watersheds and is observed more frequently in Amb Sharif, Sodhi area; due to habitat degradation population size and range both are restricted now. Yellow throated marten population was also observed in nullahs near water springs, and in depressions, its habitat. Consist of the Papper (*Buxus papillosa*) Santha (*Dodonea viscosa*), Gurhal, Koher and Vaheker (*Adhatoda vasica*).

5. Jungle Cat (*Felis chaus ueldenstaedt*)

A very rare species in Soon Valley recorded from Sakesar area and Sodhi, population is threatened and there is risk of extinction. Jungle cat population was observed in Sakesar area, it lives near hill tops and in caves, which are difficult to access usually have less tree growth like an open area, Awani, Papper (*Buxus papillosa*) and Vaheker (*Adhatoda vasica*) shrubs observed in habitat.

6. Common leopard (*Panthera pardus*)

A rare and threatened species still surviving in area is confined to Sakesar hills intentional killing have brought the population near extinction, in 2008 one animal killed in Kalyal village in Sodhi wildlife sanctuary foot print observed in Karang Ugali area in 2007 during field survey. Surviving population is highly threatened. Habitat of the Common Leopard observed in sakesar and Karang area, where thick vegetation of Kahu (*Olea ferruginea*), Phulai (*Acacia modesta*) along with bushes like Veheker (*Adhatoda vasica*), Papper (*Buxus papillosa*) and Santha (*Dodonea viscosa*).

7. Wild boar (*Sus scrofa Linnaeus*)

Widespread and cause significant damage to flora through uprooting of the vegetation. Wild boar usually lives in nullahs in day time in shrubs, in Khabeki wethland area observed hiding in Papper (*Buxus papillosa*) and Veheker (*Adhatoda vasica*) shrubs usually 3-4 feet high, while also observed in grasses having thick cover.

8. Chinkara (*Gazella benettii sykes*)

Highly threatened animal is confined in restricted pockets in Punjab Urial range, population is no more than 30 animals in area and facing threat of extinction due to illegal hunting. Chinkara habitat was studied in Dhadder and Sodhi area, it was observed that this shy animal lives in nullahs during day time in shrubs like Papper (*Buxus papillosa*), Santha (*Dodonea viscosa*) and Vaheker (*Adhatoda vasica*), while in open area it was observed in area having scattered growth of the Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*).

10. Cape Hare (*Lepus capensis Linnaeus.*)

Wide distribution range in area, observed feeding on grasses. threatened due to illegal hunting. A wide range of floral species observed in habitat of the cape here, these includes Santha (*Dodonea viscosa*), Vaheker (*Adhatoda vasica*), Papper (*Buxus papillosa*) and grasses like Sar (*Saccharum spontaneum*) and Bhabber (*Eulaliopsis binata*).

11. Indian Squirrel (*Funambulus penannantii Wroughton*) was also observed in area and its habitat was also studied, usually it builds its nest on

branches of the trees and shrubs. Nests of the squirrel was observed on Phulai (*Acacia modesta*), Vatumman (*Grewia tenax*), Ber (*Zizphus mauritiana*) and Imlah (*Zizphus nummularia*) trees.

12. Indian Porcupine (*Hystrix indica Kerr*)

Indian porcupine was also observed, it lives in furrows usually near agricultural lands Papper (*Buxus papillosa*), Awani (*Otostegia limbata*) and Vaheker (*Adhatoda vasica*) shrubs were observed near its burrows. Due to damage to crops it is hunted by farmer and its population is also threatened.

13. Indian Pangolin (*Manis crassicaudata*)

Indian Pangolin is also observed near agricultural lands and in crevices it is observed in areas having low shrubs and it prefers isolated areas, Papper (*Buxus papillosa*), Awani (*Otostegia limbata*) and Santha (*Dodonea viscosa*) observed near its burrows, it is also threatened due to conversion of the range lands into agricultural fields.

14. Punjab Urial (*Ovis Vignei Punjabiensis*)

The Punjab Urial is one of the important species of the area. It is included in the IUCN Red Data book as endangered, its trade is also prohibited as Punjab Urial is included in CITES Appendix II. It is also protected under Punjab Wildlife Act, 1974. Population range of this species is declining fastly due to several threats. Punjab Urial population in Soon Valley is + 150, illegal hunting, trade, grazing, forest fires are major threat to the Urial population. Punjab Urial observed in areas in rugged topography, steep slopes and ridges of red marl. Urial was observed moving in all vegetation types. During day time Urial observed in tall shrubs including Papper (*Buxus papillosa*), Vaheker (*Adhatoda vasica*) and Santha (*Dodonea viscosa*), while during grazing observed near Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*) tall trees. In areas having lime stone layers Urial observed in Vaheker (*Adhatoda vasica*), Phulai (*Acacia modesta*) and Kahu trees, while in sand stone area observed near Phulai (*Acacia modesta*), Kahu (*Olea ferruginea*), Bata (*Periploca aphylla*) and open places having Bhabber (*Eulalopsis binata*) grass. Different

animal and bird species which are dependent on flora has been described in figure 21.

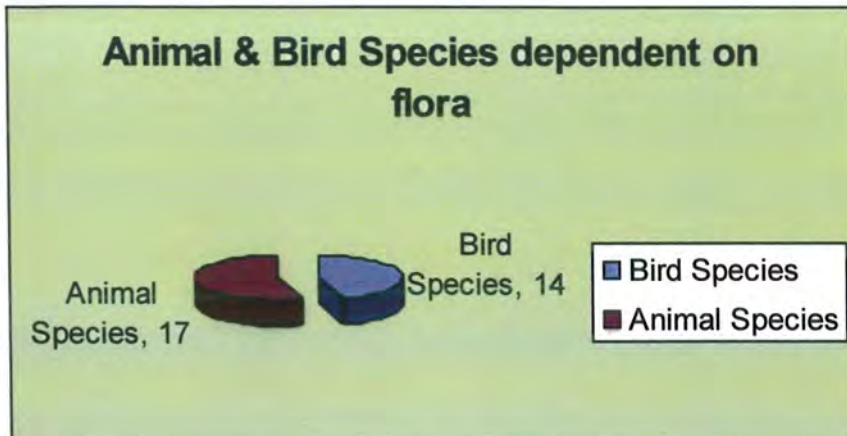


Figure 21: Animals & Birds Species Dependent on Flora

3.5.5 AGE WISE DISTRIBUTION OF KNOWLEDGE OF MEDICINAL PLANTS IN THE LOCAL COMMUNITIES OF SOON VALLEY

Indigenous knowledge about medicinal plants was collected from different villages and from people of different age groups results of the survey indicate that indigenous knowledge is confined to the upper age group, as compared to lower age groups. 65% knowledge was obtained from people of above 60 years age, as old age group, while 20% obtained from age group 45 – 60 years, and the remaining from young generations 10% from age group 15 - 45 years. 50% indigenous knowledge obtained from children upto 15 years age.

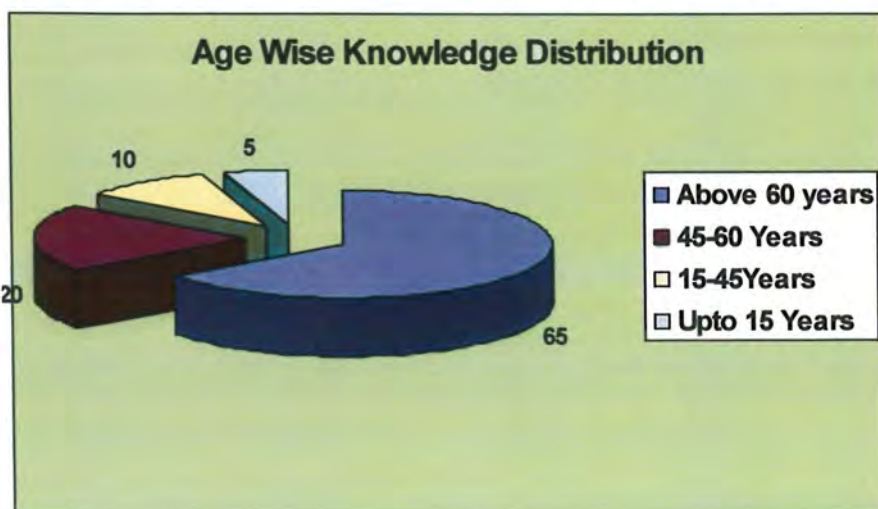


Figure 22: Age Wise Knowledge Distribution

3.5.6 PLANT SPECIES DISTRIBUTION IN DIFFERENT HABITATS

Plant species distribution in different microhabitat were also studied, overall 20 different micro habit were identified and the percentage of the distribution of the flora was studied, it was observed that reserve forest are the most rich habitat with 15% of the plant species followed by Range lands and private rakhs each 10%, agricultural fields also have the same share these is a need to conserve the species which are associated with specific habitat type and are threatened due to habitat loss. In this regard two species (*Adiantum capitatus venerisis*) Barshasha and Zohr mohra (*Sauromatum venosumn*) were indentified which usually occur at moist places and in depressions and caves. These two species need this specific micro habitat, so it was concluded that for species conservation specific habitat is also important.

Tabel No. 23 Plant species Distribution in different habitats

1. Reserve forest	15%		
2. Shamilat deh	05%	18	Wetlands 05%
3. Private rakhs	10%	19	Roads 02%
4. Water springs	05%	20	Afghan 03%
5. Water sheds	05%		refugees areas
6. Arcehological sites	02%		
7. Steep cliffs	03%		
8. Water logged areas	05%		
9. Range lands	10%		
10. Agricultural fields	10%		
11. Graveyards	05%		
12. Gardens	10%		
13. Water lands	05%		
14. Depressions caves	02%		
15. Eroded Areas	03%		
16. Wells	02%		
17. Water Ponds	02%		

3.6 CONSERVATION STATUS OF FLORA

Soon valley flora conservation status was determined according to modified formula. The categories were ranked in accordance with ground realities. Parameters for assessment were area of occupancy, availability, exploitation level. Three ranks of conservation importance were identified. These are Global ranks donated by G. rank (Internationally recognized status), Regional rank as R rank (status for the country), sub regional rank SR. (Status at a specific locality, like Soon Valley). The conservation status of a specific taxon with in three ranks were designated by specific number ranging from 0 – 6.

These ranks are

- 0 = Extinct 1 = critically endangered 2 = Endangered
 3 = Vulnerable 4 = Infrequent 5 = Near threatened
 6 = Frequent.

The flora of soon Valley has 16 plants endangered, 34 are critically endangered, 34 are vulnerable and 71 are infrequent.

Table No. 24 Check List and conservation status of Medicinal Flora of Soon Valley Punjab Salt Range

Botanical Name	Local Name	Family	C-E	E	V	I
<i>Cymbopogon Jawarancusa (Jones.) Schult.</i>	Khawai	<i>Poaceae</i>				✓
<i>Ocimum basilicum L.</i>	Jangli Niazbo	<i>Lamiaceae</i>		✓		
<i>Syzygium cumini (L.) Skeets.</i>	Jaman	<i>Myrtaceae</i>			✓	
<i>Citrulus colocynths(L.) Schred</i>	Kur Tumba	<i>Cucurbitaceae</i>		✓		
<i>Cucumis melo var agrestis Naudin.</i>	Chibar	<i>Cucurbitaceae</i>				✓
<i>Diplotaxis griffithii (Hook. f. Thoms) Boiss.</i>	Barani Mooli	<i>Brassicaccae</i>				✓
<i>Rosa webbiana Wall. Ex.Royle</i>	Jangli Gulab	<i>Rosaceae</i>		✓		
<i>Argemone mexicana L.</i>	Satianasi	<i>Papaveraceae</i>			✓	
<i>Tribulus terrestris L.</i>	Bhakra	<i>Zygophyllaceae</i>				✓
<i>Fagonia indica L.</i>	Dhammian	<i>Zygophyllaceae</i>				✓

<i>Capparis decidua</i> (Forssk.) Edgew.	Deela	Capparidaceae			✓	
<i>Phoenix sylvestris</i> (L.) Roxb.	Khajoor	Palmae			✓	
<i>Nannorrhops ritchieana</i> (Griff.) Aitchison.	Pathay	Palmae			✓	
<i>Asphodelus tenuifolius</i> Cavan.	Piazi	Liliaceae L.		✓		
<i>Allim griffithianum</i> Boiss.	Jungli Piyaz	Liliaceae L.	✓			
<i>Colebrookia oppositifolia</i> Smith	Kala vahekar	Alliaceae		✓		
<i>Vitex negundo</i> L.	Marwan	Verbenaceae			✓	
<i>Scutellaria linearis</i> Benth.	Mastiara	Labiatae			✓	
<i>Swertia cordata</i> Wall.	Chirata	Gentianaceae				✓
<i>Swertia paniculata</i> Wall.ex.C.B.Clarke	Karita	Gentianaceae		✓		
<i>Grewia villosa</i> Willd.	Jaledhor	Teliaceae			✓	
<i>Rubia cordifolia</i> L.	Majith	Rubiaceae	✓			
<i>Tinospora cordifolia</i> (Willd.) Miers	Jangli giloh	Asclepiadaceae	✓			
<i>Tulipa stelata</i> Hook.f.	Jangli wasal	Lilliaceae	✓			
<i>Adiantum cappillus _veneris</i> L.	Bershasha	Pteridaceae	✓			
<i>Abutilon bidentatum</i> A. Rich	Kangi Boti	Malvaceae				✓
<i>Phyla nodiflora</i> (Linn.). Greene	Jal Nim	Verbenaceae				✓
<i>Bauhinia variegata</i> Linn.	Kular / Kaehnor	Caesalpinaceae			✓	
<i>Bombax ceiba</i> Linn.	Simbal	Rhamanaceae				✓
<i>Cassia fistula</i> Linn.	Amaltas	Caesalpinaceaa	✓			
<i>Cuscuta reflexa</i> Roxb.	Dhari Boti	Sapindaceae				✓
<i>Eclipta prostrata</i> Linn.	Bhungra	Sapindaceae				✓
<i>Grewia optiva</i> Drum. ex.Burret.	Dhaman	Tiliaceae	✓			
<i>Ficus religiosa</i> Linn.	Pipal	Moraceae		✓		
<i>Ziziphus oxyhylla</i> Edgew.	Kunker Ber	Rhamnaceae			✓	
<i>Martynia annua</i> Linn.	Hath Jori	Martyniaceae	✓			
<i>Maytenus royleanus</i> (Wall.ex Lawson)Cufodont.	Kundar	Celastraceae				✓
<i>Sauromatum venosum</i> (Ait.) Schott.	Zohr Mohra	Araccae	✓			
<i>Sageretia thea</i> (Osbeck) M.C. Johnston	Saggar	Rhamnaceae				✓
<i>Pistacia chinensis</i> Bunge	Kangan	Anacardiaceae			✓	
<i>Heliotropium strigosum</i> Willd.	Gorak Pan	Boraginaceae				✓

<i>Grewia tenax</i> (Forssk.)Fiori.	Gondni	<i>Tiliaceae</i>				✓
<i>Rhus cotinus</i>	Allerga	<i>Anacardiceae</i>	✓			
<i>Debregeasia saeneb</i> (Forssk.) Hepper Wood	Jalekri	<i>Urticaceae</i>	✓			
<i>Bambusa glaucescens</i>	Bans	<i>Bambusidaea</i>	✓			
<i>Lathysus sativs</i> L.	Nila Jangli Matar	<i>Papilionaceae</i>		✓		
<i>Lathyrus sphaericus</i> Retz ,	Surkh Jangli Mator	<i>Papilionaceae</i>				✓
<i>Lathyrus aphaca</i> L.	Sufed Jangli Mator	<i>Papilionaceae</i>		✓		
<i>Allium Jacquemontii</i> Kunth.	Jangli Lahson	<i>Lilaceae.</i>		✓		
<i>Clematis connata</i> DC.	Chambal Booti	<i>Ranunculaceae</i>	✓			
<i>Gloriosa superba</i> L.	Kiari	<i>Lilaceae.</i>			✓	
<i>Grewia damine</i> Gaertn.	Vatuman	<i>Tiliaceae</i>			✓	
<i>Astragalus psilocentros</i> Fisch.	Tindan	<i>Papilionaceae</i>			✓	
<i>Ranunculus arvensis</i> L.	Jal dhania	<i>Ranunculaceae</i>				✓
<i>Ranunculus muricatus</i> L.	Jal dhania	<i>Ranunculaceae</i>				✓
<i>Papaver dubium</i> L.	Jangli Post	<i>Papaveraceae</i>			✓	
<i>Papaver hybridum</i> L.	Jangli Post	<i>Papaveraceae</i>			✓	
<i>Nasturtium officinale</i> R.Br.	Jangli Aloo	<i>Myrsinaceae</i>			✓	
<i>Malcomia cabulica</i> (Boiss.)Hook.f. & Thoms	Nila Phool Boti	<i>Lythraceae</i>				✓
<i>Capparis spinosa</i> L.	Kakri	<i>Capparidaceae</i>				✓
<i>Cerastium pusillum</i> Ser.	Boti	<i>Celastraceae</i>				✓
<i>Polygala abyssinica</i> R.Br.ex Fresen.	Boti	<i>Polygonaceae</i>				✓
<i>Silena conoidea</i> L.	Kanda	<i>Scrophularica</i>				✓
<i>Hibiscus caesius</i> Garchea	Jangli Phool	<i>Hamemelidaceae</i>			✓	
<i>Oxalis corymbosa</i> DC.	Khatetan	<i>Oxalidaceae</i>			✓	
<i>Prosopis glandulosa</i> Torr.	Kikar	<i>Primulaceae</i>				✓
<i>Prosopis cineraria</i> (L.Druce)	Jangli kikar	<i>Primulaceae</i>				✓
<i>Epilobium hirsutum</i> L.	Jangli booti	<i>Ephedraceae</i>			✓	
<i>Psamanogeton canescens</i> (DC.) Vatke	Jangli dhania	<i>Primulaceae</i>			✓	
<i>Reichardia orientalis</i> (L.) Hoch.	Peela kanda	<i>Ranunculaceae</i>	✓			
<i>Launaea procumbens</i> (Roxb.)Ramayya & Rajagopal	Peeli dodhak	<i>Labiatae</i>	✓			
<i>Inula grantioides</i> Boiss.	Jangli Phool	<i>Hippoastanaceae</i>			✓	
<i>Veronica cinerascens</i> Sch.-Bip.	Jangli booti	<i>Verbenaceae</i>	✓			

<i>Cousinea prolifera</i> Jaub.&Spach.	Jangli kanda	<i>Convolvulaceae</i>				✓
<i>Silybum marianum</i> (L.) Gaertner	Bara kanda	<i>Scrophulariaceae</i>				✓
<i>Cincus benedictus</i> L.	Kanda	<i>Chenopodiaceae</i>				✓
<i>Terminalia arjuna</i> Wight & Arnon	Arjun	<i>Combretaceae</i>	✓			
<i>Plumbago zeylanica</i> L.	Jangli motia	<i>Plumbaginaceae</i>			✓	
<i>Heliotropinum europaeum</i> var <i>lasiocarpum</i>	Hathi sondak	<i>Hamamelidaceae</i>				✓
<i>Trichodesma indica</i> (L.) R.Br.	Ounda holi	<i>Tiliaceae</i>				✓
<i>Ipomea purpurea</i> (L.) Roth	Jangli bel	<i>Hippoecastanaceae</i>				✓
<i>Orobanche aegyptica</i> Pers.	Jangli Boti	<i>Orobanchaceae</i>				✓
<i>Barleria cristata</i> L.	Neela phool	<i>Balsaminacea</i>				✓
<i>Stachys parviflora</i> Benth.	Booye	<i>Solancaeeae</i>				✓
<i>Ereomostachys vicaryi</i> Benth.ex Hook.f.	Booti	<i>Ephedraceae</i>				✓
<i>Anisomeles indica</i> (L). O.Kuntze	Booti	<i>Anacardiaceae</i>				✓
<i>Boerhavia procumbens</i> Banks.ex Roxb.	Itsit	<i>Bignoniaceae</i>				✓
<i>Lamium amplexicaule</i> L.	Booti	<i>Labiatae</i>				✓
<i>Ixioliroin tataricum</i> (Pall.)Herb.	Neela Phool wasal	<i>Iridicaeace</i>				✓
<i>Comelina bengalensis</i> (L.)	Neela Phool	<i>Commelinaceae</i>				✓
<i>Justicia adhatoda</i> L.	Valekar	<i>Acantaceae</i>				✓
<i>Asparagus gracilis</i> Royle	Dusan	<i>Lillaceae</i>		✓		
<i>Buxus papillosa</i> C.K. Schenid.	Pappar	<i>Buxaceae</i>				✓
<i>Capparis decidua</i> (Forsk.)Edgew.	Karir	<i>Capparidaceae</i>				✓
<i>Caralluma tuberculata</i> N.E. Brown	Chougan	<i>Asclepiadaceae</i>	✓			
<i>Acacia nilotica</i> (L.).Delile	Desi kikar	<i>Leguminosae</i>				✓
<i>Peganum hermala</i> L.	Hermal	<i>Zygophyllaceae</i>			✓	
<i>Periploa aphylla</i> Decne.	Bata	<i>Asclepiadaceae</i>				✓
<i>Otostagia limbata</i> (Benth.)Boiss.	Awani	<i>Labiatae</i>				✓
<i>Lallemantia royleana</i>	Tukhm balnaga	<i>Labitatae</i>		✓		
<i>Plantago ovata</i> L.	Ispagol	<i>Plantagineceae</i>			✓	
<i>Rhaza stricta</i> Decne.	Vena	<i>Apocynaceae</i>			✓	
<i>Solanum indicum</i> Linn.	Mahori	<i>Solancaeeae</i>				✓
<i>Solanum surrattence</i> Burm.f.	Mahori	<i>Solanaceae</i>				✓
<i>Taraxacum officinale</i> Weber	Dodak	<i>Compositae</i>				✓

<i>Olea ferrugine</i> Royle	Kahu	<i>Oleaceae</i>				✓
<i>Salvadora oleoides</i>	Jahal wan	<i>Salvadoraceae</i>				✓
<i>Zizphus nummularia</i> (Burm.f.)Wight Arnon	Mallah ber	<i>Rhamanceae</i>				✓
<i>Ricinus communis</i> L.	Arand	<i>Euphorbiaceae</i>				✓
<i>Sacchrum benghalensis</i>	Suroot kana	<i>Graminneae</i>				✓
<i>Arundo donax</i> L.	Nari	<i>Graminae</i>				✓
<i>Mentha longifola</i> L.	Podina	<i>Labiatae</i>	✓			
<i>Aloe barbadensis</i> Mill.	Kuwar Gandal	<i>Lillaceae</i>	✓			
<i>Withania somnifera</i> (L.)Dunal	Aksan	<i>Solanaceae</i>				✓
<i>Zizphus mauritiana</i> Lam.	Ber	<i>Rhamonaceae</i>				✓
<i>Dalberiga sisso</i> Roxb.	Tahli shisham	<i>Leguminosae</i>				✓
<i>Punica granatum</i> L.	Anar	<i>Punicaeae</i>	✓			
<i>Butea monosperma</i> (Lam.)O.Kuntze	Dhak	<i>Papilionaceae</i>		✓		
<i>Allium griffithianum</i> Boiss.	Jangli Piaz	<i>Liliaceae</i>				✓
<i>Verbascum thapsus</i> L.	Jangli tobacco	<i>Scrophulariaceae</i>				✓
<i>Asparagus adscendens</i> Roxb.	Sufaid moosli	<i>Liliaceae</i>	✓			
<i>Momordica diocia</i> L.	Jangli karela	<i>Cucurbitaceae</i>	✓			
<i>Albizia labbeck</i> (L.)Benth.	Shrin	<i>Leguiminoeseae</i>				✓
<i>Tamarix aphylla</i> (L.)Karst.	Bait	<i>Tamaricaeae</i>			✓	
<i>Cappris spinosa</i> L.	Kakri, kabra	<i>Papilonaceae</i>				✓
<i>Geranium rotundifolium</i> L.	Banafsha	<i>Geranicaceae</i>			✓	
<i>Incarvillea emodi</i>	Kaur	<i>Begnoniaceae</i>				✓
<i>Martynia annua</i> L.	Hathjory	<i>Martyniaceae</i>	✓			
<i>Colchicum aitchisonii</i> (Hook.f)E.Nasir	Suranjan sherin	<i>Lilicaceae</i>	✓			
<i>Vitis jaquemontii</i> Parker	Jangli angoor	<i>Vitaceae</i>		✓		
<i>Teucrium stocksianum</i>	Koondiboti	<i>Labiatae</i>				✓
<i>Withanaia coagulens</i> (L.)Dunal.	Panir dodi akri	<i>Solanaceae</i>				✓
<i>Sophora griffithii</i> Stocks	Khunhi	<i>Mimosaceae</i>				✓
<i>Tecomalla undulata</i> (Roxb.)Seeman.	Lahura	<i>Begnoniaceae</i>				✓
<i>Typha elephantiana</i> Roxb.	Kunder	<i>Typhaceae</i>				✓
<i>Luffa acutangula</i> L.	Jangli tori	<i>Labiatae</i>	✓			

<i>Iris odontostyl</i>		<i>Iridaceae</i>	✓			
<i>Geranium Spp</i>		<i>Geraniaceae</i>		✓		
<i>Whattakaba vulvulwus</i>		<i>Asclepiadaceae</i>		✓		
<i>Erigeron sp</i>		<i>Asteraceae</i>			✓	
<i>Crocus Sp</i>		<i>Iridaceae</i>	✓			
<i>Medicago Sp</i>		<i>Leguminoseae</i>				✓
<i>Astragalus Sp</i>		<i>Leguminoseae</i>				✓
<i>Cleome bracioria</i>		<i>Capparidaceae</i>			✓	
<i>Cardiospermum hellicacabum</i>		<i>Spindaceae</i>	✓			
<i>Petunia spp</i>		<i>Solanaceae</i>	✓			
<i>Adiantum incisum Forssk.</i>		<i>Adiantaceae</i>	✓			
<i>Capparis spp</i>		<i>Capparidaceae</i>	✓			
<i>Cassia sp</i>		<i>Caeselpinaceae</i>	✓			
<i>Portulaca sp</i>		<i>Portulaceae</i>	✓			
<i>Centuriae iberica Treav.ex.Spreng</i>		<i>Celastraceae</i>			✓	
<i>Onosma echiorides</i>		<i>Boraginaceae</i>			✓	
<i>Solanum ealagnum</i>		<i>Solanaceae</i>			✓	
<i>Cynoglossum Sp</i>		<i>Boraginaceae</i>			✓	

Overall 155 different floral species conservation status was determined according to CSS formula devised after IUCN categories.

CE = Critically Endangered

E = Endangered

V = Vulnerable

I = Infrequent

Category No of Species

CE 34

E 16

V 34

I 71

3.6.1 FODDER

Fodder collection for livestock rearing is one of the important activities of the residents of the area. Cattle provide milk for example cow, buffalo, sheep and goats and also are traded for cash and are one of the important income generation activities. Fodder is collected usually from own lands, Shamilat deh and from reserve forest. In winter season maize stalks dried, wheat husk, Sorghum dried and Bhabber grass are used during rainy season along with rice stalks known as parali. Maximum fodder is collected during months of July–August when enough quantity of the fodder is available. In summer season fodder is collected from wheat fields, while in November and December no fresh fodder is available to the local people.

During winter season lopped branches of the Kahu (*Olea ferruginea* Royle) are mixed in Bhabber grass and feed to the animals. Due to heavy fodder collection good quality fodder grasses are less. People also burn old grass to have new good growth and in certain cases whole area also burn completely. Data about fodder collection revealed that 10 Grasses, 38 herbs, 13 trees and 13 shrubs, while 12 cultivated crops are being used as fodder in Soon Valley.



Plate No. 19

Grass fodder collection



Plate No. 20

Fodder collection of kahu leaves

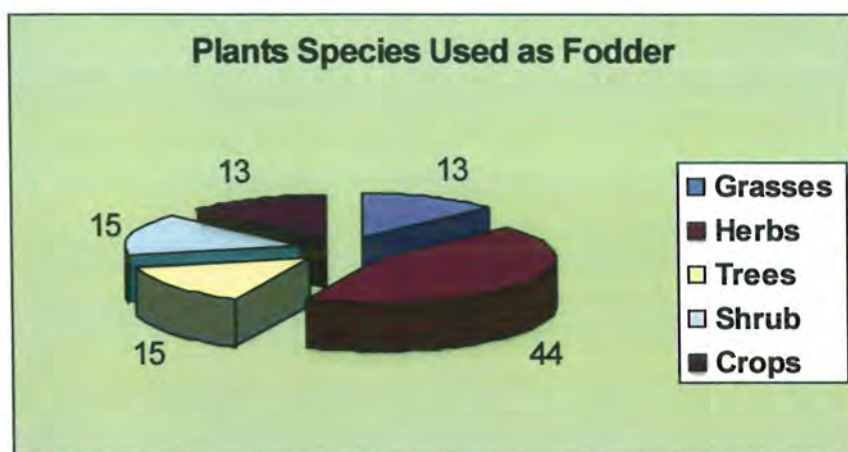


Figure 23: Plants Species Used as Fodder

Table: 25 GRASSES USED AS FODDER

<i>Family Poaceae</i>		
<i>Aristida adscensionis</i>	Lamb	Grass
<i>Bothriochloa pertusa</i>	Palwan	Grass
<i>Cenchrus ciliaris</i>	Anjan	Grass
<i>Chrysopogon serrulatusa</i>	Khar	Grass
<i>Chrysopogon jwarancusa</i>	Khawi	Grass
<i>Cynodon dactylon</i>	Khabal	Grass
<i>Cyperus pilosus</i>	Deela	Sedge
<i>Desmostachya bipinnata</i>	Dab	Grass
<i>Digitaria bicornis</i>	Pharion	Grass
<i>Eleusine flagellifera</i>	Chemmar	Grass
<i>Elionurus hirsutus</i>	Sin	Grass
<i>Eulaliopsis binata</i>	Bhabar	Grass
<i>Heteropogon contortus</i>	Suriala	Grass
<i>Ochthochloa compressa</i>	Chemmar	Grass
<i>Thysanolaena agostis</i>	Lumar	Grass

Table No. 26

**NON-GRAMINIOUS FODDER PLANTS OF SOON
VALLEY**

SR. NO.	BOTANICAL NAME	FAMILY	LOCAL NAME
1	<i>Amaranthus viridis</i>	<i>Amaranthaceae</i>	Gunhar
2	<i>Chenopodium album</i>	<i>Chenopodiaceae</i>	Bathu
3	<i>Dodonaea viscosa</i>	<i>Sapindaceae</i>	Santha
4	<i>Malva neglecta</i>	<i>Malvaceae</i>	Sonchal
5	<i>Maytenus royleanus</i>	<i>Celastraceae</i>	Kander
6	<i>Medicago laciniata</i>	<i>Papilionaceae</i>	Jangli booti
7	<i>Otostegia limbata</i>	<i>Lamiaceae</i>	Awani
8	<i>Oxalis corniculata</i>	<i>Oxalidaceae</i>	Khatetan
9	<i>Plantago major</i>	<i>Plantaginaceae</i>	Isamghol
10	<i>Sageretia thea</i>	<i>Rhamnaceae</i>	Sagger
11	<i>Silene conoidea</i>	<i>Caryophyllaceae</i>	kanda
12	<i>Solanum nigrum</i>	<i>Solanaceae</i>	Mako
13	<i>Tribulus terrestris</i>	<i>Zygophyllaceae</i>	Bhakra
14	<i>Vicia faba L.</i>	<i>Papilionaceae</i>	Rari
15	<i>Ajuga bracteosa</i>	<i>Lamiaceae</i>	Kori booti

Table No. 27 TREES LOPPED AS FODDER PLANTS

SR. NO.	BOTANICAL NAME	FAMILY	LOCAL NAME
1	<i>Broussonetia papyrifera</i>	<i>Moraceae</i>	Papper
2	<i>Dalbergia sissoo</i>	<i>Papilionaceae</i>	Tahli
3	<i>Melia azedarach</i>	<i>Meliaceae</i>	Dhrek
4	<i>Morus alba</i>	<i>Moraceae</i>	Toot
5	<i>Morus nigra</i>	<i>Moraceae</i>	Toot
6	<i>Olea ferruginea</i>	<i>Oleaceae</i>	Kahu
7	<i>Populus euphratica</i>	<i>Salicaceae</i>	Popular
8	<i>Prunus amygdalus</i>	<i>Rosaceae</i>	Badam
9	<i>Ziziphus jujuba</i>	<i>Rhamnaceae</i>	Ber



Plate No. 21

***Plantago lanceolata* Linn.**

Voucher No. 15



Plate No. 22

***Tulipa stellata* Hook. f.**

Voucher No. 40



Plate No. 23

Papaver hybridum L.

Voucher No. 48



Plate No. 24

Colchicum luteum Baker

Voucher No. 74

3.7 CULTIVATION / NURSERY TRIALS OF MEDICINAL PLANTS

An important activity of the study was to document the systematic cultivation of the plants and nursery trials, during this exercise following species have been tested. Flora of the Soon Valley was also studied from cultivation point of view. Due to threats several species are facing extinction, in order to observe their behaviour three different methods were selected for cultivation trials. Seed sowing, sapling transplanting and vegetative propagation measures which are normally used in the area were adopted. Major objective of this intervention was to study the regeneration and reproduction behaviours of the flora. This aspect is very important in plant conservation programmes as exact method of plant propagation is an effective tool in plant rehabilitation and replication. Some of the plants of the area have confined to specific patches and there is a fear that if those remaining pockets are destroyed there will be great damage to the flora species. Due to lack of information on the propagation measures, selected plants were included in these trials. These trials were cultivated in WWF-Pakistan Khabeki field office, Kinhati garden, Dhaddar Shamilat deh range land and agricultural lands. Results of the trial will be very useful in future interventions in area especially in plant conservation interventions. Both season of the year Spring and Autumn plantations (March to April) and (July to August) were used to get desirable results. Seeds of the species were cultivated, cleaned, preserved and then sown in case of species where seed sowing method was used. Sapling of some plant species were collected and then transplanted in area. For vegetative propagation measures cutting, root, bulb, were used, sites were already selected from where this plant material was collected, preserved and then used in trial.

Following plant species were selected for cultivation trials according to their mode of reproduction.

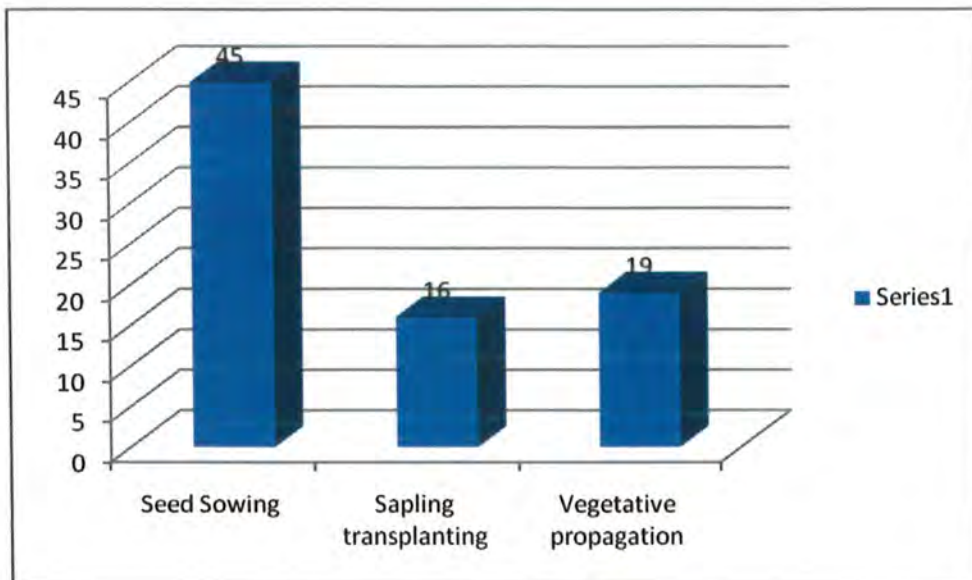


Figure 24: Cultivation Trials

Table No: 28 PLANT SPECIES CULTIVATED THROUGH SEED SOWING

Sr No.	Local Name	Botanical Name
1.	Alsi	<i>Linum usitatissimum L.</i>
2.	Methi	<i>Trigonella foenum-graceum L.</i>
3.	Tulsi	<i>Ocimum basilicum L.</i>
4.	Harmal	<i>Peganum hermala L.</i>
5.	Tukhm Malanga	<i>Lallemantia royleana (Benth) Benth.</i>
6.	Gider Tambaco	<i>Verbascum thapsus L.</i>
7.	Til	<i>Sesamum indicum L.</i>
8.	Bhang	<i>Cannabis sativa L.</i>
9.	Santha	<i>Dodonea viscosa (Linn.) Jacq</i>
10.	Makhni Booti	<i>Sida compressa</i>
11.	Jangli Karella	<i>Momordica diocia L.</i>
12.	Mahori	<i>Solanum nigrum L.</i>
13.	Aksan	<i>Withania somnifera(L.) Dunal</i>
14.	Kasni	<i>Cichorium intybus L.</i>
15.	Wild Poppy	<i>Papaver hybridum L.</i>
16.	Pohli	<i>Carthamus oxycantha M.Bieb</i>
17.	Dhatura	<i>Datura innoxia Miller</i>

18. Lunak	<i>Suaeda fruticosa</i>
19. Post	<i>Papaver somniferum L.</i>
20. Pathay	<i>Nannorrhops ritchieana (Griff.) Aitchn.</i>
21. Akri	<i>Withania coagulens L.</i>
22. Aksan	<i>Withania somnifera L.</i>
23. Dhaman	<i>Fagonia indica Burm. f.</i>
24. Barani Mooli	<i>Diplotaxis griffithii (Hook.f.Thoms.)Boiss.</i>
25. Jangli Dhania	<i>Psammogeton canescens (DC.)vatke</i>
26. Ajwain	<i>Carum copticum L.</i>
27. Satinasi	<i>Argemone mexcicana L.</i>
28. Phulai	<i>Acacia modesta Wall</i>
29. Mahori	<i>Solanum incanum Linn.</i>
30. Gorak pan	<i>Heliotropium strigosum willd</i>
31. Kolonji	<i>Nigella sativa L.</i>
32. Kur tumba	<i>Citrullus colocynthus (L.) Schrad</i>
33. Saunf	<i>Foeniculum vulgare L.</i>
34. Papra	<i>Fumaria indica (Hausskn.) Pugsly</i>
35. Jangli tamaco	<i>Verbascum thapsus Linn.</i>
36. Halia	<i>Pimpinella anisum L</i>
37. Deela / Kakri	<i>Capparis spinosa L.</i>
38. Gorak Pan	<i>Heliotropium strigosum Wild.</i>
39. Kalwanji	<i>Nigella sativa L.</i>
40. Ismagol	<i>Plantago ovata Linn.</i>
41. Shrin	<i>Albizzia lebbek (L.) Benth</i>
42. Kuri Boti	<i>Ajuga bracteosa wall. ex Benth.</i>
43. Kunhi	<i>Sophora mollis (Royle) Baker</i>
44. Jangli Matar	<i>Lathyrus aphaca L.</i>
45. Gird Nali	<i>Cassia fistula L.</i>
46. Jangli Bel	<i>Ipomea purpurea (L.) Roth</i>

**Table No. 29 PLANT SPECIES CULTIVATED THROUGH
SAPLING TRANSPLANTING**

<u>Sr. No.</u>	<u>Local Name</u>	<u>Botanical Name</u>
1.	Santha	<i>Dodonea viscosa (Linn.) Jacq.</i>
2.	Rahura	<i>Tecomella undulata (Roxb.) Seeman</i>
3.	Allerga	<i>Rhus cotinus</i>
4.	Papper	<i>Buxus papillosa C.K. Schnied.</i>
5.	Awani	<i>Otostegia limbata (Benth.) Boiss .</i>
6.	Vahekar	<i>Adhatoda zeylanica Medik.</i>
7.	Choughan	<i>Caralluma tuberculata N.E.Brown</i>
8.	Kaner	<i>Nerium oleander L.</i>
9.	Phulai	<i>Olea ferruginea Royle</i>
10.	Kuwar gandal	<i>Aloe barbadensis L.</i>
11.	Vena	<i>Rhazya stricta Decne.</i>
12.	Mastiara	<i>Swertia paniculata Wall.ex. C.B. Clarke</i>
13.	Dhrek	<i>Melia adzedarch Linn.</i>
14.	Toat	<i>Morus nigra L.</i>
15.	Bait	<i>Tamarix aphylla (L.) Krast.</i>

**Table No. 30 PLANT SPECIES CULTIVATED THROUGH
VEGETATIVE REPRODUCTION**

<u>Sr No.</u>	<u>Local Name</u>	<u>Botanical Name</u>
1.	Podina (Roots)	<i>Mentha royelana Wall ex Bth.</i>
2.	Bershasha (Roots)	<i>Adiantum capillus-veneris Linn.</i>
3.	Wild Anar (Cuttings)	<i>Punica granatum Linn.</i>
4.	Gliot (bulb)	<i>Ceropegia bulbosa Roxb.</i>
5.	Kahu (cuttings)	<i>Olea ferruginea Royle</i>
6.	Suranjan Talkh (Bulbs)	<i>Colchium aitchisoni (Hook f.) E.Nasir</i>
7.	Suranjan Shirin(Bulbs)	<i>Colchicum luteum Boker</i>
8.	Gloh (cutting)	<i>Tinospora cordifolia (Wild). Miers</i>
9.	Kiari (Tuber)	<i>Gloriosa superba L.</i>

10.	Zohr Mohra (Tuber)	<i>Sauromatum venosum (Ait.) Schott.</i>
11.	Nuri (Roots)	<i>Arundo donax L.</i>
12.	Jangli Gulab (Cuttings)	<i>Rosa webbiana .ex Royle</i>
13.	Chambeli (Cuttings)	<i>Jasminum humile L.</i>
14.	Jangli Lehsan (Tuber)	<i>Allium griffithianum Boiss.</i>
15.	Wild Tulip (Tuber)	<i>Tulipa stellata Hook. f.</i>
16.	Jalekhri (Cuttings)	<i>Debregeasia saeneb (Forssk.)</i> <i>Heper andWood</i>
17.	Choughan	<i>Caralluma tuberculata N.E. Brown</i>
18.	Jangli Piaz	<i>Allium griffithianum Boiss.</i>
19.	Dhari boati	<i>Cuscuta reflexa Roxb.</i>

3.7.1 DESCRIPTIVE RESULT SEED SOWING

1. Tukham Malanga *Lallementia royleana Benth. Benth*

Seeds of the Tukham Malanga were collected and they were broadcast, these seeds give positive results even on barren land. The wild plants germinated at the end of the month of February and flowers appeared at the end of March and ripend in May and June.

2. Ajwain *Carum copticum L.*

Ajwain was planted along with crop of the onion in rows and its seed was broadcasted, the crop ripend in June, it's sowing was successful.

3. Methi *Trigonella foenum- graecum L.*

Methi seed was broadcast during the month of October as a sole crop and it ripend during the month of May. It's sowing also proved successful.

4. Saunf *Foeniculum vulgare Mill.*

Saunf seed was sown collected from plant and proved successfully. It ripend during the month of April.

5. Kali Tulsi *Ocimum basilicum L.*

Seeds of the Kali Tulsi were collected from Khabeki Samilat Deh and Dhaddar village; seeds were also broadcasted which proved successful. Its flowering occured in the moth of August, September it was observed that it germinated from seed which spread in soil.

6. Tumba *Citrullus colocynthus (L.) Schrad*

Tumba seed were sown in sandy soil and in groundnut crop it grow very well. Trial was conducted at the field of the farmer in Khabeki village and this also gave positive result. Its fruit ripend in the month of September and October, however it gives good results only in sandy soils.

7. Harmal *Peganum harmala L.*

Harmal grows usually on wastelands its seed were collected and were broadcast the plant grew from seed as well old plants also grown in the Month of March and its fruit ripend during month of June.

8. Phulai *Acacia modesta Wall.*

Phulai saplings were collected form Dhaddar and were planted these saplings gave 80% success rate. Both plantation season in March and August gave similar results, Monsoon plantation is better.

9. Gider Tambaco *Verbascum thapsus L.*

Gidar Tambaco was also planted; its seed was collected and randomly broadcasted, 80% of the broadcast seed give positive results. It grows during winter months and new plants germinated during the month of November from previous year plant, and its flower appears in April while fruit ripened in June after that plant dried.

10. Til *Sesamum indicum L.*

It was grown along with Sorghum crop and ripened during October, while flowers appeared at the end of August. It is usually cultivated in Khabeki village Dhoke Parchun area.

12. Bhang *Cannabis sativa L.*

Bhang seed was randomly sown and all seeds grown the plant was in full swing during the month of August while seed ripend during winter months.

13. Santha *Dodonea viscosa (Linn) Jacq.*

Seeds of the Santha were collected from Government Boys Primary School Dhoke Mera Mardwal and this was broadcasted all the seeds grew, young saplings were cultivated after monsoon rains, its saplings transplanted did not grow and cultivation through those seed was only successful.

14. **Dhaman** *Fagonia indica* *Burm.f.*

Dhaman seeds were collected from Suraki Sabhral road and were broadcasted seed grew only at sandy soils; fruit ripend during month of October while new plants grew during month of March.

15. **Akri** *Withania coagulens* *Dunal.*

It is evergreen and propagates through seeds, its seeds were grown but did not succeed, and its cultivation is also confined to lower altitudes ranging from 250 m to 300m from sea level.

16. **Makhni Booti** *Sida alba*

Seeds of the Makhni Booti were broadcasted at random places which proved to be a success; it grew during month of March white flower appeared during the month of August.

17. **Jangli Karela** *Momordica diocia* *L.*

Fruit of the Jangli Karela was collected from Dhaddar village and broadcasted the young plants appeared during month of the August and yielded good fruit, its fruits ripend at the end of the September. While seed ripend during October. Its farm level cultivation is difficult in situ conservation is suggested for this species.

18. **Kasni** *Cichorium intybus* *Linn.*

Its seed was mixed in the Berseme and was grown in September, October, flowers appeared during month of June while Seed ripend during July, its cultivation is common in area.

19. **Afun Post** *Papver somniferum* *L.*

It was one of the important field crop of area before ban by government it was grown with wheat and Garlic, Red flowers appeared and fruit ripend during month of March, April. Jangli Post Varieties also occur during month of the March, April.

20. **Papra** *Fumaria indica* (*Hauskn.*) *Pugsley*

It grows in wheat crop and red flower appear during month of March, it is one of the widespread weed of wheat crop.

21. Chasku *Cassia absus L.*

Chasku was grown in Kinhati garden its fruit in pods ripend during month of the August, while during winter all plants dried, usually plant regrowth occured.

22. Aksun *Withania somnifera L.*

Aksan seeds were collected sown in field and all seed germinated well.

23. Datura *Datura stramonium L.*

White flowers appeared 2 to 3 times in year usually in July, it was grown through seed sown in field also seed germinated and plant grow well.

24. Pohli *Carthamus oxycantha M. Bieb.*

Pohli is a common weed of summer season its seeds were collected during July and were sown in field all seeds germinated well.

25. Lunak *Zygophylum simplex L.*

This weed was grown in the onion crop during months of the June and July, it ripened after onion was harvested, yellow flowers appeard and its fruiting begins afterwards. It is wide spread in area.

26. Barani Mooli *Diploaxis griffithii (Hook.f.) Thoms. Boiss.*

Seeds of the plant were collected from the Kinhati area and were broadcasted in the field, which provided positive results. 80% of the seeds germinated.

27. Jangli Dhania *Psammogeton canescens (DC.)Vatke*

Ripened seeds of the plant were collected from Khabeki area and were broad coasted in the field, 70% of the seeds germinated and survived and flowering also occurred on germinated seeds.

28. Halia *Pimpinella anisum L.*

Halia is one of the minor crops of area its seeds were sown in cultivated field, it also gives good results and 90% of the seeds germinated, flowering also occurred and fruit maturity achieved.

29. Dela / Kakri *Capparis spinosa L.*

Fully ripe seeds of the Kakri were collected from fruit and were broadcasted in open range land area, it was observed that 50% seeds germinated but only at

rock crevices while in open cultivated lands seed germination failed, so it was concluded that its preferred habitat is rock and hillsides.

30. Gorakh Pan *Heliotropium strigosum Willd.*

Gorakh Pan fully ripe seeds were broadcasted in the open area, 90% of the seeds germinated and have good uniform stand.

31. Kalonji *Nigella sativa L.*

Kalonji seed was sown in the cultivated fields, 80% of the seeds germinated and also give good flowering and good seed, later the trial repeated by farmers at different locations and they also achieved good results.

32. Mahori *Solanum incanum Linn.*

Seeds of the Mahori were collected and sown in field and also broadcasted in wild, all seeds germinated well and seed sowing of the plant remained successful.

33. Vina *Rhazya stricta Decne.*

Seed of the Vina collected from pods and were sown in wild and in a soft plots, only seed sown in wild habitat germinated while sown in cultivated fields did not germinate.

34. Stainasi *Argemone mexicana L.*

Seeds of the plant were collected and sown in the cultivated field and in pure lime stone, all seeds germinated well in both type of the habitat.

35. Dhrek *Melia azedarach L.*

Seeds were sown in both wild and cultivated land, in hilly area germination occurs but plants did not grow, in cultivated field all seeds germinated well.

36. Pathay *Nannorrhops ritchienna (Griff.) Aitchison.*

Pathay seed were collected from a mature plant and were sown in the cultivated land, 50% of the seed germinated well while seeds placed in plastic shopper, 70% germinated and grow.

37. Alsi *Linum usitatissimum L.*

Alsi seed was cultivated in the field, a good crop obtained under Soon Valley conditions.

38. Jangli Tambaco *Verbascum thapsus L.*

Seeds of tambaco were collected and were sown, all seeds germinated successfully.

39. Isamgol *Plantago ovata Linn.*

Seeds of the Isamgol were collected, preserved and broadcasted in range land and stony soil, seeds germinated in the stony soil, while in range land 50% seeds germinated, plant ripened in the month of April.

40. Shrin *Albizia lebbek (L.) Benth.*

Pods of the Shrin tree were collected from Khabeki wetland and seeds were sown in the soil, 80% of the seeds germinated and sapling developed from the seeds.

41. Kori Booti *Ajuga bracteosa Wall. ex Benth.*

Seeds of the plant were collected and were sown in the field, 70% of the seeds germinated and trial give positive result.

42. Kunhi *Sophora mollis (Royle) Baker*

Ripened seeds of the plant were collected and were broadcasted in the field, 50% of the seeds germinated in the field.

43. Kander *Zizphus oxyphylla Edgew.*

Fruit of the plant was collected and dried; it was sown in the field, fully matured seed germinated well.

44. Jangli Mater *Lathyrus aphaca L.*

Pods of the Jangli mater were collected from Kinhati garden and were dried; these were broadcasted in the field, all seeds germinated and good saplings developed.

45. Gird Nali *Cassia fistula L.*

Pods of the tree were collected from Rabh Karang area and these were sown in the field, 50% of the seeds germinated and young saplings developed from this seed.

46. **Jangli Bel** *Ipomea purpurea (L.) Roth*

Ripend seed of the climber were obtained from the field, and these were randomly broadcasted in the field, all seeds germinated and new plant developed.

3.7.2 SAPLING TRANSPLANTING

1. Kuwar Gandal *Aloe barbadensis L.*

Wildings of the plants were collected from Dhoke Tilli and these were planted in WWF – P office at Khabeki, these grew successfully, when ash was applied its growth increased its transplanting season is July-August and it multiplies once it is established at one place.

2. Allerga *Rhus cotinus*

Alarga saplings from Sakesar forest were uprooted and planted at Dhaddar village but due to less height from 4500 feet sea level to 3000 feet sea level height it did not grow and failed, hence it was concluded that its cultivation is only possible at higher altitudes.

3. Vahekar *Adhatoda zeylanica Medik.*

Valekar saplings were transplanted and all grew successfully. it was transplanted in both seasons, young seedlings grow under old plants usually in the spring season, both planting season have growth.

4. Papper *Buxus papillosa C.K. Schneid.*

Papper saplings were transplanted in the field but none of the saplings give positive results both young and old saplings, its cultivation trial did not succeeded, its young saplings grew under the shade of the old shrubs during month of March and August.

5. Vena *Rhaza stricta Decne.*

Vena young saplings were transplanted but did not grow, its seeds were also sown but no success achieved, it grow well during summer season and during winter month all leaves dried out, its growth occur through seed broadcast. It is also successful at lower elevations from 250m to 300m from sea level.

6. Kaner *Nerium oleander L.*

Kaner young saplings were transplanted from Kaila Nallah and were grown all the saplings grew well but the plant require wet places. Its red and pink flower appeared during month of May, June.

7. Rahura *Tecomella undulata Roxb. Seeman*

Rahura saplings were transplanted from Sodhee village but none of the saplings were succeeded sapling grow near old plants and its roots grow into young plants. Its beautiful red flower appeared at the end of the February.

8. Mastiara *Swertia paniculata Wall.*

This is also one of the important medicinal plant, its plants were uprooted and were transplanted which grew successfully, the plant is usually found at shady places locally called Dabak and towards southern slope. White flower appeared during month of April, while it shed leaves during winter and growth occurred from seed dispersed in soil.

9. Dharek *Melia azedarach L.*

It is one of the tree cultivated on the agricultural lands, seeds of the plant were sown in field all seed grew well but only in good soil. its fragrant leaves appeared during March after that leaves appeared, its fruiting occurred during September and it shed leaves in October, its seed can be used to grow nursery. Seed was sown which germinated successfully.

10. Toot *Morus alba L.*

Toot is also one of the important tree cultivated on the agricultural lands, it is also one of the tree whose saplings appear near the old trees, usually it ripened seed is eaten by birds and then dispersed and plants grow from this. Its fruit ripened during the month of April and May. Its young saplings were transplanted and trial was successful.

11. Bait / Farash *Tamarix aphylla L. Karst*

Saplings of the plant were transplanted in the plots, 70% of saplings successfully grew, which were in wet, or near wet places, while in dry habitat growth was less.

12. Santha *Dodonea viscosa* (Linn.) Jacq.

Young sapling of the snatha was uprooted and transplanted only 30% sapling survived while 70% failed.

13. Awani *Otostegia limbata* (Benth.) Boiss.

Awani sapling were transplanted in the field 80% of the sapling grow while 20% failed completely.

14. Choughan *Caralluma tuberculata* N.E. Brown

Choughan plant sapling was transplanted in the field, 60% sapling survived but only in pure limestone layers.

15. Phulai *Acacia modesta* Wall.

Phulai sapling of all age groups was transplanted and all of them survived in field even in cultivated lands.

16. Kahu *Olea ferruginea* Royle

Sapling of the plant were collected from rangelands, out of these 50% of the sapling failed, while 2-3 years old sapling survived and grow successfully.

3.7.3 VEGETATIVE PROPAGATION.

1. Gloh *Tinospora cordifolia* Wild. Miers.

Branches of the Gloh were collected from Kinhati garden and these branches were transplanted at different places and all branches developed into plants. Its transplanting time is August, while it shed its leaves during October; new leaves appear during month of the March.

2. Kahu *Olea ferruginea* Royle

Young saplings of Kahu were collected from two different ages one belong to 2 years age group and other 1 year age group, only one year age group give good results, and 60% plants survived, while cuttings of the wild olive, were obtained from Horticulture, Research Station Nowshera and were transplanted in WWF – P office but no saplings could survived.

3. Wild Pomegranate *Punica granatum* L.

Wild Pomegranate saplings were collected from Anara Wali Chahri and saplings were transplanted but did not succeed. It is also confined to higher elevation of the Sakesar Range. Stem cutting of the plant give good results.

4. Choughan *Caralluma tuberculata* N.E. Brown

Choughan were collected from Gorra and Chaper area and all these were planted it produced pods during month of June, while it is observed that it seed dispersed through wind. Its cultivation in pots is possible. Transplanted plants grew successfully.

5. Jangli Piaz *Allium griffithianum* Boiss.

Jangli Piaz bulbs were collected from Sakesar and Dhaddar reserve forest and transplanted at WWF-P office Dhaddar where the plant survived. Its bulb remains in soil, usually it grows in Bhabber grass, new leaves appear during month of the August, while it multiplies through seed, which grow. It is found in horn like pods and disperse through wind. During winter leaves burn while bulb remains in ground.

6. Dhari *Cuscuta reflexa* Roxb.

It is one of the wide spread climber and grows on all other tall trees it is one of the plant parasite, its branches reestablish once if they are cut and thrown on other tall trees. Branches were thrown on other plants and all branches grew well.

7. Persia Shoan *Adiantum capillus-veneris* Linn.

This plant usually found at wet places near water steams and inside the wells. It is evergreen it was collected from Kinhati garden and transplanted but it wilt soon after uprooting hence its transplantation did not succeeded. It is evergreen and has a network of roots not very deep.

8. Kiari Sup Geri *Gloriosa superba* L.

This is one of the important wild medicinal plants; its bulbs were collected from Churmali Khabeki forest and were planted at different locations, its bulb were stored and also got leaves. It was observed that new leaves appear during month of April. It leaves disappear during September.

9. Gilote *Ceropegia bulbosa* Roxb.

Bulbs of the gliote were collected from rangeland in Ahmed Abad shamilat deh area, these bulbs were planted in plots, 60% of the bulbs regenerated and give

good positive results. However, it was observed that only those bulbs survived which were fully ripe.

10. Kahu *Olea ferruginea* Royle

Cutting of the Shoots of the Kahu tree were used for trial, 50% of the cuttings survived, while other failed, out of these 50%, only 30% give positive result and while 20% failed.

11. Suranjan Shirin *Colchicum aitchisonii* Hook.f. E.Nasir

Bulbs of the species were uprooted, preserved and then cultivated in field, 70% of the bulbs give positive result, while 30% failed as they were not fully mature at the time of cultivation.

12. Suranjan Talkh *Colchicum luteum* Baker

Bulbs of this species were also uprooted, preserved and then were planted in the field, 60% bulbs give positive results and growth occurred while other 40% did not grow due to age and maturity of bulbs.

13. Zohr Mohra *Sauromatum venosum* Ait. Schott

Bulb of the Zohr Mohra were collected from the deep depression and were planted under the shade of fig tree, 80% bulbs survived and give rise to new plants, while the same bulbs also give new saplings next year, however flowering of the plant was not observed.

14. Nuri *Arundo donax* L.

Nuri plants were uprooted and saplings were planted at wet place all the saplings grew well and formed a good overbearing spike.

15. Jangli Gulab *Rosa webbiana* Wall.ex.Royle

Jangli Gulab cuttings were planted at Kinhati and Khabeki for trial purpose. 80% of the cuttings were successful and give flowers after the period of one year.

16. Chambeli *Jasminum humile* L.

Chambeli shoots were detached and were planted at Khabeki and Kinhati, 60% of the cuttings survived but the young saplings require proper care especially irrigation before flowering.

17. **Jangli Lehsun** *Allium jacquemontii Benth.*

Bulbs of the Jangli Lehsun were uprooted, cleaned and preserved and then these were planted in cultivated lands, bulb remains under ground for whole year and in spring season 60% bulbs give rise to the new plants.

18. **Wild Tulip** *Tulipa stellata Hook.f.*

Bulbs of the wild tulip were uprooted, cleaned and preserved and then these bulbs were planted in the cultivated lands, these bulbs also remained dormant for one year and in spring season 40% of the bulbs give rise to the new plants, however it was observed that it grows well in lime stone and barren land as compared to the cultivated fields.

19. **Jalekhri** *Debregeesia saeneb (Forssk.) Hepper & Wood*

Branches of the tree were obtained from Sodhi wildlife sanctuary and were planted in Kinhati garden these cuttings were obtained during month of March 50% of the cuttings give rise to the new plants and grow successfully.

20. **Podina** *Mentha royleana Wall.ex Bth.*

Podina roots were collected and transplanted in the field, root grow successfully into new plants.

3.8 THREAT TO BIODIVERSITY

Biodiversity of the Soon Valley is facing several threats, these threats both to the flora and fauna were identified during field surveys, focus group discussion and through review of literature.

Fauna of the area is closely interlinked with survival of plant species, so threats to flora are direct threats to animal biodiversity as well. Results of the field survey indicate that following important threats are present in area and there is a need to devise measures to reduce the intensity and scale of these threats through joint efforts of all stakeholders in order to conserve the plant resources of the area on long term basis.

Some of the threats identified during field surveys have been enlisted.



Plate No. 25 **Grazing in forest area**



Plate No. 26 **Mining in range lands**



Plate No. 27 **Drought in area**



Plate No. 28 **Deforestation in area**



Plate No. 29 **Stunted growth due to grazing**



Plate No. 30 **Forest fires**



Plate No. 31

***Prosopis glandulosa* Torr.**

Voucher No. 71



Plate No. 32

***Lantana camara* L.**

Voucher No. 133

(i) Soil Erosion

Soil erosion is one of the major threats to the plant resources of the Soon Valley as it washes the top fertile layer of the soil, thus leaving bare soil which affects the growth of the medicinal plants in area.

Erosion is much more wide spread in the sand stone layers and areas adjacent to Pakhar especially from Jabba to Sakesar northern slopes where red marl is exposed. 30 % of reserve forest area of the Rakh Khariot, Rakh Karang, Rakh Khabeki, Rakh Shinh Dhaki is heavily eroded and is devoid of vegetation. extent of the erosion is so widespread that flood water of the Ghabir nullah when passes through this area its color is fully red due to red marl mixing in water.

Gullies are spread over an area of 2.5 Kilometer area near Jahlar Wetland and each year cultivated lands are being engulfed by these gullies. All watersheds cause erosion in cultivated lands due to cutting of the natural vegetation in area. Soil erosion has serious negative impact on vegetation, several species distribution is restricted, and furthermore it produces unfavorable condition in which species growth is affected.

(ii) Insects and Wild Animals

Insects can also cause a significant damage and are potential threat in some cases; it has been observed that ants cause damage to the plants whose bulbs remain in soil for regeneration.

Wild animals cause significant damage to the local flora especially wild boar has caused damage to roots of the plant and also young shoots, Punjab Urial, Chinkara also eat grasses and shrubs but cause no significant damage. Hedghog, Rodents, Porcupine, Red fox, Wild hare species have been observed while eating roots of the plants and also damaging the roots of the wild plants.

(iii) Drought

Drought is one of the serious threats to the biodiversity of area and 1997 drought have negative impact on flora and fauna.

The drought of October and November is fairly severe and occurs after monsoon rains in Salt Range when the seeds of some of the trees get

germinated. Similarly the drought of April, May and June occurs after spring season. Under these conditions only those species of vegetation can be grown whose seedlings can bear severe drought, both hot and cold immediately after germination. This factor is of great importance in determining the type of vegetation that can grow in the region under such adverse conditions.

(iv) Frost

In 2007 severe frost killed santha and other shrubs resulting in total drying of the plants, herbs and grasses were killed in whole area, occasional severe frost is harmful to the medicinal plants affecting their germination and growth.

(v) Rock Crushers and Stone Querying

Rock crushing operations are now wide spread in the area, rock crushing activities are now taking place at Khabeki wetland, Sodhi Mor, and Pail area, while stone queries are located at 14 different sites at Nurwari, Kathwai, Sodhee, Kawad, Jahler, Kaila Nallah, Suraki, Uchhali, Amb, Sakesar, Dhoke Miani, Dhaddar, Koradi. Sand stone querying operations are confined in northern hills, while limestone querying is taking place in Southern side of the area. Lease is offered by Punjab Mineral department as minor minerals. Mineral department offered areas for lease. These lease areas are severely degraded due to heavy transport, erosion and cutting of the vegetation. Due to removal of top layer and disturbance to the rocks strata wide ranging damage to flora are occurring. These operations scale and intensity is increasing and there is no sensitization either on the part of the leaseholder or department. There is a need to regulate these operations and restriction of operations in areas where threatened floral species exist.

(vi) Fuel wood Depots or Tolls

Fuel wood depots are one of the main threats to the forest biodiversity as their number has increased 100% during previous 5 years. Tehsil Government issues permits for fuel wood depots and its annual fee is Rs. 100. There is no monitoring system to check the source of fuel wood and permits are issued without any consultation with forest department, the Non objection certificate from forest department is not mandatory 80% of the fuel wood depots supply

fuel wood to the outer markets and in winter months 8 – 10 trucks ranging in weight from 240- 250 Maunds and 180- 190 maunds supply fuel wood even to the N.W.F.P province. 85% of the fuel wood comes from private lands or Rakhs, while 10% from the Shamilat Deh and 5% from the state reserve forest. Afghan Refugees have also set up fuel wood depots in area and usually these exist at the edge of the reserve forest, and even inside protected areas such as the Sodhi Wildlife sanctuary near Ucchala village. Due to Afghan refugees old trees of the Toot (*Morus alba*) and Ber (*Zizphus nummalaira*) species have also been cut and sold to these fuel wood depots.

Table No. 31 **NUMBER AND LOCATION OF FUEL WOOD DEPOTS**

	<u>Village</u>	<u>Number</u>	<u>Village</u>	<u>Number</u>
1.	Nowshera	8	Angha	1
2.	Dhacca	1	Kathwai	1
3.	Ugali	1	Jahlar	1
4.	Ucchali	2	Suraki	1
5.	Ucchala	2	Koradhi	1
6.	Sodhi	1	Jaba	1
7.	Khura	1	Koradhi	1
8.	Kalyal	1	Kufri	1
9.	Mardwal	1	Sodhee	1
10.	Khabaki	1	Kotli	1

These fuel wood depots are excess in amount and are main source of the destruction of the vegetation cover in area, as 70% of the bulk fuel wood storage is exported outside of the area, due to their mushroom growth and lack of any regularity mechanism and coordination Tehsil Government issues permits without keeping in mind the fact that at the cost of annual fees of these fuel wood depots natural resource base is depleting fastly. District Nazim has authority to ban fuel wood export for the period of 15 days but these powers have been used less frequently. Main fuel wood areas are Ucchala, Kawad, Jahler, Ugali, Karang, Sodhee, Suraki and Jabbi.

There is a need to regulate fuel wood business on demand and supply basis as compared to present system in which Afghan refugees are playing havoc with vegetation cover of the area. The Afghan refugees also establish seasonal fuel wood depots during summer months at Khatwai, Ucchala, Jaba and other places as well.

(vii) Invasive Plant species

Invasive species such as (*Brousonetia papyrifera*) and (*Lantana camara*) are spreading fastly in the area. The paper mulberry trees (*Brousonetia papyrifera*) is an extremely invasive, undesirable exotic tree species a native of upper Burma and china. (Stewart, 1972). (*Cannabis Sativa*) and mesquite are also spreading fastly in cultivated lands and along roadsides. These species are occupying the potential habitat of flora with spread of infection, allergy is also reported during to these species. Invasive species are one of the great threats to flora due to their spread and ther negative impacts. Thess species are highly undersireable as they are affecting natural ecosystem and are also causing health hazards so their control is important to protect natural flora.

(a) Mesquite (*Prosopis glandulosa*)

Mesquite has spread over the lot of area in Sodhi wildlife sanctuary and Kanhati garden area and has covered a lot of area, due to its dense cover all other naturally growing floral species have badly affected; being Xerophytic the mesquite is occupying cultivated lands and reserve forest areas replacing the natural flora. Goats are considered to be main factor in spreading this plant. It has been observed that there exist no vegetation under it tall plants. With present rate of growth and spread couples with unsustainable cutting and looping it is feared that this will engulf a lot of area in coming years.

(b) Cactus (*Opuntia monacantha*)

Is another menance that is spreading fast in the area. There are two probable reasons degraded sites and hotter aspect where the possibility of regeneration of the climax species is very difficult owing to factors like grazing / browsing, poor soil type, cover and scanty rainfall.

(c) Kunder (*Typha domingensis*)

This plant is also spreading very fast in marshy areas and around wetlands, it provides excellent habitat to the wild boar, which are potential threat to the natural vegetation, this plant is also a threat in reserve forest areas where people cut grass and in turn burn the grass for better growth.

(d) Ghaneri (*Lantana camara*)

This is another fast growing plant and it is spreading fastly in northern reserve forest replacing natural vegetation of the area.

(e) Euclyptus (*Euclyptus camuldensis*)

Euclyptus has been planted in area on a large scale in waterlogged area and in other places as well. It is a great threat to ground water resources due to high water intake; also its leaves did not decompose and is not friendly to the birds as well. It is present in the form of block plantation as well. its spread has been restricted through effective campaign of WWF-Pakistan and SVDP.

(f) Gajar booti (*Parthenium hysterophorus* Linn.)

This fast spreading weed has covered whole area from graveyards to cultivated fields, probably spread in area through its seeds in farmyard manure. There are reports of allergy, scabies in area due to this weed; afghan refugees are using this weed as fuel wood.

(viii) Pollution

Mohar area belt has 2 cement factories, and one of the cement factory Zman Cement Factory is causing damage to the local flora and fauna as reported by local people. Air in the area carries a heavy load of suspended particulate due to rock mining. Polluted air also affects public health and is reported in increase of upper respiratory illness. Certain types and amounts of air pollutants can harm and animals. Lime stone queries for cement plants are spread over a large area and have destroyed local flora as well as the thick dust layer over the plants, which are destructive for plants growth and germination.

(ix) Fuel Wood Collection

Fuel wood collection is one of the major activities, which cause considerable damage to the flora of the valley, and due to deforestation medicinal plants are also affected in a negative way. Local communities of the Khabeki, Nowshera

Ucchali, Khura, Angha, area main fuel wood markets where local camel owner called "Othi" bring daily fuel wood, an average camel load weight 8 maunds and if it carries Phuali or Kahu wood it is sold at the rate of 450 while camel load of Santha only is sold at the rate of 300. Usually 80% of this fuel wood is brought from state reserve forest illegally. At least 40% fuel wood is sold at fuel wood depots. Survey of the area reveals that fuel wood depots exist in all major villages and these supply fuel wood to main villages as well to the outer markets up to Peshawar through truck and it is estimated that one truck load carries 190 maunds of fuel wood. During winter months daily 2 – 3 trucks are exporting fuel wood. There is no regulatory mechanism, any body can establish fuel wood depot and usually there is no fee, no check and balance and there is no record of the fuel wood stock. In 2001 deputy commissioner Khushab imposed section 144 to ban fuel wood export. After devolution system District Government has not imposed section 144 and numbers of fuel wood depots have increased 50% in area. 20% of the local population did not collect fuel wood, but purchase it from fuel wood depots. Four types of fuel sources are found in soon valley, which include fuel wood, LPG, cow dung and Kerosene oil. Dependency on fuel wood is 55% while LPG is found second major fuel source 35% use of the cow dung and Kerosene oil is found in traces. LPG is used in major villages such as Nowshera, Ucchali, Khabkeki Angha, Khura while in other villages use is limited; there are 5 suppliers in the valley and estimated 3000 connections or consumers.

(x) Grazing

Grazing in range, forest and agricultural lands have been identified the most serious threat to the vegetation. Stunted growth of the Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*) have been observed in area due to heavy grazing. Shamilat deh and reserve forest vegetation is highly degraded due to heavy, unplanned grazing both by local community livestock as well as nomads and Afghan refugees herds grazing.

Grazing in rangelands, cultivated lands and forests is also one of the threats to several medicinal plants. Stunted growth of the Kahu (*Olea ferruginea*) and Phuali (*Acacia modesta*) is observed in areas where heavy grazing is common. Herds usually contain goat, sheep, and cattle. An average herd size is 50 – 100 animals per herd. Ugali, Kotli, Chitta, and sodhee have maximum herds up to 50 – 70 hers per village. Usually grass permits are obtained for 50% animals. Grazing permits are issued for the period of July to 30th June. Present grazing rates are cattle Rs. 8 per head, Rs. 4 for Sheep, Rs. 8 for goat, Rs. 30 camel.

The grazing rights admitted by forest settlement officer in 1897 were by 67, 923 animals units over a total area of about 11, 5000 acres in 1897. In terms of animal units only about 3 acres to 1 ½ acres per animal unit were available for grazing to local cattle. This is extremely high intensity of grazing considering the environment and ecological conditions of the Salt Range forests. It would therefore be necessary to restrict the number of cattle in Soon Valley villages if the Salt Range forests are to be saved. The existing grazing fees charged for grazing different categories of cattle in the Salt Range forests are very nominal.

(xi) Browsing

Browsing is a serious threat to several floral species especially camel browsing which is common in state reserve forest, camel owner stay in reserve forest, along with camels illegally during rainy season and cause significant damage to the young saplings of the Phuali and Kahu. Camel browsing is most serious threat to the scrub forests as camel owner usually stays in forest for the period of 2 – 3 months during rainy season for grazing usually illegally. Livestock grazing is a common practice along the water line of all three lakes as well as in the catchments areas resulting in degradation of vegetation cover. Livestock grazing pressure is high to the point of being excessive in several parts of the Soon Valley area.

Table No. 32 GRAZING RIGHTS IN SOON VALLEY FORESTS

Sr. No	Reserve Forest	Cows	Buffaloes	Sheep	Area
1	Hayat Al Mir	2338	161	726	3648 A
2	Khariot	1317	75	1195	10,161 A
3	Mardwal	314	44	352	4093 A
4	Angha	372	30	114	3636 A
5	Amb	1380	71	1928	8003 A
6	Ucchali	1428	151	238	3530 A
7	Warcha	1233	112	269	5785 A
8	Kuraddhi	828	67	303	1186 A
9	Suraki	254	11	240	589 A
10	Khura	812	29	233	2527 A
11	Gurra I	656	57	530	3360 A
12	Gurra II	383	28	272	
Total Forest Areas (II)		11,315	836	6400	46, 518 Acres

(Source: - Salt Range Forest Working Plan 1952 -82)

(xii) Deforestation

Widespread and uncontrolled deforestation is one of the serious threats to the biodiversity. State controlled reserve forest are highly degraded due to illegal cutting activities, according to local communities an illegal practice exit locally called “Millat” in which professional wood cutter pays a monthly fix amount and in turn collect fuel wood. This illegal act has destroyed and deprived state reserve forest of all tall trees of Kahu (*Olea feruginea*) and Phuali (*Acacia modesta*), their exist no old trees aging 100 years in state forest while several exist in local people lands and in graveyards. Shamilat deh which are unclassed forest and are under the control of the revenue department are fully devoid of vegetation. Biakh have remarkably good forest mainly due to local CBO initiative. Professional woodcutter local mafias have done a non-reversible damage to flora in shamilat deh. Illegal occupations are also a common feature of these forests with support of revenue department.

Private Rakhs or the private owned forest are best managed forest in area, having maximum vegetation cover, diversity due to better management, after the arrival of the Afghan refugees several best managed private Rakhs have disappeared and trend is increasing due to fuel wood smuggling to the other areas and establishment of huge fuel wood depots in area by Afghan refugees and local people. According to survey of WWF – Pakistan 60% vegetation of the area have been cut and exported during previous 10 years.

(xiii) DETERIORATION OF VEGETATION

Heavy livestock grazing, fuel wood cutting and forest fires have resulted in deterioration of vegetation upto the extent that tall trees of the Phuali and Kahu more than 50 years old are absent from reserve forest. Santha (*Dodonea viscosa*) a fast growing shrub has spread in many patches of reserve forest areas where previously there were trees of different species. Palatable and nutritious grasses like (*Chrysopogan mountainous*), (*Chrysopogen serrulatus*), (*Dicathum annulatum*), (*Cenchrus pennisetiaformis*) are frequently grazed and harvested, while the unpalatable grasses and sedges like (*Desmostachycha bipinnata*), (*Saccharum spontaneum*), (*Sacchrum munja*), (*Imperata cylindrica*) and (*Phragmites kakra*) are spreading. This trend in vegetation deterioration is alarming in the sense that many herbs, which grow in association with other species, are confined to restricted habitat.

(xiv) Exploration

Soon Valley and adjoining areas have considerable deposits of a large number of minerals.

Mining activities in the area includes advanced mineral exploration for the mining of the limestone mainly for cement industry, while other includes open pit mines and under ground mining. Mining activities damage vegetation due to several activities including blasting, milling, housing infrastructure; camps water ponds and fuel storage. Roads are most damaging in the sense as vegetation is cleared and further they provide access to the areas where good vegetation cover exist, due to this access deforestation, grazing, habitat fragmentation and contamination of soil due to waster material occur.

**Table No. 33 MAIN MINERALS IN SALT RANGE
(DAIWAL TO GOLIWALI)**

<u>Name of Mineral</u>	<u>Total Number</u>
1. Coal	78
2. Rock Salt	6
3. Gypsum	21
4. Silica Sand	22
5. Fire Clay	18
6. Bauxite	7
7. Latrite	10
8. Oker	3
9. Lime Stone, Dolomite Calcite	30
10. Sand Stone	12
Total	196

Source: (Punjab Mineral Department)

(xv) Forest Fires

Wide spread, uncontrolled and regular incidents of forest fires burn a lot of area each year affecting state reserve forest private rakh and shamilat deh. Forest fires in shamilat deh and private rakhs remains unnoticed and uncontrolled usually. Their exit no fire management plans at local level. According to survey report of OWDS a local CBO, 80% cases of forest fires are intentional and are result of the human activities. Local communities held responsible forest department for forest fires.

Fires usually occur during months of April, May in summer season and in November, December during months of winter season, 80% fire incidents occur during early summer months. Reasons of forest fires include accidental (Cigarettes butts, burning match etc.) and anthropogenic (honey collection, burning of dry and mature grass to stimulate their growth etc.) Accidental fires generally occur in dry season (May, June and October, November) and are devastating in nature as they generally engulf vast areas of vegetation. Forest fires kills birds, animals, reptiles and burn nests of the birds. while usually tall

trees are completely burned and herbs and shrubs also burn, this affecting negatively growth of the valuable medicinal plants through habitat degradation and germination of new saplings by burning seeds of the plants.

3.8.1 SURVEY OF THE MARKETING SYSTEM

Marketing system of the medicinal plants have also been surveyed in area and outside of the area, 6 Pansar stores were identified in 4 villages of the area, it was also studied that medicinal plant local market exist in 7 villages while the 6 national markets also got a share of the medicinal plant production from the study area market price of the 16 important species were also obtained during field survey.

1. STUDY ON EXISTING MARKETING SYSTEM

Keeping in view of the medicinal plant resources of the salt range and valley Soon Sakesar in mind, the marketing sector is one of the most unorganized and inefficient, in whole Soon Valley there are 6 Pansar Store 3 in Naushera village, one in Angha, one in Ucchali and one in Khabeki village. There is no major exporter or collector of the medicinal plants except some individual who have no other source of the income or they have been hired by some Pansar store operating in big city, but their number does not exceed more than few persons. A detailed survey of the present market of the soon valley was carried out, there are following pansar Store in area.

<u>Sr.No.</u>	<u>Nameof Pansar Stores</u>	<u>Village</u>
1.	Farooq Pansar Store	Nowshera
2.	Hafiz Pansar Store	Nowshera
3.	New Hafiz Pansar Store	Nowshera
4.	Angha Pansar Store	Angha
5.	Sheikh Pansar Store	Khabeki
6.	Munawar Shah Pansar Store	Ucchali

A detailed survey was carried out and survey form was distributed to each Pansar storeowner for data collection. Discussion was also held with each Pansar storeowner, this survey revealed following important results.

2. MARKETING CHANNEL OF MEDICINAL PLANTS IN SOON VALLEY

<u>Markets</u>	<u>Collection Agents</u>	<u>Type of plant Collected</u>
1. Pansar Stores	Hakeems	
2. Pansar Markets	individual Agents	Wild plants
	Special Collection	Cultivated plants
3. Collection Process	Traders Farmers	
	Local traders	Vegetable markets

3. Collection agents involved in marketing of medicinal plants

During survey it was observed that following collection agents are involved in marketing of the medicinal plants.

- | | |
|----------------------|---------------------|
| 1. Farmers | 3. Pansar Markets |
| 2. Traders | 4. Local traders |
| 5. Vegetable markets | 6. Out Side Traders |

4. Collection Mechanism

Collection mechanism of the medicinal plants was also studied and it was concluded that it involved different agents who collect these plants and sell them in market.

1. Hakeems
2. Special Agents of Hakeems
3. Pansar Stores
4. Saniasi
5. Farmers
6. Traders

5. Markets

Markets of the medicinal plants were explored and it was observed that three different types of the markets exist in area. Markets survey revealed that some of the medicinal plants are sold in vegetable markets, while some are sold in pansar markets. These medicinal plants have been enlisted as under.

1. Local markets (Pansar Stores)
2. Outer markets (Pansar stores)
3. Pansar markets

6. Medicinal Plants Sold in Vegetable Markets

1. Alsi (*Linum usitatissimum* L.)
2. Methi (*Trigonella foenum-graceum* L.)
3. Podina (*Mentha longifolia* L.)
4. Til (*Sesamum orientale* L.)
5. Kasni (*Cichorium intybus*)
6. Choughan (*Caralluma tuberculata* N.E.Brown)
7. Ajwain (*Carum copticum* L.)

7. Medicinal Plants sold in Pansar Markets

1. Valekar (*Justicia adhatoda* L.)
2. Mastiara (*Scutellari linearis* L.)
3. Kali Jeri (*Verononia anthelmintica* willd)
4. Saunf (*Foeniculum vulgare* Mill.)
5. Tumba (*Citrullus colocynths* (L.)Schard)
6. Ispagol (*Plantago ovata* Forssk.)

3.8.2 Background of Herbal Trade in Soon Valley

The different surveys reveal that the trade of the medicinal plants begin in area about two decades ago some people from India, Lahore and Sanias and Jogis visited area for the collection of the medicinal plants, mostly jogis visited the Sakesar forest and they often stay in Ugali, Ucchali, and Chitta villages, usually they came during July to August, they use the local herdsmen for the collection of the plants and take away the plants with them. But from previous 10 years very few people visited the area during previous year 2 persons visited the Sakesar and 2 persons visited the Koradhi area, as the local herdsmen were not aware of the potential marketing values of the plants, so the trade system did not establish. Mostly these outside collectors stay for 10-15 days and they give few tips to any interested person but not the real use or marketing value of the plants or products they collected from the area. Although some medicinal plants are available in abundant quality such as Valekar (*Justicia adhatoda*) but their trade is not established, their quality and timely supply to the national market and finally to the end users is uncertain. This is perhaps due to the

unregulated trade from the area, and another factor is that local Pansar store owner does not collect these plants at their own as this was tradition in past. Only local Hakeem collect some medicinal plants through middle man, but the persons involved are not well trained, a good marketing system can be established if the trade is managed on regular basis.



Plate No. 33 **Kalar Kahar medicinal plants market**



Plate No. 34 **Kalar Kahar market**

1. Market Channels

The survey showed that N.W.F.P, Malakand division, Mingora, Madyan are the main trade centers for many medicinal plants, while in Salt Range Pansar stores exist at Chakwal, Khushab, Mianwali, Choa Saiden Shah, Nowshera, Talagang, Quaidabad, Pind Dadan Khan, Khewra, but they get their medicinal products from Lahore Akbri Mandi Market. The Lahore market acts as a major centre of the trade in country receiving material from abroad as well from Punjab Salt Range, but not through a regular Channel or system.

Usually dealers in Lahore sent their agents to collect these items through local collectors as they are illiterate and they do not negotiate for the price of the plant material and gathered sizeable quantities of the material. Only in Dhoke Miani village at border of the Khushab District in Salt Range Akri (*Withania coagulens*) leaves are collected by herdsmen and women and they are sold in Mianwali. While there exist no system of commercial level collection of any other species from wild to be collected and sold in market except for those plants which are cultivated on agricultural lands. The local Agents working on behalf of the Pansar stores owners or Hakeems get only daily paid wages. The export of the crude herbs items of the selected species to different countries is through local exporters in Joddia Bazar Karachi and Akbari Mandi Market Lahore. Selected species are currently exported to Germany, Japan, France, India, and Switzerland, Middle East and Africa.

2. Extent of Trade from Soon Valley:

Although at marketing level a high potential exist but currently only 5 % of the wild and domestic materials are being sold due to uncoordinated demand and supply and unawareness about the availability of certain species and demand.

Among the selected plant species the most valuable is Saunf (*Foeniculum vulgare Mill.*), which is sold at the rate of Rs. 60 Per kg and Methi (*Trigonella foenum-graceum*) at the rate of Rs .80 Per Kg. Price of the each species vary from year to year and also depend on the demand and supply. Based on the local figures current collective trade of the economic plants including, non timber forest products such as honey the total annual amount generated does

not exceed than 0.5 million rupees. The study reveal that Hakeems deal with the target species, but the trade at Hakeems level is more complex and heterogeneous than at collectors and dealers levels. They mostly gather these plants themselves or through their agents without paying money but as rewards for treatment free of cost or for some tonic tablets to the local People. The locals are satisfied and happy with this arrangement and gather sizeable quantities of plants on the demand of the Hakeems.

3. Price fluctuations of the Species at collector / Farmer level and beyond

The study showed that the price of the plants gradually increases from collector to local national and international level markets at each step. The price is lowest at the collector level and increase manifold from collectors to the national markets and abroad However Considerable weight of the plant is lost during drying, cleaning, processing, grading packing etc. at each level when value is added to the products. The weight loss varies from species to species and the modes of the processing for sale. One of the reasons for this low price at collectors' level is their unawareness of the price of the plants in the trade markets, due to low payment collectors or farmer does not ensure sustained supply, adulteration is also one of the problems in this trade due to which pharmaceutical companies prefer imported items.

Some Medicinal Plants Imported Abroad and Also Available In Area

<u>SR.NO.</u>	<u>NAME OF PLANT</u>	<u>DEMAND TREND</u>
1.	Ispagol (<i>Plantago ovata Forssk.</i>)	Increase
2.	Ajwain (<i>Carum copticum L.</i>)	Increase
3.	Shahtra (<i>Fumaria indica (Hausk.) Pugsley</i>)	Increase

3.8.3 ISSUES OF MARKETING SYSTEM

Local stakeholders were involved in identification of the issues of marketing system and to develop a better strategy for improving the marketing of the medicinal plants in area, issues identified and measures proposed have been enlisted below.

Poor marketing and declining demand for local plant material is due to following factors.

1. Adulterated raw material
2. Wrong identification.
3. Poor Storage, drying.
4. Unethical business practices and monopolies and less profit at local level.
5. Poor cleaning.
6. Timely supply.
7. More trend toward cash vegetables crops.
8. Less awareness about plants.

3.8.4 MARKETING STRATEGY FOR MEDICINAL PLANT

1. Cultivation at farm level of high value medicinal plants
2. Investigation of proper markets.
3. Linkages with pharmaceutical companies.
4. Proper harvesting, Packing.
5. Proper cleaning.
6. Proper drying and treatment.
7. Grading and packing in sealed, labeled bags.
8. Product relevant information.
9. Value addition at local level.
10. Preference for cultivation of the organically grown medicinal plants.
11. Trials of some selected plants at farmer's level.
12. Effective transportation system.
13. Promoting awareness about medicinal plants.
14. Developing local level markets.
15. Awareness raising for high priced crops.
16. Monitoring check on over exploitation of the wild plant resources.
17. Effective state control to protect the rights of local communities the resource base and to prevent a decline in genetic diversity.
18. Awareness and educational material.

19. Guidelines for collection of the threatened species.
20. Demonstration at farm level to motivate local people.
21. Special research studies on marketing system in collaboration with other organizations.
22. Ex- Situ conservation.
23. Cultivation of the medicinal plants as micro enterprise.

1. LOCAL MARKETS FOR MEDICINAL PLANTS OF VALLEY SOON SAKESAR SALT RANGE

- | | | |
|----------------|---------------|-------------|
| 1. Khushab | 2. Jauharabad | 3. Mianwali |
| 4. Quaidabad | 5. Talagang | 6. Chakwal |
| 7. Kalar Kahar | | |

2. NATIONAL MARKETS FOR MEDICINAL PLANTS

- | | |
|------------------------|-----------------------------|
| 1. Mingora, NWFP | 2. Qarshi industries Hattar |
| 3. Akbari Mandi Lahore | 4. Joddia Bazar Karachi |
| 5. Sargodha | 6. Faisalabad |

3. KALAR KAHAR MARKET

The only viable and good market adjacent to Studyarea is Kalar Kahar, where following items are available and they have good demand, and the business is thriving well.

- | | | |
|---------------|-------------|---------------------|
| 1. Arqa Gulab | 2. Arq Mako | 3. Valekar Gul Qand |
| 4. Honey | 5. Cho Arqa | 6. Desi Ghutti. |

Arq-e-Gulab is one of the products of the Kalar Kahar and it is obtained from rose flowers produce locally; unfortunately this is not present in Soon Valley. However the Gul Kand of Valekar (*Adhatoda vasica*) is one of the most important utilization of the wild medicinal plants, and it is considered a good treatment for Astham, and cough. Kalar Kahar can be an important market if other products are introduced and linked with this market.

Table No. 34 RATES OF SOME SELECTED MEDICINAL PLANTS

<u>S. No.</u>	<u>Name of plant</u>	<u>Demand</u>	<u>Rate in local market</u>
1.	Ajwain (<i>Carum copticum L.</i>)	More	30 Rs./ Kg.
2.	Saunf (<i>Foeniculum vulgare Mill.</i>)	More	50 Rs./ Kg
3.	Methi (<i>Trigonella foenum-graceum L.</i>)	More	32 Rs./ Kg
4.	Panir (<i>Withania coagulens Dunal</i>)	More	16 Rs./ Kg
5.	Kali Zeri (<i>Verononia anthelmintica Willd.</i>)	More	80 Rs. / Kg
6.	Alsi (<i>Linum usitatissimum L.</i>)	More	35 Rs. / Kg
7.	Podina (<i>Mentha longifolia L.</i>)	More	10 Rs. / Kg
8.	Gloh (<i>Tinospora cordifolia L.</i>)	More	12 Rs. / Kg
9.	Harmal (<i>Peganum harmala L.</i>)	More	16 Rs. / Kg
10.	Ispagol (<i>Plantago ovata Forsk.</i>)	More	50 Rs. / Kg

3.8.5 Harvesting Effects on medicinal plants

The effect of the current harvest on population of each target species have been compared 20 years record as local indicator. This was further investigated through interviews with local community collectors / knowledgeable persons. The effect was judged that how much distance the local collectors travel and time spent both now and in past. Field visits were made to some sites and at harvesting locality and observed different level of harvesting. These levels were categorized as follows.

- Level 0 : No harvesting
- Level 1 : 25% harvesting
- Level 2 : 50% harvesting
- Level 3 : 75% harvesting
- Level 4 : 100% harvesting

There are two different approaches to harvesting selective harvesting and busy harvesting. Busy harvesting for commercial purposes, collection of all the plants of the species, while selective harvests are on for the preparation of the traditional medicines or for the specific, demand. They collect all the large and mature plants using local indicators.

1. Current Harvest Levels:

The unregulated collection of the plants coupled with the loss of the habitat has resulted in the extinction of certain species. Keeping in view the soon Valley following sites have good potential of the medicinal flora and their current harvest level is as under.

1. Sakesar Site:

One of the most rich and protected site due to P.A.F base Sakesar, it still maintains the diversity of flora however the back side of the Sakesar towards QuaidAbad and Mianwali is degraded due to no restriction only the Rakh Sakesar Attock and Rakh Sakesar Shahpur are protected, here three important species are present Banafsha (*Viola canescens*), Allerga (*Rhus cotinus*) and wild pomegranate (*Punica granatum*) current harvest level is somewhat sustainable.

2. Keri Range Sodhi:

The site located in a protected area degraded due to forest have also good potential, in past it have good potential of certain species such as Makhni Booti (*Sida alba*), and Choughan (*Caralluma tuberculata*).

3. Rakh Khariot:

The site is open to the all public and it offers some of the most variety in area, its medicinal plants are collected from both sides Pakhar and Soon Valley, due to heavy harvest or 100% harvest of Choughan (*Caralluma tuberculata*). It is extinct in this area, however 25% harvesting of Vena (*Rhazya stricta*) takes place in this area, and if the protection level of the site is increased it can support all important species.

4. Rakh Karang:

The site is located close to the Sakesar and offers some of good quality fruit of Kahu, 100% harvesting of the Akri (*Withania coagulans*) takes place from the site, the other species harvested are Kahu fruit, 25% Vena (*Rhazya stricta*) 75% and Dhaman (*Fagonia indica*) 75%. The area is facing severe biotic pressure and the habitat of the medicinal plants is shrinking in area.

5. Rakh Gorra, Nowshera and Sodhee Range:

This area has already been degraded due to 100% harvesting of the some species. Some species such as Choughan (*Caralluma tuberculata*) are confined only in Chapar Sharif area due to harvesting from people belonging to Mohar and Soon Valley.

Table 35 Harvest level of some selected Wild Medicinal Plants

Sr.No.	Name of species	Sakesar	Keri	Khariot	Gorra Nowshera	Karang
1	Vena (<i>Rhazya stricta</i>)	25%	25%	50%	75%	75%
2	Akri (<i>Withania coagulans</i>)	100%	25%	25%	100%	75%
3	Dhaman (<i>Fagonia indica</i>)	100%	25%	50%	50%	75%
4	Allerga (<i>Rhus cotinus</i>)	100%	--	--	--	--
5	Banfsha (<i>Viola canescens</i>)	100%	--	--	--	--
6	Jangli Piaz (<i>Allium griffithanum Boiss</i>)	25%	--	25%	--	--
7	Makhni Booti (<i>Sida alba</i>)	100%	25%	--	100%	25%
8	Tumba (<i>Citrullus colocynthis L.</i>)	--	--	100%	--	100
9	Jangli Karela (<i>Momordica diocia Roxb.ex.Willd</i>)	100%	--	100%	--	--
10	Harmal (<i>Peganum harmala L.</i>)	75%	25%	25%	75%	25%

TableNo. 36 WORK INVESTMENT FOR COLLECTION OF SPECIES

S.No	Name of plant	Distance Travel		Time spent		Form of material sold
		Present	20 years ago	Present	20 years ago	
1	Vena (<i>Rhazya stricta</i>)	5-6	2-3	8-10	4-5	Seed
2	Akri (<i>Withania coagulans</i> Dunal)	5-8	3-4	6-8	5-6	Leaves
3	Dhaman (<i>Fagonia indica .L</i>)	3-4	2-3	5-6	3-4	Seed
4	Allerga (<i>Rhus cotinus</i>)	8-12	8-9	10-12	8-10	Branches
5	Banfsha (<i>Viola canescens</i>)	10-12	8-10	10-15	8-10	Flower
6	Jangli Piaz (<i>Allium griffithianum</i> Boiss)	15-18	10-12	10-18	8-10	Bulb
7	Makhni Booti (<i>Sida alba</i>)	15-16	10-12	10-12	8-10	Whole plant
8	Tumba (<i>Citrullus colocynthis</i> L.)	20-25	10-15	15-20	8-10	Fruit
9	Jangli Karela (<i>Momordica diocia</i> Roxb.ex. Willd)	18-20	10-12	10-15	10-12	Fruit
10	Harmal (<i>Peganum harmala</i> L.)	5-7	3-4	5-6	2-4	Seed

The results indicates that population of the some selected plants have declined to a great extent as the traveling distance have increased along with time spent on collection.

Current use and Marketing

Information and data on various aspects of the use and marketing of the plants such as collection, preparation, traditional uses marketing and distribution of harvest areas for the market of each species were collected from the local experienced persons and Pansar Stores through interviews and discussion. Information was gathered as to how and when plants are collected. The traders and Hakeems were reluctant to give details due to fear that the information would be passed on to the income tax authorities. However the present limited data about their income analyzed mostly by judgment.

Table No. 37 KALR KAHAR MARKET SURVEY

<u>Sr.No.</u>	<u>Product Name</u>	<u>RATE</u>
1.	Arq -e- Gulab	Rs.500 / Kg.
2.	Arq-e- Choaraqa	Rs. 20/ KG
3.	Saunf	Rs. 50 / 20 / 100/ Kg
4.	Gul Kand Valekar	Rs. 30 Kg
5.	Gul Kand Gulab	Rs. 25 / Kg
6.	Arqe mako	Rs. 20 / kg
7.	Achar mix	Rs. 20/kg
8.	Sharbat Shahtoot	Rs. 50-150/kg
9.	Arqe Podina	Rs. 20/kg
10.	Loquat	Rs. 20/kg
11.	Jaman	Rs. 150 /kg
12.	Arqe badam	Rs. 100 /kg
13.	Vinegar Sirka	Rs. 25/kg
14.	Honey Ber	Rs. 200 /kg
15.	Honey small	Rs. 500/kg
16.	Arqe Ajwain	Rs. 20/kg

3.8.6 Relationship of the trade issues with potential / existing threats

In order to relate the trade issues with the existing threats it has been observed that the marketing of the some of the important plants is closely related to the marketing or trade issues. Some selected plants and their abundance and the

vegetation or other which are utilized for medicinal purpose are badly affected hence reducing the price and availability of the product and also affecting medicinal value and quality of the product.

1. Grazing pressure is also one of the important factor reducing the supply, availability and quantity of the products received from the medicinal plants.
2. Collection Practices of the plants also affect trade of the species if plants are not collected in proper form their market value reduces.
3. Forest fires totally destroy the vegetation and have the most negative impact on the trade of the medicinal plants.
4. Deforestation is also one of major reason of the decline of the trade of the certain species of the medicinal plants.
5. Mining due to excessive mining and their residues growth of the selected plants reduces thus reducing the marketable quantity.
6. Exotic plant species spread reduce the growth of the plants thus limiting the quality and quantity of the marketable products of medicinal plants.
7. Over Exploitation of the medicinal plant resources limit the availability of the plant material and result in shortage and high value of the product thus creating an imbalance in trade issues.
8. Non transfer of the indigenous knowledge is also reported to be affecting less collection of certain species thus negatively reducing the trade of the medicinal plants.
9. Due to depletion of the gene pool depletion and extinction of the certain species their trade has become none exist at all.
10. Degradation of the natural habitat have reduced the supply chain of the selected plants and thus reducing the trade of the certain species.
11. Lack of the development cultivation and appropriate conservation, cultivation and harvesting strategies also affecting trade.
12. Social and environmental issues are directly responsible for creating an imbalance in supply and demand and thus negative impact on trade.

Hence we can conclude that the trade and threats to the medicinal plants are inter related.

3.8.7 Medicinal plant values of plant species from Soon Valley Salt Range

Flora of study villages was analyzed with respect to the medicinal values of the plants species and number of plants used against specific value. Overall 68 different medicinal properties of the plant were documented. Plant species medicinal values were also investigated and it was concluded that 10 plant species are used against rheumatism, 10 against skin diseases, 10 in digestive related problems and 10 against constipation, 15 as astringent and 50 in animal diseases.

Table No. 38 Medicinal plant values of plant species from Soon Valley Salt Range

Medicinal Properties	Number of Plants Species
Astringent	15
Tonic	3
Stimulant	2
Diarrhea	4
Dysentery	3
Expectorant	2
Aphrodisiac	2
Febrifuge	3
Restorative	3
Gonorrhea	2
Swelling	2
Tuberculosis	2
Piles	3
Skin diseases	10
Worms	5
Snake bite	3
Diuretic	4
Diabetes	10
Constipation	8

Purgative	4
Carminative	10
Cough	8
Vomiting	4
Pains and bruises	3
Rheumatism	10
Leucorrhoea	1
Cooling	4
Scabies	2
Lungs and bladder diseases	4
Jaundice	3
Enlarged spleen	3
Cholera	2
Vermifuge	3
Toothache	2
Antiseptic	2
Refrigerant	3
Inflammation of throat	2
Asthma	4
Hoarseness of voice	2
Hemorrhage	2
Anemia	2
Digestive	10
Stomachache	5
Intestinal colic (antispasmodic)	2
Bone fractures	3
Burns	2
Headache	3
Scorpion sting	2
Joints	5

Malaria	3
Wounds	4
Cardiac	3
Fever	4
Skin allergy	3
Liver complaints	4
Herbal tea	2
Aromatic	5
Blood purifiers	8
Insect bites	3
Milk and butter production for goat & sheep	4
Narcotic	5
Sedative	2
Urinary diseases	3
Cold	4
Cancer	2
Animal diseases	50
Chronic disorder of kidney and live	3
Paralysis	2

Table No. 39 Plants Used For Abdominal Pain / Stomach Disorder

Sr. No.	Botanical Name	Family	Local Name
1	<i>Ajuga bracteosa</i>	<i>Lamiaceae</i>	Siri wali booti
2	<i>Chenopodium murale</i>	<i>Chenopodiaceae</i>	Bathu
3	<i>Foeniculum vulgare</i>	<i>Apiaceae</i>	Sonf
4	<i>Justicia adhatoda</i>	<i>Acanthaceae</i>	Vahekar
5	<i>Menthe longifolia</i>	<i>Lamiaceae</i>	Podina
6	<i>Oxalis corniculata</i>	<i>Oxalidacea</i>	Khatetan

7	<i>Punica granatum</i>	<i>Punicaceae</i>	Anar
8	<i>Salvia moorcroftiana</i>	<i>Lamiaceae</i>	Kali jeri
9	<i>Swertia cordata</i>	<i>Gentianeae</i>	Chirata
10	<i>Ceropegia bulbosa</i>	<i>Asclepiadaceae</i>	Gilote
11	<i>Asparagus gracilis</i>	<i>Liliaceae</i>	Dusan
12	<i>Rhazya stricta</i>	<i>Apocynaceae</i>	Vina
13	<i>Carum copticum</i>	<i>Apiaceae</i>	Ajwain
14	<i>Fagonia indica</i>	<i>Zygophyllaceae</i>	Dhanian

Table No. 40 Plants used for diarrhea

Sr.No.	Botanical Name	Family	Local Name
1	<i>Menthe longifolia</i>	<i>Lamiaceae</i>	Podina
2	<i>Plantago lanceolata</i>	<i>Plantaginaceae</i>	Aspagol
3	<i>Punica granatum</i>	<i>Punicaceae</i>	Anar

Table No. 41 Plants used for Dysentery

Sr.No.	Botanical name	Family	Local Name
1	<i>Ficus plamata</i>	<i>Asteraceae</i>	Khabari
2	<i>Withania somnifera</i>	<i>Solanaceae</i>	Aksan

Table No. 42 Plants used as Vermifuge

Sr. No.	Botanical Name	Family	Local Name
1	<i>Melia azedarach</i>	<i>Meliaceae</i>	Dhrek
2	<i>Ajuga bracteosa</i>	<i>Lamiaceae</i>	Siri Wali booti
3	<i>Juglans regia</i>	<i>Juglandaceae</i>	Akhort

Table No. 43 Plants use as Antispasmodic

Sr. No.	Botanical Name	Family	Local Name
1	<i>Allim sativum</i>	<i>Alliaceae</i>	Piaz
2	<i>Cannabis sativa</i>	<i>Cannabiaceae</i>	Bhang

Table No. 44 Plants used as Emollient

Sr. No.	Botanical Name	Family	Local Name
1	<i>Boerhavia procumbens</i>	<i>Nyctaginaceae</i>	It Sit
2	<i>Calotropis procera</i>	<i>Asclepiadaceae</i>	Aak
3	<i>Dodonea viscosa</i>	<i>Sapindaceae</i>	Santha
4	<i>Datura metel</i>	<i>Solanaceae</i>	Dhatura
5	<i>Euphorbia prostrata</i>	<i>Euphorbiaceae</i>	Dodhook
6	<i>Rosa indica</i>	<i>Rubiaceae</i>	Galoh
7	<i>Solanum nigrum</i>	<i>Solanaceae</i>	Chichmaj

Table No. 45 Plants used as Tonic

Sr. No.	Botanical Name	Family	Local Name
1	<i>Acacia modesta</i>	<i>Mimosaceae</i>	Phuali
2	<i>Vitex negundo</i>	<i>Verbenaceae</i>	Masvan
3	<i>Sida alba</i>	<i>Malvaceae</i>	Makhni booti
4	<i>Carum copticum</i>	<i>Apiaceae</i>	Ajwain

Table No. 46 Plants used as Refrigerant

Sr. No.	Botanical Name	Family	Local Name
1	<i>Cichorium intybus</i>	<i>Asteraceae</i>	Kasni
2	<i>Fumaria indica</i>	<i>Fumariaceae</i>	Papra

3	<i>Prunus persica</i>	<i>Rosaceae</i>	Alu bukhara
4	<i>Viola canescens</i>	<i>Violaceae</i>	Banafsha
5	<i>Olea ferruginea</i>	<i>Oleaceae</i>	Kahu
6	<i>Ficus palmata</i>	<i>Moraceae</i>	Khabari
7	<i>Nasturtium officinale</i>	<i>Brassicaceae</i>	Jangli Aloo

Table No. 47 Plants used for Jaundice

Sr. No.	Botanical Name	Family	Local Name
1	<i>Phyla nodiflora</i>	<i>Verbenaceae</i>	Gul Nim
2	<i>Saggeretia thea</i>	<i>Rhamanceae</i>	Saggar
3	<i>Zizphus nummularia</i>	<i>Rhamanceae</i>	Ber
4	<i>Boerhavia procumbens</i>	<i>Nyctaginaceae</i>	It sit nurga
5	<i>Heliotropium strigosum</i>	<i>Hamamelidaceae</i>	Gorakh pan

Table No. 48 Plants used for Diabetics

Sr. No.	Botanical Name	Family	Local Name
1	<i>Justicia adhatoda</i>	<i>Acanthaceae</i>	Vahekar
2	<i>Psidium guajava</i>	<i>Myrtaceae</i>	Amrood
3	<i>Momordica diocia</i>	<i>Cucurbitaceae</i>	Karela
4	<i>Caralluma edulis</i>	<i>Asclepiadaceae</i>	Choughan
5	<i>Melia azedarach</i>	<i>Meliaceae</i>	Dharek
6	<i>Solanum nigrum</i>	<i>Solanaceae</i>	Chich maj
7	<i>Syzygium cuminii</i>	<i>Myrtaceae</i>	Jaman
8	<i>Tylohora hirsuta</i>	<i>Asclepiadaceae</i>	Gloh
9	<i>Withania coagulens</i>	<i>Solanaceae</i>	Akri
10	<i>Zizphus mauritiana</i>	<i>Rhamnaceae</i>	Ber
11	<i>Fagonia indica L</i>	<i>Zygophyllaceae</i>	Dhanian
12	<i>Allium sativum</i>	<i>Liliaceae</i>	Lahsun

Table No. 49 Plants used in different diseases

Sr. No.	Botanical Name	Family	Local Name	For disease
1	<i>Viola canescens</i>	<i>Violaceae</i>	Banafsha	Fever cold
2	<i>Ficus bengalensis</i>	<i>Moraceae</i>	Bohar	Male infertility
3	<i>Tribulus terrestris</i>	<i>Zygophyllaceae</i>	Bhakra	Back bone
4	<i>Otostegia limbata</i>	<i>Lamiaceae</i>	Awani	Eye deseases
5	<i>Sesamum orientale</i>	<i>Pedaliaceae</i>	Til	Urine
6	<i>Colebrookea oppositifolia</i>	<i>Labiatae</i>	Kala vahekar	Blood purifier
7	<i>Rubia cordifolia L.</i>	<i>Rubiaceae</i>	Majith	Back bone
8	<i>Momordica dioica</i>	<i>Cucurbitaceae</i>	Karela	Diabetics
9	<i>Aloe barbadensis</i>	<i>Liliaceae</i>	Munwar Gandal	Conditioner
10	<i>Grewia villosa</i>	<i>Teliaceae</i>	Jaledher	Piles
11	<i>Withania coagulens</i>	<i>Solaanaceae</i>	Akri	Blood purifier

Table No. 50 Honey Bee Pollination Species

Botanical Name	Family	Local Name
(1) <i>Brassica juncea</i>	<i>Brassicaceae</i>	Sarson
(2) <i>Eruca sativa</i>	<i>Brassicaceae</i>	Jamun
(3) <i>Zizphus mauritiana</i>	<i>Rhamanaceae</i>	Ber

(4) <i>Morus nigra</i>	<i>Moraceae</i>	Toat
(5) <i>Corriandrum sativum</i>	<i>Apiaceae</i>	Dhania
(6) <i>Rosa indica</i>	<i>Rosaceae</i>	Gulab
(7) <i>Mentha longifolia</i>	<i>Lamiaceae</i>	Podina
(8) <i>Otostegia limbata</i>	<i>Lamiaceae</i>	Awani
(9) <i>Justicia adhatoda</i>	<i>Acanthaceae</i>	Vahekar
(10) <i>Acacia nilotica</i>	<i>Mimosaceae</i>	Kiker
(11) <i>Acacia modesta</i>	<i>Mimosaceae</i>	Phulai

Table No. 51 Medicinal Plants Used against Different Animal Bites

Sr. No.	Names of Species	Family	Local Name	Remarks
1	<i>Amaranthus viridis</i>	<i>Amaranthaceae</i>	Chaleri	Scorpion & Snake
2	<i>Barleria cristata</i>	<i>Acanthaceae</i>	Kanda	Snake
3	<i>Boerhavia procumbens</i>	<i>Nyctaginaceae</i>	Itsit	Scorpion
4	<i>Datura stramonium</i>	<i>Solanaceae</i>	Dhatura	Fish
5	<i>Ficus carica</i>	<i>Moraceae</i>	Anjir	Bee
6	<i>Jasminum officinalis</i>	<i>Oleaceae</i>	Chambeli	Scorpion
7	<i>Rubia cordifolia</i>	<i>Rubiaceae</i>	Manjit	Scorpion & Snake
8	<i>Sauromatum venosum</i>	<i>Araceae</i>	Sap jari, Zohr mohra	Snake
9	<i>Verbena officinale</i>	<i>Verbenaceae</i>	Jangli phool	Scorpion & Snake

3.8.8 Documentation of indigenous knowledge

Survey of the flora of all villages was carried out to assess the status of the flora, during these surveys it was observed that some villages are more rich in indigenous knowledge as compared to other villages, one of the factors considered during selection of these villages was also the presence of traditional Hakims families in these villages or other such notable persons having knowledge and are known in the area due to their expertise. Another factor in the selection of these villages was to fully cover the entire different diverse micro habitat. Following villages were selected for detailed documentation of folk recipes of the medicinal plants.

- | | | |
|-------------|-------------------|------------|
| 1. Chitta | 2. Chinji | 3. Dhaddar |
| 4. Naushera | 5. Uchali | 6. Ugali |
| 7. Angha | 8. Chappar Sharif | 9. Khura |

1. Chitta

This village lies at the foot hills of the Sakesar peak and is one of the most rich villages in terms of archeological remains and folk knowledge about medicinal plants, it is well known due to Hakims and medicinal plant collectors even in the sub continent, traditional collectors of medicinal plants from Tilla Jogian, known as "Sanisai" and Jogis used this village as base camp before partition. Due to interaction of these people with the local community it is quite rich in indigenous knowledge, another importance is that it is located at the western corner of the Uchali wetland and has rich archeological history in Salt Range.

2. Chinji

This village is located in the northern range of the valley at the junction of the Soon and Pakhar areas; it is selected due to the presence of Hakim families and is also representative of the Northern slopes of the valley. Village is located 35 km away from Nowshera village.



Plate No. 35

***Taraxacum officinale* Webber**

Voucher No. 68

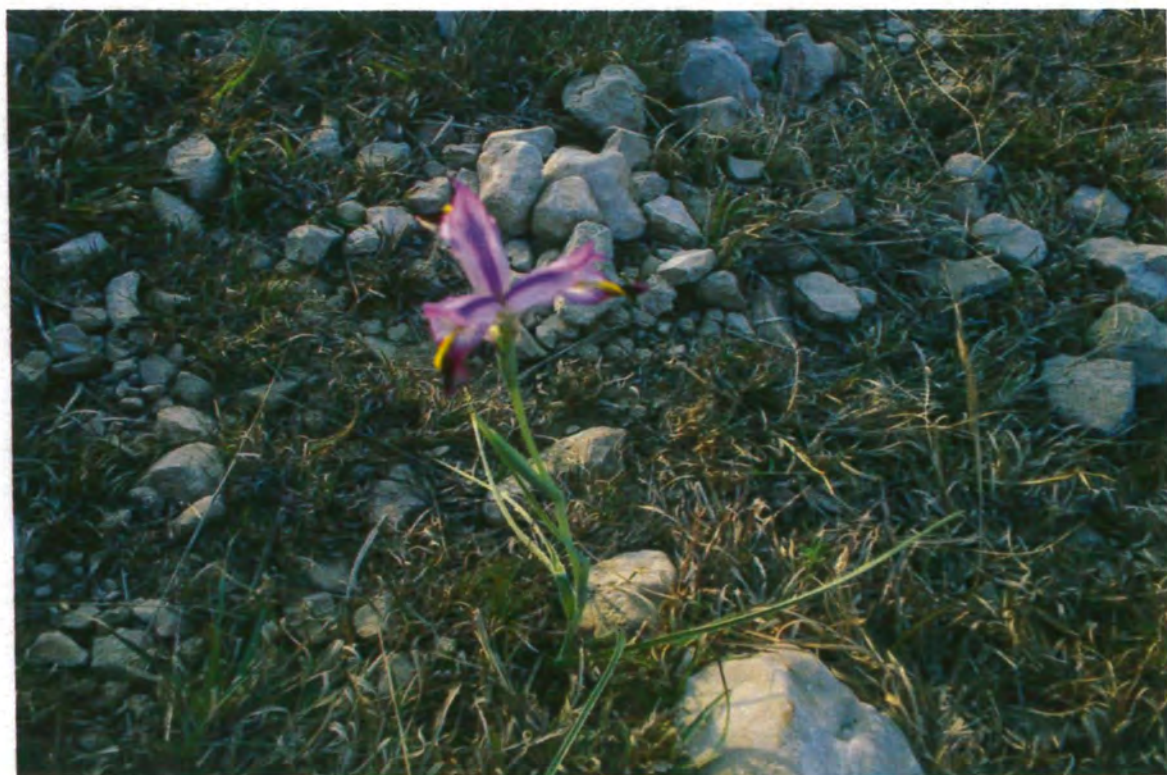


Plate No. 36

Iris odontostyla

Voucher No. 102



Plate No. 37

Schinus molle

Voucher No. 165



Plate No. 38

Reserve forest



Plate No. 39

Lathyrus sativus L.

Voucher No. 130



Plate No. 40

Echinops echinatus Roxb.

Voucher No 145



Plate No. 41

Hibiscus caesius Garckae

Voucher No. 24



Plate No. 42

Inula grantioides Boiss

Voucher No. 39

3. Dhaddar

This village is located at the northern corner of the valley and is one of the traditionally rich villages in cultural values and medicinal plants. Village is located at the northern hills of Khabeki wetland. It is 8 km away from central town of the valley Nowshera on Rawalpindi Nowshera road.

4. Nowshera

This is the central town of the valley and is hub of all activities most clinics of the local Hakims and Pansar store owners are also located in this village, it is quite rich in traditional knowledge due to centre of valley.

5. Ucchali

This village is located 12 km away from Nowshera in south western corner of the valley, this is also quite rich in indigenous knowledge due to close proximity to Sakesar hills also as base camp of the traditional collectors from all over the Pakistan. Ucchali wetland an international Ramsar Site is also named after this village.

6. Ugali

Ugali village is located 12 km away from Nowshera village in north western corner of the valley, it is one of rich village in terms of indigenous knowledge, traditional livestock disease experts, and is also located close to the Sakesar hills which are local hotspot of medicinal flora diversity, famous for medicinal plants collection by traditional collectors "Sanisai" and "Jogis". This village is located on north side of the Ucchali Wetland.

7. Anga

This village is located in Northern side of the valley at the junction of limestone & sandstone layers. Village is quite rich medicinal plant knowledge it is located 10 km away from Naushera village.

8. Chapar Sharif

This village is located 26 km away from Nowshera village in southern side of the valley towards plains of the Punjab. It represents flora of the southern slopes and area known as “Mohar” village is also rich in traditional knowledge due to presence of Hakims and medicinal plant collectors.

9. Khura

This village is located 12 km away from Nowshera village and is also centre of the old Hakims and traditional medicinal plant collectors regularly visit this village due to rich medicinal flora, it is located in centre of the valley towards southern slopes.

3.8.9 FOLK RECIPES AND INDIGEOUS KNOWLEDGE CHITTA VILLAGE

Table No. 52

Sr. No.	Name of Plant part used	Number of plant part used
Chitta Village		
Number of Diseases Cured = 35		
1	Liquid extract	5
2	Leaves	21
3	Seeds	12
4	Branches	7
5	Whole plant	8
6	Tuber	1
7	Fruit	13
8	Bark	2
9	Pulp	2

10	Oil	2
11	Flowers	5
12	Bulb	1
13	Roots	4

- (1) Local Name Khaltara
- Family *Lamiaceae*
- Botanical Name *Salvia aegyptiaca L.*
- Part Used Seed
- Flowering Time March, April
- Method Tukhm (seed) Kanocha 3 gram seed is well mixed in water and seed is used with water and this is treatment of the gastric troubles. it is dried and used, in case of no impact two times use is recommended.
- 6 gram Tukhm (seed) Kanocha is placed in milk during nighttime, and the seed is used in morning time; it will cure hepatitis with in seven days.
- (2) Local Name Akas Bel
- Family *Cuscutaceae*
- Botanical Name *Cuscuta reflexa Roxb.*
- Part used Whole Plant
- Flowering Time July, September
- Method Akas bel is treatment of Gonorrhoea old or new both. Half quarter Dhari booti (*Cuscuta*

reflexa) half quarter red Shaker are grinded well in earthen pot and then one quarter water is mixed and grinded once again then it is filtered from cloth and four glass water are also mixed again and used in early morning without using any thing before, then it must be used noon, after use of this dosage bread is used without salt, on the same day use of curry and tea is banned other than Ghee and bread. On the second day early morning Roghan Sandal Oil 3 drops mixed in Patasa (White Sugar Pellets) are used for 7 days, but bread should only be used without salt but Ghee must be part of medicine.

500 gram (*Cuscuta reflexa*) + 500 gram sugar is also mixed with water of the Akas Bel, the water of Akas Bel is filtered and 3 to 4 glasses are mixed, it is the treatment of the gonorrhoea

(3)	Local Name	Chiber
	Family	<i>Cucurbitaceae</i>
	Botanical Name	<i>Cucumis sativa</i>
	Part Used	Root, seed
	Flowering Time	May, June
	Method	Its root is boiled in water and used for tooth ache. Its seeds are also grinded and two grams seed is used it reduces stomach heat.

(4) Local Name Siri wali booti

Family *Lamiaceae*

Botanical Name *Ajuga bracteosa Wall. ex Bth.*

Part Used Leaves

Flowering Time Throughout the year

Method Chambal booti (*Clematis connata DC*) + Siri Wali booti after drying are mixed in Sarson pure oil, and paste is applied on affected body part there is precaution that soap may not be used, This is treatment of skin infection and pimples.

(5) Local Name Khabari

Family *Moraceae*

Botanical Name *Ficus virgata Wall.ex Roxb.*

Part Used Fruit

Flowering Time March, April

Method Fruit of the plant is mixed with honey and decoction is made, it controls diabetics, also useful in small pox and cause pimples to come on body surface.

Unripe fruit of the Desi Khabari wild is dried under shade and grinded well, small amount of water is also mixed, and this is placed on white spart on face continuous use will effectively diminish the bars.

- (6) Local Name Allerga
- Family *Anacardiaceae*
- Botanical Name *Rhus cotinus*
- Part Used Branches, Leaves
- Flowering Time July, August
- Method Allerga branches are used to treat stone in bladder and liver disorder Hepatitis finger like sticks are placed in half litre water after making small pieces and in 3- 4 glass of water in vessel for the period of 24 hours, when the color of the water changes red after 24 hours, it is boiled continuously, when one quarter of the water is left it is collected and after cooling it is filtered with water, also mixed one bottle of Arq Gulab (Rose water) + 3 quarter white sugar mixed well and when it dissolve then boiled on fire and Sharbat (liquid extract) is made. In winter season 2 spoon be used in morning / evening time. In summer month 2 spoon be used in water it will effectively cure hepatitis and stone in bladder.
- (7) Local Name Bukan booti / Jalnim
- Family *Verbenaceae*
- Botanical Name *Phyla nodiflora (Linn.) Greene*
- Flowering Time June, July
- Part Used Leaves, Young shoots

Method	Its water extract is extremely effective for all type of the disorder of the kidneys. Leaves and young shoots are used for curing indigestion in children.
(8) Local Name	Pathar chat
Family	<i>Saxifragaceae</i>
Botanical Name	<i>Bergenia ciliata</i> (Haw). Sternb.
Part Used	Leaves
Flowering Time	March, May
Method	Its white flower is common during August month. It is effective treatment for kidney diseases as well as to expell stones from the kidney. Its leaves are mixed in ordinary salt + black pepper (<i>Piper nigrum</i>) and 1 to 2 grams of the medicine is used, it is commonly available during the months of the October / November
(9) Local Name	Kanghi booti
Family	<i>Malvaceae</i>
Botanical Name	<i>Abutilon bidentatum</i> A. Rich
Part Used	Leaves
Flowering Time	March, May
Method	Its leaves extract is helpful to treat wounds. It is grinded, as well as its leaves are used by wrapping on wounds.

(10) Local Name	Vahekar
Family	<i>Acanthaceae</i>
Botanical Name	<i>Justicia adhatoda</i> Linn.
Part Used	Leaves
Flowering Time	March, April
Method	Small and large pimples can be treated to excrete material from pimples through use of Vahekar leaves on pimples.

Leaves of Berg Bansa + Candel + sweet oil + Ral all are converted into ointment it is treatment of the pimples. 5 -10 leaves of the Vahekar after dipping in oil or Ghee and placing Haldi (*Curcuma domestica*) are wrapped on pimples, the pimple will burst and then any ointment can be used to treat.

Leaves of the Barg Bansa (Vahekar) are crushed in earthen pot water is taken out and this water is placed for 12 hours, after filtering the extract is grinded well, so that water dries and extract remain, all this extract is used in eyes for the period Cataract in eyes diseases especially but this should be used during early stages.

It is effective treatment in early Cataract. Leaves are dried by extracting water and one quarter of the material is used after grinding with stones and is dried and extract is used in eyes, it stops early Cataract.

It is treatment of the Tuberculosis as well-dried leaves are used as tea and is effective treatment of Tuberculosis.

In order to control pimples leaves are wrapped on body part after heating and then are removed; it effectively stop the pimple.

Juice extract of the leaves is taken and boiled, filtered in large quantity then pressed in clothes and after drying a mixture is made and used is treatment of the eyes. It is also treatment of the chest stomach problems and its leaves are used as Qahwa drink (Soft drink).

Flowers of the vahekar are utilized to make gulqand (Petals extract) and it is treatment of the cold, flue and also lungs disorder. Leaves of the vahekar are used in making mixture for blood purification.

It can also be used to treat tuberculosis and its prevention by using the Phaki (Mixture) of the Vahekar; it has also anti germal activity. It is also used in various combinations with other plants to treat digestion related problems.

(11) Local Name	Satinasi
Family	<i>Papaveracea</i>
Botanical Name	<i>Argemone mexicana L.</i>
Part Used	Whole Plant
Flowering Time	March, August

Method	There are two types one having yellow flowers while the other having the white flowers, after taking water from the plant, all the other part can be used to treat Syphilis a male infectious sex disease and other infections diseases.
(12) Local Name	Makhni booti
Family	<i>Malvaceae</i>
Botanical Name	<i>Sida alba</i>
Part Used	Whole plant, Leaves
Flowering Time	March, July
Method	It is powerful tonic, and it should not be used in pure form, it has cooling effect. It must be used with husk of the Ispaghul (<i>Plantago ovata</i>) and black pepper (<i>Piper nigrum</i>) and usually 3 gram of the mixture is made including dried leaves in shade and is used with milk. It is power tonic and increases male sexual abilities
(13) Local Name	Gorak Pan
Family	<i>Boraginaceae</i>
Botanical Name	<i>Heliotropium strigosum Willd.</i>
Part Used	Whole plant
Flowering Time	July, September
Method	It has the property that it gives red color if placed in water, it should be placed in water for whole night and after filtering liquid extract is used, it is treatment of the liver



Plate No. 43

Argemone mexicana L.

Voucher No. 13



Plate No. 44

Justicia adhatoda L.

Voucher No. 49

disorders. It is treatment of the Hepatitis and is used as liquid extract without taking any thing as meal.

- (14) Local Name Banafsha
Family *Violaceae*
Botanical Name *Viola odorata L.*
Part Used Leaves
Flowering Time April, July
Method Its survival is threatened due to its collection from roots and its uprooting is one of the major issue, it has different flowers yellow and red. Its decoction is used in chest disease and infections.
- (15) Local Name Gilote
Family *Asclepiadaceae*
Botanical Name *Ceropegia bulbosa Roxb.*
Part Used Bulb
Flowering Time July, August
Method It is like potato and is delicious usually it is also uprooted and is eaten by herdsmen and goats. There are two types white / Red colour. It is also used as carminative and diuretic.
- (16) Local Name Zohr Mohra
Family *Araceae*
Botanical Name *Sauromatum venosum Ait. Schott*
Part Used Bulb

Flowering Time	September, October
Method	It is like potato tuber and ripe with Bajra crop, its inflorescence is like snake it is effective treatment of the piles, 24 gram Black pepper (<i>Piper nigrum</i>) + 24 gram Anar dana (<i>Punica granatum</i>) along with Zohr Mohra tuber are mixed and 2 tablets are used after meals for a long period. This treatment is effective for piles disease.
(17) Local Name	Alu bukhara
Family	<i>Rosaceae</i>
Botanical Name	<i>Prunus domestica</i>
Part Used	Fruit
Flowering Time	February, March
Method	One quarter of Alu bukhara + zeera sufaid (<i>Cumin cyminum</i>) and gohkro (<i>Xanthium stramonium</i>) all in equal amount are mixed and capsule is made it is used in quantity of 2 grams for hepatitis.
(18) Local Name	Jangli Gloh
Family	<i>Asclepiadaceae</i>
Botanical Name	<i>Tinospora cordifolia</i> (DC.) Miers
Part Used	Pulp, Stem
Flowering Time	March, April
Method	It is usually located in rocky places and steep slopes, its one branch is mixed in water and is dipped in water placed for whole night, in

the early morning the extract is taken out after filtering it is used as drink it cures diabetics in period of 40 days. Usually it is utilized in the blood infusion recipes.

- (19) Local Name Kakar Singhi
Family *Anacardiaceae*
Botanical Name *Pistacia chinensis Bunge*
Part Used Fruit
Flowering Time March, April
Method Its fruit is grinded and one or two drops amount of the honey are also mixed, it quickly gives relief in child cough. Local Kaker singhi is also treatment of the cough. It is also an antidote to snake venom and scorpion sting.
- (20) Local Name Aksan
Family *Solanaceae*
Botanical Name *Withania somnifera (Linn.) Dunal*
Part Used Leaves
Flowering Time May, August
Method It is an effective treatment of the backbone pain, Its root is cut, and then upper layer is removed the bark is grinded and sugar is mixed up to 3 gram and then it is used with cow milk it is used to treat back bone disorder.

- (21) Local Name Vehri
Family *Convolvulaceae*
Botanical Name *Convolvulus arvensis Linn.*
Part Used Whole plant
Flowering Time January, March
Method Its leaves are boiled in the form of Sag (Vegetable curry) and placed in stored wheat it kills the insects and worms. It is treatment of the worms of the stomach and its saag (curry) in vegetable form is made.
- (22) Local Name Suranjan Shirin
Family *Colchiaceae*
Botanical Name *Colchicum aitchisonii (Hook.f.) E.Nasir*
Part Used Bulb
Flowering Time March, April
Method It is a good food of Chukor and gives them the breeding ability. It is used in different ointment used for body pains.
- (23) Local Name Mako
Family *Solanaceae*
Botanical Name *Solanum nigrum L.*
Part Used Leaves, Fruit
Flowering Time Throughout the year
Method Its vegetable form Saag (Curry) is prepared and water is taken out, and if used with bread this kills worms. It is effective treatment of the worms. Its Arq (Liquid

extract) is also made; its saag is made and used with bread as local vegetable.

- (24) Local Name Jangli Zafron
Family *Iridaceae*
Botanical Name *Crocus sp*
Part Used Flower, Whole plant
Flowering Time March, April
Method It is of two different types Red / white and it is used in rice pulao dish and also used for writing Quranic verses. It is also aphrodisiac and also used to reduce fever.
- (25) Local Name Hath Jori
Family *Martyniaceae*
Botanical Name *Martynia annua Linn.*
Part used Leaves, Fruits
Flowering Time July, August
Method The juice is used as gargle for sore throat leaves are used in epilepsy and applied to tubercular glands of the neck. Its fruit is useful in inflammation.
- (26) Local Name Akhor
Family *Juglandaceae*
Botanical Name *Juglans regia Linn.*
Part used Nut
Flowering time March, April

Method	Nuts are collected and are placed in water for whole right, then are taken early in the morning, it is effective brain tonic, also its nuts are mixed in drink to reduce thirst.
(27) Local Name	Kiari
Family	<i>Liliaceae</i>
Botanical Name	<i>Gloriosa superba L.</i>
Part Used	Tuber
Flowering Time	July, August
Method	Hindu tribe usually used its tuber especially traditional healer as food and it gives them power and they were able to spend whole weak without taking any thing, it is used after grinding, usually in milk if is used by kids.
(28) Local Name	Aru
Family	<i>Rosaceae</i>
Botanical Name	<i>Prunus persica</i>
Part Used	Leaves, Fruit
Flowering Time	March, April
Method	10 gram leaves are grinded and boiled in water and honey is added 5 grams it is used twice in a day. It is effective against hernia dieses (Intestinal disorder). One & half leaves of aru are grinded, black pepper (<i>Piper nigrum</i>) is added and used to eliminate old fever.

- (29) Local Name Karanjwa
Family *Caesalpinaceae*
Botanical Name *Caesalpinia bonduc (L.) Roxb.*
Part Used Seeds
Flowering Time July, August
Method It is effective to kill worms in kids intestine it is also a good treatment of fever. Oil seed is used to increase face beauty.
- (30) Local Name Mushki bathu
Family *Chenopodiaceae*
Botanical Name *Chenopodium ambrosioides Linn.*
Part Used Leaves
Flowering Time February, June
Method 10 gram leaves is the minimum dosage which is used to clear the worms in animals and men. Leaves are crushed and are used with water.
- (31) Local Name Mastiara
Family *Labiatae*
Botanical Name *Scutellaria lineris Benth.*
Part Used Leaves
Flowering Time Throughout the year
Method It is bitter in taste and its sharbat (Soft drink) is used, in pimples. 6 gram leaves are dipped in water for night and are used after filtering with fresh water.

- (32) Local Name Chirata
Family *Gentianeaceae*
Botanical Name *Swertia cordata Wall.*
Part Used Leaves, Stem
Flowering Time August, September
Method Usually Chirata and Mastiara grow closely it is also treatment of scabies and allergy. Decoction of the leaves of the plant are used in quantity of one cup.
- (33) Local Name Bershasha
Family *Polypodiaceae*
Botanical Name *Adiantum capillus-veneris L.*
Part Used Leaves
Flowering Time No flowering
Method Its leaves gives silver like look in winter season if there is frost, its leaves are used to treat blood disorders. It is usually found in wet and shady places and is used as decoction and is also used in different medicines. It is treatment of heat stroke and also treatment of male sexual disorders.
- (34) Local Name Dhamian
Family *Zygophyllaceae*
Botanical Name *Fagonia indica Burm f.*
Part Used Whole plant
Flowering Time April, August

Method

It is effective treatment of the Blood diabetics and high blood pressure. For blood pressure 12 gram of the leaves are collected and is used early in the morning are placed in water and are used before breakfast. It is used for the period of 15 – 16 days, but there should be interval of 3 days after first 7 days used.

It is treatment of the blood diabetics; its one Kg leaves are divided into 16 parts and are dipped in water for whole night. One cup of this liquid extract is used early in the morning.

50 grams of the plant is dipped in water for the period of night. The extract is boiled and when one cup is left then it is used for the period of 16 days. It is treatment of scabies, blood disorders and pimples.

(35) Local Name

Jawansa

Family

Fabaceae

Botanical Name

Alhagi maurorum Medic

Part Used

Whole plant

Flowering Time

March, July

Method

It gives good results after rainy season and liquid extract is used and it is effective treatment of the cancer. Whole plant is mixed in water

- (36) Local Name Deela
Family *Cyperaceae*
Botanical Name *Cyperus rotundus*
Part Used Root
Flowering Time July, August
Method It has long deep roots and is found around waterlogged areas, it can be used as treatment of cancer and needs further research.
- (37) Local Name Bhatal
Family *Compositae*
Botanical Name *Launaea procumbens (Roxb) Ramayya & Rajagopal*
Part Used Whole plant
Flowering Time March, May
Method The earthen pot is decorated by this plant after extracting water from the plant by the Kumhars. (Traditional utensils maker). It has white milk and its leaves and milk is used in different women specific diseases. It is treatment of parsoot a female disease.
- (38) Local Name Phool kanda
Family *Acanthaceae*
Botanical Name *Barleria cristata L.*
Part Used Whole plant
Flowering Time May, June

Method	It is used as antivenome against snakebite and scorpion bite. Its leaves and other parts are crush and is used with water.
(39) Local Name	Jal dhania
Family	<i>Brassicaceae</i>
Botanical Name	<i>Nasturtium officinale R.Br.</i>
Part Used	Leaves
Flowering Time	March, June
Method	It is abundant around water bodies and is treatment of the scabies. Decoction of the plant is given as a blood purifier, vermifuge and diuretic.
(40) Local Name	Niazbo
Family	<i>Lamiaceae</i>
Botanical Name	<i>Ocimum basilicum L.</i>
Part Used	Leaves
Flowering Time	July, August
Method	It is a good fragrant plant and its leaves and seeds are used and usually mixed with other items. It is good flavoring agent and has properties to repel insects.
(41) Local Name	Majith
Family	<i>Rubiaceae</i>
Botanical Name	<i>Rubia cordifolia L.</i>
Part Used	Roots
Flowering Time	June, July

Method	It is used in treatment of different animal diseases, especially wounds of the camel also used in drying clothes. It is also used as treatment of backbone problems.
(42) Local Name	Kunwar Gandal
Family	<i>Liliaceae</i>
Botanical Name	<i>Aloe barbadensis</i> Mills.
Part Used	Branches
Flowering Time	Late summer
Method	It is treatment of the Asthma 12 gram seed is taken out and 60 ml honey is also mixed it becomes a liquid extract like water after 6 hours. The extract is used as expectorant for Asthma treatment. Asthma disease is treated by the plant, half quarter maize + 6 gram extract of kuwar Gandal are mixed. After filtering from cloth it is mixed early in the morning and in evening time it looks like water, one teaspoon of this is used for one week it eliminate the Asthma. extract of the Aloe Vera is dried to make Asara, a pure extract
(43) Local Name	Jangli tori
Family	<i>Cucubitaceae</i>
Botanical Name	<i>Luffa actuangula</i> L.
Part Used	Fruit
Flowering Time	May, June

Method	When this vegetable ripe, its seeds in quantity of 12 gram are boiled and are used with one cup of the extract due to this treatment there is sudden vomiting which excrete all material from lungs and is used as expectorant.
(44) Local Name	Lunak
Family	<i>Zygophyllaceae</i>
Botanical Name	<i>Zygophyllum simplex L.</i>
Part Used	Whole plant
Flowering Time	August, May
Method	Its sag (Vegetable extract) is prepared and is used as vegetable, it usually grow in onion crop it is effective treatment against mental disorders.
(45) Local Name	Paitha
Family	<i>Cucurbitaceae</i>
Botanical Name	<i>Benincasa cerifera</i>
Part Used	Fruit
Flowering Time	April, May
Method	Leaves and fruit are cooked like vegetable and used for blood pressure diseases. Sweet is made from fruit of the plant.
(46) Local Name	Bhakra
Family	<i>Zygophyllaceae</i>
Botanical Name	<i>Tribulus terrestris Linn.</i>
Part Used	Whole Plant

Flowering Time	Throughout the year.
Method	It is mixed in other medicines and is used by the patients who are physically weak; it gives more strength to the body. It is treatment of the back pain but usually used in the form of the Murakabat (mixtures).
(47) Local Name	Buphali
Family	<i>Teliaceae</i>
Botanical Name	<i>Corchorus depressus L.</i>
Part Used	Whole plant
Flowering Time	March, April
Method	This is found usually in wheat crop: this is placed in Lasi (Curd) for the period of 7 days and is grinded it is used in nose and this excrete the worms in brain.
(48) Local Name	Nashpati
Family	<i>Rosaceae</i>
Botanical Name	<i>Pyrus communis Linn.</i>
Part Used	Fruit, Leaves
Flowering Time	February, March
Method	Leaves of the plant are grinded and are used in case of snakebite. it blocks poison spread. Its liquid extract prevents blood vomiting and dysentery.
(49) Local Name	Kali Zeeri
Family	<i>Asteraceae</i>
Botanical Name	<i>Verononia anthelmintica Willd.</i>

Part Used	Seed
Flowering Time	April, May
Method	It grows in the month of the April, March and is treatment of the skin disease scabies and white spots, usually it is grinded and half boiled in and Ghee is used.
(50) Local Name	Aak
Family	<i>Asclepiadaceae</i>
Botanical Name	<i>Calotropis procera (Aitch). Aitch f.</i>
Part Used	Leaves
Flowering Time	Throughout the year
Method	Ak plant is uprooted and insects are collected present underground usually there are 2 insects in case of Aak plant these insects are placed in rice for the period of 10–15 days, a capsule is made and then mixture is used with butter in amount not more than wheat grain. Its continuous use cure Epilepsy disease. Its flower is used and smaller pellets are made to treat joint pains. Its bark is burned and is used in severe cough and is used with honey.
(51) Local Name	Krira
Family	<i>Capparidaceae</i>
Botanical Name	<i>Capparis decidua (Forssk.) Edgew.</i>
Part Used	Fruit

Flowering Time	March, June
Method	Achar (pickles) is made from the fruit of the Karia, while the bark is burned and coal is made and it is used along with milk it gives man a complete heal from the wounds. Wood is burned in vessel and when smoke ends it is covered then this Ash is mixed with butter and used it relieves all type of the pain.
(52) Local Name	Imlah
Family	<i>Rhamnaceae</i>
Botanical Name	<i>Zizphus nummularia (Burm.f.) Wight & Arn.</i>
Part Used	Fruit
Flowering Time	July, August
Method	Seed of Minha is treatment of the blood disorder Thalasemia, its Sharbat (Soft drink) is made which is useful to cover the blood deficiency. Thalasemia is locally called Bhus disease. Sharbat of the Minha fruit is made at the end of the October and quarter of this sharbat (Soft drink) is placed in water and sugar is also mixed. 500 gram of fruit is dipped in water for whole night and early in the morning it is boiled and water is excluded, then Arq gulab (Rose water) and sugar are mixed in sufficient quantity and is used, it increases the blood production.

- (53) Local Name Dusan
Family *Lilliaceae*
Botanical Name *Asparagus gracilias Royle*
Part Used Branches
Flowering Time April
Method It is used as vegetable in the month of the March, its new branches are cooked and milk is mixed, it gives relief to the belly disorders. It is a traditional vegetable.
- (54) Local Name Jangli Karela
Family *Cucurbitaceae*
Botanical Name *Momordica diocia.L.*
Part Used Fruit
Flowering Time July, September
Method It is used as vegetable, and is an effective treatment of the Diabetes. It taste is like cultivated karela, it is treatment of the diabetic disease it is also used after drying.
- (55) Local Name Boher
Family *Moraceae*
Botanical Name *Ficus bengalensis Linn.*
Part Used Leaves, Root
Flowering Time June, July
Method Red new leaves of Boher, soft branches and roots which are not hard in quantity of one and half quarter are boiled in 2.5 liter water

and when only 1 liter water remains then it is filtered and sugar is mixed it is used as tonic for men vital power and is also effective treatment of male sexual disorder.

- (56) Local Name Mirch
Family *Solanaceae*
Botanical Name *Capsicum frutescens Linn.*
Part Used Fruit
Flowering Time May, June
Method Its fruit are extremely pungent and condiment and it is also used in prickles. It is preserved in oils and then used, usually recommended in certain diseases.

- (57) Local Name Jangli lahsan
Family *Alliaceae*
Botanical Name *Allium jacquemontii Kunth*
Part Used Pods
Flowering Time March, April
Method It is an effective treatment of the hearing disorders, 3 – 4 pods are burned in the Til Oil (*Sesamum Orientale*), and drops are placed in ear, this improves the ear disorder.

- (58) Local Name Jangli Piaz
Family *Alliaceae*
Botanical Name *Allium griffithianum Boiss.*
Part Used Bulb

Flowering Time	March, April
Method	Bulb of the piaz is placed in open fire and well cooked and then equal amount of the pea is also mixed and tablets are made and used it is an effective treatment of Epilepsy.
(59) Local Name	Dharek
Family	<i>Meliaceae</i>
Botanical Name	<i>Melia azedarach L.</i>
Part Used	Seeds, Leaves
Flowering Time	March, April
Method	Seeds of the Dharek are mixed in quantity of 24 gram with Gur mar booti + 24 gram sodha + 24 gram Tukhm jaman (<i>Eugenia jambolona</i>) and this all is mixed in form of the Phaki (Solid extract), then this mixture is used with 3 gram cow milk and this is the treatment of the common diabetes. It is also treatment of the Piles after taking green seeds out of the pulp.
(60) Local Name	Dhatora
Family	<i>Solanaceae</i>
Botanical Name	<i>Datura stramonium L.</i>
Part Used	Seeds
Flowering Time	March, July
Method	Seed of the dhatura are utilized in the joint pain treatment; usually it is utilized in making kushta (Tonic) by cleaning seeds.

(61) Local Name Ajwain

Family *Solanaceae*

Botanical Name *Carum opticum L.*

Part Used Seed

Flowering Time March, April

Method It is mixed with kor Tumba (*Citrullus colocynthis*) + Black salt and all these are purified and Mixture is made and it is treatment of the disorders of the balley. It is also treatment of air in digestive system and it removes blockage after mixing in lemon and drying, at least for four times.

(62) Local Name Alsi

Family *Linaceae*

Botanical Name *Linum usitatissimum L.*

Part Used Seeds

Flowering Time Feb, March

Method Alsi oil is used in making ink and printing matter, it is also used in treatment of the burn / cut by making a layer usually called lupri / or pultus.

(63) Local Name Tukhm malanga

Family *Lamiaceae*

Botanical Name *Lallemantia royleana Benth.*

Part Used Seeds

Flowering Time March, August

- Method It is used to remove sediments in balley, and also to treat liver heat by dipping in water for whole night, and then it is used with milk with addition of the sugar.
- (64) Local Name Ismaghol
- Family *Plantaginaceae*
- Botanical Name *Plantago lanceolata Linn.*
- Part Used Husk
- Flowering Time March, April
- Method It is used for indigestion and 4 to 20 gram doasage is recomended as treatment of the constipation. It is also used in skin infection and insect bite.
- (65) Local Name Harmal
- Family *Zygophyllacea*
- Botanical Name *Peganum harmala L.*
- Part Used Seed, Leaves
- Flowering Time July, August
- Method It is used in different combination of the drugs, also used by burning its leaves and smoke used as antigerm, but it single use is very rare.
- (66) Local Name Rukh
- Family *Tamaricaceae*
- Botanical Name *Tamarix aphylla (L.) karst*
- Part Used Wood

Flowering Time	April, May
Method	Its leaves are dried in the shade and then grinded, after mixing salt it is treatment of the Ghandi (tonsils).
(67) Local Name	Jaledhar
Family	<i>Tiliaceae</i>
Botanical Name	<i>Grewia villosa Willd.</i>
Part Used	Seed
Flowering Time	August
Method	It is used to treat skin ach by boiling seed and sugar is also mixed. Seed is also dipped in water, its Arq is mixed with Arq Gulab (Rose water) + 2 quarter sugar and all these are mixed and bottle is prepared, it is treatment of the rash (skin allergy).
(68) Local Name	Ber
Family	<i>Rhamnaceae</i>
Botanical Name	<i>Zizphus mauritiana Lam.</i>
Part Used	Leaves
Flowering Time	March, April
Method	Ber is the treatment of the mental illness, its leaves are boiled in water and are used.
(69) Local Name	Kikar
Family	<i>Mimosaceae</i>
Botanical Name	<i>Acacia nilotica (Linn.) Delile</i>
Part Used	Leaves

- Flowering Time March, April
- Method Its pods are dried and are grinded and then used to treat jarian khoon (blood infusion) in old times cobblers usually color the hides in special structure called (Kanali) and use pods of this plant.
- (70) Local Name Jandi
- Family *Mimosaceae*
- Botanical Name *Prosopis cineraria (L.) Druce*
- Part Used Fruit
- Flowering Time December, March
- Method Fruit of the Jandi is used in different items it is also sacred tree of Hindu tribes.
- (71) Local Name Jahl
- Family *Salvadoraceae*
- Botanical Name *Salvadora oleoides Decne*
- Part Used Fruit
- Flowering Time May, August
- Method Its fruit is used in medicines it is anti microbial, its miswak is treatment of the cancer, and its branches are used as miswak in past and usually placed in mosques.
- (72) Local Name Khawi
- Family *Poaceae*
- Botanical Name *Cymbopogon jawrancusa (Jones.) Schultz.*

- Method It is treatment of the Typhoid disease smoke and ash along flame has anti germ properties.
- (73) Local Name Anar
- Family *Punicaceae*
- Botanical Name *Punica granatum L.*
- Part Used Flowers
- Flowering Time March, April
- Method Flower of the Anar is grinded and is treatment of the jurian Khoon (blood infusion) it stops bleeding.
- (74) Local Name Podina
- Family *Lamiaceae*
- Botanical Name *Mentha longifolia (L.) Hudson.*
- Part Used Leaves
- Flowering Time March, August
- Method Podina is treatment of the allergy and its leaves are grinded and curry is made.
- (75) Local Name Saunf
- Family *Apiaceae*
- Botanical Name *Foeniculum vulgare Mill.*
- Part Used Seeds
- Flowering Time March, April
- Method It is treatment of the stomach pain and also treatment of the Renal colic. Its seed are used along with water. 1 gram podina + 1

gram choti elaichi + saunaf mixed and boiled in 120 ml water and used for stomach disorder twice in a day and is treatment.

- (76) Local Name Mahori
Family *Solanaceae*
Botanical Name *Solanum incanum Linn.*
Part Used Leaves Fruit
Flowering Time April, August
Method It is used as vegetable usually seed is taken out and it is used as curry it is also treatment of the piles.
- (77) Local Name Lani
Family *Chenopodiaceae*
Botanical Name *Suaeda frutiicosa Lhm. Forst.*
Part Used Whole plant
Flowering Time March, April
Method Usually its water is taken and is mixed in simple water which is treatment of the skin allergy.
- (78) Local Name Gandi boati
Family *Asteraceae*
Botanical Name *Parthenium hysterophorus L.*
Part used Root, stem
Flowering time Whole year

- Method It is applied externally on skin infections, but also cause allergy and other complications in certain peoples. It is also used as fuel.
- (79) Local Name Khaksi Sar
- Family *Brassicaceae*
- Botanical Name *Sisymbrium irio* Linn.
- Part Used Seed
- Flowering Time March, August
- Method It is used in milk of the goat usually milk is half boiled 500 gram of the Khaksi sir is also added and then dried and boiled at least fourth time it is dried in shade and is treatment of the Sukha Pan, a disease in which weakness occur, usually its quantity used recommended is not more than wheat grains in milk.
- (80) Local Name Papra
- Family *Fumariaceae*
- Botanical Name *Fumaria indica* (Hauskn.) Pugsley
- Part Used Whole plant
- Flowering Time March, April
- Method It is blood purifier and also treatment of pimples; usually 500 gram is boiled and is mixed in water and then used.
- (81) Local Name Chasku
- Family *Caesalpiniceae*
- Botanical Name *Cassia absus* L.

Part Used	Seed
Flowering Time	April, May
Method	It is treatment of the eye diseases and usually used in women specific diseases, it gives balance usually when pregnancy is lost due to any factor and is used in different medicines.
(82) Local Name	Jamun
Family	<i>Cruciferae</i>
Botanical Name	<i>Eruca sativa</i>
Part Used	Seed
Flowering Time	March, April
Method	It is treatment of the stomach pain and is also treatment of the worms, usually it is placed in lasi (Curd) and when it gives bad smell then it is used.
(83) Local Name	Bhang
Family	<i>Cannabaceae</i>
Botanical Name	<i>Cannabis sativa Linn.</i>
Part Used	Leaves
Flowering Time	April, October
Method	Leaves of the plant are dried under shade and are used as drink it is narcotic and promotes hunger as well carminative.

- (84) Local Name Phulai
- Family *Mimosaceae*
- Botanical Name *Acacia modesta Wall.*
- Part Used Leaves, Bark
- Flowering Time November, March
- Method Its gond and miswak is used, usually its resin is used in recipes of male sexual vigour and back pain. Bark of the Phulai is separated from the plant, boiled in water and dried and before preparation of the Rub desi (pure extract) ghee 10gram to 20 gram is mixed this increases the eye sight. It is also treatment of the back bone, joint pains and also improves stomach / liver functions along with blood production.
- (85) Local Name Santha
- Family *Sapindacea*
- Botanical Name *Dodonaea viscosa (Linn.) Jacq.*
- Part Used Leaves
- Flowering Time February, March
- Method Its seed is used in minor quantity to treat muscle pull and joint pains.
- (86) Local Name Sumender sukh
- Family *Labiatae*
- Botanical Name *Salvia plebeia R.Br.*
- Part Used Seed, Leaves
- Flowering Time April, May

- Method It is used in different recipes to increase male sexual vigour. Seed of the plant is used after collection. Leaves are used in toothache.
- (87) Local Name Pohli
- Family *Asteraceae*
- Botanical Name *Carthamus oxycantha M.Bieb.*
- Part Used Seed
- Flowering Time July, August
- Method Oil of the pohli was used in past as food. Usually it was used in sweet prepared for bulls, and camel called locally (Kota) tonic.
- (88) Local Name Thoar
- Family *Cactaceae*
- Botanical Name *Opuntia monacantha Haw.*
- Part Used Fruit
- Flowering Time March, April
- Method Fruit is the treatment of the stomach disorder and pain. It is wild fruit usually eaten by children.
- (89) Local Name Harnoli / Castor Oil
- Family *Euphorbiaceae*
- Botanical Name *Ricinus communis Linn.*
- Part Used Seed
- Flowering Time Summer Fall

Method	It is used to treat swelling parts of the body usually leaves are used; its kestrel oil is made which is used in bandages.
(90) Local Name	Vina
Family	<i>Apocynaceae</i>
Botanical Name	<i>Rhazya stricta Decne</i>
Part Used	Leaves
Flowering Time	December, March
Method	Its rus (liquid extract) is made and is considered blood purifier, for diabetes and also for skin infections, skin also used for allergy usually it is bitter in taste.
(91) Local Name	Jangli booti
Family	<i>Polygonaceae</i>
Botanical Name	<i>Polygonum plebijum R.Br.</i>
Part used	Whole plant
Flowering time	July-August
Method	Whole plant dried and used against cholera and Rneumonia along with tea or water two to three time.
(92) Local Name	Jangli tambaco
Family	<i>Scrophulariaceae</i>
Botanical Name	<i>Verbascum thapsus Linn.</i>
Part Used	Seed, Bark
Flowering Time	March, April

Method	Its seed is used. Its smoke is treatment of the piles. Its bark is used as antibiotic.
(93) Local Name	Puth Kanda
Family	<i>Amaranthaceae</i>
Botanical Name	<i>Achyranthes aspera</i> Linn.
Part Used	Roots, Leaves
Flowering Time	March, April
Method	It is used after burning whole plant is burned and paste is applied on part burned.
(94) Local Name	Rahura
Family	<i>Bignoniaceae</i>
Botanical Name	<i>Tecomella undulata</i> (Roxb.) Seeman
Part used	Flowers, Wood
Flowering time	March, August
Method	Flowers are used as decoration piece, while the leaves are used in animal diseases, wood is used for making furniture
(95) Local Name	Papper
Family	<i>Buxaceae</i>
Botanical Name	<i>Buxus papillosa</i> C. K. Schneid.
Part Used	Leaves
Flowering Time	April, May
Method	It is poisonous plant and used for sometime roof construction and also as spray.



Plate No: 45

Verbascum thapsus Linn.

Voucher No. 10



Plate No. 46

Caralluma tuberculata N.E. Brown

Voucher No. 30

- (96) Local Name Chougan
 Family *Asclepidaceae*
 Botanical Name *Caralluma tuberculata N.E. Brown.*
 Part Used Whole plant
 Flowering Time July, August
 Method It is treatment of the diabetics and it reduces sugar level in patients. It is used in vegetable form. branches and whole plant is cooked.
- (97) Local Name Kahu
 Family *Oleaceae*
 Botanical Name *Olea ferruginea Royle*
 Part Used Fruit, Leaves
 Flowering Time April, August
 Method It is used in the treatment of the blood deficiency. Gond of the Kahu is used to treat eye disease; it is mixed in surma (Solid extract) and is treatment of the watering of eyes and other eye disorder.
- It is also used to treat teeth problems if there is gum bleeding then decoction of the leaves is made, fresh leaves are dried and three times this is used taken, it also gives strength to the teeth which are loose.
- There is only one precaution that water may not be used after taking decoction. Its bark leaves and fruit sharbat is helpful in reducing

weight loss; it is also treatment of the cold, flu.

- (98) Local Name Kanda, Gokhru
Family *Apiaceae*
Botanical Name *Xanthium strumarium Linn.*
Part used Seed, Leaves, Root
Flowering time July-August
Method Seeds are grinded and used along with to cure malaria, it is good fuel species, its root is used in small pox disease.
- (99) Local Name Kala Toot
Family *Moraceae*
Botanical Name *Morus nirgra L.*
Part Used Fruit
Flowering Time April
Method It is used in the treatment of oral infections. Fruit of the plant is used to treat throat infection.
- (100) Local Name Sufed toot
Family *Moraceae*
Botanical Name *Morus alba L.*
Part Used Fruit
Flowering Time April
Method It is treatment of the Khunaq (Throat disease) its decoction / pure fruit is used.

- (101) Local Name Til
- Family *Pedaliaceae*
- Botanical Name *Sesamum orientale* Linn.
- Part Used Seed
- Flowering Time August, September
- Method Til are widely used in the urine diseases. Seeds are used as nourishing agent for livestock
- (102) Local Name Mahori
- Family *Solanaceae*
- Botanical Name *Solanum incanum* Linn.
- Part Used Leaves, Fruit
- Flowering Time April, August
- Method It is also treatment of balley diseases. Fruit of the plant is used in animal diseases.
- (103) Local Name Baboona
- Family *Asteraceae*
- Botanical Name *Matricaria chamomilla*
- Part Used Flowers
- Flowering Time July, August
- Method Its oil is treatment of body pain and backbone pain.

3.9 FOLK RECIPES AND INDIGEOUS KNOWLEDGE

CHINJI VILLAGE

Table No. 53

Sr. No.	Name of Plant part used	Number of plant part used
Recipes Chinji Village		
No. of diseases cured = 26		
1	Branches	6
2	Leaves	17
3	Roots	4
4	Fruit	10
5	Tuber	1
6	Whole plant	11
7	Seed	4
8	Bark	3
9	Ash	1
10	Flowers	3
11	Stem	2

- (1) Local Name Akas Bel
- Family *Cuscutaceae*
- Botanical Name *Cuscuta reflexa Roxb.*
- Part used Whole Plant
- Flowering Time July, September

Method	It is used to treat body swelling, full parts are boiled and fumes are used to give patient relief. Different Kushta Jats (tonic) are made in liquid extract of the plant.
(2) Local Name	Makhni Booti
Family	<i>Malvaceae</i>
Botanical Name	<i>Sida alba</i>
Part Used	Whole Plant
Flowering Time	March, August
Method	It is treatment of the diseases due to heat problems. It is dried under shade and is mixed in water then sugar is added. It is treatment of urine problems, premature ejaculation in males, Night release in males, and also treatment of the acute heat problems.
(3) Local Name	Chirata
Family	<i>Gentianeae</i>
Botanical Name	<i>Swertia cordata (G.Don.) C.B. Clarke</i>
Part Used	Leaves, Stem
Flowering Time	August, September
Method	It is highly bitter in taste, and is treatment of piles, and blood disorders, also treatment of all type of fever, it can be used by grinding and can also used by boiling and liquid extract can also be made sugar is usually mixed in medicine and can be used along with water.

- (4) Local Name Mastiara
- Family *Labiatae*
- Botanical Name *Scutellaria linearis Benth.*
- Part Used Leaves
- Flowering Time Throughout the year
- Method It is also treatment of the fever, blood purification, piles, and concentration of blood it can be used in both three different forms including Phaki (micxture), (Joshanda decoction), Sharbat (Soft drink). Medicine can be used along with water.
- (5) Local Name Bhakra
- Family *Zygothillaceae*
- Botanical Name *Tribulus terrestris Linn.*
- Part Used Whole Plant
- Flowering Time Through out the year
- Method It is effective treatment of backbone problem, also effective in treatment of dryness whole plant is used, grinded and flour is made then wheat flour is also mixed, and sweet is made, which is effective treatment of backbone.
- It can also be used by boiling or making decoction of Bhakra + Narial (Coconut) both are mixed in equal quantity and are used is effective treatment of the backbone problem.

- (6) Local Name Kali Jeri
- Family *Asteraceae*
- Botanical Name *Verononia anthelimitica Willd.*
- Part Used Seed
- Flowering Time March, April
- Method It is a good blood purifier and effective treatment of piles. Phaki mixture of the whole plant is made and can be used along with milk or water. Capsule are made, by mixing Kali Jeri + Sulphur Amla Sar + Geero all in equal quantity and all items are mixed and mixture is made 1–2 gram mixture is recommended medicine after eating meals along with water, it is effective treatment of indigestion.
- (7) Local Name Boher
- Family *Moraceae*
- Botanical Name *Ficus bengalensis Linn.*
- Part Used Whole plant
- Flowering Time April, May
- Method It is effective treatment of body dryness, and is treatment of the weakness. All parts can be used, leaves or dried roots are boiled and decoction is made. Fruit is grinded well and is mixed in milk and shake well, tablets are made up to size of gram seed, these tablets are used along with milk twice during a day. It is treatment of heat, increases male vital

power by increasing sperm concentration also effective in premature ejaculation in males it is used before taking any food in morning time.

- (8) Local Name Peepal
Family *Moraceae*
Botanical Name *Ficus religiosa* Linn.
Part Used Bark
Flowering Time April, May
Method Bark of the Pipal is detached and it is placed in water, color of the water turns red, this water is used twice in a day morning and evening time. It is treatment of the excessive menstrual bleeding, and infertility also effective in control of piles bleeding.
Fruit of the Pipal is cut into two equal parts by sharp weapon from the centre. Mixture of the first part is made and is recommended for use by male patients along with water for the period up to one month. Second part of the fruit is also converted into mixture and is used by female patient. It is effective treatment of the both male and female infertility.

- (9) Local Name Jangli Piaz
Family *Alliaceae*
Botanical Name *Allium griffithianum* Boiss.
Part Used Bulb

Flowering Time March, April

Method All types of the Jangli Piaz are dried and Mixture is made after grinding, it is treatment of Asthma, it excretes blockage effectively and thus relieves Asthma patients.

(10) Local Name Banafsha

Family *Violaceae*

Botanical Name *Viola odorata L.*

Part used Flowers

Flowering Time July, August

Method Bananfsha is effective treatment of throat infections and disorder Banafsha is mixed along with Mulathi (*Glycyrrhiza glabra L.*) and Vahekar (*Adhatoda zeylanica*) in equal amount and is used along with water or milk; it relieves constipation, and also excretes fluids from lungs.

(11) Local Name Karanjwa

Family *Caesalpiniaceae*

Botanical Name *Caesalpinia bonduc (L.) Roxb.*

Part Used Seeds

Flowering Time July, August

Method It is also bitter in taste, its seeds are usually used, seeds are grinded and are used along with water and milk this is treatment of the Malaria, piles and also blood purifier.

- (12) Local Name Kala Vehakar
 Family *Labiatae*
 Botanical Name *Coleobrookia oppositifolia Smith.*
 Part used Leaves
 Flowering Time January, April
 Method Its leaves are wrapped as bandage in wounds and bruises, it is also used in mixtures to improve the digestion.
- (13) Local Name Bhungra
 Family *Asteraceae*
 Botanical Name *Eclipta prostrata Linn.*
 Flowering Time Throughout the year
 Method It is used in different Khushta Jat tonics. Whole plant is crushed and is used in different recipes to turn silver into gold also leaves are used as paste and is applied as antidote.
- (14) Local Name Phulai
 Family *Mimosaceae*
 Botanical Name *Acacia modesta Wall.*
 Part Used Bark
 Flowering Time March, August
 Method It is blood purifier, its bark is used decoction is made and is good treatment of throat, cough disorders. It is also blood purifier it regulates blood pressure, its leaves

are used with water but very little quantity is recommended.

- (15) Local Name Papper
Family *Buxaceae*
Botanical Name *Buxus papillosa C.K .Schneid.*
Part Used Leaves
Flowering Time March, April
Method Leaves of the paper are grinded and liquid extract cause dysentery. It is also blood purifier
- (16) Local Name Akri
Family *Solanaceae*
Botanical Name *Withania coagulens Dunal*
Part Used Seed, Fruit
Flowering Time November, April
Method It is also bitter in taste is good blood purifier, its seed is used and decoction is made. Leaves and fruit both are used and are treatment of pimples and diabetics.
- (17) Local Name Gilot
Family *Asclepiadaceae*
Botanical Name *Ceropegia bulbosa Roxb.*
Part Used Leaves, Bulb
Flowering Time August
Method Water is taken from the tuber of the gilote and Mercury is mixed for the period of 2

hours, it cleans mercury and also softens up to some extent. Which is used in metallurgy It is also used as food and is good appetizer

- (18) Local Name Puth Kanda
Family *Amaranthaceae*
Botanical Name *Achyranthus aspera* Linn.
Part Used Whole plant
Flowering Time July, October
Method Whole plant is burned and ash is collected, it is used in treatment of asthma. Ash of the plant is used to treat wounds Arsenic, Sumbal far for making different Kushta Jats and tonic. It is also used for vomiting. Ash is also used for the treatment of Asthma.
- (19) Local Name Suranjan Shirin
Family *Colchiaceae*
Botanical Name *Colchicum aitchisonii* (Hook.f.) E.Nasir
Part Used Bulb
Flowering Time March, April
Method Whole plant of the Suranjan including tuber is grinded and mixture is made, it can be used independently or can be mixed in other medicines. It is effective in treatment of joint pains, backbone, Ankle pain; Majoon Suranjan is effective treatment of the backbone.



Plate No. 47

Sesamum indicum L.

Voucher No. 45



Plate No. 48

Morus alba

Voucher No. 70



Plate No. 49 ***Colchicum aitchisonii* (Hook.) f. E. Nasir** **Voucher No. 72**

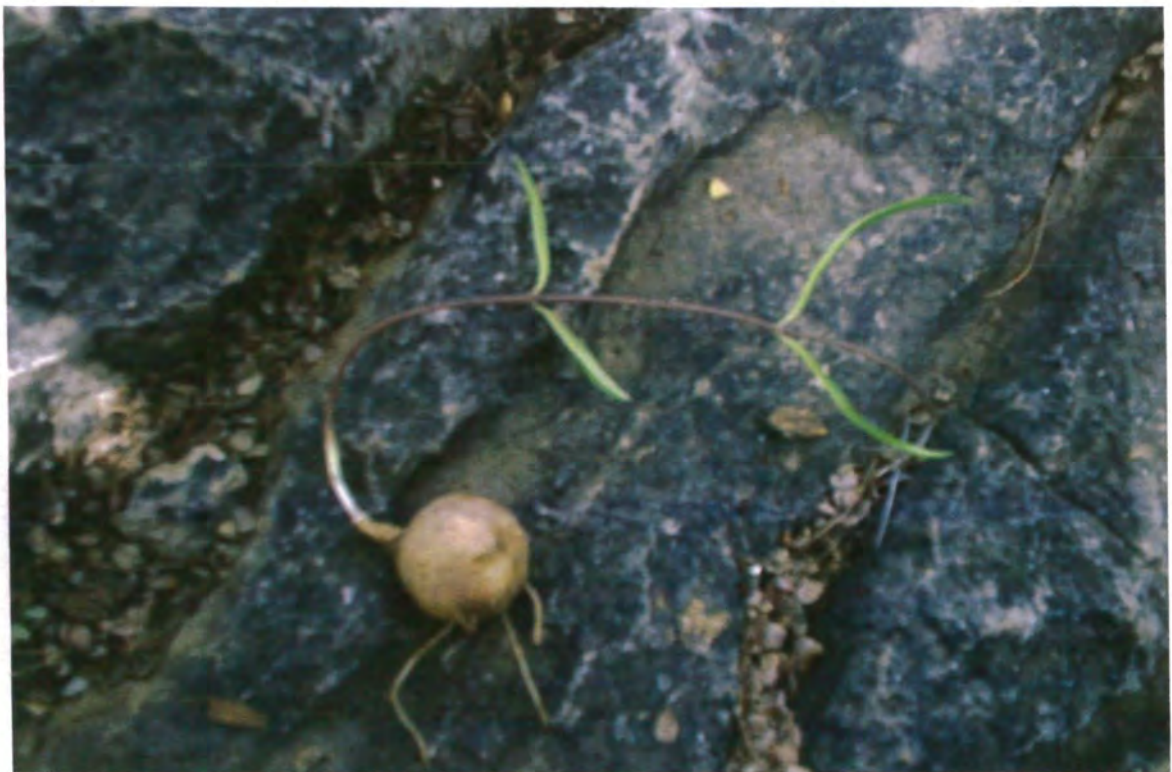


Plate No. 50 ***Ceropegia bulbosa*** **Voucher No. 134**

- (20) Local Name Khabari
- Family *Moraceae*
- Botanical Name *Ficus virgata Wall.ex Roxb.*
- Part Used Fruit
- Flowering Time March ,April
- Method Fruit of the plant is mixed with honey and decoction is made, it controls diabetics, also useful in small pox and cause pimples to come on body surface.
-
- (21) Local Name Kala Toot
- Family *Moraceae*
- Botanical Name *Morus nigra L.*
- Part Used Fruit
- Flowering Time April
- Method Sharbat (Liquid extract) from fruit of the toot is made and it is treatment of the throat infections.
-
- (22) Local Name Til
- Family *Pedaliaceae*
- Botanical Name *Sesamum orientale Linn.*
- Part Used Seed
- Flowering Time June, October
- Method Til oil is used in treatment of different diseases, Til seed is chewed regularly it reduces the Urine frequency if it is more

frequent. Seed is also used in animal sweet especially prepared as a tonic for bulls.

- (23) Local Name Bari Mahori
- Family *Solanaceae*
- Botanical Name *Solanum incanum* Linn.
- Part Used Leaves, Fruit
- Flowering Time April, August
- Method Leaves + fruit of the Mahori is mixed and is used along with water and is treatment of blood pressure. Santha (*Dodonea viscosa*) seed + Black Papper (*Piper nigrum*) both in equal weight are mixed and medicine is made, which is effective treatment of intestinal infections.
- (24) Local Name Nurga / Allerga
- Family *Anacardiaceae*
- Botanical Name *Rhus cotinus*
- Part Used Stem, Leaves
- Flowering Time July, August
- Method It has cooling effect and is used as refrigerant pieces of the stem are cut and placed in water and boiled then sugar is mixed, it is treatment of liver diseases and acute heat problems such as sun stroke and is hepatic tonic.

(25) Local Name Vahekar
 Family *Acanthaceae*
 Botanical Name *Adhatoda zeylanica* Medik
 Part Used Leaves
 Flowering Time March, May
 Method Yellow leaves of the Vahekar 4–5 + one ounce bark of the Phulai (*Acacia modesta*) + 4–5 Yellow leaves of the Shahtoot (*Morus alba*) + 4–5 leaves of the Kahu (*Olea ferruginea*) + 2–3 Eucalyptus leaves all are mixed and extract is made which is used as treatment of the flu and cold, an amount equal to tea cup is used during night. Leaves are used as a treatment for the joint pains as these leaves are wrapped on the joint pains affected area.

(26) Local Name Kur Tumba
 Family *Cucurbitaceae*
 Botanical Name *Citrullus colocynthis* L. Schrad
 Part Used Fruit, Seed
 Flowering Time July, August
 Method Kur tumba seed is used as a blood purifier, also treatment of piles and digestion related disorder of stomach and is stomachic. Seed of the tumba is taken out and fruit is mixed with black pepper (*Piper nigrum*) + Kali Jeri (*Verononia anthelmintica*) + Salt in equal

amount, the medicine is effective treatment of the stomach disorders.

Ajwain is mixed in green unripe fruit of the tumba and when fruit ripe then this Ajwain is taken out and is used for all type of digestive disorders.

- | | | |
|------|----------------|---|
| (27) | Local Name | Kanir |
| | Family | <i>Apocynaceae</i> |
| | Botanical Name | <i>Nerium oleander L.</i> |
| | Part Used | Leaves |
| | Flowering Time | April, August |
| | Method | Leaves of the Kanir are burned in Taramera oil; the medicine is effective treatment of scabies. Flowers are used in different tonics; it should be used as massage in very minute quantity. |
| (28) | Local Name | Khatetan |
| | Family | <i>Oxalidaceae</i> |
| | Botanical Name | <i>Oxalis corniculata Linn.</i> |
| | Part Used | Whole plant |
| | Flowering Time | Through out the year |
| | Method | Alum is boiled in water extract of the plant; after drying of the water, left medicine is used for the treatment of hepatitis three times in a day use is recommended. Khatetan also promote hunger, also useful in heat related complications. |

(29) Local Name Aak

Family *Asclepiadaceae*

Botanical Name *Calotropis procera (Aitch.) Aitch.f.*

Part Used Leaves, Fruit

Flowering Time Through out the year

Method It is effective treatment of the Asthma, Haldi Turmeric (*Curcuma domestica L.*) 20 gram grinded + Aak milk 15 milli liter is mixed for the period of 3 hours. and then capsule is made, it is three time used and this capsule excrete blockage from lungs. It also prevent bleeding Aak milk is treatment of Asthma.

(30) Local Name Santha

Family *Sapindaceae*

Botanical Name *Dodonea viscosa (Linn.) Jacq*

Part Used Leaves

Flowering Time March, April

Method It is blood purifier, fresh leaves are grinded and mixture is made which is used after meals three times in a day is effective blood purifier and also treatment of pimples blood disorder complications

(31) Local Name Bata

Family *Asclepiadaceae*

Botanical Name *Periploca aphylla Decne.*

Part Used Stem, Branches

Flowering Time March, July

Method	Fresh stem and branches of the plant are used cut, crushed and juice is collected this juice is effective treatment of Nervous system disorders for the period of one month. This juice if used in evening and morning time is also treatment of piles and mental disorders.
(32) Local Name	Chibar
Family	<i>Cucurbitaceae</i>
Botanical Name	<i>Cucumis melo var agrestris Naudin</i>
Part Used	Fruit
Flowering Time	May, June
Method	Whole plant is grinded and capsule is made along with seed, this is used for the pain in belly and also in indigestion.
(33) Local Name	Choti Mahori
Family	<i>Solanaceae</i>
Botanical Name	<i>Solanum surrattense Burm.f.</i>
Part Used	Fruit
Flowering Time	Throughout the year
Method	It is blood purifier seed is boiled in water and then used is treatment of women fever.
(34) Local Name	Khawi
Family	<i>Poaceae</i>
Botanical Name	<i>Cymbopogon jawarancusa (Jones.) Schultz</i>
Part Used	Whole plant

- Flowering Time July, August
- Method It is fragrant grass, is useful in treatment of Typhoid fever.
- (35) Local Name Anar Dana
- Family *Punicaceae*
- Botanical Name *Punica granatum Linn.*
- Part Used Fruit
- Flowering Time April, May
- Method It is used in chutni and curry, belly pain and is carminative, also change flavor. Podina juice is obtain and salt is extracted from this which is used in tobacco (Niswar)
- (36) Local Name Podina
- Family *Lamiaceae*
- Botanical Name *Mentha longifolia L.*
- Part Used Leaves
- Flowering Time March, August
- Method Podina leaves are used as Decoction also in different safoof mixtures is treatment of indigestion. Podina + Ajwain desi (*Carum copticum*) + one grain of Allaichi (*Amomum compactum*) are mixed in tea and are used it is treatment of belly problems stomach disorders
- (37) Local Name Khaksi Sar
- Family *Brassicaceae*
- Botanical Name *Sisymbrium irio Linn.*

Part Used	Seed
Flowering Time	March, August
Method	It is treatment of the fever Typhoid, and also used as decoction to treat small pox.
(38) Local Name	Kasni
Family	<i>Asteraceae</i>
Botanical Name	<i>Cichorium intybus Linn.</i>
Part Used	Leaves, Flowers, Root
Flowering Time	July, August
Method	Leaves + flowers + Root of the plant all are treatment of acute heat stroke, Urine problems and is also active ingredient of Sharbat Bazoori.
(39) Local Name	Jalnim
Family	<i>Verbenaceae</i>
Botanical Name	<i>Phyla nodiflora (Linn.) Greene</i>
Part Used	Leaves
Flowering Time	July, September
Method	It is grinded and used with salt and black pepper. It is blood purifier and also affective in skin infections, also used in tonic preparation.

3.9.1 FOLK RECIPES AND INDIGEOUS KNOWLEDGE
DHADDAR VILLAGE

Table No. 54

Sr. No.	Name of Plant part used	Number of plant part used
Dhaddar		
Number of Diseases Cured 46		
1	Gond	4
2	Fruit	29
3	Pulp	5
4	Branches	6
5	Bark	3
6	Leaves	34
7	Seeds	30
8	Whole plant	12
9	Stem	3
10	Latex	3
11	Bulb	2
12	Roots	3
13	Flowers	2



Plate No. 51

***Olea ferruginea* Royle**

Voucher No. 64



Plate No. 52

***Acacia modesta* Wall.**

Voucher No. 65

(1)	Local Name	Phulai
	Family	<i>Mimosaceae</i>
	Botanical Name	<i>Acacia modesta Wall.</i>
	Part Used	Bark
	Flowering Time	March, August
	Method	<p>Gum of the Phulai tree is used for muscles strength and pain in back bone. In order to cure joint pain remedy Gum Phulai 01 gram + Salajeet are mixed and used in quantity of 12 gram with milk daily. The two items are mixed and tablet is made which are upto 10 gram in weight. Extract of Gum Phulai is used to treat if there is a water or Luab in joints.</p> <p>Gum phulai + Kamar Kas (<i>Salvia plebia</i>) + Kalpi Misri (<i>Asparagus adscendens</i>) all three are mixed in equal amount and half spoon is used along with milk, it is treatment of backbone, joint pains and body weakness.</p> <p>Bark of the Phulai is detached which is soft it is chewed and extract is effective cough treatment.</p> <p>Char Magaz + Taj + Gond Phuali + wheat flour all are boiled in desi ghee and gur is mixed, after mixing gur it is again boiled, it is used daily, if Methray (<i>Trigonella foenum-graceun</i>) are also mixed then it is more effective, it is effective in cold treatment, and also gives strength to body. Bark of the</p>

Phuali is effective treatment of the cough and fever. Gond Phuali increases male sperm; its pods are effective blood purifier.

(2) Local Name	Kahu
Family	<i>Oleaceae</i>
Botanical Name	<i>Olea ferruginea Royle</i>
Part Used	Fruit, Leaves
Flowering Time	April, August
Method	Decoction of Kahu leaves is used for flu, cold and weight. Paste of the leaves of the Kahu is useful to support the teeth, which are weak. Its powder is also used for treatment in children of less age, but it is not useful if teeth are weak due to dryness. Leaves of the Kahu are dried and paste is made, this powder along with tea is treatment of gum bleeding. It is also treatment of the cold and flu used regularly, kahu gum also effective treatment of the eye diseases. Its oil is also made from seed and it increases eyesight. Gond Kahu is also useful for eyesight.

(3) Local Name	Kanir
Family	<i>Apocynaceae</i>
Botanical Name	<i>Nerium oleander Linn.</i>
Part Used	Leaves
Flowering Time	April, August

Method	Kanir red flower is toxic and fatal for camel. Its flower oil is extracted and is mixed in Til oil (<i>Sesamum indicum</i>) and drops of this mixture is useful to increase male vital power, its inner and outer use both are possible. White flower kanir is effective treatment of male infertility.
(4) Local Name	Vahekar
Family	<i>Acanthaceae</i>
Botanical Name	<i>Justicia adhatoda</i> Linn.
Part Used	Leaves
Flowering Time	March, April
Method	<p>It is treatment of all ailments of the lungs, it is treatment of the Tuberculosis, cough, cold, flu, Asthma, especially its salt is treatment of asthma. In order to obtain salt of the plant leaves and full plant is burned and ash is placed in water, and after 48 hours it is shaken and the water is filtered, the remaining item is white salt. Its leaves are used to make sharbat while flowers are used to make gulkand, which is treatment of the Asthma, and cough.</p> <p>Gulqand (Flowers extract) is made from flowers of the vahekar and after mixing sugar, it is preserved in bottle, it is effective treatment of chest diseases, lungs disorder and other diseases.</p>

Leaves, flowers and roots of the vahekar are mixed and after boiling sharbat soft drink is made, then Molathi (*Glycyrrhiza glabra*) is also added, it is effective treatment of cough, flu, cold and chest infections.

One kg flowers are mixed in one kg sugar and gulkand is made, it is placed in sunlight and dried, it is treatment of Asthma. Fallen yellow leaves decoction is made which is treatment of acute cough.

(5) Local Name	Kunwar Gandal
Family	<i>Liliaceae</i>
Botanical Name	<i>Aloe barbadensis</i> Mills.
Part Used	Branches
Flowering Time	Late summer
Method	<p>Solid extract locally known as Mosabar is made from the stem of the plant and it is blood purifier used in treatment of Hardness. Liquid extract is mixed with Noshadar is treatment of the belly and stomach disorder, one Kilogram of the liquid extract is mixed with one quarter of the Noshadar.</p> <p>Fresh pulp of the plant is used and is mixed with salt, and then it is used in treatment of blood disorders and also treatment of indigestion.</p> <p>1 quarter Kuchla + ½ kg kuwar gandal + ½ kg mahori (<i>Solanum nigrum</i>) along with fruit + ½ kg Akas bel (<i>Cuscuta reflexa</i>) all are</p>

grinded mixed and are placed in earthen vessel for the period of 10 days, after 10 days kuchla is taken out its outer cover is removed with Knife then a smaller part like pan leaves is removed, and both parts of the Kuchla after cleaning in vessel are grinded well, then wheat flour is mixed and it is boiled in cow ghee and honey of small bees is mixed, it is used along with bread both morning and evening time it is treatment of female menstrual cycle disorder and regulate cycle, if the same medicine is used by males then it is treatment of muscles weakness. It is blood purifier and is used to make mosaber local product, which is prepared after boiling and removing outer bark while using inner soft portion.

(6)	Local Name	Kur tumba
	Family	<i>Cucurbitaceae</i>
	Botanical Name	<i>Citrullus colocynthus L.</i>
	Part Used	Fruit
	Flowering Time	July, August
	Method	Mixture of the Kor Tumba is treatment of the belly, Gas trouble, weight and blood purifier, for constipation patients Gum of the tumba is converted into Sharbat soft drink half spoon of the Muraba of the Tumba is useful for diabetic patients. Its roots are also boiled and are treatment of the blood

disorders, Colic, permanent constipation. Fruit along with the whole plant is boiled in water and half of the water extract is thrown and the remaining is used for reducing sugar level in diabetic patients.

- (7) Local Name Imlah
Family *Rhamnaceae*
Botanical Name *Zizphus nummularia (Burm.f.) Wight & Arn*
Part Used Fruit
Flowering Time July, August
Method Ripe fruit of the Amlahi is collected and Sharbat soft drink is made which is treatment of the liver disorder. It is used for ailment of the liver disorder; sharbat is made from the fruit of the plant.
Amlah + Imlı (*Tamarindis indica*) + Sandal sufed (*Santalum album*) + Nilofar (*Nymphae lotus*) sharbat soft drink all are mixed in equal amount and it is effective treatment of hepatitis.
- (8) Local Name Dhamian
Family *Zygophyllaceae*
Botanical Name *Fagonia indica Burm .f.*
Part Used Whole plant
Flowering Time April, August
Method It is treatment of the women disease Athra, it should be dried under shade and Phaki

mixture is used for the treatment of the diabetics and liver disorder. It continuous use must be avoided and desi Ghee should be used .

- (9) Local Name Mahori
Family *Solanaceae*
Botanical Name *Solanum incanum Linn.*
Part Used Leaves, Fruit
Flowering Time April, August
Method It is used as vegetable, it gives power to the muscles, and it is blood purifier Long pepper (*Piper longum*) are placed in Mahori seed and when fruit is dried, then the fruit burned in Til oil (*Sesamum indicum*) this is effective "Tilla" massage and effective treatment of body pains.
- (10) Local Name Satinasi
Family *Papaveracea*
Botanical Name *Argemone mexicana L.*
Part Used Whole Plant
Flowering Time March, August
Method It is blood purifier, and in blood disorder diseases it can be used.
- (11) Local Name Khalatra
Family *Lamiaceae*
Botanical Name *Salvia aegyptica L.*
Part Used Seed

Flowering Time	March, April
Method	It is cool and treatment of the heat stroke and also useful in male vital power. Its seed are grinded and is used with water.
(12) Local Name	Bhangra
Family	<i>Asteraceae</i>
Botanical Name	<i>Eclipta prostrata Linn.</i>
Part Used	Aerial parts
Flowering Time	Throuhgout the year
Method	It is treatment of the stomach disorder, also used in Kushta sazi (Metullargy) especially in Qali and silver conversion to gold.
(13) Local Name	Dhatora
Family	<i>Solanaceae</i>
Botanical Name	<i>Datura stramonium L.</i>
Part Used	Seeds
Flowering Time	March, July
Method	Dhatora is toxic plant and it badly affect nervous system, in some cases it gives good sleep, patients affected from mental disorder get some relief from this plant. Bark of fruit of Dhatora after taking seed out of the fruit is mixed along with Harmal seeds, then Choti Mahori (<i>Solanum surratense</i>) is also mixed and grinded and water is mixed, then it is boiled up to the extent that its juice is extracted after filtering from the cloth, Til oil

(*Sesamum orientale*) is mixed and is boiled on Ber (*Zizphus mauritiana*) fuel wood, when there remains pure extract, it is preserved, this is used as massage for treatment of the muscular pain, it is effective especially for the treatment of joint pains.

- (14) Local Name Ount katara
Family *Asteraceae*
Botanical Name *Echinops echinatus Roxb.*
Part Used Root
Flowering Time April, July
Method Bark of the root of ount katera is sexual tonic; its water is used in making kushta shingraf (Cinnabar) Tonic.

- (15) Local Name Vena
Family *Apocynaceae*
Botanical Name *Rhazya stricta Decne.*
Part Used Leaves
Flowering Time March, August
Method Mixture powder made up of vena is blood purifier; it gives strength to the intestine and is effective treatment of indigestion.

Vena (*Rhaza stricta*) + Akri panir (*Withania coagulens*) + Dhaman (*Fagonia indica*) all are mixed in equal amount is effective treatment of gas troubles, stomach disorder. Vena is mixed in Ajwain, black salt + Panir

and all are mixed in equal quantity, it is used along with meals is effective for indigestion. It is blood purifier, also used in treatment of diabetics if kushta Faulad is also used.

(16) Local Name	Aak
Family	<i>Asclepiadaceae</i>
Botanical Name	<i>Calotropis procera (Aitch.) Aitch.f.</i>
Part Used	Leaves
Flowering Time	April, May
Method	Shigraf kushta (Cinnabar) is made from the Aak leaves, one kg Aak leaves are grinded and piled up, then 12 gram is used, and is placed on the fire of cow dung 10 kg, this process helps in preparation of shingraf Kushta. Aak leaves are placed on Corn sheet and Ajwain and black pepper grinded salt is also mixed, then second layer of the leaves are also arranged and fire is burned slowly, when all leaves are dried, the leaves are grinded and it is used in livestock diseases. It is effective in digestive system improvement Aak milk is placed in Patasa (Sugar pellets) and it is used in quantity from 1 drop to 11 drops and then reduced up to one, it is treatment of joint pains, and rheumatism. Aak roots + suranjan shirin (<i>Colchicum aitchisonii</i>) + Aksan (<i>Withania somnifera</i>) roots all are mixed in equal amount and

mixture is made, it is treatment of the body pains.

- (17) Local Name Aksan
Family *Solanaceae*
Botanical Name *Withania somnifera (L.) Dunal*
Part Used Roots
Flowering Time March, August
Method Aksan is effective remedy in treatment of body pains, when blood circulation is affected its leaves massage is effective, leaves of the Aksan along with Mulathi (*Glycyrrhiza glabra*) are effective treatment of frozen blood.
- Roots of the plant are placed in earthen vessel after grinding and water is mixed, after 3 – 4 days water is taken out and Gur is mixed, it is used for the treatment of heat problems in livestock and is also digestive. If honey is mixed in this sharbat drink then it is effective in joint pains.
- (18) Local Name Podina
Family *Lamiaceae*
Botanical Name *Mentha longifolia (L.) L.Wall ex. Bth.*
Part Used Leaves
Flowering Time July, August
Method Podina is good treatment of gastric problems, it is promotes hunger, and the

patients of the fever must use it after they recover from illness. Its curry is carminative.

Podina leaves curry is useful for heart patients; its tea is effective in digestive system disorders.

- (19) Local Name Giloh
Family *Asclepiadaceae*
Botanical Name *Tinosporia cordifolia (DC) Miers.*
Part Used Branches
Flowering Time March, April
Method Giloh is effective treatment of fever, liver, heat and its salt is powerful tonic. It is effective treatment of old fever, it is grinded and then boiled in water and sharbat soft drink is made, it is used for the treatment of fever. Its leaves can also be used. White stem is placed in the water and Giloh two layers are made and are grinded and used for the treatment of fever.
- (20) Local Name Shrin
Family *Mimosaceae*
Botanical Name *Albizzia lebbek (Linn.) Bth*
Part Used Leaves
Flowering Time April, May
Method Old kaler salt collected from saline place in quantity 4 kg is mixed in 8 kg shrin leaves for the period of 4 days this mixture is well

mixed daily, after four days extract (Zulal) is ready, now Gorakh Pan, (*Heliotropium strigosum*), Bukan (*Phyla nodiflora*), Vahekar (*Justicia adhatoda*), Jawansa (*Alhagi mauoronum*) and butter Ash in quantity of half kg is mixed, after 11 days salt is prepared and now it is effective treatment of different diseases. For Fever seasonal and regular the medicine in the quantity of 250mg along with hot milk is effective treatment of fever and after fever again; 250mg along with fresh milk eliminate fever. For hearing disorder / pain in Ear If there is hearing disorder then same medicine is placed in liver of cow or poultry bird, and boiled half then it is placed in ear it is effective treatment of hearing disorder. For ear pain 12 gram Safoof mixture is mixed in Roghan Gul 24 gram and one drop half boiled is placed on ear, this relive the pain effectively.

(21) Local Name	Papra
Family	<i>Fumariaceae</i>
Botanical Name	<i>Fumaria indica (Hauskn.) Pugsley</i>
Part Used	Leaves
Flowering Time	March, April
Method	250 grams same medicine as described above is mixed in Arq e Shahtra and 72

gram is treatment of both skin infections and blood disorder.

- (22) Local Name Saunf
Family *Apiaceae*
Botanical Name *Foeniculum vulgare Mill.*
Part Used Seed
Flowering Time March, April
Method Above prepared medicine in amount of 250mg to 500 mg is mixed in Arqe Badian and after half an hour it relieves pain. For Kidney pain (New and old both)
500mg same medicine is mixed in 120 ml Arqe badian for kidney pain and this is used for the period of 7 days is treatment of kidney pain its 3 months consecutive use is permanent treatment of kidney pain.
- (23) Local Name Boher
Family *Moraceae*
Botanical Name *Ficus bengalensis Linn.*
Part Used Roots
Flowering Time April, May
Method 8 – 10 kg leaves of the Bohar, after boiling, are filtered and when these become soft then these are placed in Iron vessel and boiled. when leaves fully dissolve then dry matter is taken out, and water remain in vessel this water is converted into rub (A pure extract)

and tablets are made, this is effective treatment of the blood infusion and power tonic. It is used to stop excretion of metals in Urine, and few drops of the boher milk is used and mixed in Patasa (Sugar pellets) it is treatment of excess blood excretion, its roots are also used and it is effective in increasing male vital power.

- | | |
|-----------------|---|
| (24) Local Name | Peepal |
| Family | <i>Moraceae</i> |
| Botanical Name | <i>Ficus religiosa Linn.</i> |
| Part Used | Bark |
| Flowering Time | April, May |
| Method | Hanging roots of the peepal are dried and cut and be converted into dry powder then Salib misri (<i>Orchis latifolia</i>) is added in equal amount it is effective treatment of the male infertility. Hindu tribes before partition, used its leaves like cigarette |
| (25) Local Name | Koher |
| Family | <i>Sapotaceae</i> |
| Botanical Name | <i>Monotheca buxifolia (Falc.) A. D.</i> |
| Part Used | Fruit |
| Flowering Time | April, May |
| Method | Koher fruit is dried and grinded it prevents vomiting, and also strengthen stomach. it is effective in preventing child vomiting. |

Its fruit is used as vegetable curry and salad is also made. Koher + Choughan (*Caralluma tuberculata*) + Podina (*Mentha longifolia*) all are mixed in equal amount and it is effective in digestive system. It removes liver disorder fruit is used curry is also made from the fruit which is appetizer.

(26) Local Name

Hermal

Family

Zygophyllaceae

Botanical Name

Peganum harmala Linn.

Part Used

Seed

Flowering Time

March, April

Method

One quarter hermal is grinded and honey is mixed in equal amount, half spoon of this medicine is useful for joint pains.

It is anti germal and its fumes are effective against germs, it is also used in livestock diseases.

Green Hermal leaves + Lahsun green whole plant are mixed in cow lasi curd and placed separately, Alum + Gur + Black salt all are mixed in water and placed in earthen pot, both two items are used during the months of March, April, it is effective treatment against worms, skin disorders and other digestive disorders of goats and sheep. Black salt + Mustard pure oil are mixed in equal quantity and are used in case of indigestion and other problems.

3 – 4 eggs are mixed and one kg milk is placed along with Gur all are boiled well and when it is less warm then 3 – 4 other eggs are placed, and 1 quarter of honey is placed, this is used for 3 – 4 days and one fourth of this medicine is used for goats and sheep it is effective treatment in animal diseases especially when animals drink hot water or cold water then this cause problem, it is effective in order to remove these ill effects. Masoor (*Lens culinaris*) pulse is boiled well then chilies and salt is mixed it is also treatment of the water disorder in animals. for example use as cold water in winter season.

It is treatment of germs, and is effective in treatment of pain.

(27)	Local Name	Puth kanda
	Family	<i>Amaranthaceae</i>
	Botanical Name	<i>Aschyranthus aspera</i> Linn.
	Part Used	Whole plant
	Flowering Time	April, May
	Method	Whole plant of the puth kanda is burned and ash mixed with honey, it is effective treatment of the cough. Puth Kanda is dried, spike of the Kunder Tyha; plant is also used and Puth Kanda is burned Ash is mixed in water then it is placed in Kunder dried and fire clay stone is used to produce fire. Salt of

the Puth kanda is used for treatment of Asthma, whole plant is burned and Ash is boiled in water and salt is collected.

- | | |
|-----------------|--|
| (28) Local Name | Isam ghol |
| Family | <i>Plantaginaceae</i> |
| Botanical Name | <i>Plantago lanceolata</i> Linn. |
| Part Used | Husk |
| Flowering Time | March, April |
| Method | <p>Its seed is good treatment of stomach inflammation, increased thirst and is effective in control of excessive thirst. It is used in treatment of patients, facing the problem of excessive urine, bulk of the dry fruit is taken along with water, and it maintains male vital power and also regulates urine.</p> <p>It is used to treat dysentery. Its husk is mixed in Sirka Angoori and paste is applied on the body parts, which gives relief to the body.</p> |
| (29) Local Name | Alsi |
| Family | <i>Linaceae</i> |
| Botanical Name | <i>Linum usitatissimum</i> L. |
| Part Used | Seed |
| Flowering Time | March, April |
| Method | <p>It is effective treatment of the kidney wounds, and also useful for asthma patients, as well as breathing disorders. It is boiled, and used in livestock to remove wastes from</p> |

body after birth. It is also used to treat dryness and is treatment of pain as well. Its sweet is made which is used as livestock feed tonic.

- (30) Local Name Soey
Family *Apiaceae*
Botanical Name *Anethum graveolens L.*
Part used Seed
Flowering time March, April
Method Seed are grinded and feed to animal with water or milk to increase lactation, it is also used in gastric troubles.
- (31) Local Name Chirata
Family *Gentianaceae*
Botanical Name *Swertia cordata (G .Don) C .B. Clarke*
Part Used Whole plant, Leaves
Flowering Time July, March
Method Whole plant is dried and grinded and mixture is made, this is used for blood purification and also treatment of Pimples. It is blood purifier, and is effective in liver disorder, and it is also treatment of fever. Chirata (*Swertia cordata*) + Paper (*Buxus papilosa*) + Giloh (*Tinospora cordifolia*) all are mixed and decoction is made, it is treatment of typhoid, fever and malaria.

- (32) Local Name Santha
Family *Sapindaceae*
Botanical Name *Dodonea viscosa (Linn.) Jacq.*
Part Used Leaves
Flowering Time Feburary, March
Method Santha leaves + Revand Cheeni (*Rheum emodi*) + Majo (*Cupressus sempervirens*) all are mixed in equal amount and grinded well and mixture is made, and the medicine is applied this is treatment of wounds which are in bad shape.
- (33) Local Name Bata
Family *Asclepiadaceae*
Botanical Name *Periploca aphylla Decne.*
Part Used Shoots
Flowering Time March, July
Method Its young shoots are used as vegetable. Coal of the plant + Qalmi Shora all is mixed and it is used to produce explosion and fire.
- (34) Local Name Karira
Family *Capparidaceae*
Botanical Name *Capparis decidua (Forssk.) Edgew.*
Part Used Stem
Flowering Time May, June
Method Karira plant branches are broken and its wood is burned, ash is mixed with old

Bhabar (*Eulaliopsis binata*) grasses ash and mixture is made and this is placed on wounds of animals as well as human beings, it rectify the wounds. Its coal is used to treat livestock diseases especially, urine disorder in which blood is coming.

- (35) Local Name Kiari
Family *Lilaceae*
Botanical Name *Gloriosa superba L.*
Part Used Tuber
Flowering Time July, August
Method Half quarter of the plant is cut into small pieces, then 2 kilogram milk is mixed, then butter is obtained from this, it is boiled to make ghee, it is used after meals and is effective treatment of the piles and other problems related to stomach.
- (36) Local Name Jangli Karela
Family *Cucubitaceae*
Botanical Name *Momordica diocia L.*
Part Used Fruit
Flowering Time July, October
Method It is used in both form cooked as well as unripe, and curry can also be made, it is effective treatment of diabetics.



Plate No. 53

Momordica dioica L.

Voucher No. 28



Plate No. 54

Peripoloca aphylla

Voucher No. 168

- (37) Local Name Mastiara
 Family *Gentianaceae*
 Botanical Name *Swertia paniculata* Wall.ex.C.B.Clarke
 Part Used Leaves
 Flowering Time Throughout the year
 Method It is used as broom, also used in extract locally called Rus; flower is used while leaves are used in mixture.
- (38) Local Name Chibar
 Family *Cucurbitaceae*
 Botanical Name *Cucumis melo* var. *agrestis* Naudin
 Part Used Fruit
 Flowering Time May, June
 Method It is used as vegetable and brutha a vegetable extract of the fruit is made. It is also used in the livestock for good digestion.
- (39) Local Name Itsit
 Family *Nyctaginaceae*
 Botanical Name *Boerhavia procumbens* Banks ex Roxb
 Part Used Root
 Flowering Time March, May
 Method Itsit + Kuwar gandal (*Aloe barbadensis*) + Bhakra (*Tribulus terrestris*) all in equal amount are mixed and are used for making kushta (Tonic).

(40) Local Name Rahura
 Family *Bignoniaceae*
 Botanical Name *Tecomella undulata (Roxb.) Seeman*
 Part Used Wood
 Flowering Time April, May
 Method Its wood is very hard used in rifles parts and door wood. Rahura wood is used to make wooden parts of the rifles.

(41) Local Name Halia
 Family *Apiaceae*
 Botanical Name *Pimpinella anisum L.*
 Part Used Seed
 Flowering Time March, April
 Method It is mixed in water during evening time and boiled in milk then gur is mixed, it is effective in pains especially backbone problems. It is used in making sweet for bullocks; sweet is made in gur and is effective in giving vital power to the bulls. Its sweet is also treatment of pain and gives strength to body.

(42) Local Name Anar Dana
 Family *Punicaceae*
 Botanical Name *Punica granatum Linn.*
 Part Used Fruit

Flowering Time	April, May
Method	Bark of the Anar is effective treatment of dysentery.
(43) Local Name	Sufed Chambeli
Family	<i>Oleaceae</i>
Botanical Name	<i>Jasminum officinale Linn.</i>
Part used	Flowers
Flowering time	July, October
Method	25 gram fresh loaves of the chambeli are failed in 250 milli litre water and are filtered then this water is used as gorgle for mouth ulcers.
(44) Local Name	Jaledhar
Family	<i>Tiliaceae</i>
Botanical Name	<i>Grewia villosa Willd.</i>
Part Used	Seed
Flowering Time	July, August
Method	Ripe seed of the Jaledhar is used, roots of the Jaledhar + Awani leaves (<i>Otostegia limbata</i>) + Kahu leaves (<i>Olea ferruginea</i>) + Vina (<i>Rhaza stricta</i>) + Kikar (<i>Acacia nilotica</i>) bark all are grinded and mixed and boiled up to the extent that a concentrated extract remains after some time Ajwain and gur are also mixed in little cow Ghee and again placed on fire. Concentrated form is used and placed in earthen vessel, then tablets are

made and used along with water, it is effective treatment of indigestion, and other stomach problems, locally it is called Rus, it is also treatment of Cough.

- (45) Local Name Bhakra
- Family *Zygophyllaceae*
- Botanical Name *Tribulus terrestris* Linn.
- Part Used Whole plant
- Flowering Time Throughout the year
- Method Bhakra + Kamr Kas (*Salvia plebia*) + Jaledhar roots (*Grewia villosa*) + Awani leaves (*Otostegia limbata*) + Kahu leaves (*Olea ferruginea*) + Vina (*Rhaza stricta*) + Kikar bark (*Acacia nilotica*) + Ajwain (*Carum copticum*) + Panir (*Withania coagulens*) and gur all are mixed and cow ghee is also mixed and boiled it is treatment of Liqoria and other body pains. It is treatment of removal of any blockage in urine. Its salt is used to remove breathing disorder. It increases concentration of male sperm.

- (46) Local Name Lunak
- Family *Zygophyllaceae*
- Botanical Name *Zygophyllum simplex* L.
- Part Used Whole plant
- Flowering Time August, May

Method	Chutni (Sauce) is made from this plant, and it is effective treatment of burning, it is grinded and paste is made, this is effective in healing of body wounds. Ash of the plant is placed on body part burned and it reduces the impact of burning.
(47) Local Name	Lahsun
Family	<i>Liliaceae</i>
Botanical Name	<i>Allium cepa Linn.</i>
Part Used	Bulb
Flowering Time	February, March
Method	It is used to treat blood pressure its pods are used starting from one up to five.
(48) Local Name	Post
Family	<i>Papaveraceae</i>
Botanical Name	<i>Papaver hybridum L.</i>
Part Used	Seed
Flowering Time	March, April
Method	Seeds of the poppy are used in making Joshanda (Decoction) which is treatment of flu and cold. Afun in also made from the plant by maing cuts on part of the plant. Badam fruit (<i>Prunus amygdalus</i>) is placed in water for some time then poppy is also mixed two items along with black pepper (<i>Piper longun</i>) + Elachi (<i>Amomun campactun</i>) is used along with milk and it is effective treatment of the mental weakness.

also gives strength to heart, there is one precaution that this may be boiled if used during in winter season.

- (49) Local Name Bathu
Family *Chenopodiaceae*
Botanical Name *Chenopodium album L.*
Part Used Leaves
Flowering Time April, May
Method Leaves of the bathu are boiled and are placed on the wounded body parts; it is effective in removing blood clots which are frozen and gives way to fresh blood.
- (50) Local Name Mako
Family *Solanaceae*
Botanical Name *Solanum nigrum L.*
Part Used Leaves, Fruit
Flowering Time Throughout the yea
Method Curry of the leaves of the plants is made; it is also used to remove dryness of the intestine. It is treatment of the intestinal part which is non functional. It is used as vegetable, also treatment of the extreme thirst and the patient which have eaten raw mercury its fluid extract that mercury. It also improves liver condition.

- (51) Local Name Pohli
Family *Asteraceae*
Botanical Name *Carthamus oxycantha M. Bieb.*
Part Used Seed
Flowering Time July, August
Method Seeds of the pohli are eaten, while it is used as food during periods of extreme drought.
- (52) Local Name Tahli
Family *Papilionaceae*
Botanical Name *Dalbergia sissoo Roxb.*
Part Used Bark
Flowering Time April, May
Method Bark of the Shisham + Kikar bark is mixed and is placed in tobacco Beera (*Nicotiana tabacum*) it is strong narcotic.
- (53) Local Name Dharek
Family *Meliaceae*
Botanical Name *Melia azedarach Linn.*
Part Used Seeds, Leaves
Flowering Time March, April
Method Dharek leaves are used as blood purifier, these are used along with water and it is also treatment of jaundice.
- (54) Local Name Sanka Holi
Family *Convolvulaceae*
Botanical Name *Evolvulus alsinoides (Linn.) Linn.*

Part used	Whole Plant
Flowering Time	February, October
Method	This plant is used as tonic against asthma it is bitter in taste also used as vermifuge.
(55) Local Name	Majith
Family	<i>Rubiaceae</i>
Botanical Name	<i>Rubia cordifolia L.</i>
Part Used	Roots
Flowering Time	June, July
Method	Its roots are used and these are boiled then Bhaswat plant extract is mixed along with butter, it is treatment of the infection. It is also mixed in water and is treatment of hepatitis. It is effective treatment of pain, roots of the plant are used powder is made and it is treatment of backbone problems.
(56) Local Name	Ajwain
Family	<i>Apiaceae</i>
Botanical Name	<i>Carum copticum L.</i>
Part Used	Seeds
Flowering Time	March, April
Method	Ajwain is placed in Tumba (<i>Citrullus colocynthis</i>) fruit by opening from one side, which is not fully ripe, then it is closed and placed for the period of 7 days, n kuwar gandal is mixed and is grinded well, after mixing honey of small bees, tablets are made

and are dried under shade, one tablet is used after meals, it is effective treatment of constipation, digestive, diuretic and blood purifier. It is effective in belly pain. if tea is made from this plant it is effective treatment of dryness.

- (57) Local Name Dhania
Family *Apiaceae*
Botanical Name *Corriandrum sativum L.*
Part Used Whole, plant
Flowering Time July, August
Method It is effective in reducing heat level of body and reduces male sexual desire, in previous years Kabadi player used to retain their power by using its excessive amount.
- (58) Local Name Akas Bel
Family *Cuscutaccae*
Botanical Name: *Cuscuta reflexa Roxb.*
Part used Whole Plant
Flowering Time July, September
Method It is good blood purifier it decreases inflammation, and also treatment of pain, its layer is placed as bandage, and its direct consumption must be avoided as it is harmful as well.

- (59) Local Name Makhni Booti
Family *Malvaceae*
Botanical Name: *Sida alba*
Part Used Whole Plant
Flowering Time March, August
Method It is treatment of male early release and male vital power, it is crushed and extract is placed in water and used with sugar.
- (60) Local Name Kali Zeeri
Family *Asteraceae*
Botanical Name *Verononia anthelmintica Willd.*
Part Used Seed
Flowering Time April, May
Method Its seed is used as blood purifier; it is also treatment of worms in livestock and is used along with Ghee.
- (61) Local Name Banafsha
Family *Violaceae*
Botanical Name *Viola odorata L.*
Part Used Leaves
Flowering Time April, July
Method It is effective treatment of cough and Joshanda. Decoction is made from whole plant which is used along with tea regularly.

- (62) Local Name Karanjwa
Family *Caesalpinaceae*
Botanical Name *Caesalpinia bonduc (L.) Roxb.*
Part Used Seeds
Flowering Time July, August
Method It is effective treatment of the malaria, it is grinded and mixed in flour Giloh can also be used along with this plant.
- (63) Local Name Akri
Family *Solanaceae*
Botanical Name *Withania coagulens Dunal*
Part Used Seed, Fruit
Flowering Time November, April
Method It is blood purifier, and used in Mixtures, it is also used to improve digestion in livestock. Seed and leaves of the plant are grinded and are mixed with other medicines for gastric troubles.
- (64) Local Name Gilote
Family *Asclepiadaceae*
Botanical Name *Ceropegia bulbosa Roxb.*
Part Used Bulb
Flowering Time July, August
Method It dries the water in the stomach, it is grinded and used with water, it is also effective for extreme thirst if Jaman fruit is also added.

- (65) Local Name Suranjan Shirin
 Family *Colchiaceae*
 Botanical Name *Colchicum aitchisonii (Hook.f.) E.Nasir*
 Part Used Bulb
 Flowering Time March, April
 Method Majon (Ointment) Surnajan is made and is treatment of the pains. Suranjan Shirin is grinded and powder is made, seed of Aak plant (*Calotropis procera*) and Aksan (*Withania somnifera*) root is also added and capsule is made, this is treatment of all pains.
- (66) Local Name Khabari
 Family *Moraceae*
 Botanical Name *Ficus virgata Wall.ex Roxb.*
 Part Used Fruit
 Flowering Time March, April
 Method It is used for the treatment of the worms, the deep rooted worms are cut and milk of the plant is added on the worms this effectively control worms.
- (67) Local Name Kala toot
 Family *Moraceae*
 Botanical Name *Morus nigra L.*
 Part Used Fruit
 Flowering Time March, April

Method	It is good treatment of throat and glands, its sharbat (Liquid extract) is used which is made from fruit.
(68) Local Name	Desi Kikar
Family	<i>Mimosaceae</i>
Botanical Name	<i>Acacia nilotica (Linn) Delile</i>
Part used	Flowers
Flowering time	March-November
Method	Flowers of the kiker 1 kilogram are collected and are mixed in Dhania seed and Kado seed each is 10 gram and are grinded, it is used with water twice in a day, it is treatment of headache.
(69) Local Name	Jamanoo
Family	<i>Myrtaceae</i>
Botanical Name	<i>Syzygium cumini L. skeels</i>
Part Used	Fruit
Flowering Time	March, May
Method	Jaman sharbat soft drink is used for diabetics. Use of fruit eliminate bad smell from teeth, its drink also cover blood deficiency and face beauty after grinding.
(70) Local Name	Pathar chat
Family	<i>Saxifragaceae</i>
Botanical Name	<i>Bergenia ciliata (Haw.) Sternb.</i>
Part Used	Leaves

Flowering Time	March May
Method	Leaves are used for the treatment of the stones in kidney, it breaks the stones. Leaves are chewed regularly.
(71) Local Name	Kanghni
Family	<i>Polygonaceae</i>
Botanical Name	<i>Fagopyrum esculentum Moench</i>
Part Used	Seed
Flowering Time	March, April
Method	It is treatment of the (Tuberculosis) sweet of the Kaghni is made, ghee and local desi sugar gur is mixed in sweet and is used as porridge.
(72) Local Name	Khatetan
Family	<i>Oxalidaceae</i>
Botanical Name	<i>Oxalis corniculata Linn.</i>
Part Used	Whole plant
Flowering Time	March, August
Method	It is effective for liver disorder and also improves digestion. Chutni (Curry) of this plant is also made.
(73) Local Name	Bershasha
Family	<i>Polypodiaceae</i>
Botanical Name	<i>Adiantum capillus- veneris L.</i>
Part Used	Leaves
Flowering Time	No flowering

- Method Leaves are boiled and old gur desi sugar at least 5 years old is added this extract regulate menstrual cycle and removes blockage.
- (74) Local Name Til
- Family *Pedaliaceae*
- Botanical Name *Sesamum orientale* Linn.
- Part Used Seed
- Flowering Time July, August
- Method It is used to regulate urine and is mixed in gur local desi sugar and this is used to reduce urine intensity.
- (75) Local Name Sufeda
- Family *Myrtaceae*
- Botanical Name *Eucalyptus camaldulensis* Dehnh.
- Part Used Leaves
- Flowering Time March, August
- Method Sneezing of the Eucalyptus leaves is effective treatment of the flu, cold it control flu and cold and is also defence of the tear gas.
- (76) Local Name Khaksi sar
- Family *Brassicaceae*
- Botanical Name *Sisymbrium irio* Linn.
- Part Used Seed
- Flowering Time March, April

- Method It is used in treatment of the Typhoid fever, capsule is made and is mixed in goat milk, which is of red color and also has passed 40 days lactation period, after drying it is again used with milk of the same goat it is effective treatment of typhoid. If its juice is sprayed on the bed then it is effective in control of worms.
- (77) Local Name Sumender sukh
- Family *Labiatae*
- Botanical Name *Salvia plebeia R.Br*
- Part Used Seed
- Flowering Time May, June
- Method It increases male vital power and stimulant. Seeds are grinded in water and are used for strength.
- (78) Local Name Bhang
- Family *Cannabaceae*
- Botanical Name *Cannabis sativa Linn.*
- Part Used Leaves
- Flowering Time April, October
- Method It is narcotic, it is used to treat heat problems in livestock, it is grinded and feed to animals, and leaves weaken muscles, kushta Qalai a tonic is also made in bhang, which is sexual tonic.
- (79) Local Name Jahl

Family	<i>Salvadoraceae</i>
Botanical Name	<i>Salvadora oleoides Decne</i>
Part Used	Fruit
Flowering Time	May, August
Method	Its fruit is used, and miswak is used for teeth cleaning. Leaves of the Jandi (<i>Prosopis juliflora</i>) + Jahl are mixed and these are used to treat blood in urine from buffaloes which are urinating with blood drops.
(80) Local Name	Marwan
Family	<i>Verbenaceae</i>
Botanical Name	<i>Vitex negundo Linn.</i>
Part Used	Seed
Flowering Time	May, July
Method	Its seed and leaves are used it is boiled in Karahi (Iron vessel) and sweet is made in flour and oil is added and grinded and boiled again then it is used in blood purification, stomach disorder and especially used in camel for better grazing.
(81) Local Name	Jalekri
Family	<i>Urticaceae</i>
Botanical Name	<i>Debregeasia longifolia (Den) Rendle</i>
Part used	Leaves and fruits
Flowering time	March, April
Method	Decoction of the young leaves is used as treatment of stomachs. Leaves are given to

cow and buffaloes for the treatment of diasshoea and platulence.

(82) Local Name	Jangli Ber
Family	<i>Rhamnaceae</i>
Botanical Name	<i>Zizphus oxyphylla</i> Edgew.
Part used	Root, bask
Flowering time	July-August
Method	Extract of the root bask is made and is mixed with lemon (<i>Citrus medica</i>) in equal quantity and given there time in a day to cure hypertension and other associated diseases.

3.9.2 FOLK RECIPES AND INDIGEOUS KNOWLEDGE

NAUSHEHRA VILLAGE

Table No. 55

Sr. No.	Name of Plant part used	Number of plant part used
Number of Diseases Cured 32		
1	Wood	1
2	Root	5
3	Seed	5
4	Leaves	8
5	Fruit	14
6	Oil	2
7	Bark	3
8	Branches	2

9	Husk	1
10	Stem	1
11	Bulb	1
12	Pulp	1
13	Grains	1
14	Whole plant	1

- (1) Local Name Ajwain
- Family *Apiaceae*
- Botanical Name *Carum copticum L.*
- Part Used Seeds
- Flowering Time April
- Method For reducing over weight, Isamgol (*Plantag ovata*) Whole + Kalonji (*Nigella sativa*) + Ajwain + Methray (*Trigonella foenumgraceum*) in equal amount all are grinded mixture is made one small dosage is used during night time before sleep, and the same is used in early morning before taking any food.
- Ajwain is mixed in sugar in equal amount and mixture is made, this is used three times along with milk and water, it is treatment of Rheumatism.
- (2) Local Name Krira
- Family *Capparidaceae*
- Botanical Name *Capparis decidua (Forsk.) Edgew.*

Part Used	Whole Plant
Flowering Time	July, August
Method	Wood of the Karir after burning and making cool is mixed in Kalonji in equal amount and capsule is made, which is used by mixing honey + milk in equal amount and it is treatment of the joint pains.
(3) Local Name	Aak
Family	<i>Asclepiadaceae</i>
Botanical Name	<i>Calotropis procera (Aitch). Aitch. f.</i>
Part Used	Leaves
Flowering Time	Throughout the year
Method	Root of Aak along with bark + Ajwain desi (<i>Carum copticum L.</i>) + Kalonji (<i>Nigella sativa</i>) after mixing, drying is grinded and it is utilized in equal amount in treatment of the joint pains and backbone pain. Green stem of the Aak and its root are broken into 7 pieces and two full Khuchla are also placed in vessel and fire is burned, when water is dried then both are mixed and three to four eggs are also placed but Yellow layer is removed Til Oil (<i>Sesamum orientale</i>) one quarter + 1 quarter egg + mixture already prepared + 12 gram Ratan Jot are also mixed and boiled and placed in bottle and mixed and then it is used as massage on body part having pain



Plate No. 55

***Calotropis procera* (Aitch.) Aitch. f. Voucher No. 32**



Plate No. 56

***Capparis spinosa* L.**

Voucher No. 35

- (4) Local Name Kalwangi
 Family *Ranunculaceae*
 Botanical Name *Nigella sativa L.*
 Part Used Seed
 Flowering Time March, April
 Method 24 gram kalonji + 36 gram Vehaker (*Justicia adhatoda.*) After making tea qahwa is used with honey three times in a day and is treatment of the asthma.
- (5) Local Name Imlah
 Family *Rhamnaceae*
 Botanical Name *Zizphus nummularia (Burn.f.) Wight & Arn*
 Part Used Leaves, Fruits
 Flowering Time March, June
 Method Its leaves are used in dysentery and diabetic by decoction, leaves are also applied externally on boils and scabies.
- (6) Local Name Gajar
 Family *Umbelliferae*
 Botanical Name *Daucus carota var. sativus*
 Part Used Root
 Flowering Time March, April
 Method Gajar is treatment as blood purifier, it gives strength to heart, and in case of scabies allergy it is used on daily basis in quantity

of ½ Kg daily. Juice is used to strengtheng eye sight

- (7) Local Name Shrin
Family *Mimosaceae*
Botanical Name *Albizzia lebbeck (L.) Bth*
Part Used Seeds
Flowering Time April, May
Method Seeds of the shirin + kalonji is treatment of the diabetics. Seed of the both species are mix in equal amount and are used with water and it is effected in reducing sugar level.
- (8) Local Name Seb
Family *Rosaceae*
Botanical Name *Pyrus malus Linn.*
Part Used Fruit
Flowering Time March, April
Method 50 Grams kalonji + 50 grams long + 1 kg apple after mixing in water, then mixture is dried it is grinded and is used with small amount of saunf (*Foeniculum vulgare*) or Arq -e- gulab 2 or 3 sips in, morning / evening is treatment of diabetes.
- (9) Local Name Kahu
Family *Oleaceae*
Botanical Name *Olea ferruginea Royle*
Part Used Fruit, Leaves

Flowering Time	April, August
Method	Wild olive one teaspoon + honey of the small bees after mixing are used at evening with meal is effective in reducing blood concentration. Kahu seed is also boiled and Sharbat Liquid extract made after mixing sugar it is treatment of the scabies allergy and blood problems. Root of the wild olive is treatment of the cough. Roots are boiled and water extract is used for the period of 3 days
(10) Local Name	Saunf
Family	<i>Apiaceae</i>
Botanical Name	<i>Foeniculum vulgare Mill.</i>
Part Used	Seeds
Flowering Time	March, April
Method	Saunf + Ajwain (<i>Carum copticum L.</i>) having equal weight + 1/8 part of Tumba (<i>Citrullus colocynthis</i>) + Green Alaichi (<i>Amomum campactum</i>) are grinded Phaki mixture is made which is treatment of the gas trouble.
(11) Local Name	Kanir
Family	<i>Apocynaceae</i>
Botanical Name	<i>Nerium oleander Linn.</i>
Part Used	Root
Flowering Time	March, September

Method	Flowers of the Kaner are boiled in water and are placed in mouth are effective treatment of the mouth pain.
(12) Local Name	Pathay
Family	<i>Palmae</i>
Botanical Name	<i>Nannorhops ritchieanna (Griff.) Aitchison</i>
Part Used	Leaves
Flowering Time	July, October
Method	Pathay leaves are used to make different items. For example ropes, mats, carpet, Fan. Basket. Its gacha (stem) is ready after weak times. and in pail Padhrar in the Month of the July / August Gacha (stem) is dried and is sold at the rate of the 30-35 Rs / Kg. Fruit is used in local sweet.
(13) Local Name	Vahekar
Family	<i>Acanthaceae</i>
Botanical Name	<i>Justicia adhatoda Linn.</i>
Part Used	Leaves
Flowering Time	March, April
Method	Vahekar leaves are used in the Thadi specific local livestock disease of the animals. Vahekar + Vena (<i>Withania coagulens</i>) + Panir (<i>Rhazya stricta</i>) all in equal amount after grinding are and bread is

made and is used and is treatment of the renal colic and skin infections.

- (14) Local Name Nari
Family *Poaceae*
Botanical Name *Arundo donax L.*
Part Used Branches
Flowering Time June, December
Method Sticks of the plant are used to make bandage on broken limbs of animals and human beings.
- (15) Local Name Neela Koradh
Family *Boraginaceae*
Botanical Name *Trichodesma indicum (Linn.) R.Br.*
Part Used Whole Plant
Flowering Time August, October
Method Leaves and roots are used against snakebite; leaves are also applied in infections and wounds. Root is applied as paste on swelling and joints.
- (16) Local Name Khabari
Family *Moraceae*
Botanical Name *Ficus virgata Wall.ex Roxb.*
Part Used Fruit
Flowering Time March, April
Method Anjeer desi + hanging Root of the Bohar (*Ficus bengalensis*) + bark of the Kabli kikar

(*Acacia nilotica*) in equal amount are mixed having equal weight and all the items are dried under shade, after drying all items are grinded and the combination is filtered in cloth, the medicine is used with milk or water for the period of one month and it is treatment of male infertility.

- (17) Local Name Santha
Family *Sapindaceae*
Botanical Name *Dodonaea viscosa (Linn.) Jacq.*
Part Used Leaves
Flowering Time Feb, March
Method Fallen leaves of the Santha are collected and they are grinded, the grinded material is placed on wounds and it dries the pus of the wounds.
- (18) Local Name Phulai
Family *Mimosaceae*
Botanical Name *Acacia modesta Wall.*
Part Used Leaves, bark
Flowering Time November, March
Method Bark of the Phulai + fallen leaves of the vahekar (*Justicia adhatoda.*) + Yellow leaves of the kahu (*Olea ferruigena*) + outer cover of the poppy (*Papaver dubium*) is used as seed is taken out are boiled and then are used during night time it is treatment of the flu and cold.

(19) Local Name Kunwar Gandal

Family *Liliaceae*

Botanical Name *Aloe barbadensis* Mills.

Part Used Branches

Flowering Time Late summer

Method Half ripen tumba (*Citrullus colocynthis*) fruit is cut and khurasani ajwain (*Hyoscyamus niger*) + kunwar gandal are placed and closed for the period of five to six days, then these items are well mixed in shade and grinded and again mixed well, now honey of the little bee is mixed in this mixture in full amount, after this tablets like size of ber fruit are made and these are dried in shade, it is treatment of the constipation, one time dose will solve the problem, other wise may be taken twice. It will also end renal colic problem. The medicine must be taken in evening or morning time after taking meal.

(20) Local Name Harmal

Family *Zygophyllacea*

Botanical Name *Peganum harmala* Linn.

Part Used Seed, Leaves

Flowering Time July, August

Method Roots of the hermal are boiled and water is used to treat mouth pain. Roots of the hermal are boiled and are placed in vessel karwa and

mouth is closed and it fumes are taken through ear it is treatment of the ear pain.

- (21) Local Name Awani
Family *Labiatae*
Botanical Name *Otostegia limbata (Bth.) Boiss.*
Part Used Leaves, Stem
Flowering Time April, May
Method Leaves of the awani are grinded and water is taken out, and the extract is placed on eye infection pimples it is good treatment of these infections.
- (22) Local Name Akri
Family *Solanaceae*
Botanical Name *Withania coagulens Dunal*
Part Used Seed, Fruit
Flowering Time November, April
Method Akri is treatment of the animal disease special worm in belly, it is grinded and salt is mixed and used for the period of 4 days in animals especially cow and buffaloes. Akri is treatment of the animal disease special worm locally called Pila, it is grinded and salt is mixed and given to the animal.
- (23) Local Name Dhari booti
Family *Cuscutaceae*
Botanical Name *Cuscuta reflexa Roxb.*
Part Used Whole plant

Flowering Time	August, September
Method	Akas Bel / Dhari booti is also treatment of the animal disease special worm locally known as paila and it is mixed in flour and salt is also mixed it is used for 4 days and it excretes worms effectively.
(24) Local Name	Kur Tumba
Family	<i>Cucurbitaceae</i>
Botanical Name	<i>Citrullus colocynthis (L.) Schrad</i>
Part Used	Fruit, Seed
Flowering Time	July, August
Method	Tumba fruit is cut like potato and placed in earthen pot and sugar is also mixed for 7 days. After 22 days a spoon or two are used and this cause dysentery likes situation and cure tuberculosis. Root of the Tumba is a good miswak for teeth its regular use is good treatment of teeth disorders and kills all germs
(25) Local Name	Kala Toot
Family	<i>Moraceae</i>
Botanical Name	<i>Morus nirgra Linn.</i>
Part Used	Fruit
Flowering Time	April
Method	Black toot is used to treat infection of the throat; it is also used to treat flu by making drink. Fruit of the plant is collected and juice

is extracted it is purified and then sugar is mixed and used for the period of 2 days as juice. It effectively relieves throat pain.

- (26) Local Name Sufed toot
Family *Moraceae*
Botanical Name *Morus alba* Linn.
Part Used Fruit
Flowering Time April
Method Fruit of this plant is eaten as tonic and as carminative it cleans throat while dried fruit is used by wild animals and birds
- (27) Local Name Maju
Family *Cupressaceae*
Botanical Name *Cupressus sempervirens* L.
Part Used Fruit
Flowering Time March, July
Method Maju fruit + white Alum Pathkari + Sipari are grinded well and mixture is made and used this will shrink the vagina muscles and will tight them.



Plate No. 57

***Otostegia limbata* (Bth.) Boiss**

Voucher No. 33



Plate No. 58

***Cuscuta reflexa* Roxb.**

Voucher No. 37



Plate No. 59

***Cichorium intybus* L.**

Voucher No. 18



Plate No. 60

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

Voucher No. 52

- (28) Local Name Boher
- Family *Moraceae*
- Botanical Name *Ficus bengalensis* Linn.
- Part Used Whole plant
- Flowering Time April, May
- Method Milk of Boher tree daily use for the period of 2 weeks is effective treatment of blood disorders, and early release in male, 2 drops of daily use before taking any other food in dried date palm is effective remedy male infertility.
- (29) Local Name Anar
- Family *Puniceae*
- Botanical Name *Punica granatum* Linn.
- Part Used Flowers
- Flowering Time March, April
- Method Outer coat of the Anar is grinded and it is good remedy to stop dysentery. Juice of the fruit is used for body heat.
- 30) Local Name Til
- Family *Pedaliaceae*
- Botanical Name *Sesamum orientale* L.
- Part Used Seed
- Flowering Time July, October
- Method Til Oil + egg are boiled and when its yellow layer become black, then Ratan Jot is

mixed, then it is taken out from fire and Shingraf (Cinnabar) is also mixed and it used as massage on muscles of the male sex organ it will revive the muscles.

- (31) Local Name Dharek
Family *Meliaceae*
Botanical Name *Melia azedarach* Linn.
Part Used Seeds, Leaves
Flowering Time March, April
Method Leaves of the Dharek / Neem if are grinded and used with water are treatment of the heat stroke.
- (32) Local Name Podina
Family *Lamiaceae*
Botanical Name *Mentha royelana*.Wall. ex. Benth.
Part Used Leaves
Flowering Time Throughout the year
Method Podina leaves improve indigestion, also utilized in Qahwa and Tea is good for heart patients, its chutney is good for digestion.
- (33) Local Name Dhaman
Family *Zygophyllaceae*
Botanical Name *Fagonia indica* Burm .f.
Part Used Whole plant
Flowering Time April, August

- Method Green branches of the Dhaman are collected and grinded salt is mixed, it is treatment of the body heat and it is used with water and effective in gas trouble.
- (34) Local Name Ber
- Family *Rhamnaceae*
- Botanical Name *Zizphus mauritiana Lam.*
- Part Used Fruit
- Flowering Time July, August
- Method Leaves of the ber 3 – 4 kg are boiled in vessel and when it is still hot, these are placed on head under the clothes. Sarsam disease a local mental illness will be cured within 2 hours.
- (35) Local Name Niazbo
- Family *Lamiaceae*
- Botanical Name *Ocimum basilicm L.*
- Part Used Leaves
- Flowering Time March, July
- Method Leaves of the Niazbo are grinded and water taken out, then water is filtered from clothe and 2 to 3 drops are placed in nose and three to four days use will end Naksir also known as nose bleeding .
- (36) Local Name Piaz
- Family *Alliaceae*
- Botanical Name *Allium cepa L.*

Part Used	Bulb
Flowering Time	March April
Method	Tukhm Piaz seed (100 grams) + one cup sirka angori (Vinger) are mixed in a way that piaz burn completely in Sirka and color of sirka turn complete black, this is grinded and filtered and the extract is again mixed in Til Oil (<i>Sesamum orientale</i>) 50 grams and the cream is made and is used on place affected from Balchar a hair disease after 7 days treatment infection is removed.

(37) Local Name	Nimbo
Family	<i>Rutaceae</i>
Botanical Name	<i>Citrus limonia (L.)</i>
Part Used	Fruit
Flowering Time	March, April
Method	Fresh egg of the hen is placed in large size glass and one Kg lime juice is dropped on it egg is dissolved yellow layer is taken out and the remaining part is used in the form of 02 spoon, it l relive joint pain effectively.

(38) Local Name	Jamunh
Family	<i>Crucifera</i>
Botanical Name	<i>Eruca sativa Mill.</i>
Part Used	Seed
Flowering Time	March, April

- Method Mustard is grinded and crushed and yogurt is mixed and is used on the body parts affected from skin infections and allergy after 2 days it will give relief, the mixture must be placed on affected part.
- (39) Local Name Karela
- Family *Cucurbitaceae*
- Botanical Name *Momordica diocia L.*
- Part Used Fruit
- Flowering Time April, May
- Method Bitter guard + choughan (*Caralluma tuberculata*) are eaten as vegetable then it is used in lasi curd of the cow and is treatment of the Diabetics.
- (40) Local Name Bajra
- Family *Gramineae*
- Botanical Name *Pennisetum americanum*
- Part Used Seed
- Flowering Time August, September
- Method Sweet coarse fine of the Bajra is prepared and is used in case of dysentery; it is used one time only. Second time Maize bread is used along with Ghee, it is effective treatment of Dysentery.
- (41) Local Name Chich maj
- Family *Solanaceae*
- Botanical Name *Solanum nigrum L.*

Part Used	Leaves, Fruit
Flowering Time	Throughout the year
Method	Mako leaves are boiled and water is taken out and remaining part locally called Sag is prepared and is used along with bread it is treatment of body inflammation.
(42) Local Name	Papra
Family	<i>Fumariaceae</i>
Botanical Name	<i>Fumaria indica (Hausskn.) Pugsley</i>
Part Used	Leaves
Flowering Time	March, May
Method	Papra leaves are dried and mixture is made it is used along with fresh water, it is effective treatment of Allergy , Scabies, its liquid extract can also be used, in case of liquid extract 4 teaspoon are used morning and evening time.
(43) Local Name	Aksan
Family	<i>Solanaceae</i>
Botanical Name	<i>Withania somnifera (Linn.) Dunal</i>
Part Used	Root, Leaves
Flowering Time	May, August
Method	Root of the Asghand is mixed in water for the period of four days, then it is filtered cleaned and used 3 times, it is effective in vaginal problems. Roots can be fried and

sugar is added it is also effective treatment of gastric troubles, blood disorder.

- (44) Local Name Jangli Dhania
Family *Apiaceae*
Botanical Name *Psammogeton biternatum Edgew.*
Part Used Whole Plant
Flowering Time March, April
Method Whole plant is removed clean and is grinded and used along water. It is effective in stomach disease and gastric troubles.
- (45) Local Name Angoor
Family *Vitaceae*
Botanical Name *Vitis vinifera L.*
Part Used Fruit
Flowering Time June, July
Method Fresh or dry Angoor fruit is cleaned and 20 gram medicine is used along with half boiled milk for the period of 15 days, it is treatment of infertility in females.

3.9.3 FOLK RECIPES AND INDIGEOUS KNOWLEDGE
UCCHALI VILLAGE

Table No. 56

Sr. No.	Name of Plant part used	Number of plant part used
Uchali		
Number of Diseases Cured 26		
1	Leaves	15
2	Branches	1
3	Tuber	1
4	Fruit	12
5	Branches	1
6	Seeds	3
7	Bulb	1
8	Roots	1
9	Juice	1
10	Flowers	1
11	Bulb	2
12	Bark	1
13	Whole plant	3



Plate No. 61

Rhus cotinus

Voucher No. 80

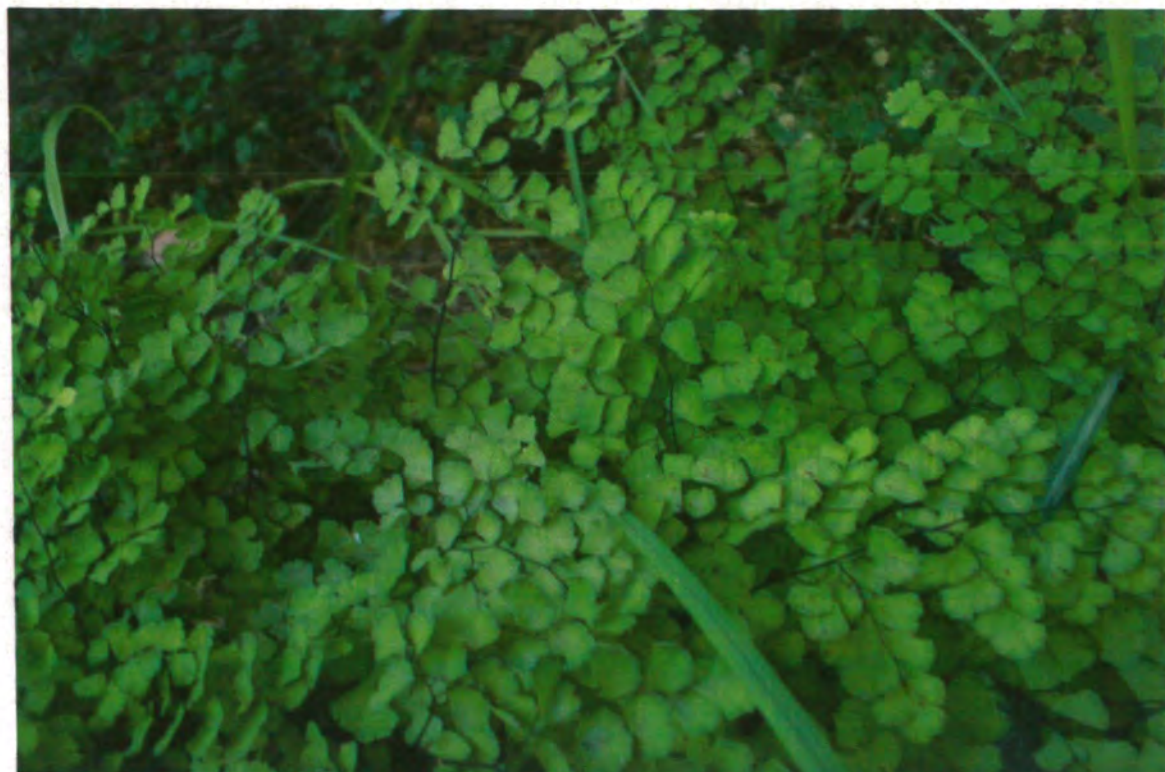


Plate No. 62

Adiantum capillus-veneris

Voucher No. 215

- (1) Local Name Allerga
Family *Anacardiaceae*
Botanical Name *Rhus cotinus*
Part Used Branches
Flowering Time July, August
Method There are two types Red and white, it is cold dry in nature of second degree, its liquid extract is made, smaller branches are cut boiled and placed in water for the period of 12 hours, then filtered and sugar is mixed, it is used for the heat, stomach disorder body heat, it gives strength to the stomach and promote hunger, it is used in large quantity in joint pains.
- (2) Local Name Bershasha
Family *Polypodiaceae*
Botanical Name *Adiantum capillus-veneris Linn.*
Part Used Whole plant
Flowering Time Nil
Method It is useful in treatment of the diabetic, it is also used in blood infusion, it is blood generating and blood collector. It is used in blood disease and also in treatment of male infertility.
- (3) Local Name Marchia Kand ,Kiari
Family *Lilaceae*
Botanical Name *Gloriosa superba L.*

Part Used	Tuber
Flowering Time	July, August
Method	It is treatment of the poison especially Snake poison, its tuber is cut and dried, it is treatment of the snake poison it prevents the poison to affect the kidney.
(4) Local Name	Kahu
Family	<i>Oleaceae</i>
Botanical Name	<i>Olea ferruginea Royle</i>
Part Used	Fruit, Leaves
Flowering Time	April, August
Method	Fruit of the Kahu is used to make Sharbat Liquid extract and also used as food, it is carminative and digestive, its gum is used as surma in eyes, and it is useful for blood infusion. Its bark is used on the wounds, its tea / Qahwa is used to treat flu and is also used as fodder, its heat is used to treat flu / cold.
(5) Local Name	Awani
Family	<i>Labiatae</i>
Botanical Name	<i>Otostegia limbata (Bth.) Boiss.</i>
Part Used	Leaves, Stem
Flowering Time	April, May
Method	Its water extract is taken out and is used to treat white fluids in eyes, for making Neela Thohta Kushta tonic its leaves are also used.

(6) Local Name Phulai
 Family *Mimosaceae*
 Botanical Name *Acacia modesta Wall.*
 Part Used Leaves, bark
 Flowering Time November, March
 Method Bark of the Phuali is digestive carminative. Its Raswant bark pure extract is useful for man vital power. Gum is also useful for man vital power, also used for pregnancy.

(7) Local Name Kunwar Gandal
 Family *Lillaceae*
 Botanical Name *Aloe barbadensis Mill.*
 Part Used Branches
 Flowering Time Late summer
 Method Its branches are used as food and curry; it is also used to treat Astma and excrete wastes from body, also increase hunger and gives power to muscles. It is also used to maintain eye power and hearing ability. Its continuous use maintains youth and is useful for all liver disorders.
 Liquid extract 2 kg + 1 kilo gram patasa sweet is useful medicine, the patasa is placed after taking liquid extract, use of one teaspoon after 3 months is useful. It is also used for skin freshness.

Abraq siah or sufed is made like sufoof and is placed in kuwar gandal flour is placed in Tanoor and a layer is also made, 2-3 kg of animal dung is burned, then a new Ghara an (earthen vessel) after washing with water is placed on the Tandor kiln, Para mercury will stick to the ghara which is collected. Para mercury usually sticks with silver and cold items.

- | | | |
|-----|----------------|--|
| (8) | Local Name | Mastiara |
| | Family | <i>Gentianeae</i> |
| | Botanical Name | <i>Swertia paniculata Wall.</i> |
| | Part Used | Leaves |
| | Flowering Time | Throughout the year |
| | Method | Mastiara is blood purifier its leaves extract is useful, Arq of the mastiara is useful for piles. |
| (9) | Local Name | Makhni booti |
| | Family | <i>Malvaceae</i> |
| | Botanical Name | <i>Sida alba</i> |
| | Part Used | Whole plant leaves |
| | Flowering Time | March, July |
| | Method | Its whole plant is collected washed in water and dried under shade. It is generator of the male sperms restores the vital power. it must be used after drying in Shade and used with milk along with sugar, other wise it is not useful. |

- (10) Local Name Papper
- Family *Buxaceae*
- Botanical Name *Buxus papillosa C.K. schneid.*
- Part Used Leaves
- Flowering Time April, May
- Method Papper is highly toxic to camel and kill the animal instantly goat easily digests, it badly affect kidney, brain, and distort the blood cells.
- (11) Local Name Kanir
- Family *Apocynaceae*
- Botanical Name *Nerium oleander L.*
- Part Used Flower
- Flowering Time March, September
- Method It is used as Naswar narcotic and also to treat flu, People involved in business of Metal Kushta saz use it to change silver into white color.
- (12) Local Name Mahori
- Family *Solanaceae*
- Botanical Name *Solanum incanum Linn.*
- Part Used Leaves, Fruit
- Flowering Time April, August
- Method Its leaves are wrapped on body parts effected from wounds or has inflammation White

mahori turn silver into white color. It seed is used in body pains

- (13) Local Name Dhaman
Family *Zygophyllaceae*
Botanical Name *Fagonia indica Burm f.*
Part Used Whole plant
Flowering Time April, August
Method Dhaman plant which grows on the hills having salt deposit is collected and its Arq liquid extract is treatment of asthma, it is also treatment of the cancer as well if used for longer duration.
- (14) Local Name Vahekar
Family *Acanthaceae*
Botanical Name *Adhatoda zeylancia Medik*
Part Used Leaves
Flowering Time March, April
Method Flowers of the Valekar are used to prepare "Gul Kand" a mixture Along with sugar to treat Asthma and other chest diseases.
- (15) Local Name Podina
Family *Lamiaceae*
Botanical Name *Mentha longifolia L.*
Part Used Leaves
Flowering Time March, August

Method

Fresh Podina leaves are mixed with salt and are used with tea to treat animal Gas troubles. Podina is used to treat diseases of the stomach.

Podina leaves are grinded and vinegar is mixed, mixture is used as paste on body to remove spots on face.

Podina leaves 6 grams are mixed in Anardana in (*Punic granatum*) 1 gram and boiled in 1/5 litre water, extract is effective to control vomiting.

Podina leaves (50 grams) are mixed in 5 big Allaichi (*Amomum compactum*) seed and boiled; it is effective treatment of Dysentery and indigestion.

- (16) Local Name Tambaco
Family *Solanaceae*
Botanical Name *Nicotiana tabacum L.*
Part Used Leaves
Flowering Time April, May
Method Tobacco leaves extract is sometime used as a spray to kill insect. Leaves are dried and crushed form is used for smoking in locally made huqa.
- (17) Local Name Aksan
Family *Solanaceae*
Botanical Name *Withania somnifera L. Dunal*

Part Used	Root
Flowering Time	May, August
Method	Asghand is used to treat animals and it is mixed with feed, its roots are used for animal health to treat water flow. For pimples and pain leaves of Asghand soaked in oil are used as a bandage.
(18) Local Name	Akas Bel
Family	<i>Convolvulaceae</i>
Botanical Name:	<i>Cuscuta reflexa Roxb.</i>
Part used	Whole Plant
Flowering Time	July, September
Method	Dhari is used as a bandage if bones meat is affected. Branches are collected and are wrapped on body parts affected from pain.
(19) Local Name	Dhrek
Family	<i>Meliaceae</i>
Botanical Name	<i>Melia azedarach Linn.</i>
Part Used	Leaves
Flowering Time	April, May
Method	Dhrek leaves are dipped in water for long period and these are used to kill worms' lice of animals.
(20) Local Name	Kasni
Family	<i>Asteraceae</i>
Botanical Name	<i>Cichorium intybus Linn.</i>

Part Used	Roots
Flowering Time	June, July
Method	Kasni roots extract is used as an extract for different diseases body heat especially and other soft drink of summer season.
(21) Local Name	Methi
Family	<i>Papilionaceae</i>
Botanical Name	<i>Trigonella foenum- graecum L.</i>
Part Used	Seed
Flowering Time	July, August
Method	Methi is used a tonic for man in bandages used, also as achar pickles and vegetable use is also common.
(22) Local Name	Halia
Family	<i>Apiaceae</i>
Botanical Name	<i>Pimpinella anisum L.</i>
Part Used	Seed
Flowering Time	March, April
Method	Halia seed is used after dipping in water for animals as tonic. It is carminative and flavouring agent.
(23) Local Name	Alsi
Family	<i>Linaceae</i>
Botanical Name	<i>Linum usitatissimum L.</i>
Part Used	Seed
Flowering Time	Feb, March

Method	Alsi is also used as a bandage. It is used in animal feed as tonic. Its seed are mixed in feed and water is placed for some period and then mixture is used in animal feed.
(24) Local Name	Til
Family	<i>Linaceae</i>
Botanical Name	<i>Sesamum orientale L.</i>
Part Used	Seed
Flowering Time	August, September
Method	Til oil is used to treat animals diseases especially buffalo, cow, and goats also used as feed tonic. It is also used body masag in case of affected body parts from accidents or fractures.
(25) Local Name	Lahsun
Family	<i>Liliaceae</i>
Botanical Name	<i>Allium sativum Linn.</i>
Part Used	Pods
Flowering Time	March, April
Method	Lahsun is used to treat herds' diseases such as bad smell and to kill worms. Pods are mixed in water and then its liquid is used.
(26) Local Name	Saunf
Family	<i>Apiaceae</i>
Botanical Name	<i>Foeniculum vulgare Mill.</i>
Part Used	Seed

Flowering Time	April, May
Method	Saunf is used to treat indigestion. It is mixed in water and salt is also added. It is effective in gastric troubles and other stomach disorder.
(27) Local Name	Aak
Family	<i>Asclepiadaceae</i>
Botanical Name	<i>Calotropis procera (Aitch.) Ait.f.</i>
Part Used	Leaves, Fruit
Flowering Time	Whole year
Method	AK fiber is utilized in pillows. Leaves of the aak are used in different recipes to treat animal diseases. Root of Aak is removed and its coat separated and mixed in goat milk and well shaken, at the time of attack, 2 drops of this medicine are placed in nose, patient will be normal.
	When only one hour is left in the day time then milk of Aak plant is placed beneath feet and black pepper is also sprayed, after this Aak leaves are placed under feet and then shoes are provided to the patient, and this treatment is continued for the period of 40 days, but feet t be wash is not allowed effective treatment of the Epilepsy
(28) Local Name	Harmal
Family	<i>Zygophyllacea</i>
Botanical Name	<i>Peganum harmala L.</i>

Part Used	Seed	Leaves
Flowering Time		July, August
Method		Hermal leaves are used to produce smoke for poultry farm. It is good worm killer and is also used by spiritual healers in treatment of different diseases.
(29) Local Name		Khawi
Family		<i>Poaceae</i>
Botanical Name		<i>Cymbopogon jawarancusa (Jones.) Schultz</i>
Part Used		Whole plant
Flowering Time		July, August
Method		Khawi leaves are used to treat fever. Smoke of the plant is used to treat typhoid fever.
(30) Local Name		Dhatora
Family		<i>Solanaceae</i>
Botanical Name		<i>Datura stramonium L.</i>
Part Used		Leaves
Flowering Time		March, July
Method		Datura leaves are also used as a treatment of body pains as these are wrapped in clothes to get the desired affect.
(31) Local Name		Potato
Family		<i>Solanaceae</i>
Botanical Name		<i>Solanum tuberosum L.</i>
Part Used		Tuber
Flowering Time		March, August

Method	Potato is cut into pieces and part is placed on body part burned, it gives relief in pain and also prevents further damage to the skin. Potato is roasted and outer cover is removed salt and Chilies are mixed and eaten, it removes body pains.
(32) Local Name	Bathu
Family	<i>Chenopodiaceae</i>
Botanical Name	<i>Chenopodium album Linn.</i>
Part Used	Leaves
Flowering Time	March, April
Method	Bathu leaves in quantity of 60 gram is mixed in water 120ml for the period of 1 to 2 week it is remedy of kidney pain and also excrete stones from kidney.
(33) Local Name	Bangan
Family	<i>Solanaceae</i>
Botanical Name	<i>Solanum melongena</i>
Part Used	Fruit
Flowering Time	July, August
Method	Small pieces of Bangan are made and 1/8 th part salt is added and boiled in vessel, half boiled pieces are wrapped on body part having muscle strain, Two to Three time use relieves pain.

- (34) Local Name Bhindi
- Family *Malvaceae*
- Botanical Name *Hibiscus esculentus*
- Part Used Root
- Flowering Time May, August
- Method Root of the Bhindi is used along with milk in quantity of 0.5 gram; it increases sexual power and also effective in blood infusion.
- (35) Local Name Piaz
- Family *Alliaceae*
- Botanical Name *Allium cepa Linn.*
- Part Used Bulb
- Flowering Time March, April
- Method It is worm killer, pieces are placed on soil to kill germs, also if eaten unripe for the period of four to five days kills worms in intestine.
- (36) Local Name Paitha
- Family *Cucurbitaceae*
- Botanical Name *Benincasa cerifera*
- Part Used Fruit
- Flowering Time July, August
- Method Muraba sweet is made from fruit and extract of the plant is carminative and gives strength to heart and brain; its sweet is used as breakfast during winter season and gives body strength and also relieves body pains.

- (37) Local Name Cauliflower
Family *Cruciferae*
Botanical Name *Brassica oleraceae L.*
Part Used Flower
Flowering Time June, October
Method It is used as vegetable good food in piles but also cause gastric troubles. It is used as vegetable in area.
- (38) Local Name Tori
Family *Cucurbitaceae*
Botanical Name *Luffa acutangula*
Part Used Fruit
Flowering Time May, August
Method Outer cover of the fruit is used as cleaning agent to remove dust and clean body as well as utensils.
- (39) Local Name Lasoora
Family *Boraginaceae*
Botanical Name *Cordia obliqua Willd.*
Part Used Leaves
Flowering Time April, May
Method Three Lasoora leaves are placed in water during nighttime and filtered, water extract is used for the period of 15 days it is effective control of diabetics.

- (40) Local Name Gana
- Family *Poaceae*
- Botanical Name *Saccharum officinarum L.*
- Part Used Stem
- Flowering Time May, June
- Method Juice of the plant is tonic for hepatitis patient, ½ liter juice is recommended for the period of 15 days. Juice is obtained from stem crushing.
- (41) Local Name Khira
- Family *Cucurbitaceae*
- Botanical Name *Cucumiss sativus L.*
- Part Used Fruit
- Flowering Time April, May
- Method Outer layer of the plant is removed and is used on face to clear the skin and as beauty tonic; its root is placed in water and used in case of teeth gum and pain.
- (42) Local Name Khaji
- Family *Palmeae*
- Botanical Name *Phoenix sylvestris (L.) Roxb.*
- Part Used Fruit
- Flowering Time March, April
- Method Date palm whole fruit is grinded and used in heart attack it gives immediate relief. Its fruit

extract along with inner coat gives strength to intestine. It is also used in sweet.

- (43) Local Name Banana
Family *Musaceae*
Botanical Name *Musa sapientum Linn.*
Part Used Fruit
Flowering Time May, June
Method Banana fruit is cooked as vegetable and used to treat diabetics.
- (44) Local Name Malta
Family *Rutaceae*
Botanical Name *Citrus sinensis Linn.*
Part Used Fruit
Flowering Time March, April
Method Outer cover of the fruit is dried and is mixed in Sarson oil and is placed on face and after one hour it is removed and washed it act as a skin conditioner and cleans face.
- (45) Local Name Jaman
Family *Apiaceae*
Botanical Name *Eugenia jambolana Lam.*
Part Used Leaves
Flowering Time June, July
Method Jaman leaves are grinded in water are used in snakebite along with water.

Leaves of the Jaman are dried under shade and mixture is made and one teaspoon is used along with water it controls excessive menstrual bleeding.

3.9.4 FOLK RECIPES AND INDIGEOUS KNOWLEDGE

UGALI VILLAGE

Table No. 57

Sr. No.	Name of Plant part used	Number of plant part used
Ugali		
No of diseases cured = 34		
1	Oil	1
2	Leaves	11
3	Flowers	12
4	Fruit	11
5	Seed	1
6	Husk	4
7	Bark	1
8	Latex	2
9	Liquid extract	4
10	Branches	3
11	Stem	1
12	Buds	1
13	Root	1
14	Pulp	1

15	Juice	1
16	Whole plant	2
17	Ash	2

- (1) Local Name Kahu
- Family *Oleaceae*
- Botanical Name *Olea ferruginea Royle*
- Part Used Fruit, Leaves
- Flowering Time April, August
- Method Dried leaves of the Kahu are used as tea. it is dry in nature, but it is effective for blood production and for liver, its fruit is boiled in water and filtered, and used as a drink and is effective remedy of the heat. Kahu is used in digestive system it is effective in increasing milk of animal if used as feed. It is good fuel as it emits less smoke, Kahu oil is used as massage in body pains. Ripe fruit of the Kahu is placed in vessel and different points are made from which it enter into another vessel after boiling. It is also useful in cooking.
- (2) Local Name Phulai
- Family *Mimosaceae*
- Botanical Name *Acacia modesta Wall.*
- Part Used Leaves, Bark
- Flowering Time November, March

Method

Bark of Phuali + Jaledher (*Grewia villosa*) + Vahekar (*Justicia adhatoda*) + Vena (*Rhaza stricta*) + Mastiara (*Swertia cordata*) all are dried and are boiled and soft drink is made which is effective to treat heat strokes and other disorders. Bark of Phulai is separated and dried, and then vahekar leaves which automatically shed from the plant are mixed and used as treatment of flu and cold. Phulai bark is detached and is boiled and soft drink is made it is boiled and sugar is mixed, it is effective digestive element and have multiple effect . Bark of the Phuali is used in different soft drink.

(3) Local Name

Santha

Family

Sapindaceae

Botanical Name

Dodonea viscosa (Linn.) Jacq

Part Used

Leaves

Flowering Time

March, April

Method

Buds of the Santha are grinded and then boiled and used with water after filtration it is effective treatment of nose bleeding , Santha is used as tea and its fruit is effective blood purifier, fruit is mixed in water, crushed and is used as medicine.

(4) Local Name

Aak

Family

Asclepiadaceae

Botanical Name

Calotropis procera (Aitch.) Aith .f.

Part Used	Leaves
Flowering Time	Throughout the year
Method	Four leaves of the Aak are taken with dried hands and are placed in vessel and closed airtight by placing wheat flour on the side of the vessel in the form of layer. Leaves are boiled and are crushed in hands with clothes, this water is mixed with Til oil (<i>Sesamum orientale</i>) + Turpentine oil + Refel oil + Castor oil (<i>Ricinus communis</i>) one quarter, along with 10gm Ratan jot + 10 gm Sat Ajwain (<i>Carum copticum</i>) + 10gm Ganda Beroza + 10gm chitta val, all are mixed after grinding, but the sat ajwain should be mixed at the end, after mixing all things are boiled, then the medicine be used on body wounds especially broken legs other affected body parts in broad day light. It is effective in treating Mercury for Kushta (Tonic) preparation; Simbal far is also treated in Aak milk.

(5) Local Name	Dhatora
Family	<i>Solanaceae</i>
Botanical Name	<i>Datura stramonium L.</i>
Part Used	Seeds
Flowering Time	March, July
Method	Dried stem of the Dhatoora is used as cigarette; it is effective treatment of the chest problems. Dhatura is eaten by goats ant it

increases milk, which is more powerful tonic.

- (6) Local Name Akri
Family *Solanaceae*
Botanical Name *Withania coagulens Dunal*
Part Used Seed, Fruit
Flowering Time November, April
Method Seed of the Akri are grinded and are used for the treatment of the Malaria. Akri fruit is treatment of digestive disorder; it improves blood production and also used to reduce blood concentration.
- (7) Local Name Dhaman,
Family *Tiliaceae*
Botanical Name *Grewia optiva Drum. ex. Burret*
Part Used Fruit, Leaves, Bark
Flowering Time May, August
Method Seed and stem of the plant is placed in water for whole night and water is used after mixing sugar, it is good blood purifier.
- (8) Local Name Kanir
Family *Apocynaceae*
Botanical Name *Nerium oleander L.*
Part Used Leaves
Flowering Time April, August

Method	Root of the whiter kanir + Shingraf roomi 10 gm + ¼ quarter vine are mixed and are used as massage on male sexual organ.
(9) Local Name	Dhamian
Family	<i>Zygophyllaceae</i>
Botanical Name	<i>Fagonia indica</i> Burm .f.
Part Used	Whole plant
Flowering Time	April, August
Method	Bark of the Dhaman is separated and boiled and used in case of animals after giving birth face problems, it is effective and excrete all the wastes from the body of the animals.
(10) Local Name	Kur tumba
Family	<i>Cucurbitaceae</i>
Botanical Name	<i>Citrullus colocynthus</i> L.
Part Used	Fruit
Flowering Time	July, August
Method	Tumba fruit is cut into two pieces and is used in buffalo in case of indigestion and other complications. It is effective treatment of piles 6 to 12 pieces are cut and are placed in Iron vessel, Ajwain (<i>Carum copticum</i>) is also mixed and patient place its feet in vessel, until he feels that his mouth is bitter, it is effective remedy of piles.



Plate No. 63

Nerium indicum Mill.

Voucher No. 95



Plate No. 64

Fagonia indica

Voucher No. 110

- (11) Local Name Akas Bel
 Family *Cuscutaceae*
 Botanical Name: *Cuscuta reflexa Roxb.*
 Part used Whole Plant
 Flowering Time July, September
 Method It is good treatment and removes complications of urine if its pieces are given to the patients also useful in case there is problem in urethra.
- (12) Local Name Pathay
 Family *Palmae*
 Botanical Name *Nannorhops ritchieanna (Griff.) Aitchison.*
 Part Used Leaves
 Flowering Time July, October
 Method Its root is boiled and given to the patients facing problem of urine, it regulates the urine.
- (13) Local Name Harmal
 Family *Zygophyllacea*
 Botanical Name *Peganum harmala Linn.*
 Part Used Seed Leaves
 Flowering Time July, August
 Method Harmal seed is taken with water and is considered effective against rheumatism. Kushta (Tonic) of the Shingrif is prepared from the harmal plant, harmal is grinded.

and its mixture is made, then it is placed in vessel shingrif is also placed in vessel and then soil is plasted around the vessel, khustha (Tonic) is prepared which is useful for the period of 12 years and can be used even for the period of 24 years.

- (14) Local Name Ber
 Family *Rhamnaceae*
 Botanical Name *Zizphus mauritiana Lam.*
 Part Used Leaves
 Flowering Time March, April
 Method Ber leaves are effective treatment of the tumors, its leaves are grinded and mixed in lasi (Butter milk) or Milk, and it eliminates the tumors.
- (15) Local Name Kunwar Gandal
 Family *Liliaceae*
 Botanical Name *Aloe barbadensis Mill.*
 Part Used Branches
 Flowering Time Late summer
 Method Its fresh stem is placed on the tumor and is wrapped under bandage; it is also useful in eliminating tumors.
- (16) Local Name Awani
 Family *Lamiaceae*
 Botanical Name *Otostegia limbata (Bth) .Boiss*
 Part Used Leaves, Stem

Flowering Time	April, May
Method	Leaves of the Awani are crushed and liquid extract is preserved, if it is used during night time it cleans eyes, it is bitter in taste.
(17) Local Name	Saunf
Family	<i>Apiaceae</i>
Botanical Name	<i>Foeniculum vulgare Mill.</i>
Part Used	Seeds
Flowering Time	March, April
Method	Saunf seed if chewed regularly are effective treatment of eye sight. Saunf are effective in digestive system and also improves eye sight Alaichi (<i>Amoum compactum</i>) and saunf are mixed and are chewed, it improves eye sight.
(18) Local Name	Alarga, Nirga
Family	<i>Anacardiaceae</i>
Botanical Name	<i>Rhus cotinus</i>
Part Used	Branches
Flowering Time	July, August
	Nirga stem is cut into pieces and is placed in water for whole night, liquid extract is filtered and boiled, and it is effective treatment of the body heat. Fresh branches of the Allerga are cut and pieces are made, then these are placed in vessel and are boiled, then it is filtered, when water evaporates

then sugar is mixed it is well mixed then the product is ready and this is treatment of hepatitis, also gives strength to male vital power.

- (19) Local Name Nimbo
Family *Rutaceae*
Botanical Name *Citrus limonia (L.)*
Part Used Fruit
Flowering Time March, April
Method Lemon juice is placed in vessel and seashells are placed in this extract the medicine is used as effective treatment of the kidney stones. White Alum is burned and powder is made and used with yogurt for the period of 7 days, after 7 days medicine amount be reduced, lemon drops be placed, and used for hepatitis treatment. Glucose may also be used after treatment.
- (20) Local Name Pathar chat
Family *Saxifragaceae*
Botanical Name *Bergenia ciliata (Haw). Sternb.*
Part Used Leaves
Flowering Time March, May
Method Leaves of the Pather chat are chewed and it is also treatment of stone in kidney.

- (21) Local Name Dusan
- Family *Lilliaceae*
- Botanical Name *Asparagus gracilis Royle*
- Part Used Branches
- Flowering Time April
- Method Fresh dusan branches are used as vegetable. It is cooked as vegetable and is recommended for patients having indigestion problems.
- (22) Local Name Jangli Gloh
- Family *Asclepiadaceae*
- Botanical Name *Tinospora cordifolia (DC.) Miers*
- Part Used Pulp, Stem
- Flowering Time March, April
- Method Branches of the gloh are cut into pieces and one small part is placed in mouth during nighttime, its liquid extract will clean intestine.
- (23) Local Name Jangli Karela
- Family *Cucurbitaceae*
- Botanical Name *Momordica diocia L.*
- Part Used Fruit
- Flowering Time July, October
- Method It is also used as vegetable it is effective stomach cleaner. It is used as vegetable and useful in diabetics' treatment.

- (24) Local Name Imlah
 Family *Rhamnaceae*
 Botanical Name *Zizphus nummularia (Burm.f.) Wight & Arn*
 Part Used Fruit
 Flowering Time July, August
 Method Fruit of the Amlah is dried and boiled in water and used to increase blood production especially in patients where there are white spot on the body due to less blood production.
- (25) Local Name Majith
 Family *Rubiaceae*
 Botanical Name *Rubia cordifolia L.*
 Part Used Roots
 Flowering Time June, July
 Method It is also treatment of the livestock diseases: it is mixed in milk and used in bullocks for increasing body strength. Majith is mixed in different food items and is placed in sweet; it gives strength to the broken bones.
- (26) Local Name Jangli tambaco
 Family *Scrophulariaceae*
 Botanical Name *Verbascum thapsus Linn.*
 Part Used Seed
 Flowering Time March, April

- Method Its whole plant is burned and its ash is used to treat wounds.
- (27) Local Name Khawi
- Family *Poaceae*
- Botanical Name *Cymbopogon jawarancusa (Jones.) Schultz*
- Part Used Whole plant
- Flowering Time July, August
- Method Ash of the grass is used to treat small pox disease.
- (28) Local Name Siri Wali Booti
- Family *Lamiaceae*
- Botanical Name *Ajuga bracteosa Wall. ex Bth.*
- Part Used Branches
- Flowering Time March, August
- Method Leaves and flowers of the Plant are crushed and mixture is made, this is dried under shade and black salt is mixed, it is effective for digestive and promotes hunger; it is effective in preventing heat prickles.
- (29) Local Name Ismaghol
- Family *Plantaginaceae*
- Botanical Name *Plantago lanceolata Linn.*
- Part Used Husk
- Flowering Time March, April

- Method Isam Gol is effective for digestion, and also gives strength, as well as has cooling affect. Its husk is effective in preventing dysentery.
- (30) Local Name Ajwain
- Family *Apiaceae*
- Botanical Name *Carum copticum L.*
- Part Used Seed
- Flowering Time April
- Method Ajwain is grinded and salt is mixed then it is used as a remedy for blood purification, digestive, reducing blood pressure and also effective in increasing male vital power.
- (31) Local Name Aksan
- Family *Solanaceae*
- Botanical Name *Withania somnifera (Linn.) Dunal*
- Part Used Leaves
- Flowering Time May, August
- Method It is used to treat animal diseases; its root and bark are used, and kills animal worms.
- (32) Local Name Vahekar
- Family *Acanthaceae*
- Botanical Name *Justicia adhatoda Linn.*
- Part Used Leaves
- Flowering Time March, April

Method	Vahekar is effective treatment of the Asthma, fresh flowers of the Vahekar are used to make Gul Kand.
(33) Local Name	Mako
Family	<i>Solanaceae</i>
Botanical Name	<i>Solanum nigrum L.</i>
Part Used	Leaves, Fruit
Flowering Time	Throughout the year
Method	Fruit of the mako is used to make Arq (Juice extract) and this Arq (Juice extract) is effective for Asthma and digestive system. Its full plant is used as vegetable.
(34) Local Name	Mahori
Family	<i>Solanaceae</i>
Botanical Name	<i>Solanum incanum Linn.</i>
Part Used	Leaves, Fruit
Flowering Time	April, August
Method	Mahori fruit is used as vegetable and it is blood purifier.
(35) Local Name	Jaledhar
Family	<i>Teliaceae</i>
Botanical Name	<i>Grewia villosa Willd.</i>
Part Used	Seed
Flowering Time	August
Method	Its ripe fruit is useful and is effective in improving digestive system.

(36) Local Name Papper

Family *Buxaceae*

Botanical Name *Buxus papillosa C.K. Schneid.*

Part Used Leaves

Flowering Time April, May

Method Its leaves are used in treatment of Asthma, fresh leaves are eaten, in early stages one fourth parts of leaves is eaten. and then the quantity is increased, heavy dosage cause dysentery.

(37) Local Name Vina

Family *Apocynaceae*

Botanical Name *Rhazya stricta Decne*

Part Used Leaves

Flowering Time December, March

Method A local mixture (Rus) is made, fruit of the plant is dried, grinded and boiled in vessel after filtration, water is dried and then one litre of this water is mixed and 3 quarter of sugar is placed, this (Rus) is used along with butter, this medicine is effective in improving digestive system, for diabetic's control.

(38) Local Name Rahura

Family *Bignoniaceae*

Botanical Name *Tecomella undulata (Roxb.) Seeman*

Part Used Bark

- | | |
|-----------------|---|
| Flowering Time | April, May |
| Method | Flowers of the Rahura are used for making mixture which is useful for improving digestion. |
| (39) Local Name | Gilot |
| Family | <i>Asclepiadaceae</i> |
| Botanical Name | <i>Ceropegia bulbosa Roxb.</i> |
| Part Used | Leaves, Bulb |
| Flowering Time | August |
| Method | Its tuber is eaten by animals as well as by human being; its fresh leaves are also used along with bread as feed. |
| (40) Local Name | Makhni booti |
| Family | <i>Malvaceae</i> |
| Botanical Name | <i>Sida alba</i> |
| Part Used | Whole, plant, leaves |
| Flowering Time | March, July |
| Method | It is used to treat body heat and it is also a powerful tonic for man vital power. |
| (41) Local Name | Koher |
| Family | <i>Sapotaceae</i> |
| Botanical Name | <i>Monotheca buxifolia (Falc.) A. D.</i> |
| Part Used | Fruit |
| Flowering Time | April, May |
| Method | Fruit of the plant is eaten; its unripe fruit is used as vegetable. |

- (42) Local Name Satinasi
Family *Papaveracea*
Botanical Name *Argemone mexicana L.*
Part Used Whole Plant
Flowering Time March, August
Method It is used in different Kushtas (Tonic) especially in preparation of the gold.
- (43) Local Name Dusan
Family *Lilliaceae*
Botanical Name *Asparagus gracilis Royle*
Part Used Branches
Flowering Time April
Method Dusan are used as vegetable. Fresh branches are collected and are cooked.
- (44) Local Name Boher
Family *Moraceae*
Botanical Name *Ficus bengalensis Linn.*
Part Used Whole plant
Flowering Time April, May
Method It is used to increase male sperm concentration by eating fruit of red color. Coins are converted into kushta (Tonic) in milk of Boher.
- (45) Local Name Khaltara
Family *Lamiaceae*
Botanical Name *Salvia aegyptiaca L.*

Part Used Seed
 Flowering Time March, April
 Method Fruit of the Khalatra is mixed in Salt and is used three times it is treatment of fever also improves digestion, is used to treat intestine infections and also treatment of all digestive disorder.

(46) Local Name Rukh
 Family *Tamaricaceae*
 Botanical Name *Tamarix aphylla (L.) karst*
 Part Used Wood
 Flowering Time April, May
 Method Wood of the plant is useful. Leaves is used in animal diseases.

3.9.5 FOLK RECIPES AND INDIGEOUS KNOWLEDGE ANGA VILLAGE

Table No. 58

No. of diseases cured 27		
Sr. No.	Name of Plant part used	Number of plant part used
1	Fruit	3
2	Roots	4
3	Sees	7
4	Braches	6
5	Leaves	16

6	Bulb	1
7	Grains	2
8	Whole plant	1
9	Bark	1

- (1) Local Name Saru
Family *Cupressaceae*
Botanical Name *Cupressus sempervirens L.*
Part Used Fruit
Flowering Time April, August
Method Fruit of the Saru Plant 5kg is collected and it is mixed in one kg of the water, then it is boiled up to the extent that only one kilo gram of water is left, this extract is mixed in one quarter desi sugar gur and is used three times in a day for the period of 5 days it is effective treatment of hepatitis.
- (2) Local Name Kalwanji
Family *Apiaceae*
Botanical Name *Nigella sativa L.*
Part Used Seed
Flowering Time December
Method Sana Maki (*Cassia angustifolia*) 100 grams + 100 gram honey + 100 gram kalonji + 100 gram Loban all are mixed and grinded then the extract is mixed in water 1/7th part then it is filtered, one or two teaspoon are used

along with water before breakfast, it is effective treatment of diabetics.

- (3) Local Name Allerga
Family *Anacardiaceae*
Botanical Name *Rhus cotinus*
Part Used Stem, Branches, Leaves
Flowering Time July, August
Method Chirata (*Swertia cordata* G.Don C.B.Clarke) + Mastiara (*Swertia paniculata* Wall) + Allerga + Dhamian (*Fagonia indica* Burm.f.) + Phuali bark (*Acaccia modesta* Wall.) + Kahu bark (*Olea ferruginea*) + Vahekar (*Adhatoda zeylanica* Medik) + Vina (*Rhaza stricta*) + panir (*Withania coagulens* Dunal) + Kur Tumba (*Citrullus colocynthis* L. Schrad) + Amaltas (*Cassia fistula* Linn) in old Gur (Local sugar made from sugarcane) . 20 kg water is added and boiled when all items left up to 7 kg then it is filtered and 2 teaspoon are used after meals, it is effective treatment of Asthma, stomach problems, heart ailments and blood pressure.

- (4) Local Name Adrak
Family *Zingiberaceae*
Botanical Name *Zingiber officinalis* Rose.
Part Used Root
Flowering Time March, April

- Method Sang Dara 12 gram + Nisadar 12 gram + Sumbal Musli 12 gram + Sonth (Adrak) 12 gram + Budhara 12 gram + Shaker Gur 60 gram all are mixed and are used with water or milk it is treatment of Rheumatism and joint pains.
- (5) Local Name Wasal
- Family *Alliaceae*
- Botanical Name *Allium cepa L.*
- Part Used Bulb
- Flowering Time September, October
- Method 12 ml of honey + 12 ml water extract of the white onion is mixed and this mixture is used for the period of 7 days it is treatment of eyes sight weakness.
- (6) Local Name Dhatora
- Family *Solanaceae*
- Botanical Name *Datura stramonium L.*
- Part Used Seeds
- Flowering Time March, July
- Method Dhatura leaves are mixed in the sarson oil (*Brassia compesptris*), then this mixture is placed on wounds it is effective treatment of the wounds and inflammation.
- (7) Local Name Ajwain
- Family *Apiaceae*
- Botanical Name *Carum copticum L.*

Part Used	Seed
Flowering Time	March, April
Method	Dhatura (<i>Datura stramonium L.</i>) seed 12 gram and Ajwain 12 gram are mixed in equal quantity and are placed in cloth, then both items are hanged along milk one quarter but there is a precaution that both items remains apart, after some time the milk is used, it is effective for male vital power.

(8) Local Name It Sit

Family *Nyctaginaceae*

Botanical Name *Boerhavia procumbens Banks ex.Roxb*

Part Used Roots

Flowering Time Throughout the year

Method Roots of the It Sit are cut into pieces and they are arranged in the form of ring and placed in thread, this is given to the hepatitis patients for the period of 14 days usually this is placed in the throat thred enlarge in start and then stops.

(9) Local Name Aak

Family *Asclepiadaceae*

Botanical Name *Calotropis procera (Aitch.) Aitch. f.*

Part Used Leaves

Flowering Time Throughout the year

Method In case of the foot stiffness feet is washed with hot water and Aak leaves are used as a

bandage. Aak boll is given to the snakebite patient and 2 kg desi Ghee is also used.

- (10) Local Name Jao
Family *Poaceae*
Botanical Name *Hordeum vulgare L.*
Part Used Seed
Flowering Time March, April
Method Jao flour is mixed in water and its paste is made, this paste is placed in the form of layer on head, and it is treatment of the headache.
- (11) Local Name Khawi
Family *Poaceae*
Botanical Name *Cymbopogon jawrancusa (Jones.) Schult*
Part Used whole plant
Flowering Time July, August
Method It is effective treatment of typhoid fever. Its leaves along with branches are boiled in hot water and water is given to the patient as medicine.
- (12) Local Name Kachnar
Family *Caesalpinaceae*
Botanical Name *Bauhinia variegata Linn.*
Part Used Flowers
Flowering Time March, April
Method Flowers of the plant are used as vegetable

- (13) Local Name Kiarii
- Family *Liliaceae*
- Botanical Name *Gloriosa superba L.*
- Part Used Tuber
- Flowering Time July, August
- Method It is used as Antivenome, its root is like radish and roots are crushed, mixed and are used for snakebite and also other insects, animals bite.
- (14) Local Name Santha
- Family *Sapindaceae*
- Botanical Name *Dodonea viscosa (Linn.) Jacq*
- Part Used Leaves
- Flowering Time March, April
- Method Branches of santha are used to treat broken legs of animals. Santha is used hedge around houses, it is preferred fuel wood, in case of pimples, its leaves are crushed and black pepper is mixed, it is treatment of pimples, and blood purifier.
- (15) Local Name Vahekar
- Family *Acanthaceae*
- Botanical Name *Adhatoda zeylancia Medik*
- Part Used Leaves
- Flowering Time March, April

Method	Vahekar leaves are used in treatment of flue and nose bleeding, its leaves are boiled in water and water is used as medicine. Salt prepared from the whole vahekar plant is treatment of chronic cough and tuberculosis; its soft drink is also treatment of tuberculosis and cough.
(16) Local Name	Mastiara
Family	<i>Gentianeae</i>
Botanical Name	<i>Swertia paniculata Wall.</i>
Part Used	Leaves
Flowering Time	Throughout the year
Method	Fragrant leaves of the mastiara are used in the treatment of the joint pain. Akri, (<i>Withania coagulens</i>), Vena (<i>Rhaza stricta</i>) and Vahekar (<i>Adhatoda zeylancia Medik</i>) leaves are dried, crushed and Ajwain (<i>Carum copticum</i>) is mixed along with Panir, it is effective treatment of indigestion.
(17) Local Name	Makhni booti
Family	<i>Malvaceae</i>
Botanical Name	<i>Sida alba</i>
Part Used	Whole, plant, leaves
Flowering Time	March, July
Method	It is used to treat body heat and it is also a powerful tonic for man vital power.

- (18) Local Name Jangli Gloh
 Family *Menispermaceae*
 Botanical Name *Tinospora cordifolia (DC.) Miers*
 Part Used Branches
 Flowering Time March, April
 Method It is used to treat jaundice, along with valekar (*Justicia adhatoda*) and some other items. Punjab Urial also eats it, and it is also treatment of fever.
- (19) Local Name Dhamian
 Family *Zygophyllaceae*
 Botanical Name *Fagonia indica Burm .f.*
 Part Used Whole plant
 Flowering Time April, August
 Method It is a blood purifier and can be used after drying in shade; it is also treatment of piles and tuberculosis.
- (20) Local Name Majith
 Family *Rubiaceae*
 Botanical Name *Rubia cordifolia L.*
 Part Used Roots
 Flowering Time June, July
 Method Its roots are utilized for power and are also treatment of the heat is given to women after birth after mixing in desi Ghee. It is used to treat poison.

- (21) Local Name Bhangra
 Family *Asteraceae*
 Botanical Name *Eclipta prostrata* Linn.
 Part Used Whole plant
 Flowering Time Throughout the year
 Method Seeds are used to treat cough and heart
 Diseases
- (22) Local Name Kanir
 Family *Apocynaceae*
 Botanical Name *Nerium oleander* Linn.
 Part Used Flower, Branches
 Flowering Time March, September
 Method It is poison for camel its old branches if mixed in mustard oil is a good ointment. Its stick does not damage skin of bulls, so farmers use it for bull's movement control.
- (23) Local Name Awani
 Family *Labiatae*
 Botanical Name *Otostegia limbata* (Bth) .Boiss
 Part Used Leaves, Stem
 Flowering Time April, May
 Method Awani leaves extract is used to treat eye disorders. Awani leaves are crushed and Juice extract is used in eye infections, it is also used as hedge and dried branches are

used as fuel wood. Extract from leaves of the Awani is used to treat soaring eyes.

- (24) Local Name Rahura
- Family *Bignoniaceae*
- Botanical Name *Tecomella undulata (Roxb.) Seeman*
- Part Used Bark
- Flowering Time April, May
- Method Its bark is utilized to treat worm skin infection bark is boiled in water and used then it is also treatment of the allergy.
- (25) Local Name Zohr Mohra
- Family *Araceae*
- Botanical Name *Sauromatum venosum (Ait.) Schott*
- Part Used Bulb
- Flowering Time September, October
- Method Its bulb is a treatment of the poison, and is also utilized to treat poison of flies as well. It



Plate No. 65 ***Tecomella undulata* (Roxb.) Seeman** **Voucher No. 26**



Plate No. 66 ***Sauromatum venosum*** **Voucher No. 97**

is also utilized by people involved in metal conversion to gold and especially Silver conversion to gold.

- (26) Local Name Jangli Karela
Family *Cucurbitaceae*
Botanical Name *Momordica diocia L.*
Part Used Fruit
Flowering Time July, October
Method It is used to treat diabetes. Its unripe fruit is collected, also used as vegetable.
- (27) Local Name Boher
Family *Moraceae*
Botanical Name *Ficus bengalensis Linn.*
Part Used Roots
Flowering Time April, May
Method Its milk is used to male vital power. Fruit is also used as medicine for male infertility.
- (28) Local Name Bhang
Family *Cannabaceae*
Botanical Name *Cannabis sativa Linn.*
Part Used Leaves
Flowering Time April, October
Method It is utilized to treat heating problems and used in Kushta Kalai, also used in delivery. Dried leaves are used as a treatment for

people affected from summer heat in the form of drink.

- (29) Local Name Dusan
Family *Lilliaceae*
Botanical Name *Asparagus gracilis Royle*
Part Used Branches
Flowering Time May, April
Method It is utilized as vegetable and also used as a treatment of diabetics by chewing fresh branches.

- (30) Local Name Papper
Family *Buxaceae*
Botanical Name *Buxus papillosa C.K. Schneid.*
Part Used Leaves
Flowering Time April, May
Method It is also used in the treatment of diabetics and in poisoning of worms. Leaves of the paper are utilized in case of severe throat problem, 3 leaves extract mixed in the tea ensure breathing, if the person is unable to eat or drink due to closure of the intestine, the extract improve the situation for two to four hours and patient is relived from the pain.

- (31) Local Name Choughan
Family *Asclepiadaceae*
Botanical Name *Caralluma tuberculata N.E. Brown.*

Part Used	Whole plant
Flowering Time	July, August
Method	Choughan should be dried in shade and karela is mixed with it after drying and it is used after mixing and mixture is used for the treatment of diabetics.
(32) Local Name	Phulai
Family	<i>Mimosaceae</i>
Botanical Name	<i>Acacia modesta Wall.</i>
Part Used	Leaves, Bark
Flowering Time	November, March
Method	Phulai is used as miswak, it is also used as a treatment of the Flu, and its beroza natural extract is used for body strength and vigour. It is treatment of the fever.
(33) Local Name	Kunwar Gandal
Family	<i>Apiaceae</i>
Botanical Name	<i>Aloe barbadensis Mill.</i>
Part Used	Branches
Flowering Time	Late summer
Method	It is utilized for the treatment of the piles and in different body pains. It is utilized to dry injuries. It is used in animal diseases. Branches are fed to animals to treat indigestion.

- (34) Local Name Chasku
 Family *Caesalpiniceae*
 Botanical Name *Cassia absus L.*
 Part Used Seeds, Leaves
 Flowering Time April, May
 It seed is used to treat eye diseases it is also good blood purifier. Leaves are effective in indigestion problems.
- (35) Local Name Jangli Post
 Family *Papaveraceae*
 Botanical Name *Papaver hybridum Linn.*
 Part Used Seed, Stem
 Flowering Time February, April
 Method It is utilized to correct sleep disorders, and is also treatment of the cough. Seed is used along with water and tea.
- (36) Local Name Til
 Family *Pedaliaceae*
 Botanical Name *Sesamum orientale Linn.*
 Part Used Seed
 Flowering Time July, October
 Method Til is mixed with Gur and this reduce the excretion. Til oil is used as a massage to relieve pain in broken legs.

- (37) Local Name Pohli
 Family *Asteracea*
 Botanical Name *Carthamus oxycantha M.Bieb*
 Part Used Seed
 Flowering Time March, June
 Method Pohli seed are utilized as food in Pakhar area during years of drought, seeds are also used in sweet.
- (38) Local Name Jaledhar
 Family *Teliaceae*
 Botanical Name *Grewia villosa Willd*
 Part Used Bark, Branches
 Flowering Time August
 Method It is used to treat seasonal pimples its old bark and branches are cut into pieces and then dried for four days and are covered after four days sugar is mixed and used.
- (39) Local Name Asghand
 Family *Solanaceae*
 Botanical Name *Withania somnifera Linn. Dunal*
 Part Used Leaves
 Flowering Time May, August
 Method Leaves of Asghand are use for the treatment of the joint pains. Leaves are wrapped on affected place for whole night.

- (40) Local Name Khaji
 Family *Palmeae*
 Botanical Name *Phoenix sylvestris Roxb.*
 Part use Fruit
 Flowering time June-July
 Method Fruit of the tree is dried and is used as tonic, while it is also used as cooling agent, fruit is also added in local sweet fro taste.
- (41) Local Name Harmal
 Family *Zygophyllacea*
 Botanical Name *Peganum harmala L.*
 Part Used Seed, Leaves
 Flowering Time July, August
 Method Leaves branches and seeds of the Harmal are burned to give smoke to affected people from mental and other ailments.
- (42) Local Name Shrin
 Family *Mimosaceae*
 Botanical Name *Albizzia lebbeck (Linn.) Bth.*
 Part Used Leaves
 Flowering Time April, May
 Method Leaves of Shrin are wrapped on the soaring eyes of the animals. It is effective treatment of eye diseases.

- (43) Local Name Dharek
 Family *Meliaceae*
 Botanical Name *Melia azedarach* Linn.
 Part Used Seeds, Leaves
 Flowering Time March, April
 Leaves are used as an insecticide to kill worms in crops.
- (44) Local Name Arind, Harnoli
 Family *Euphorbiaceae*
 Botanical Name *Ricinus communis* Linn.
 Part used Seed
 Flowering time Through out the year
 Method Oil is obtained from seed and is used as message also laxative. Seeds are also used as contraceptive.
- (45) Local Name Jamun Taramera
 Family *Cruciferae*
 Botanical Name *Eruca sativa* Mill.
 Part Used Seed
 Flowering Time March, April
 Method Oil of Mustard is used as a cleaning agent for eyes.
 Oil of Mustard and Brassica are used for body massage. Oil of Mustard along with Salt is used to clean teeth.

- (46) Local Name Kahu
- Family *Oleaceae*
- Botanical Name *Olea ferruginea Royle*
- Part Used Fruit, Leaves
- Flowering Time April, August
- Method Kahu leaves are used as a tea.
- Its extract is utilized to treat body heat and its old stick is placed in earthen pot and fire is burned and oil is collected; the oil can be used as a massage for hair. Kahu oil is used as a skin treatment during cold season. Ripe fruit extract of the wild olive is used as syrup for better health
- (47) Local Name Phulai
- Family *Mimosaceae*
- Botanical Name *Acacia modesta Wall*
- Part Used Leaves, Bark
- Flowering Time November, March
- Method Bark of Phulai, Kikar (*Acacia nilotica*), Dharek (*Melia azedarch*), is used to prepare an extract for better health.
- (48) Local Name Dodhak
- Family *Asteraceae*
- Botanical Name *Taraxacum officinale weber.*
- Part used Leaves, Roatss
- Method Root of the plant is collected and are used

for chronic disorder of kidney and liver
along with tea or water.

- (49) Local Name Alsi
- Family *Linaceae*
- Botanical Name *Linum usitatissimum L.*
- Part Used Seeds
- Flowering Time Februray, March
- Method Alsi seeds are cooked for regular animal diet
and are mixed with several other items to kill
worms.
- (50) Local Name Kala toot
- Family *Moraceae*
- Botanical Name *Morus nigra Linn.*
- Part Used Fruit
- Flowering Time May, June
- Method Fruit of Toot is used as an extract and
special cooked extract is used a cough syrup.
- (51) Local Name Kandiori
- Family *Asteraceae*
- Botanical Name *Silybum marianumn (L.) Gaertndr.*
- Part used Leaves, seeds, flower heads
- Flowering time March-April
- Method Its seed entrant is used for treatement of
Jaundice and calculi of liver.

- (52) Local Name Sufeda
- Family *Myrtaceae*
- Botanical Name *Eucalyptus camaldulensis* Dehnh.
- Part Used Leaves
- Flowering Time March, August
- Method 20–25 leaves of the Eucalyptus are placed in boiled water and stem is taken extract is treatment of the cold / flu. Leaves are used as a treatment to flu.
- (53) Local Name Gul Abbasi
- Family *Nyctaginaceae*
- Botanical Name *Mirabilis jalapa* L.
- Part Used Leaves
- Flowering Time Round the year
- Method For leg wounds 4 to 5 leaves of the Gul Abbasi after mixing in Tara mera (*Eruca sativa*) oil and after heating are wrapped on the wound, after 2 to 3 time treatment wounds will heal early.
- (54) Local Name Thoom
- Family *Liliaceae*
- Botanical Name *Allium sativum* Linn.
- Part Used Bulb
- Flowering Time July, September
- Method In order to get rid of joint pain 3 to 4 pods of the garlic are cooked in the Dalda Ghee, and

is eaten will help to recover from joint pains. For Blood pressure control 3 to 4 pods of the garlic after meal help to reduce blood pressure. Lahsun / Garlic bulbs are used as a treatment for animal diseases and in various human diseases.

- (55) Local Name Khalatra
Family *Lamiaceae*
Botanical Name *Salvia aegyptiaca L.*
Part Used Seed
Flowering Time March, April
Method Seed is effective to control liver, bladder heat, its seed are mixed in water during nighttime and sugar + milk are also mixed early in the morning, it will increase the male vital power and if olive oil is used along it will be effective to reduce body heat and other complications.
- (56) Local Name Kala toot
Family *Moraceae*
Botanical Name *Morus alba Linn.*
Part Used Leaves
Flowering Time May, June
Method Leaves of the Shahtoot are treatment of the cold and flu; its leaves are collected before the start of the winter season and grinded like tea and are used like tea it give relief in flu and cold.

- (57) Local Name Tinda
 Family *Cucurbitaceae*
 Botanical Name *Citrullus vulgaris* var. *Fistulosis*
 Part Used Fruit
 Flowering Time April, May
 Method Tinda ground and radish both are treatment of hepatitis if are used continuously.
- (58) Local Name Kado
 Family *Cucurbitaceae*
 Botanical Name *Cucurbita pepo* L.
 Part Used Fruit
 Flowering Time July, August
 Method Parts of the Kado (Sweet gourds) are placed under feet and this effective remedy and it relieves body heat.
- (59) Local Name Kado
 Family *Cucurbitaceae*
 Botanical Name *Cucurbita moschata* Duch.Ex.Poir.
 Part Used Fruit
 Flowering Time July, August
 Method Halwa, (sweet) of the Kado is used early in the morning without taking anything before breakfast help it is effective in reduction of the thirst in the month of the June / July.

- (60) Local Name Tambaco
- Family *Solanceae*
- Botanical Name *Nicotiana tabacum L.*
- Part Used Leaves
- Flowering Time April, May
- Method Boiled extract of the tobacco leaves +
Datura seeds if mixed are an effective
treatment of the vegetables diseases if used
as spray.
- (61) Local Name Kali Jeri
- Family *Labiatae*
- Botanical Name *Salvia moorcroftiana wall. ex Bth.*
- Part Used Seeds
- Flowering Time May, June
- Method Its seeds are used along with water early in
the morning before break fast to reduce
burning of urine.
- (62) Local Name Kander
- Family *Celastraceae*
- Botanical Name *Maytenus royleanus (Wall. ex Lawson)*
- Part Used Seeds
- Flowering Time March, October
- Method Its seeds are used as a smoke to relieve
toothache.

- (63) Local Name Sagger
- Family *Rhamnaceae*
- Botanical Name *Sagretia thea (osbeck) M.C. Johnston*
- Part Used Leaves
- Flowering Time July, September
- Method Its leaves are grinded and decoction is made wich is mixed in other herbs and capsule is made wich is used to treat diabetics.
- (64) Local Name Moli
- Family *Cruciferae*
- Botanical Name *Raphanus sativus*
- Part used Fresh Leaves
- Flowering time March-April
- Method Fresh leaves are collected and 200 milli litre juice is extracted, then Til oil (*Sesamum orientale*) is also added and is boild untill only oil is left, 2 drops of the this medicine is placed in ear for the treatement of earache.
- (65) Local Name Khub Kalan / Khalsiser
- Family *Frassicaceae*
- Botanical Name *Sisymbrium irio L.*
- Part used Seeds
- Flowering time March, April
- Method Seeds are used in dropsy; it is also used as antifever, in cholera it is used along with Kasri.

- (66) Local Name Arjun
 Family *Combretaceae*
 Botanical Name *Terminalia arjuna wight and Arn*
 Part used Leaves
 Flowering time April-May
 Method Leaves fresh juice is used in earache, while twigs are used to cure flisters and ulcers of the mouth.
- (67) Local Name Sufed Chambeli
 Family *Oleaceae*
 Botanical Name *Jasminum officinale Linn.*
 Part used Flowers
 Flowering time July-October
 Method 25 gram fresh loaves of the chambeli are failed in 250 milli litre water and are filtered then this water is used as gorgle for mouth ulcers.

3.9.6 FOLK RECIPES AND INDIGEOUS KNOWLEDGE CHAPAR VILLAGE

Table No. 59

No. of diseases cured 33		
Sr. No.	Name of Plant part used	Number of plant part used
1	Fruit	7
2	Roots	5

3	Seed	42
4	Branches	2
5	Leaves	14
6	Bulb	2
7	Pulp	2
8	Whole plant	3
9	Bark	7
10	Juice	2
11	Oil	2
12	Flowers	2
13	Pods	2

- (1) Local Name Arjun
- Family *Combretaceae*
- Botanical Name *Terminalia arjuna* Wight & Arnon.
- Part Used Leaves, Bark, stem
- Flowering Time April, May
- Method Fresh juice of the leaves is used as earache.
Bark ash is used in scorpion sting.

- (2) Local Name Bhang
- Family *Cannabaceae*
- Botanical Name *Cannabis sativa* Linn.
- Part Used Leaves
- Flowering Time June, August

Method Ash of Bhang + Cassafron (*Crocus sativus*)
Afiun (*Papaver dubium*), Long (*Myristica
fragrans*), Jafal (*Myrica nagi*) + Ajwain
Kharasani, (*Hyoscyamus niger*) all in equal
quantity are mixed and capsules are filled
and used with milk for the period of one
week. It is power tonic and increases body
vigor

(3) Local Name

Kalonji

Family

Apiaceae

Botanical Name

Nigella sativa L.

Part Used

Seed

Flowering Time

Februray, March

Method

Sonth (*Zingiber officinale*) 12 gram + Magz.
Pista 12 gram + Kalwangi 12 gram + Zofa
(*Hyssopus officinalis*) 12gram ½ quarter
salib misri (*Orchis latifolia*) are mixed in
equal quantity and mixture is made in
quantity of 12 gram dosage is recommended
for the period of 3 weeks. It is also power
tonic

(4) Local Name

Peepal

Family

Moraceae

Botanical Name

Ficus religiosa Linn.

Part Used

Bark

Flowering Time

April, May

Method

Leaves of Pipal tree + Black pepper (*Piper
nigrum*) 1 gram are all grinded. first dried.

and then a dosage of 1 gram twice in a day evening and morning time is recommended. It is treatment of hepatitis.

- (5) Local Name Boher
Family *Moraceae*
Botanical Name *Ficus bengalensis Linn.*
Part Used Whole plant
Flowering Time April, May
Method Peepal (*Ficus religiosa Linn.*) ½ quarter roots + Bohar ½ quarter branches of Bohar 12 gram + Musli Siah 12 gram, Behman white (*Centaurea behen*) and red each 12 gram + Tukham Lajwanti (*Mimosa pudica*) 12 gram, roots of the Bohar are used and cut into pieces and all mixed in 4 kg water for the period of 3 to 4 days, water is dried, and all other items are converted into tablets, and used daily twice morning and evening time (one tablet) with milk. It is effective treatment of blood disorders, Nocturnal emission leucorrhea.
- (6) Local Name Lemon Nimbo
Family *Rutaceae*
Botanical Name *Citrus limon L. Burm. f.*
Part Used Fruit
Flowering Time Round the year
Method One teaspoon of honey + One teaspoon of lemon water well mixed and used twice in

morning and evening time. this is effective for reducing blood concentration.

- (7) Local Name Mako
Family *Solanaceae*
Botanical Name *Solanum nigrum L.*
Part Used Leaves, Fruit
Flowering Time Throughout the yea
Method Revand Chceni (*Rheum emodi*) (12 gram) + Mako 12 gram are dried and are submerged in water, sugar is added in evening time it is effective treatment of asthma and expectorant.

- (8) Local Name Akhrot
Family *Juglandaceae*
Botanical Name *Juglans regia L.*
Part Used Bark
Flowering Time July, August
Method Mosag 20 gram well mixed in water (*Akhroat Bark*) for whole night and is used early in the morning before taking any thing, this will excrete whole matter from lungs, after excretion of the matter 24 gram Kafor + Hen egg extract is used by the patient. The medicine is expectorant.

- (9) Local Name Kunwar Gandal
Family *Liliaceae*
Botanical Name *Aloe barbadensis Mill.*

Part Used	Branches
Flowering Time	Late summer
Method	Sana maki (<i>Cassia angustifolia</i>) (500 grams) + Pepper (<i>Piper nigrum</i>) 500 gram + Moosaber (<i>Aloe barbadensis</i>) 500 gram Amaltas, (<i>Cassia fistula</i>), Sut Mulathi (<i>Glycyrrhiza glabra</i>) and old Gur all 500 gram are mixed, petals of Amaltas (<i>Cassia fistula</i>) are taken out and it is dipped in water, water colour turn black, it is filtered after shuffling with hands, this is converted into half litre juice, all other items are grinded and tablets are made up to gram seed, 2 tablets are recommended in thrice in a day with water. It is effective treatment of rheumatism, Joint pain, Sciatica.
(10) Local Name	Ber
Family	<i>Rhamnaceae</i>
Botanical Name	<i>Zizphus mauritiana Lam.</i>
Part Used	Fuit
Flowering Time	March, August
Method	Mulathi (<i>Glycyrrhiza glabra</i>) + Kalonji (<i>Nigella sativa L.</i>) + Qusth shirin (<i>Saussurea lappa</i>) + Ber all in quantity of one quarter are mixed in the form of capsule and ½ teaspoon, twice in a day with water is prescribed. It is treatment of goiters.

- (11) Local Name Podina
- Family *Labiatae*
- Botanical Name *Mentha longifolia L.*
- Part Used Leaves
- Flowering Time March, August.
- Method Bhera (*Terminalia belpica*) (12 gram) + Amla (*Embilica officinalis*) (24 gram) + Green Harir (*Terminalia chebularrets*) (24 gram) + Asghand (*Withania coagulens*) (1 gram) + Long Pepper (*Piper nigrum*) (1 gram) + Peepal Mal (1 gram) + Dried Podina(36gram) + Ajwain Chahar (each 12gram) + Sonf (*Foeniculum vulgare*) 2 4 gram + Noshadar 12 gram + Girah Nali (*Cassia fistula*) 12 gram + 24 gram black pepper, all are grinded and capsule is made, ½ to 3 gram capsule are used evening and morning time with water. It is treatment of the mouth ulcer and acidity.
- (12) Local Name Ajwain
- Family *Apiaceae*
- Botanical Name *Carum copticum L.*
- Part Used Seeds
- Flowering Time April
- Method Half Kg Ajwain + Half Kg Sonf (*Foeniculum vulgare*) + Black Salt + white salt + Soda each 2 gram all well cleaned and

mixture is made, one to two gram with water is utilized. It is carminative and digestive.

- (13) Local Name Chirata
Family *Gentianeaceae*
Botanical Name *Swertia cordata (G.Don) C.B Clarke*
Part Used Leaves, Stem
Flowering Time August, September
Method Gilo (*Tinospora cordifolia*) 1 quarter + chirata 1 quarter Salib Misri (*Orchis latifolia*) 1 quarter + Munaqa (*Vitis vinifera*) 1 quarter + Bao bring (*Embelia ribes*) 500 gram. Zeera siah (*Carum bubocastanum*) and white each 500 gram, all items mixed in 12 liter water for the period of one night and these items are boiled in early morning, light heat, when water reduces upto 0.5 litre, it is filtered, 12 gram dosage is recommended twice in a day. It is treatment of tuberculosis.

Chirata leaves are effective treatment of blood disorder and are used for blood purification; leaves are boiled in water and are used by patient.

- (14) Local Name Kikar
Family *Mimosaceae*
Botanical Name *Acacia nilotica (Linn.) Delile*
Part Used Leaves
Flowering Time March, April

Method

Half kg unripe pods of kikar and gond Kikar 500 gram + Salib Misri (*Orchis latifolia*) 500 gram + Kikar bark 500 gram + l'al makhana 500 gram + kikar (*Acacia nilotica*) 500 gram + musli India ½ quarter + spari pak 1 quarter + white kalpi misri (*Orchis latifolia*) 500 gram + bohar (*Ficus bengalensis*) milk 500 gram + mehndi leaves 500 gram, all well mixed and capsule is made, the capsule is used with milk and dosage is one to two gram. It is treatment of diabetics, male sexual tonic Leucorrhoea. Prickles of Desi Kikar 1 kg are placed in vessel and are treated with heat of 5 kg animal manure after complete burning capsule is made by grinding, 1 gram dosage with water twice in a day this is effective treatment of Bed wetting or Nycturia. Pod of the kikar is used in treatment of Jarian and body heat, pod has cooling affect.

(15) Local Name

Dharek

Family

Meliaceae

Botanical Name

Melia azedarach L.

Part Used

Seeds, Leaves

Flowering Time

March, April

Method

Tukhm Nim + tukhm dharek each 2 gram, seed of both is taken out and well grinded, 10 gram is recommended early morning before meals and use of hot items is



Plate No. 67

Melia azedarach L.

Voucher No. 65



Plate No. 68

Acacia nilotica (L.) Delile

Voucher No. 218

discouraged. It is treatment of piles and used for 5 days.

- (16) Local Name Akas Bel
Family *Convolvulaceae*
Botanical Name: *Cuscuta reflexa Roxb.*
Part used Whole Plant
Flowering Time July, September
Method This is an effective treatment of the sexually transmitted disease Gonorrhoea. Half quarter of the Akas Bel (10 – 12 gram) are mixed with 12 grams red Shakar and half kg water is also mixed, and the two items are grinded, one dosage of the medicine is effective treatment of the Gonorrhoea. But there is precaution that salt may not be mixed in bread medicine used for 3 days.
- (17) Local Name Suranjan Shirin
Family *Colchicaceae*
Botanical Name *Colchicum aitchisonii (Hook.f.) E.Nasir*
Part Used Bulb
Flowering Time March, April
Method These are used in joint pain treatment. It is also utilized in the treatment of the Arqunisa (disease) Blue flower is attached with chukor and it get excited by seeing this flower. White flower is tonic and good for man vital power.

- (18) Local Name Khabari
 Family *Moraceae*
 Botanical Name *Ficus virgata wall. Ex. Roxb. Syn Ficus palmata Forssk.*
 Part Used Roots Leaves
 Flowering Time March, April
 Method There are two types known as Haj / Khaj Haj tree is fruitless, while local people eat Khaji which bear fruit. It is also used in sweet.
- (19) Local Name Makhni booti
 Family *Malvaceae*
 Botanical Name *Sida alba*
 Part Used Whole plant leaves
 Flowering Time March, July
 Method Leaves of Makhni Booti are used with butter for vigor and man vital power.
- (20) Local Name Kur tumba
 Family *Cucurbitaceae*
 Botanical Name *Citrullus colocynthus L.*
 Part Used Fruit
 Flowering Time July, August
 Method Four big Kur tumba are cut in 4 kg water and boiled, then 1 quarter sweet soda is mixed, recommended dosage is 0.25 gram along with water. It is treatment of kidney pain and colic pain

(21) Local Name Dhania
 Family *Apiaceae*
 Botanical Name *Corriandrum sativum L.*
 Part Used Whole plant
 Flowering Time July, August
 Method Dhania 5 gm + Asprin powder 50 g + Surnajan shirin (*Colchicum aitchisonii*) 50 gm + Gero 12 gram, all are well grinded and capsules is made, it is used with half boiled milk or water, recommended dosage is 125 mg for infants and 0.5 gram for adults. It is treatment of fever headache and flu.

(22) Local Name Jangli gloh
 Family *Menispermaceae*
 Botanical Name *Tinospora cordifolia (DC.). Miers.*
 Part Used Branches
 Flowering Time March, April
 Method Afsantin (*Artemisia quettensis*) + Jangli Giloh (*Tinospora cordifolia*) + Dhaman (*Fagonia indica*) + Neem leaves all in equal amount are grinded and 1 gram dosage twice in a day with water is recommended. After one day tea of vena plant root is used by the patient. It is treatment of diabetic disease.

(23) Local Name Cactus / Thoar
 Family *Cactaceae*
 Botanical Name *Opuntia monacantha Haw.*

Part Used	Leaves
Flowering Time	July, August
Method	Leaves of the chitar Tohar are grinded and tablets are made equal to the weight of Ber fruit, 2 tablets thrice in a day are recommended. It is good remedy for weight loss.
(24) Local Name	Bathu
Family	<i>Chenopodiaceae</i>
Botanical Name	<i>Chenopodium album</i> Linn.
Part Used	Leaves, Branches
Flowering Time	July, March
Method	<p>Bathu water 1 teaspoon + 1 teaspoon honey mixed and are used for the treatment of child pneumonia. Fruit of dhrek is filled in green trunk of Aak plant and then burned; ash is preserved, and mixed in honey only 250mg dosage is used before meals.</p> <p>Peepal (<i>Ficus religiosa</i>) bark 1 kg Jaman (<i>Eugenia jambolona</i>) 1 kg + ber 1kg all are placed in 5 litre water and boiled, when water reduces to the 1 quarter, then Halia (<i>Pimipnella anisum</i>) ½ quarter + honey ½ quarter + sugar ½ quarter and pure bitter Taramera (<i>Eruca sativa</i>) oil prepared in sweet form are also mixed in other items in quantity of 500 gram. Halia is prepared in water and filtered and mixed, then tablets are</p>

made like gram seed. twice use in a day is effective treatment of swellings of wounds.

- (25) Local Name Kala toot
Family *Moraceae*
Botanical Name *Morus nigra L.*
Part Used Fruit
Flowering Time March, April
Method Black pepper (*Piper nigrum*) + Black toot are mixed and all are crushed mixed and used for sore throat.
- (26) Local Name Badam
Family *Rosaceae*
Botanical Name *Prunus amygdalus Batsch.*
Part Used Fruit
Flowering Time March, April
Method Hard coat of the Badam grinded and then placed on the nails reduces fever effect on body. Seed is grinded and used as soft drink in hot weather.
- (27) Local Name Angoor
Family *Vitaceae*
Botanical Name *Vitis vinifera L.*
Part Used Leaves
Flowering Time April, May

- Method Eight to ten leaves of the grapes after grinding and taking one full spoon of water extract is effective treatment of Pneumonia
- (28) Local Name Ount katara
- Family *Asteraceae*
- Botanical Name *Echinops echinatus Roxb.*
- Part Used Root
- Flowering Time April, July
- Method Root of ount katara 1.5 gram used for the period of 5 to 10 days increase male vital power.
- (29) Local Name Tahli
- Family *Papilionaceae*
- Botanical Name *Dalbergia sissoo Roxb.*
- Part Used Leaves, Roots
- Flowering Time March, April
- Method Its leaves are bitter and stimulant. Its decoction used in gonorrhoea.
- (30) Local Name Mirch
- Family *Solanaceae*
- Botanical Name *Capsicum frutescens*
- Part Used Fruit
- Flowering Time July, August
- Method Full red chillies one piece is taken and fruit is taken out, then poppy 12 gram is filled and after this Rape seed oil 500 gram is mixed. It

is boiled in Iron Vessel and mixed thoroughly then 1.5 gram Ganda Beroza is mixed and this bandage is used on affected part from scabies.

- (31) Local Name Neem
Family *Meliaceae*
Botanical Name *Melia azedarach Linn.*
Part Used Leaves
Flowering Time March, April
Method Leaves of Neem tree + Mehndi (*Lawsonia inermis*) green 12 gram are mixed and grinded then filtered in cloth and at least 12 ml liquid extract is taken and this is used early in the morning before taking any meal. It is treatment of allergy.
- (32) Local Name Kasni
Family *Asteraceae*
Botanical Name *Cichorium intybus L.*
Part Used Leaves, Flowers, Root
Flowering Time July, August
Method Tukhm Kasni 0.3 gram and 1 gram Zarshik (*Berberis asiatica*) are grinded and filtered and used morning and evening time in quantity of 2 grams is effective treatment of jaundice.

(33) Local Name Harnoli
 Family *Euphorbiaceae*
 Botanical Name *Ricinus communis* Linn.
 Part Used Root
 Flowering Time April, May
 Method Root of Harnoli and Dhatura (*Datura alba*) , Mahori (*Solanum surratense*) root, Aksan (*Withania somnifera*) root , Aak (*Calotropis procera*) root in quantity of 500 gram each are collected cleaned and are placed in Sarson oil and are boiled on low heat when all roots burn then it is cool down and mixture is ready which is effective treatment of all body pains.

(34) Local Name Vahekar
 Family *Acanthaceae*
 Botanical Name *Adhatoda zeylanica* Medik.
 Part Used Flowers
 Flowering Time March, August
 Method Flowers of the plant are used to make extract locally known as Gul qand it is effective in chest diseases its leaves are also used to make phaki a mixture for blood purification and pimples it has also anti germ properties.

(35) Local Name Papra
 Family *Fumariaceae*
 Botanical Name *Fumaria indica* (Hauskn.) Pugsley

Part Used	Whole plant
Flowering Time	March, April
Method	The plant is taken and dried in shade and after drying a powder is made and used with cold water to stop vomiting
(36) Local Name	Jal Nim
Family	<i>Scrophulariaceae</i>
Botanical Name	<i>Bacopa monnieri (Linn.) Wettst.</i>
Part Used	Whole Plant
Flowering Time	July, August
Method	Jul Nilm Booti 5 gram + Black pepper 1 gram after grinding is converted into tables like gram seed, and are used three time in a day along with fresh water is effective treatment for blood purification.
(37) Local Name	Aksan
Family	<i>Solanaceae</i>
Botanical Name	<i>Withania somnifera (Linn.) Dunal</i>
Part Used	Seed, Leaves
Flowering Time	May, August
Method	Three to four seeds of the Aksan are used for the treatment of gas troubles and stomach disorders and are also useful in excreting air from the body. Decoction is made by boiling few leaves in 1 liter water and boiled up to half litre the extract is used for rheumatism.

- (38) Local Name Karanjwa
Family *Caesalpiaceae*
Botanical Name *Caesalpinia bonduc (L.) Roxb.*
Part Used Seeds
Flowering Time July, August
Method Seeds of the Karanjwa are grinded and it is used in treatment of fever and piles.
- (39) Local Name Chirchinda
Family *Cucurbitaceae*
Botanical Name *Momordica dioica L.*
Part Used Fruit
Flowering Time July, October
Method Chirchinda fruit is dried and grinded and 0.5 teaspoon is recommended for diabetes patients, in morning and evening time.
- (40) Local Name Chibar
Family *Cucurbitaceae*
Botanical Name *Cucumis melo var. agerestis Naudin*
Part Used Fruit
Flowering Time July, September
Method Its pieces are placed in the meat due to which it is easy to cook early, its salt is made and it is effective treatment of kidney stone.
- (41) Local Name Bhakra
Family *Zygohyllaceae*
Botanical Name *Tribulus terrestris Linn.*

Part Used	0Whole Plant
Flowering Time	Through out the year
Method	Bhakra seed is treatment of the backbone pain; its seed is grinded and used with water.
(42) Local Name	Imlah
Family	<i>Rhamnaceae</i>
Botanical Name	<i>Zizphus nummularia (Burm.f.) Wight & Arn</i>
Part Used	Fruit
Flowering Time	July, August
Method	Amlah seed which is fully ripe, is used in preparation of the Sharbat and this is used for blood purification, and is also considered treatment of Hepatitis- C, by chewing its fully ripe fruit on daily basis.
(43) Local Name	Zohr mohra
Family	<i>Araceae</i>
Botanical Name	<i>Sauromatum venosum (Ait) Schott.</i>
Part Used	Bulb
Flowering Time	August, September
Method	It is used in livestock diseases and also used in different medicine and tonics. Its tuber is cut and used along with any other feed.
(44) Local Name	It sit
Family	<i>Nyctaginaceae</i>
Botanical Name	<i>Boerhavia procumbens Banks.ex Roxb.</i>
Part Used	Whole plant

- Flowering Time July, August
- Method It is effective treatment of the wounds which are not controlled in first stage and turn into bad shape, its leaves are burned and ash is used, it is also used to regulate menstrual cycle.
- (45) Local Name Afsantin
- Family *Asateraceae*
- Botanical Name *Artemisia vulgarus L.*
- Part Used Whole plant
- Flowering Time March, August
- Method It is effective treatment of diabetics, its leaves are grinded and are used along with water, and it is also treatment of stomach pain.
- (46) Local Name Kiari
- Family *Liliacea*
- Botanical Name *Gloriosa superba L.*
- Part Used Tuber
- Flowering Time July, August
- Method It is effective treatment of piles; its pieces are mixed with black pepper and are used by patients.
- (47) Local Name Koher
- Family *Sapotaceae*
- Botanical Name *Monotheca buxifolia (Falc.) A.D.*

	Part Used	Fruit
	Flowering Time	March, April
	Method	Fruit of the Koher is blood purifier, it is used to treat blood disorders its bark is boiled and given to the patient.
(48)	Local Name	Jaledhar
	Family	<i>Teliaceae</i>
	Botanical Name	<i>Grewia villosa Willd.</i>
	Part Used	Bark
	Flowering Time	July, August
	Method	Bark of the Jaledher is taken and boiled and this is treatment of skin diseases.
(49)	Local Name	Dhaman
	Family	<i>Zygophyllaceae</i>
	Botanical Name	<i>Fagonia indica Burm .f.</i>
	Part Used	Whole plant
	Flowering Time	April, August
	Method	It is a good blood purifier and is used to treat body heat by placing whole plant in water for long period and then used in early morning as soft drink.
(50)	Local Name	Gorak Pan
	Family	<i>Boraginaceae</i>
	Botanical Name	<i>Heliotropium strigosum Willd.</i>
	Part Used	Whole plant
	Flowering Time	July, September

Method	It is treatment of body heat, full plant is placed in vessel full of water and water extract is used in early morning. It is also treatment of liver disorder.
(51) Local Name	Aak
Family	<i>Asclepiadaceae</i>
Botanical Name	<i>Calotropis procera (Aitch.) Aitch.f.</i>
Part Used	Leaves, Fruit
Flowering Time	Whole Year
Method	<p>Basmati rice is prepared in the glass pot after placing rice, milk of Aak is also placed in such quantity that it covers all rice, when rice absorb all water it should be placed at a safe place and again Aak milk is placed, the process is repeated once again. after all milk is absorbed it is grinded and placed in air tight bottle.</p> <p>This mixture should be used by the patient and after sneezing, flu will be controlled effectively.</p> <p>Root of the of Aak plant is collected and cut and its outer cover is removed, 1 quarter is dried under shade, and then grinded well, and Alachi seed 24 gram + kafor 48 gram also mixed and grinded and filtered from cloth.</p> <p>When needed, a little amount of powder is sneezed, this will excrete all material as it is expectorant and patient will feel relief, in</p>

this medicine, peppermint can also be mixed instead of Kafor.

Half meter cloth of Khider is taken and well mixed in Aak milk and then dried in the same way the process is repeated 21 times, then it pieces are cut and Roghan Aak is collected from this and preserved, it is effective treatment of body pains. Aak milk is placed in China pot and blood of poultry bird is mixed in equal amount and then it is used as massage for the effective treatment of the muscle pain

Root of Aak is removed and its coat separated and mixed in goat milk, at the time of attack, 2 drops of this medicine is placed in nose, patient will be normal.

In case of piles, patient should go to the place where there are Aak plants in abundant quantity, and the leaves of the Aak is used as toilet tissue, this relieves pain.

Haldi is grinded, and then placed in Aak milk, the process is repeated 7 times then tablets are made and these are dried under shade, these tablets are used on piles spots with water for a long period after some period this will completely finish the piles problem.

Aak leaves are crushed and are placed in cloth, this is wet with oil and heated then it is used as massage, when massage ends then

these leaves are wet with Ghee and are used as bandage.

Six leaves of the Aak are taken and crushed and grinded in vessel, and 36 gram Jokhar is also mixed and tablets are made.

One tablet in evening and morning time along with hot water are used, if patient feels heat then Banafsha 3 gram is placed in water for hours and medicine is used with this extract instead of hot water, but after this hot water must be used.

Leaves of the Aak are crushed and water is taken out and wheat flour is prepared and its coat placed, then cotton roll is also placed, and heated, this will be effective treatment of body pains.

Aak leaves wet with sweet oil are placed on Iron sheet and heated, then it is placed on body affected parts, this will relieve body pain.

Aak milk and fresh cow milk all in equal amount are mixed and are used on worms 3 times, this will eliminate worms.

Aak flowers + Desi Ajwain all five kg + Sohanja 1.5 kg are placed in earthen pot and water is also added then closed pot is left for the period of Nine days extract of this mixture is distilled, oil is separated and preserved.

Placing this oil in amount of 125 mg along with Pan is effective treatment of the cough.

- (52) Local Name Til
Family *Pedialaceae*
Botanical Name *Sesamum indicum Linn.*
Part Used Seed
Flowering Time August, September
Method Til oil is boiled in Iron pot, and leaves of the Aak plant are cooked, when it burn completely, then it is filtered a good massage of this material is effective treatment of the Facial paralysis.
- (53) Local Name Deela
Family *Cyperaceae*
Botanical Name *Cyperus rotundus*
Part Used Root
Flowering Time March, April
Method Root of the deela is treatment of the cancer but needs further research.
- (54) Local Name Kkhabal
Family *Poaceae*
Botanical Name *Cynodon dactylon (L.) Piers*
Part Used Whole Plant
Flowering Time June, October
Method Grind fresh plant into a paste and this paste is applied on body wounds. The plant is used

as cattle fodder. It is also grown as lawn grass.

3.9.7 FOLK RECIPES AND INDIGEOUS KNOWLEDGE

KHURA VILLAGE

Table No. 60

Sr. No.	Name of Plant part used	Number of plant part used
Khura		
No. of Diseases cured 32		
1	Leaves	21
2	Seeds	10
3	Pulp	2
4	Fruit	6
5	Roots	4
6	Bulb	3
7	Whole plant	5
8	Latex	1
9	Bark	1
10	Flowers	2

- (1) Local Name Makhni booti
- Family *Malvaceae*
- Botanical Name *Sida alba*
- Part Used Whole plant leaves
- Flowering Time March, July

Method	It is used as tonic, its leaves are dried under Shade and mixture is made, usually used along with water. Salib Misri (<i>Orchis latifolia</i>) can also be added in case patient having more heating problems.
(2) Local Name	Chirata
Family	<i>Gentianaceae</i>
Botanical Name	<i>Swertia cordata</i> Wall.
Part Used	Whole plant leaves
Flowering Time	July, March
Method	It is blood purifier, digestive, carminative, usually it is mixed in water and liquid extract is used which is useful against indigestion problems. It is also used by boiling in water but it strength reduces.
(3) Local Name	Bhakra
Family	<i>Zygophyllaceae</i>
Botanical Name	<i>Tribulus terrestris</i> Linn.
Part Used	Whole plant
Flowering Time	Through out the year
Method	It is treatment of the back bone problem whole plant is burned and Ghee is added. Prickles of the plant are detached and plant is crushed then Gond (Gum) Phulai (<i>Acacia modesta</i>) + Ghee + Gur (local sweet) is mixed and is useful in joint pains problems and backbone. All things are mixed and

paste is made which is used for the period of 7 days.

- (4) Local Name Kali Zeeri
Family *Asteraceae*
Botanical Name *Verononia anthelmintica Willd.*
Part Used Seed
Flowering Time April, May
Method Lesser quantity of the seed is used along with water; it is effective in control of gas troubles. It is also treatment of ear disorder. Seed is burned in Ghee, then the paste is placed around ear; it relieves pain and is also effective in other ear-related disorders. One-time use is usually recommended.
- (5) Local Name Boher
Family *Moraceae*
Botanical Name *Ficus bengalensis Linn.*
Part Used Roots
Flowering Time April, May
Method Hanging roots of the plant are used as blood purifier, tonic; Decoction extract of the roots is used as treatment of wounds. It is also treatment of male infertility. Its milk extract and seed is used as stimulant for male sex power.

- (6) Local Name Jangli Piaz
 Family *Alliaceae*
 Botanical Name *Allium griffithianum Boiss.*
 Part Used Bulb
 Flowering Time March, April
 Method Jangli Piaz bulb is placed around worms and it cause worms to explode and excrete the material inside. If bulb outer layer is kept during journey it prevents vomiting if it is also used it is highly toxic if sneezed and incase of toxicity.
- (7) Local Name Banafsha
 Family *Violaceae*
 Botanical Name *Viola canescens Wall.ex Roxb.*
 Part Used Leaves
 Flowering Time April, July
 Method Banafsha whole plant continous use is recommended for 7 days. Plant is boiled in water and is treatment of Flu, fever and cold usually used with tea and warm water.
- (8) Local Name Bhangra
 Family *Asteraceae*
 Botanical Name *Eclipta prostrata Linn.*
 Part Used whole plant
 Flowering Time July, August

- Method Mixture of the plant is made and sugar is mixed it prevents vomiting. Extract or infusion of the herb in water serve as useful gargle in teeth disorder, leaves are used in cough, headache and jaundice.
- (9) Local Name Kangni
- Family *Polygonaceae*
- Botanical Name *Fagopyrum esculentum Moench*
- Part Used Seed
- Flowering Time Feb, March
- Method It is effective in reducing intestine problems. It is placed in water and then yogurt is made. It is treatment of acute dysentery problems.
- (10) Local Name Gilote
- Family *Asclepiadaceae*
- Botanical Name *Ceropegia bulbosa Roxb.*
- Part Used Bulb
- Flowering Time July, August
- Method It is digestive, and softens stomach, also good appetizer. Bulb of the plant is used. Bulbs is collected cleaned and is used with salt.
- (11) Local Name Puth Kanda
- Family *Amaranthaceae*
- Botanical Name *Aschyranthes aspera Linn.*
- Part Used Roots, Leaves

Flowering Time	March, April
Method	Miswak of roots of the plant is treatment of teeth problems. Salt of the plant is made then honey is mixed it is treatment of cough.
(12) Local Name	Dusan
Family	<i>Lilliaceae</i>
Botanical Name	<i>Asparagus gracilis Royle</i>
Part Used	Branches
Flowering Time	April
Method	Dusan are used as vegetable, it is good appetizer and promotes hunger yogurt is mixed and utilized. It is harmful if used for a long period.
(13) Local Name	Chatri Dodhak
Family	<i>Euphorbiacea</i>
Botanical Name	<i>Euphorbia helioscopia L. Ramayya & Rajagopal</i>
Part Used	Leaves
Flowering Time	Feburary, March
Method	Dodhak is used under shade and Bhatal (<i>Lannaea procumbens</i>) is mixed in equal amount it is powerful tonic, milk of the plant is used to treat, inflammation and wounds which are not in good condition.

- (14) Local Name Kahu
- Family *Oleaceae*
- Botanical Name *Olea ferruginea* Royle
- Part Used Fruit Leaves
- Flowering Time April, August
- Method Gond Kahu cleans eyes and removes all dust. Kahu leaves are useful for heat and gives strength to heart. Leaves are used as tea.
- (15) Local Name Phulai
- Family *Mimosaceae*
- Botanical Name *Acacia modesta* Wall.
- Part Used Leaves, Bark
- Flowering Time November, March
- Method Leaves and Bark are boiled in water and extract is used which is effective in control of gastric troubles. A bark is also digestive, and excretes wastes.
- (16) Local Name Awani
- Family *Lamiaceae*
- Botanical Name *Otostegia limbata* (Bth) Boiss
- Part Used Leaves, Stem
- Flowering Time April, May
- Method Liquid extract of the plant is collected and it is placed in eyes, it is treatment of early stage eye diseases, prevention of the eyes

disease such as Cataract. It is also used in treatment of livestock eye diseases if there is a layer in eyes and eye sight is weak.

- (17) Local Name Papper
Family *Buxaceae*
Botanical Name *Buxus papillosa C.K. Schneid.*
Part Used Leaves
Flowering Time April, May
Method Leaves of the papper are grinded and liquid extract is used it cause dysentery. It is blood purifier. It is usually used to excrete material from stomach
- (18) Local Name Khabari
Family *Moraceae*
Botanical Name *Ficus palmata Forssk.*
Part Used Roots, Leaves
Flowering Time April
Method Root of the plant is cut and a bottle is placed under it for the period of one night, liquid extract is collected and it is mixed with water & used this is treatment of diabetics. Mixture of the unripe fruit can also be made; it is also treatment of diabetics. It is used along water for long period.
- (19) Local Name Til
Family *Pedaliaceae*
Botanical Name *Sesamum orientale L.*

Part Used	Seed
Flowering Time	August, September
Method	Sweet is made from the seed of the plant and it is treatment in control of the excessive urine. It is used 3-4 times in the form of sweet. Oil is used as massage on body parts which are fractured.
(20) Local Name	Kala vehekar
Family	<i>Labiatae</i>
Botanical Name	<i>Colebrookea oppositifolia Smith.</i>
Part Used	Leaves
Flowering Time	January, April
Method	Its leaves extract is used along with water as drink and it is blood purifier, it is also used as fuel wood when plant shed leaves.
(21) Local Name	Kur tumba
Family	<i>Cucurbitaceae</i>
Botanical Name	<i>Citrullus colocynthus L.</i>
Part Used	Fruit
Flowering Time	July, August
Method	It is blood purifier, seeds are taken out then water and Ghee is mixed and is boiled, sugar is mixed afterwards, 7 days use cause dysentery, it is also treatment of indigestion.

- (22) Local Name Kanir
 Family *Apocynaceae*
 Botanical Name *Nerium oleander Linn.*
 Part Used Leaves
 Flowering Time March, September
 Method It is highly toxic. Leaves are grinded and then boiled, spray of this extract is used to kill worms in beds. Extract of the plant is used as spray in order to kill animal pests especially in sheep.
- (23) Local Name Aak
 Family *Asclepiadaceae*
 Botanical Name *Calotropis procera (Aitch.) Aith. f.*
 Part Used Leaves
 Flowering Time Throughout the year
 Method 100 Leaves of the Aak are collected and then they are burned in Ghee one by one. Mixture is used as ointment, it is treatment of joint pains.
- (24) Local Name Bathu
 Family *Chenopodiaceae*
 Botanical Name *Chenopodium album Linn.*
 Part Used Leaves
 Flowering Time July, March

- Method Sag (vegetable paste) of the bathu is made, and is used to regulate menstrual cycle in female. Leaves are collected as vegetable.
- (25) Local Name Chibar
- Family *Cucurbitaceae*
- Botanical Name *Cucumis melo var agerestis (Naud.) Grebensc*
- Part Used Fruit
- Flowering Time July, September
- Method Achar (pickle) of the chibar is made which is useful in control of it is also useful to regulate menstrual cycle in females.
- (26) Local Name Anar
- Family *Punicaeae*
- Botanical Name *Punica granatum L.*
- Part Used Flowers
- Flowering Time March, April
- Method Flowers of the Anar are grinded and are used as paste this gives strength to teeth and also prevent bleeding from gums. Dried bark is grinded and is mixed in salt; it is used in gastric troubles.
- (27) Local Name Santha
- Family *Sapindaceae*
- Botanical Name *Dodonea viscosa (Linn.)Jacq*
- Part Used Leaves

Flowering Time	Feb, March
Method	It is blood purifier, usually it is dried and leaves grinded, and is used, it is effective treatment of the fever with water.
(28) Local Name	Kunhi
Family	<i>Papilionaceae</i>
Botanical Name	<i>Sophora mollis (Royle) Baker.</i>
Part Used	Whole Plant
Flowering Time	March, April
Method	Root is boiled in water and worm decoction is used in case of headache. Juice of the plant is also used in sore eyes. Powdered seed is mixed in oil to kill lice in hairs. It is used as fuel wood also.
(29) Local Name	Majith
Family	<i>Rubiaceae</i>
Botanical Name	<i>Rubia cordifolia L.</i>
Part Used	Roots
Flowering Time	June, July
Method	It is effective in treatment of liver diseases and it is mixed in different sharbat (soft drink). It is treatment of backbone pain in females. Roots are grinded and are used along with milk and water.



Plate No. 69

***Sophora mollis* (Royle) Baker**

Voucher No. 12



Plate No. 70

Dodonaea viscosa

Voucher No. 14

(30) Local Name Aksan
 Family *Solanaceae*
 Botanical Name *Withania somnifera (Linn.) Dunal*
 Part Used Leaves
 Flowering Time May, August
 Method It is effective in increasing deficiency of different body elements, also treatment of joint pains, also increases blood concentration. Leaves are crushed, boiled and used along water, seeds are poisonous.

(31) Local Name Mako
 Family *Solanaceae*
 Botanical Name *Solanum nigrum L.*
 Part Used Leaves, Fruit
 Flowering Time Throughout the year
 Method Arq Mako liquid extract is made from the plant, which is good treatment of liver disorders. It is also used in vegetable in the form of Sag (vegetable paste) is prepared and black pepper (*Piper longum*) is added, this is treatment of liver inflammation. Also treatment of the uterus inflammation Vaginitis

(32) Local Name Harnoli / Castor Oil
 Family *Euphorbiaceae*
 Botanical Name *Ricinus communis Linn.*
 Part Used Seed

Flowering Time	Summer Fall
Method	Castor Oil is extracted from the seed of the plant, which is treatment of intestinal worms. Leaves of the Harnoli are used to make different tonic. Black Abrak changes its color in Harnoli water. Its seeds are highly poisonous and negatively effect a reproductive system.
(33) Local Name	Bhang
Family	<i>Cannabaceae</i>
Botanical Name	<i>Cannabis sativa Linn.</i>
Part Used	Leaves
Flowering Time	April, October
Method	Excessive amount of the Bhang drink is toxic, it is used by specific group of people as soft drink living at shrines as custodian as drink and it promotes hunger, excessive amount creates unconsciousness, it is treatment of the infertility, seed is used with water on daily basis in minute amount.
(34) Local Name	Vahekar
Family	<i>Acanthaceae</i>
Botanical Name	<i>Justicia adhatoda Linn.</i>
Part Used	Leaves
Flowering Time	March, April
Method	Decoction is made from leaves and roots of the plant, which is effective treatment of

chest diseases, also treatment of Asthma and removes blockage from veins.

- (35) Local Name Jangli Karela
Family *Cucurbitaceae*
Botanical Name *Momordica diocia L.*
Part Used Fruit
Flowering Time July, October
Method Jangli Karela fruit is dried and Safoof (mixture) is made, one teaspoon of this Mixture along with water is treatment of diabetics.

- (36) Local Name Vina
Family *Apocynaceae*
Botanical Name *Rhazya stricta Decne*
Part Used Leaves
Flowering Time December, March
Method It is blood purifier, leaves of the vina are cut and decoction is made, it is treatment of indigestion blood disorder internal inflammation, inflammation of uterus Vaginitis, inflammation of stomach, fever and cough due to blood purification it gives relief in body pains.

- (37) Local Name Kunwar Gandal
Family *Liliaceae*
Botanical Name *Aloe barbadensis Mills.*
Part Used Branches

Flowering Time	Late summer
Method	It is blood purifier, and treatment of indigestion. Extract from the plant is taken and it is prepared on light heat and pure extract is made locally known as mosaber which is treatment of belly diseases and indigestion. Powder form is used in skin disorder & gastric trouble.
(38) Local Name	Dharek
Family	<i>Meliaceae</i>
Botanical Name	<i>Melia azedarach Linn.</i>
Part Used	Seeds, Leaves
Flowering Time	March, April
Method	Seeds and leaves of the plant are used and are good treatment of piles. It is bitter in taste, kushta tonic is prepared in leaves of Dharek + leaves of Nim and Shah Yamani red and white are mixed and are boiled this kushta (tonic) is treatment of people burned from fire.
(39) Local Name	Dhatora
Family	<i>Solanaceae</i>
Botanical Name	<i>Datura stramonium L.</i>
Part Used	Seeds
Flowering Time	March, July

Method	Seeds are used in different medicines heavy dosage is toxic. It paralyses nervous system. Leaves are used as spray to kill worms.
(40) Local Name	Ajwain
Family	<i>Apiaceae</i>
Botanical Name	<i>Carum copticum L.</i>
Part Used	Seeds
Flowering Time	April
Method	It is treatment of indigestion, is used in tea, also treatment of fever. It is placed in the water and is used in early morning before breakfast; it is used in treatment of typhoid fever.
(41) Local Name	Alsi
Family	<i>Linaceae</i>
Botanical Name	<i>Linum usitatissimum L.</i>
Part Used	Seeds
Flowering Time	Feb, March
Method	It is used to excrete wastes from body. and is used after mixing Mulathi (<i>Glycyrrhiza glabra L.</i>) and Alsi seed mixed in equal amount, then honey is mixed one third part, paste is treatment of dry asthma. One teaspoon is recommended in morning and evening time.

- (42) Local Name Tukhm Malanga
Family *Lamiaceae*
Botanical Name *Lallemantia royleana Benth.*
Part Used Seeds
Flowering Time July, August
Method It is treatment of all diseases due to heat problems; it is used in medicines, which are treatment of premature ejaculation in males. It is also treatment of dry cough. Seeds are mixed in water and are used.
- (43) Local Name Ismaghol
Family *Plantaginaceae*
Botanical Name *Plantago lanceolata Linn.*
Part Used Husk
Flowering Time March, April
Method It is treatment of stomach ulcer its husk is used along with milk and water. Whole husk of the plant is taken and Gur (desi sugar) Sharbat is also used by the patients, which is treatment of intestinal worms. It is also treatment of the muscles strain if one-quarter of the medicine is used.
- (44) Local Name Dhamian
Family *Zygophyllaceae*
Botanical Name *Fagonia indica Burm .f.*
Part Used Whole plant
Flowering Time April, August

Method	It is also blood purifier and treatment of blood cancer, black pepper (<i>Piper nigrum</i>) + Santha (<i>Dodonea viscosa</i>) + Dhaman are all mixed and are used for the period of one month all items are mixed in equal amount. It is also treatment of Piles and indigestion.
(45) Local Name	Harmal
Family	<i>Zygophyllacea</i>
Botanical Name	<i>Peganum harmala Linn.</i>
Part Used	Seed
Flowering Time	Leaves
Method	July, August
	Decoction of all parts of the plant is used, different kushta jat tonic are made while its decoction is treatment of rheumatism. Plant is burned and is considered of anti germ properties. It is used as germ killer through its smoke.
(46) Local Name	Jaledhar
Family	<i>Tiliaceae</i>
Botanical Name	<i>Grewia villosa Willd.</i>
Part Used	Roots
Flowering Time	August
Method	It is also blood purifier roots are used in sharbat (soft drink) and is treatment of liver problems. Jaledhar Roots + Ber (<i>Zizphus jujuba</i>) bark are mixed in equal quantity and are treatment of piles blood, also different blood disorders.

- (47) Local Name Imlah
- Family *Rhamnaceae*
- Botanical Name *Zizphus nummularia (Burm.f.) Wight & Arn*
- Part Used Fruit
- Flowering Time July, August
- Method Sharbat (drink) is made from the fruit of the Imlah, which is used as treatment of excessive thirst. Imlah fruit is boiled in water and is used as treatment of hepatitis. Fruit is eaten as treatment of hepatitis.
- (48) Local Name Kikar
- Family *Mimosaceae*
- Botanical Name *Acacia nilotica (Linn.) Delile*
- Part Used Leaves
- Flowering Time March, April
- Method Dried leaves of the Kikar (*Acacia nilotica*) + Bark of Anar fruit (*Punica granatum*) + white Zeera (*Cuminum cyminum*) all in equal amount are mixed and mixture is made, it is used in morning and evening time and is treatment of acute dysentery. Gond Kikar is used as medicine and power tonic. Bark of the plant is used as treatment of cough and blood purification. Its bark sharbat (drink) is also effective in preventing blood due to piles. It is also treatment of teeth gum disorder if used as miswak.

- (49) Local Name Gorak Pan
 Family *Boraginaceae*
 Botanical Name *Heliotropium strigosum Willd*
 Part Used Whole plant
 Flowering Time July, September
 Method It is used as treatment of the liver disorder, water and sugar is mixed in water extract, it is also useful in certain other skin, gastric disorders.
- (50) Local Name Vehri
 Family *Convolvulaceae*
 Botanical Name *Convolvulus arvensis Linn.*
 Part Used Whole plant
 Flowering Time January, March
 Method It is laxative, and urine activator also treatment of liver and stomach problems. Zeera sufed (*Cuminum cyminum*) + Saunf (*Foeniculum vulgare*) + Vehri all are mixed in equal amount and it is treatment of all stomach disorders. 20 gram leaves are mixed in sugar and it cause dysentery.

3.9.8 FOLK RECIPES AND INDIGEOUS KNOWLEDGE (ETHNOVETERINARY)

Ethno-veterinary medicine (EVM) or veterinary anthropology refers to holistic and interdisciplinary study of traditional knowledge, skills, methods, practices and folk beliefs of the people about the health care, healthful husbandry and production of livestock (McCorkle, 1986). It encompasses information on disease and their control, remedies and clinical practices for treatment and prevention, management, feeding and breeding strategies, spiritual elements, and the human resources that hold the information and experience.

(Mathias, 2004)

During field survey information about Ethno-veterinary uses have also been collected but the focus was to document general uses of these plants for livestock instead of detailed recepies collections.

During survey 50 different plants species were identified which are partly or fully used in different diseases.

(1) Local Name	Kahu
Family	<i>Oleaceae</i>
Botanical Name	<i>Olea ferruginea Royle</i>
Part Used	Fruit , Leaves
Flowering Time	April, August
Method	Kahu leaves are used as feed for livestock during winter season and also these leaves are fed to the animals which are week and are not able to graze in forest area, it seed are boiled in water and are used as treatment for indigestion in livestock.

- (2) Local Name Phulai
 Family *Mimosaceae*
 Botanical Name *Acacia modesta* Wall.
 Part Used Leaves, Bark
 Flowering Time November, March
 Method Phulai bark and seed are cut and are mixed in different tonics for livestock. Its leaves are also used as feed during winter season.
- (3) Local Name Khabari
 Family *Moraceae*
 Botanical Name *Ficus palmate* Forssk.
 Part Used Roots, Leaves
 Flowering Time April
 Method It is also used as feed for livestock its ripe fruits are used in different recepies of livestock disease.
- (4) Local Name Kur tumba
 Family *Cucurbitaceae*
 Botanical Name *Citrullus colocynthus* L.
 Part Used Fruit
 Flowering Time July, August
 Method Kur Tumba fruit is used to treat in livestock dieseae Zeharbad, Its 30gm fruit is pulverized given to the animal, It is also used to improve digestion in animals.

- (5) Local Name Aak
- Family *Asclepiadaceae*
- Botanical Name *Calotropis procera (Aitch.) Aith. f.*
- Part Used Leaves
- Flowering Time Throughout the year
- Method Aak leaves and fiber is used in recipes for indigestion and as worm killer.
- (6) Local Name Chibar
- Family *Cucurbitaceae*
- Botanical Name *Cucumis melo var. agerestis*
- Part Used Fruit
- Flowering Time July, September
- Method Its ripe fruit is collected and fed to animals in case of digestion problems
- (7) Local Name Anar
- Family *Punicaeaceae*
- Botanical Name *Punica granatum L.*
- Part Used Flowers
- Flowering Time March, April
- Method Its fruit peel 150gm is used for the period of 2 to 3 days as a treatment of diarrhea in livestock.
- (8) Local Name Santha
- Family *Sapindaceae*
- Botanical Name *Dodonea viscosa (Linn.) Jacq.*

- | | |
|-----------------|---|
| Part Used | Leaves |
| Flowering Time | Feb, March |
| Method | Its straight branches are used as bandage in goat & sheep if their organs are fractured. |
| (9) Local Name | Majith |
| Family | <i>Rubiaceae</i> |
| Botanical Name | <i>Rubia cordifolia L.</i> |
| Part Used | Roots |
| Flowering Time | June, July |
| Method | It is used in recepies of livestock, which are injured or have any fracture; it is effective painkiller and gives strength to animal. |
| (10) Local Name | Aksan |
| Family | <i>Solanaceae</i> |
| Botanical Name | <i>Withania somnifera (Linn.) Dunal</i> |
| Part Used | Leaves |
| Flowering Time | May, August |
| Method | Its leaves are used in different indigestion problems like diarrhea and also a disease zeharabad. |
| (11) Local Name | Mako |
| Family | <i>Solanaceae</i> |
| Botanical Name | <i>Solanum nigrum L.</i> |
| Part Used | Leaves, Fruit |
| Flowering Time | Throughout the year |

- Method Leaves are used in indigestion recepies also used as fodder.
- (12) Local Name Harnoli / Castor Oil
- Family *Euphorbiaceae*
- Botanical Name *Ricinus communis* Linn.
- Part Used Seed
- Flowering Time Summer Fall
- Method The oil of seed is used as a purgative in animals. This oil is mixed with decoction of Kandra. (*Alhaji camelorum*) leaves and thorns and is given to cattle suffering from severe impaction of rumen. The extract of its leaves is used to hasten the expulsion of placenta in cattle.
- (13) Local Name Bhang
- Family *Cannabaceae*
- Botanical Name *Cannabis sativa* Linn.
- Part Used Leaves
- Flowering Time April, October
- Method Leaves of the bhang are dried and are mixed in food as wormkiller and other complications.
- (14) Local Name Vahekar
- Family *Acanthaceae*
- Botanical Name *Justicia adhatoda* Linn.
- Part Used Leaves

- | | |
|-----------------|---|
| Flowering Time | March, April |
| Method | Vahekar leaves are wrapped on different body parts in case of swelling or injury in animals. |
| (15) Local Name | Vina |
| Family | <i>Apocynaceae</i> |
| Botanical Name | <i>Rhazya stricta Decne.</i> |
| Part Used | Leaves |
| Flowering Time | December, March |
| Method | Vina seed and leaves are used in different mixture and are used as digestive agent. |
| (16) Local Name | Kunwar Gandal |
| Family | <i>Liliaceae</i> |
| Botanical Name | <i>Aloe barbadensis Mills.</i> |
| Part Used | Branches |
| Flowering Time | Late summer |
| Method | Kunwar Gandal fresh stem is fed to livestock to improve digestion and it is diuretic as well. |
| (17) Local Name | Dharek |
| Family | <i>Meliaceae</i> |
| Botanical Name | <i>Melia azedarach Linn.</i> |
| Part Used | Seeds Leaves |
| Flowering Time | March, April |



Plate No. 71

***Rhazya stricta* Decne**

Voucher No. 67



Plate No. 72

Aloe barbadensis

Voucher No. 76

- Method Leaves of the plant are used as stall feed and extract of the leaves is used in different stomach related complications.
- (18) Local Name Ajwain
- Family *Apiaceae*
- Botanical Name *Carum copticum L.*
- Part Used Seeds
- Flowering Time April
- Method Ajwain seed is mixed in salt and is used as treatment of belly swelling and also to excrete air from the body.
- (19) Local Name Alsi
- Family *Linaceae*
- Botanical Name *Linum usitatissimum L.*
- Part Used Seeds
- Flowering Time Feb, March
- Method Its seed oil 100 ml, is drenched to animals affected from severe cold and also used in feed tonic for livestock.
- (20) Local Name Dhaman
- Family *Zygophyllaceae*
- Botanical Name *Fagonia indica Burm f.*
- Part Used Whole plant
- Flowering Time April, August
- Method Its leaves are grinded and fed to livestock for killing worms.

- (21) Local Name Harmal
Family *Zygophyllacea*
Botanical Name *Peganum harmala* Linn.
Part Used Seed Leaves
Flowering Time July, August
Method Harmal fruit and seed along with leaves is used as smoke agent in animals shed, its leaves are also used in different recepies.
- (22) Local Name Shrin
Family *Mimosaceae*
Botanical Name *Albizzia lebbeck* (L.) Bth
Part Used Leaves
Flowering Time April, May
Method Leaves are wrapped on soaring eyes of goat and sheep and it is effective treatment of eye disease in livestock.
- (23) Local Name Saunf
Family *Apiaceae*
Botanical Name *Foeniculum vulgare* Mill.
Part Used Seeds
Flowering Time March, April
Method Saunf seed is mixed in water and is used as a treatment of fever in livestock.
- (24) Local Name Akri
Family *Solanaceae*
Botanical Name *Withania coagulens* Dunal

Part Used	Seed, Fruit
Flowering Time	November, April
Method	Akri whole plant especially seed and leaves are collected and are fed to buffaloes and other livestock; it is effective treatment of worms in body.
(25) Local Name	Dhari booti
Family	<i>Cuscutaceae</i>
Botanical Name	<i>Cuscuta reflexa Roxb.</i>
Part Used	Whole plant
Flowering Time	August, September
Method	Its branches are collected and fed to livestock as digestive agent and worm killer.
(26) Local Name	Podina
Family	<i>Lamiaceae</i>
Botanical Name	<i>Mentha royelana Wall. ex Bph.</i>
Part Used	Leaves
Flowering Time	Throughout the year
Method	Leaves of the podina are mixed in anar seed to be used as remedy for glactozena in bovine. Its leaves are also boiled and liquid extract is used as digestive element.
(27) Local Name	Jamunh
Family	<i>Crucifera</i>
Botanical Name	<i>Eruca sativa Mill.</i>
Part Used	Seed

- | | |
|-----------------|---|
| Flowering Time | March, April |
| Method | 500gm of seed cake are given daily for the treatment of ectoparasites |
| (28) Local Name | Bajra |
| Family | <i>Gramineae</i> |
| Botanical Name | <i>Pennisetum americanum L.</i> |
| Part Used | Seed |
| Flowering Time | August, September |
| Method | Seed are mixed in water and are boiled and used in foot and mouth diseases in animals. |
| (29) Local Name | Marchia Kand, Kiari |
| Family | <i>Lilaceae</i> |
| Botanical Name | <i>Gloriosa superba L.</i> |
| Part Used | Tuber |
| Flowering Time | July, August |
| Method | Its tuber is cut and fed to buffaloes and in other animals in case of worm and it is also used as good remedy for indigestion problems. |
| (30) Local Name | Methi |
| Family | <i>Papilionaceae</i> |
| Botanical Name | <i>Trigonella foenum-graecum L.</i> |
| Part Used | Seed |
| Flowering Time | July, August |

- Method Methi is dried and is mixed in water along with salt and is used in gastric troubles in animals.
- (31) Local Name Halia
- Family *Apiaceae*
- Botanical Name *Pimpinella anisum L.*
- Part Used Seed
- Flowering Time March, April
- Method Its seed are used to make sweat for bulls in winter season to give them strength.
- (32) Local Name Lahsun
- Family *Liliaceae*
- Botanical Name *Allium sativum Linn.*
- Part Used Pods
- Flowering Time March, April
- Method Lahsun pods are boiled in water and are used in sheep nosal discharge.
- (33) Local Name Bhakra
- Family *Zygoehyllaceae*
- Botanical Name *Tribulus terrestris Linn.*
- Part Used Whole Plant
- Flowering Time Through out the year
- Method The juice of fresh leaves is given to animals in case of colic and chronic cough.

- (34) Local Name Satinasi
Family *Papaveracea*
Botanical Name *Argemone mexicana L.*
Part Used Whole Plant
Flowering Time March, August
Method Juice of the leaves is given to animals suffering from malaria and milk of the plant is also applied on wounds.
- (35) Local Name Ber
Family Rhamnaceae
Botanical Name *Zizphus mauritiana Lam.*
Part Used Leaves
Flowering Time March, April
Method Ber leaves are used as fodder during winter season for sheep and goat.
- (36) Local Name Jandi
Family *Mimosaceae*
Botanical Name *Prosopis cineraria (L.) Druce*
Part Used Fruit
Flowering Time December, March
Method The flowers are used in the form of poultices to treat rheumatism in cattle sheep and goat.
- (37) Local Name Jahl
Family *Salvadoraceae*
Botanical Name *Salvadora oleoides Decne.*

- | | |
|-----------------|---|
| Part Used | Fruit |
| Flowering Time | May, August |
| Method | Its dry fruit is used to treat rheumatism in animals. |
| (38) Local Name | Mahori |
| Family | <i>Solanaceae</i> |
| Botanical Name | <i>Solanum incanum Linn.</i> |
| Part Used | Leaves, Fruit |
| Flowering Time | April, August |
| Method | Fruit of the Mahori is used as agent to induce heat for reproduction in animals. |
| (39) Local Name | Puth kanda |
| Family | <i>Amaranthaceae</i> |
| Botanical Name | <i>Aschyranthus aspera Linn.</i> |
| Part Used | Whole plant |
| Flowering Time | April, May |
| Method | Leaves are used to remove urolith in Billy goats, fresh root extract is used to expel placenta. |
| (40) Local Name | karira |
| Family | <i>Capparidaceae</i> |
| Botanical Name | <i>Capparis decidua (Forssk.) Edgew.</i> |
| Part Used | Stem |
| Flowering Time | May, June |

- Method Fruit is used to cure diarrhea in cattle and goats. Bark powder is used in cases of anorexia, indigestion and rheumatism.
- (41) Local Name Marwan
- Family *Verbenaceae*
- Botanical Name *Vitex negundo Linn.*
- Part Used Seed
- Flowering Time May, July
- Method Leave are crushed dried and are used in the form of mixture as digestive agent.
- (42) Local Name Jangli tambaco
- Family *Scrophulariaceae*
- Botanical Name *Verbascum thapsus Linn.*
- Part Used Seed
- Flowering Time March, April
- Method Its seed and leaves are used in different mixtures used for livestock diseases such as diarrhea and fever.
- (43) Local Name Saru
- Family *Cupressaceae*
- Botanical Name *Cupressus sempervirens L.*
- Part Used Fruit
- Flowering Time April, August
- Method Fruit of the plant is used as agent to induce heat for reproduction in animals.

- (44) Local Name Kachnar
 Family *Caesalpinaceae*
 Botanical Name *Bauhinia variegata Linn.*
 Part Used Flowers
 Flowering Time March, April
 Method Leave of the kachnar is used as digestive agent.
- (45) Local Name Jangli Gloh
 Family *Menispermaceae*
 Botanical Name *Tinospora cordifolia (DC.) Miers*
 Part Used Branches
 Flowering Time March, April
 Method Branches of the plant with leaves are fed to animals as worm killer and digestion improvement.
- (46) Local Name Zohr Mohra
 Family *Araceae*
 Botanical Name *Sauromatum venosum (Ait.) Schott*
 Part Used Bulb
 Flowering Time September, October
 Method Bulb of the plant is used to treat indigestion problems and also worm killer.
- (47) Local Name Choughan
 Family *Asclepiadaceae*
 Botanical Name *Caralluma tuberculata N.E. Brown.*

Part Used	Whole plant
Flowering Time	July, August
Method	Choughan are mixed in different recepies to improve digestion.
(48) Local Name	Niazbo
Family	<i>Lamiaceae</i>
Botanical Name	<i>Ocimum basilicm L.</i>
Part Used	Leaves
Flowering Time	March, July
Method	Tulsi leaves and seed is boiled along with salt and is used in gastric trouble.
(49) Local Name	Wheat
Family	<i>Gramineae</i>
Botanical Name	<i>Triticum aestivun L.</i>
Part Used	Grains
Flowering Time	No Flowering
Method	Grains are used to made sweet for different animals as feed tonic also used in livestock for weight gain.
(50) Local Name	Sarson
Family	<i>Brassicaceae</i>
Botanical Name	<i>Brassica campestris L.</i>
Part Used	Leaves, Seeds
Flowering Time	March, April

Method Leaves are used as vegetable and livestock feed, grains are mixed in sweet prepared for animals during winter season.

3.9.9 DESCRIPTIVE RESULTS

- (1) Botanical name *Adiantum capillus - veneris L.*
Local name Bershasha
Family *Polypodiaceae*
Habit Herb
Flowering season None
Part Used Whole plant
Indigenous uses Entire plant is used as emollient in cough. Leaves are used as febrifuge. Used by women in childbirth problems and amenorrhea. Decoction of fresh leaves is used as a cooling agent.
- (2) Botanical name *Amaranthus viridis Linn.*
Local name Chaleri
Family *Amaranthaceae*
Habit Herb
Flowering season March, November
Part Used Leaves
Indigenous uses Leaves are used as emollient. Also used in scorpion sting and snakebite. Juice of the leaves is mixed with oil, applied to the scalp as hair tonic. It is used and cooked as vegetable and also used as fodder.

- (3) Botanical name *Barleria cristata L.*
- Local name Jangli phool
- Family *Acanthaceae*
- Habit Herb
- Flowering season July, October
- Part Used Whole plant
- Indigenous uses Roots and leaves are used to reduce swelling. Infusion is given in cough. Root is also used in rheumatism and pneumonia. Decoction of the whole plant is used as a substitute for human milk. Used in snakebite. Leaves boiled within oil are used in ear and eye ailments
- (4) Botanical name *Cannabis sativa L*
- Local name Bhang
- Family *Cannabaceae*
- Habit Herb
- Flowering season April , October
- Part Used Whole plant
- Indigenous uses Decoction of the leaves are used for female's infertility; Dried and crushed leaves are taken as a drink for their narcotic action also used as refrigerant. The plant is used as astringent, tonic, narcotic, sedative and anodyne, causes dyspepsia, cough, and insanity. Crushed leaves are given to animals as appetizer. Seeds are given to poultry to

enhance egg production and oil is used to keep body warm in cold season also used as fuel by Afghan Refugee.

Other Uses:

The intoxicating drugs 'bhang' 'ganja' and 'charas' are obtained from the resinous exudation of the stem, young leaves and flowers.

- (5) Botanical name *Cichorium intybus Linn.*
Local name Kasni
Family *Asteraceae*
Habit Herb
Flowering season: July, September
Part Used: Root, seed
Indigenous uses: Decoction of the fresh and ground root is taken for all kinds of fevers (e.g., typhoid, malaria, tuberculosis) and good mental capabilities. Decoction of fresh ground root is made kept overnight used for lowering blood pressure in a hypersensitive status. Decoction of powdered seed is used in amenorrhoea and menorrhagia. Other Uses: As a fodder for cattle and also used as soft drink.

- (6) Botanical name *Convolvulus arvensis L.*
Local name Lehli
Family *Convolvulaceae*
Habit Herb

Flowering season	Throughout the year
Part Used	Whole Plant
Indigenous uses	Roots are known as purgative. For ringworms leaves along with fruit are used. The whole plant is used for skin diseases and as antidandruff. Other Uses: As fodder for goats and cattle.
(7) Botanical name	<i>Cuscuta reflexa Roxb.</i>
Local name	Dhari booti
Family	<i>Cuscutaceae</i>
Habit	Herb Climber
Flowering season	August, October
Part Used	Stem, seed
Indigenous uses	The plant is known as anthelmintic, carminative, alterative, purgative and diuretic. Used in jaundice, joint pain, paralysis, vomiting & toothache. Seed is known to be carminative, alterative, anthelmintic. Stem is used in bilious disorders. Juice of the fresh stem is taken for general health maintenance. Also used in eye and heart diseases. It is parasitic and dry other plant by extracting food.
(8) Botanical name	<i>Cynodon dactylon (L.) Pers.</i>
Local name	Khabal
Family	<i>Poaceae</i>
Habit	Herb

Flowering season	April, October
Part Used	Whole plant
Indigenous uses	Infusion of the grass with milk is used for bleeding piles, irritation of urinary organs, dropsy and vomiting. Crushed plant in the form of paste is applied for checking bleeding. The juice is also given in dysentery. It is also used in cows for increasing milk and butter production.
Other Uses	As fodder for cattle.
(9) Botanical name	<i>Datura stramonium L.</i>
Local name	Dhatura
Family	<i>Solanaceae</i>
Habit	Herb
Flowering season	March, September
Part Used	Leaves, flower and fruit
Indigenous uses	The plant parts are used in fevers, skin diseases, dyspepsia and for removing abdominal worms. Juice of the fruit is applied to scalp for falling hairs and as antidandruff. Juice of the flower is used in earache. Leaves are applied to boils, sores and fish bite.
Other Uses	Seeds and leaves are used as narcotic.
(10) Botanical name	<i>Dodonaea viscosa (Linn.) Jacq.</i>
Local name	Sanatha
Family	<i>Sapindaceae</i>

Habit	Shrub
Flowering season	February, March
Part Used	Leaves, bark
Indigenous uses	Leaves are known as bitter, astringent; used in gout, rheumatism, swelling and burns. Bark is employed as astringent in bath. Warm poultice of the leaves is used to reduce the pain in arthritis.
Other Uses:	Wood is hard; used for walking sticks and tool handles, excellent firewood also used as a hedge plant and fruit is used as fish poison. Also used in the construction of roof.

(11) Botanical name	<i>Euphorbia helioscopia</i> Linn.
Local name	Dhodak
Family	<i>Euphorbiaceae</i>
Habit	Herb
Flowering season	February, March
Indigenous uses	The plant is used as cathartic. Seeds with roasted peppers are given in cholera; Milky juice is applied to eruption. Roots are known as anthelmintic. Milky latex is known to be poisonous and causes swelling on the skin.
Other Uses	Also used as a fodder.

(12) Botanical name	<i>Ficus virgata</i> Wall. ex Roxb.
Local name	Jangli khabari
Family	<i>Moraceae</i>
Habit	Shrub

Flowering season	May, November
Part Used	Leaves, fruit
Indigenous uses	Its fruit is known as laxative and demulcent; used as diet in constipation. It is useful in lung and bladder diseases. Leaves are boiled in the milk of goat used to soften the arteries.
Other Uses	Fruit edible; Branches and leaves are used as a cattle fodder
(13) Botanical name	<i>Ipomoea hederacea (L.) Jacq.</i>
Local name	Bail
Family	<i>Convolvulaceae</i>
Habit	Climbing herb
Flowering season	September, October
Part Used	Seed
Indigenous uses	Its seeds are purgative. It is grown as ornamental in homes.
(14) Botanical name	<i>Jasminum humile Linn</i>
Local name	Peeli Chammbeli
Family	<i>Oleaceae</i>
Habit	Shrub
Flowering season	April, June
Part Used	Root, flower
Indigenous uses	Its flowers are used as astringent and tonic to heart and bowels. Root is used in ringworm. Milky juice of plant is used for destroying



Plate No. 73

***Datura stramonium* L.**

Voucher No. 21



Plate No. 74

***Ipomoea purpurea* (L.) Roth**

Voucher No. 23

the unhealthy lining walls of chronic sinuses and fistulas.

Other Uses

Perfume made from the flower is highly prized. It is used as feed by grazing animals.

(15) Botanical name

Jasminum officinale Linn.

Local name

Sufaid Chammbeli

Family

Oleaceae

Habit

Shrub

Flowering season

May, July

Part Used

Whole plant

Indigenous uses

The plant is used as diuretic, and anathematic. Flowers are applied in skin diseases, headache, weak and tired eyes and in scorpion bite. Leaves are chewed as a treatment against ulceration or eruptions in the mouth.

Other Uses:

Perfume made from the flower is highly prized. It is eaten by grazing animals.

(16) Botanical name

Morus alba L.

Local name

Kala Toot

Family

Moraceae

Habit

Tree

Flowering season

March, April

Part Used

Leaves, stem, bark, fruit

Indigenous uses

Its leaves are known as diaphoretic and emollient. A decoction of leaves is used as gargle in inflammation of throat. The fruit is

used as cooling and laxative. It is used for sore throat, dyspepsia and melancholia. Root bark is known as anthelmintic and astringent. Other Uses: Fruit is edible. Leaves are used for sericulture and as fodder. Wood yield timber for making furniture and as a fuel wood.

- (17) Botanical name *Nasturtium officinale* R. Br.
Local name Jangli booti
Family *Brassicaceae*
Habit Herb
Flowering season: February, July
Part Used: Whole plant
Indigenous uses It is used in the complaints of chest; also used as an appetizer.
- (18) Botanical name *Plantago lanceolata* Linn.
Local name Ispaghul
Family *Plantaginaceae*
Habit Herb
Flowering season April, September
Part Used Whole plant
Indigenous uses It is useful in toothache and in dysentery also, effective for wound bruises and inflamed areas. Lotion of the oil from the fresh ground leaves is applied externally to burns and ulcers of the skin. Powder of the dried seed is applied to tooth for pain relief.

Seeds are also taken for diarrhea and constipation.

- (19) Botanical name: *Plantago major* Linn.
Local name Isamghol
Family *Plantaginaceae*
Habit Herb
Flowering season April, May
Part Used Whole plant
Indigenous uses Its dried seeds are either chewed or taken in powder form in dyspepsia, constipation and stomachache. Other uses .It is also used as a fodder.
- (20) Botanical name *Plantago ovata* Linn.
Local name Isabghol
Family *Plantaginaceae*
Habit Herb
Flowering season March, May
Indigenous uses Its dried seeds are taken orally with water in dyspepsia, dysentery and constipation.
- (21) Botanical name *Punica granatum* Linn.
Local name Anar dana
Family *Punicaceae*
Habit Shrub
Flowering season April, July
Part Used Fruit, root, bark, seed

Indigenous uses

Seeds are used as stomachic; pulp is used as cardiac. Fresh juice is known as cooling, refrigerant and used as a tonic in fever; Decoction of root and stem bark is used as astringent and anthelmintic and taken in dysmenorrhoea, vomiting and diarrhoea.

Other Uses Fruit is edible. A number of dyes can be extracted from it. Also used as fuel wood. Black writing ink is also made from it. Dried seeds are used to add taste to certain foods. Foliage given to cattle as a fodder.

(22) Botanical name:

Rubia cordifolia L. (Syn: *R. purpurea* DC.)

Local name

Manjit

Family

Rubiaceae

Habit

Woody climber

Flowering season

Jun, July

Part Used

Root, stem, leaves

Indigenous uses

Its stem is used in snakebite and scorpionbite. Dried root powder is effective in toothache. Decoction of leaves and stem is used as vermifuge, used in amenorrhoea, leucorrhoea, dysmenorrhoea and as diuretic for bladder and kidney problems.

(23) Botanical name:

Sauromatum venosum (Ait.) Schott

Local name

Zohr mohra

Family

Araceae

Habit

Herb

Flowering season	April, May
Part Used	Rhizome
Indigenous uses	Rhizome is used as stimulating poultice in snakebite and also fed to livestock as worm killer
(24) Botanical name	<i>Silene conoidea</i> Linn.
Local name	Chota kanda
Family	<i>Caryophyllaceae</i>
Habit	Herb
Flowering season	May, June
Part Used	Whole plant
Indigenous uses	The plant is known as emollient and is used in bath or as fumigant. Juice of the fresh seeds is rubbed on pimples and spots.
(25) Botanical name	<i>Silybum marianum</i> (L.) Gaertn
Local name	Kanda
Family	<i>Asteraceae</i>
Habit	Herb
Flowering season	March, April
Part Used	Leaves, seeds
Indigenous uses	Its leaves are used as aperient and sudorific. Seeds are known as demulcent and are used in hemorrhage.
(26) Botanical name	<i>Sisymbrium irio</i> Linn.
Local name	Khub Kalan, Khaksi sar
Family	<i>Brassicaceae</i>

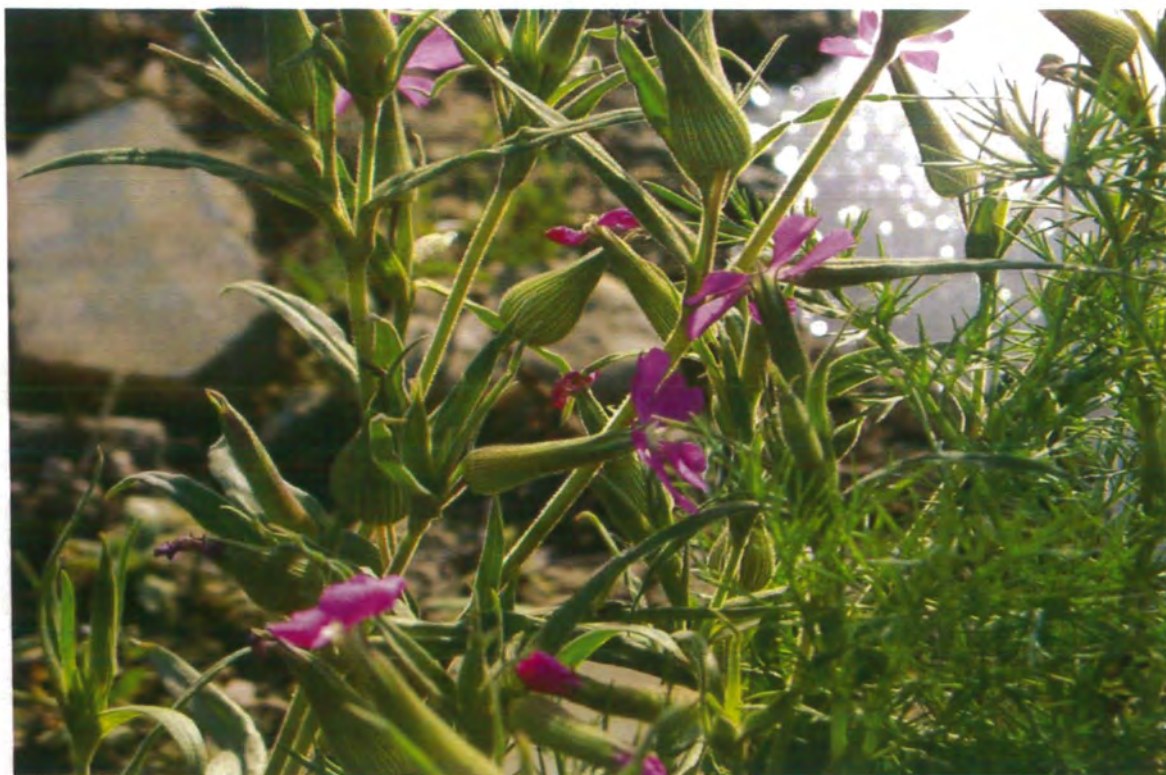


Plate No. 75

***Silene conoidea* L.**

Voucher No. 62



Plate No. 76

***Silybum marianum* (L.) Gaertner**

Voucher No. 39

Habit	Herb
Flowering season	February, April
Part Used	Seed
Indigenous uses	Used as fodder and treatment of fever.
(27) Botanical name	<i>Sonchus asper</i> (L.)
Local name	Dodhak
Family	<i>Asteraceae</i>
Habit	Herb
Flowering season	December, April
Part Used	Leaves, root
Indigenous uses	It is used as febrifuge. Decoction of leaves and roots is effective in inflammation, constipation, itching & heart problems.
Other Uses	Cooked as vegetable.
(28) Botanical name	<i>Swertia cordata</i> (G.Don) C.B Clarke
Local name	Chirayita
Family	<i>Gentianaceae</i>
Habit	Herb
Flowering season	September, October
Part Used	Whole plant
Indigenous uses	Decoction of fresh leaves is used thrice a day for any kind of fever e.g. malaria, typhoid and pneumonia.

(29)	Botanical name	<i>Tribulus terrestris</i> Linn.
	Local name	Bhakra
	Family	<i>Zygophyllaceae</i>
	Habit	Herb
	Flowering season	August, November
	Part Used	Whole plant
	Indigenous uses	Its fruit is regarded as tonic diuretic, cooling and aphrodisiac. Also used in urinary disorders, impotency, cough and heart diseases. Seeds are recommended in hemorrhages, diseases of the bladder, kidney stones and gout. Root is used in stomachache and ulcers. Dried stem and leaves are used as a cure for lumbago in old age.

(30)	Botanical name	<i>Verbascum thapsus</i> Linn.
	Local name	Geedar Tambaco
	Family	<i>Scrophulariaceae</i>
	Habit	Herb
	Flowering season	March, October
	Part Used	Whole plant
	Indigenous uses	The plant is used against diarrhea and dysentery of cattle. Some time used as supporting material and analgesic. Also used as antiseptic. Leaves in powdered form are used for healing the wounds. Seeds are known as aphrodisiac. Also used in cough, fever and pulmonary disease. Warm poultice

of the fresh leaves is externally applied to blisters and carbuncles. Decoction of the seed is taken orally as cooling agent and also for fever. Decoction of fresh and ground root is taken in dyspepsia and colic.

Other Uses	Used as a narcotic and fish poison.
(31) Botanical name	<i>Xanthium strumarium</i> Linn.
Local name	Gohkru
Family	<i>Asteraceae</i>
Habit	Herb
Flowering season	July, August
Part Used	Leaves, root
Indigenous uses	Used in long standing malarial fever and skin diseases. Fresh root is taken for controlling diarrhea and dysentery. It is also used as fuel.
(32) Botanical name	<i>Corriandrum sativum</i> L.
Local name	Dhaniya
Family	<i>Umbelliferae</i>
Habit	Herb
Flowering season	February, March
Part Used	Seeds
Indigenous uses	Seeds are chewed to stop bad breath also used in dyspepsia, flatulence and vomiting. Externally decoction of seeds is used as eyewash and seed in the form of poultice and applied to ulcers.

Other Uses Fruit edible, Ash is used in snuff. Also used as fuel wood and shade plant.

- (33) Botanical name *Foeniculum vulgare Mill.*
Local name Sonf
Family *Apiaceae*
Habit Herb
Flowering season March, April
Part Used Whole plant
Indigenous uses It is used as treatment of gastric troubles and stomach problems.
- (34) Botanical name *Juglans regia L.*
Local name Akhrot
Family *Juglandaceae*
Habit Tree
Flowering season February, April
Part Used Whole plant
Indigenous uses Used as aphrodisiac and anthelmintic. Stem and leaves are used in toothache and mouth ulcer. Seeds are considered good for brain.
- Other Uses Walnut is valued for its wood and edible fruit. The bark is used to clean the teeth and is sold under the name "dandasa". Wood is valuable for furniture

(35)	Botanical name	<i>Trigonella foenum-graecum</i> Linn.
	Local name	Methi
	Family	<i>Papilionaceae</i>
	Habit	Herb
	Flowering season	November, February
	Part Used	Seed, leaves
	Indigenous uses	Seed is used as aphrodisiac. Infusion of seeds is used in small pox.

(36)	Botanical Name	<i>Allium cepa</i> L.
	Local Name	Piaz
	Family	<i>Alliaceae</i>
	Habit	A cultivated vegetable
	Flowering Season	April, May
	Part Used	Bulbs, Leaves
	Indigenous uses	The plant is extensively used in cooking both in fresh and dry form as salad, spices and condiment. The bulbs are stimulant. The leaves are diuretic, aphrodisiac and expectorant. The plant is also antiseptic. Its juice is applied to soothe the irritation caused by scorpion and hornet stings.

(37)	Botanical Name	<i>Allium Jacquemontii</i> Kunth.
	Local Name	Jangli Piaz
	Family	<i>Alliaceae</i>
	Habit	A wild herb
	Flowering Season	April, May

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| Part used | Bulbs, Leaves |
| Indigenous uses | The bulbs are stimulant. It is also used in epilepsy. |
| (38) Botanical Name | <i>Achyranthus aspera</i> L. |
| Local Name | Puth kanda |
| Family | <i>Amaranthaceae</i> |
| Habit | A perennial wasteland herb |
| Flowering Season | April, May |
| Part Used | Root, whole plant |
| Indigenous uses | Root infusion is used for removing stones from kidneys. Decoction of the plant is diuretic and laxative. It is also used as agent to treat burning patients. |
| (39) Botanical Name | <i>Pistacia chinensis</i> Bungs ssp. <i>Intergerrima</i> |
| Local Name | Kakar singi |
| Family | <i>Anacardiaceae</i> |
| Habit | A wild larged sized tree |
| Flowering Season | March, May |
| Part used | Insect infected galls |
| Indigenous uses | Fruits and gall's extract is given in jaundice. Leaves are used as fodder for cattle. Wood yields timber, and is used for making furniture. Branches used as fuel wood. |
| (40) Botanical Name | <i>Periploca aphylla</i> Decne. |
| Local Name | Bata |
| Family | <i>Asclepiadaceae</i> |

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| Habit | A wild herb |
| Flowering Season | March, May |
| Part Used | Latex |
| Indigenous uses | Latex is used to remove warts |
| (41) Botanical Name | <i>Asphodelus tenuifolius Cavan</i> |
| Local Name | Piazi |
| Family | <i>Asphodelaceae</i> |
| Habit | Common Spring weed |
| Flowering Season | April, September. |
| Part used | Fresh leaves |
| Indigenous uses | It is cooked with maize bread and is used as a condiment. |
| (42) Botanical Name | <i>Calendula arvensis L.</i> |
| Local Name | Phool |
| Family | <i>Asteraceae</i> |
| Habit | An annual wild herb |
| Flowering Season | March, July |
| Part Used | Leaves and flowers |
| Indigenous uses | The leaves and flowers are given to children suffering from scrofula. it is used as a tonic. diaphoretic and anthelmintic. |
| (43) Botanical Name | <i>Calendula officinalis L</i> |
| Local Name | Phool |
| Family | <i>Asteraceae</i> |
| Habit | A cultivated ornamental herb |

Flowering Season	March, July
Part used	Flower, leaves
Indigenous uses	Flowers and shoots are used to treat wounds.
(44) Botanical Name	<i>Carthamus oxyacantha M.B.Bieb</i>
Local name	Pohli
Family	<i>Asteraceae</i>
Habit	A common weed of exposed sites
Flowering Season	March ,September
Part Used	Roots, stem, leaves
Indigenous uses	Diuretic and aphrodisiac
(45) Botanical Name	<i>Taraxcum officinale Weber.</i>
Local Name	Dodhak
Family	<i>Asteraceae</i>
Habit	Herb
Flowering Season	March, September
Part Used	Young shoots, flowers
Indigenous uses	Its decoction is used as a tonic, diuretic and for jaundice. Also used for curing constipation.
(46) Botanical Name	<i>Lepidium sativum Linn.</i>
Local Name	Halon
Family	<i>Brassicaceae</i>
Habit	An annual herb
Flowering Season	March, Aug
Part Used	Dried seeds

- Indigenous uses Seeds are given as a decoction to all livestock to treat flatulence.
- (47) Botanical Name *Raphanus sativus L.*
- Local Name Mooley
- Family *Brassicaceae*
- Habit A cultivated herb
- Flowering Season March, August
- Part Used Young leaves, roots
- Indigenous uses Young leaves and roots are used extensively as and in salads. They are digestive, carminative, Diuretic; also used for jaundice and piles.
- (48) Botanical Name *Buxus pappilosa C.K. Schneid*
- Local Name Papper
- Family *Buxaccae*
- Habit shrub growing under trees
- Flowering season May, September
- Part Used Whole plant, leaves, stem
- Indigenous uses It is anti rheumatic, diaphoretic, purgative, poisonous and ebrifuge. It is used in making wooden spoons and utensils.
- (49) Botanical Name *Maytenus royleanus Wall.*
- Local Name Kander
- Family *Celastraceae*
- Habit Spiny shrub of exposed habitat in forest
- Flowering Season March, April

	Part Used	Fruits stem
	Indigenous uses	Used as fuel wood.
(50)	Botanical Name	<i>Chenopodium ambrosioidis L.</i>
	Local Name	Mushki batho
	Family	<i>Chenopodiaceae</i>
	Habit	Herb
	Flowering Season	May, August
	Part Used	Shoot
	Indigenous uses	The young shoots are used as laxative and against malaria
(51)	Botanical Name	<i>Luffa cylindrica (Linn) Roem</i>
	Local Name	Tori
	Family	<i>Cucurbitaceae</i>
	Habit	Fruits
	Flowering Season	June, September
	Indigenous uses	The fruits are used as a vegetable. It is good for stomach and ulcer problems. The dried fruit case is used for cleaning utensils.
(52)	Botanical Name	<i>Cupressus sempervirens L.</i>
	Local Name	Saro
	Family	<i>Cupresaceae</i>
	Habit	A wild medium sized tree
	Flowering Season	May, August
	Parts Used	Fruit and wood
	Indigenous uses	The fruit and wood are anthelmintic

and astringent. The Wood is used in carpentry and for furniture making.

- (53) Botanical Name *Thuja orientalis L.*
Local Name Saru
Family *Cupressaceae*
Habit A Wild medium sized tree
Flowering Season February, March
Parts Used Fresh Berries and oil
Indigenous uses The fruits and wood are anthelmintic and astringent. It is planted as an ornamental tree.
- (54) Botanical Name *Ricinus communis L.*
Local Name Arund, Harnoli
Family *Euphorbiaceae*
Habit A perennial herbaceous shrub
Flowering Season Through out the year
Parts Used Leaves, seeds, oil
Indigenous uses The leaves are emetic, narcotic, poisonous and purgative. . Castor oil is purgative; oil is given for constipation and to mothers before and after childbirth. The sees are sedative. Castor oil seeds are mainly employed for the preparation of castor oil, which is used as purgative and lubricant.

- (55) Botanical Name *Euphorbia prostrata* Ait.
 Local Name Dodhak
 Family *Euphorbiaceae*
 Habit A prostrate annual herb
 Flowering Season April, July
 Parts Used Whole plant
 Indigenous uses The decoction and its paste are used for dermatophytes, especially against ringworms. The paste is applied in skin diseases. It is also used in urine burning and delaying ejaculation.
- (56) Botanical Name *Euphorbia indica* L.
 Local Name Dodhak
 Family *Euphorbiaceae*
 Habit Annual herb
 Flowering Season April, July
 Parts Used Whole plant
 Indigenous uses Latex is poisonous and causes swelling on skin. It also causes irritation.
- (57) Botanical Name *Fumaria indica* (Husskn.) Pugsley
 Local Name Parpra / Shatara
 Family *Fumariaceae*
 Habit Herb
 Flowering Season April, May
 Parts Used Shoot
 Indigenous uses It is used as a blood

purifier; diaphoretic and antipyretic.

- (58) Botanical Name *Otostegia limbata (Benth). Boiss.*
Local Name Awani
Family *Lamiaceae*
Habit A small sized shrub
Flowering Season May, June
Parts Used Leaves
Indigenous uses Liquid extract of the leaves is used to treat eyes also used as fuel wood.
- (59) Botanical Name *Salvia moorcroftiana Wall. ex. Benth*
Local Name Khalatra
Family *Lamiaceae*
Habit Herb
Flowering Season May, June
Parts Used leaves
Indigenous uses Leaf poultice is used for healing wounds.
- (60) Botanical Name *Cloebrookea oppositifolia Smith.*
Local Name Kala vahekar
Family *Lamiaceae*
Habit Herbaceous plant of exposed areas
Flowering Season January, April
Parts Used Fruit
Indigenous uses Used as blood purifier and firewood.

- (61) Botanical Name *Tulipa stellata* Hk. f.
 Local Name Jangli Phool
 Family *Lilaceae*
 Habit Rhizomatous plant of moist temperate forests
 Flowering Season February, June
 Parts Used Rhizome
 Indigenous uses Plant is used as medicinal and fodder.
- (62) Botanical Name *Melia azedarach* L.
 Local Name Dhrek
 Family *Meliaceae*
 Habit A medium sized wild / cultivated tree
 Flowering Season March, May
 Parts Used Bark, leaves
 Indigenous uses The decoction of the leaves is employed in hysteria and for skin diseases. The leaves and flowers are effective for blood purifier.
- (63) Botanical Name *Albizia lebbeck* (L.) Bth.
 Local Name Shrin
 Family *Mimosaceae*
 Habit Tree
 Flowering Season March, May
 Parts Used Bark, Seeds, flower

Indigenous uses	Bark and seeds are restorative, astringent and used in piles, diarrhea, dysentery and gonorrhoea.
(64) Botanical Name	<i>Ficus palmata</i> Forssk.
Local Name	Khabari
Family	<i>Moraceae</i>
Habit	Medium sized cultivated tree
Flowering Season	June, December
Parts Used	Bark, Fruits, Latex
Indigenous uses	Fruit is laxative and demulcent, used as diet in constipation and in lungs and bladder diseases also source of firewood.
(65) Botanical Name	<i>Morus nigra</i> L.
Local Name	Toot
Family	<i>Moraceae</i>
Habit	A cultivated or wild deciduous tree
Flowering Season	March, July
Parts Used	Leaves, fruits, branches, wood
Indigenous uses	Mulberry leaves are considered diaphoretic and emollient. A decoction of the leaves is an emollient and used as gargle in inflammation of throat. The fruit is cooling and laxative. It is used for sore throat, dyspepsia and melancholia. The fruit is laxative, a cooling agent, anthelmintic and astringent. Leaves are also used in rearing of silkworm.

- (66) Botanical Name *Borussonetia papyrifera* (Linn.)
- Local Name Jangli Toot
- Family *Moraceae*
- Habit A cultivated or wild deciduous tree
- Flowering Season March, April
- Parts Used Leaves, branches, wood
- Indigenous uses Plants used for paper manufacturing. Bark is used in Clothing and paper industry; erosion control, furniture boxes, packing crates, sports equipments, veneer and plywood. It is used for fodder.
- (67) Botanical Name *Mirabilis Jalapa* L.
- Local Name Gul – e – Abasi
- Family *Myrsinaceae*
- Habit A perennial ornamental herb
- Flowering Season July, October.
- Parts Used Leaves
- Indigenous uses A hot poultice of leaves is used to mature and resolve boils.
- (68) Botanical Name *Papaver somniferum* L.
- Local Name Khash Khash,
- Family *Papaveraceae*
- Habit A rarely cultivated herb on the margins of gardens
- Flowering Season April, June
- Parts Used Latex and seeds

- Indigenous uses Latex is obtained from the unripe fruits by making an incision. It is narcotic and an anodyne. It increases excitement and physical vigor.
- (69) Botanical Name *Pisum sativum L.*
- Local Name Matar
- Family *Papilionaceae*
- Habit A cultivated climbing herb
- Flowering Season February, June
- Parts Used Seeds, Leaves
- Indigenous uses Leaves and seeds are extensively used as vegetables in winter.
- (70) Botanical Name *Astragalus psilocentros Fisch.*
- Local Name Tindani
- Family *Papilionaceae*
- Habit A wild Herb
- Flowering Season May, June
- Parts Used Whole plant, seeds
- Indigenous uses Used as fuel wood. Plant is used as fodder for goats. It is also used as hedge plant. It is favorite food of camel.
- (71) Botanical Name *Sophora mollis (Royle) Baker ssp. mollis.*
- Local Name Kunhi
- Family *Papilionaceae*
- Habit Shrub
- Flowering Season March, April

Parts Used	Whole Plant
Indigenous uses	Decoction of root, applied warm to relieve headache. Juice is used in sore eyes. Powdered seed mixed with oil is used to kill lice in hairs. The oil is used for skin diseases while branches and leaves are used as fodder for cattle and as fuel wood.
(72) Botanical Name	<i>Lathyrus aphaca</i> L.
Local Name	Jangli matar
Family	<i>Papilionaceae</i>
Habit	Herb
Flowering Season	February, April
Parts Used	Shoots, Leaves
Indigenous uses	Plant is used as fodder, hay fodder and as pot herb.
(73) Botanical Name	<i>Lathyrus sativus</i> L.
Local Name	Jangli matar
Family	<i>Papilionaceae</i>
Habit	Herb
Flowering Season	February – April
Parts Used	shoots, Leaves
Indigenous uses	Plant is used as fodder, hay fodder and as pot herb.
(74) Botanical Name	<i>Vicia faba</i> L.
Local Name	Rari
Family	<i>Papilionaceae</i>

Habit	Herb
Flowering Season	February, April
Parts Used	shoots leaves
Indigenous uses	Plant is used as fodder, hay fodder, Fruit is edible.
(75) Botanical Name	<i>Medicago denticulata Willd.</i>
Local Name	Maina
Family	<i>Papilionaceae</i>
Habit	Herb
Flowering Season	March, June
Parts Used	shoots leaves
Indigenous uses	Plant is used as medicine, fodder, and hay fodder.
(76) Botanical Name	<i>Sacharum bengalens Retz.</i>
Local Name	Nari
Family	<i>Poaceae</i>
Habit	Small grass
Flowering Season	April to August
Parts Used	Whole plant
Indigenous uses	It is used as hedge, soil binder and for various utensils.
(77) Botanical Name	<i>Sorghum halepense (L) Pers.</i>
Local Name	Barwa
Family	<i>Poaceae</i>
Habit	Small rhizomatous grass

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| Flowering Season | April, August |
| Parts Used | Whole plant |
| Indigenous uses | It is used as green fodder and hay fodder. |
| (78) Botanical Name | <i>Rumex dentatus L.</i> |
| Local Name | Jangli palak |
| Family | <i>Polygonaceae</i> |
| Habit | A perennial herb |
| Flowering Season | April, July |
| Parts Used | Leaves, Roots |
| Indigenous uses | It is diuretic, astringent and Demulcent.
Roots are astringent. |
| (79) Botanical Name | <i>Portulaca oleracea L.</i> |
| Local Name | Kulfa |
| Family | <i>Portulacaceae</i> |
| Habit | A cultivated herb |
| Flowering Season | April, August |
| Parts Used | Vegetative portion |
| Indigenous uses | Plant is used as pot herb, refrigerant, and alternative. It is also used for kidney, liver, urinary bladder and lung problems. |
| (80) Botanical Name | <i>Sageretia thea (Osbeck) M.C. Jhonston</i> |
| Local Name | Sagger |
| Family | <i>Rhamnaceae</i> |
| Habit | A wild shrub |
| Flowering Season | Summer |

- Part Used Leaves, Bark, Fruits, Roots.
- Indigenous uses Decoction of leaves is used as stimulant and blood purifier. Root decoction is very effective in jaundice. Leaves are used as fodder.
- (81) Botanical Name *Ziziphus oxyphylla* Edgew.
- Local Name Kokan ber
- Family *Rhamanaceae*
- Habit Shrub
- Flowering Season March, June
- Part Used Root, fruits
- Indigenous uses The roots are used for curing jaundice. The fruit are edible and used for gas troubles also grown as hedge plant.
- (82) Botanical Name *Eriobotrya japonica* (Thunb.) Lindley.
- Local Name Lokat
- Family *Rosaceae*
- Habit Medium sized tree
- Flowering Season February, March
- Part Used Fruits
- Indigenous uses The fruit is edible; the tree is cultivated as an ornamental Tree and for its fruit.
- (83) Botanical Name *Prunus amygdalus* Batsch.
- Local Name Badam
- Family *Rosaceae*
- Habit A cultivated fruit tree with many varieties

Flowering Season	February, March
Part Used	Fruit
Indigenous uses	Seed is stimulant, nervine tonic and demulcent.
(84) Botanical Name	<i>Prunus armeniaca</i> L.
Local Name	Khubani
Family	<i>Rosaceae</i>
Habit	A cultivated fruit tree with many varieties
Flowering Season	February, April
Part Used	Fruits, wood, leaves, seeds.
Indigenous uses	The fruits and seeds are eaten both fresh and dry. Dried fruit is refrigerant and laxative. It is used in fever.
(85) Botanical Name	<i>Prunus bokhariensis</i> Royle ex. C.K. Schn.
Local Name	Alucha
Family	<i>Rosaceae</i>
Habit	A medium sized cultivated fruit tree with many varieties
Flowering Season	March, June
Part Used	Fruits, wood, leaves
Indigenous uses	Tree is cultivated for its fruit. Fruit is refrigerant and Laxative; it is given in combination with other drugs in leucorrhoea, irregular menstruation and debility following miscarriage.

The fruits are used commercially to make jams and jellies. It is a laxative and a flavoring agent.

- (86) Botanical Name *Purnus persica (L.) Batsch.*
Local Name Aru
Family *Rosaceae*
Habit A medium sized cultivated fruit tree with many varieties
Flowering Season March, May
Part Used Fruits, wood, leaves
Indigenous uses The tree is cultivated for its fruit. Flowers are purgative and diuretic. Fruit is stomachic, demulcent.
- (87) Botanical Name *Pyrus communis L.*
Local Name Nashpati
Family *Rosaceae*
Habit Cultivated tree with many varieties
Flowering Season March, April
Part Used Fruits, wood
Indigenous uses Fruit is febrifuge, sedative and astringent
- (88) Botanical Name *Rosa webbiana Wall. ex Royle*
Local Name Jangali gulab
Family *Rosaceae*
Habit Climbing to prostrate shrub
Flowering Season June, August
Part Used Flowers, Branches

Indigenous uses	Used for manufacturing perfumes. It is an ingredient of Gul Kand” used in digestive aliments. Petals fruits are pplied to foul ulcer, wounds, sprain and injuries.
(89) Botanical Name	<i>Citrus aurantium L.</i>
Local Name	Khati
Family	<i>Rutaceae</i>
Habit	Shrub
Flowering Season	July, August
Part Used	Flowers, Fruit
Indigenous uses	The flowers are stimulant; its smell relieves colds, its decoction is good in fevers, its juice is tonic, diuretic, and useful in piles, enlargement of the spleen, chest troubles, and lumbago. The leaves are given for bronchitis. The peel is useful for checking vomiting, and prevention of intestinal worms.
(90) Botanical Name	<i>Cirus reticulata Blanco</i>
Local Name	Kino
Family	<i>Rutaceae</i>
Habit	A medium sized cultivated fruit tree with many varieties
Flowering Season	June, August
Part Used	Fruits, Roots
Indigenous uses	The ripe fruit is sweet and sour; stimulant, digestible and Tonic. It cures leprosy,

relieves sore throat; cough asthma, thirst. The seeds are good for piles and in biliousness. The root is anthelmintic; remove colic, useful in vomiting and urinary calculus.

- (91) Botanical Name *Cirus sinensis (L.) Osbeck*
Local Name Malta
Family *Rutaceae*
Habit A medium sized cultivated fruit tree with many varieties.
Flowering Season July, September
Part Used Fruits
Indigenous uses Plant produces a popular fruit called "Malta" rich in vitamin.
- (92) Botanical Name *Populus alba L.*
Local Name Popular
Family *Salicaceae*
Habit A shrub / tree plant
Flowering Season March, April
Part Used Whole plant
Indigenous uses Wood is used as timber and fuel wood and for making Cricket bats and other sport articles. It is also used in papermaking. Leaves are used as fodder for cattle.
- (93) Botanical Name *Monothea buxifolia (Fale) A. DC.*
Local Name Kuher
Family *Sapotaceae*

Habit	Tree
Flowering Season	April, May
Part Used	Fruits, Leaves
Indigenous uses	Plant is used as fodder, fuel wood and for fencing. Fruits are edible and commonly used by the local people.
(94) Botanical Name	<i>Capsicum annum L.</i>
Local Name	Mirch
Family	<i>Solanaceae</i>
Habit	An annual herb
Flowering Season	May, September
Part Used	Fruits
Indigenous uses	Flavoring agent, condiment, used in salads, cooked foods as both in fresh and dry forms and pickles. It is used as stimulant, against common cold, dyspepsia and diarrhea.
(95) Botanical Name	<i>Cestrum nocturnum L.</i>
Local Name	Raat Ki Rani
Family	<i>Solanaceae</i>
Habit	A perennial shrub of temperate forests
Flowering Season	August, September
Part Used	Fruit
Indigenous uses	An infusion of the plant is used as an antispasmodic in the treatment of epilepsy

- (96) Botanical Name *Solanum pseudo – capsicum L.*
 Local Name Shimla Mirch
 Family *Solanaceae*
 Habit A small spiny herb
 Flowering Season May, September
 Part Used Whole plant
 Indigenous uses Expectorant, bitter, diuretic, anit asthmatic, antigonorrhoea. The plant is also used for stomachache, coughs and fever pains in the chest. Roots are expectorant. Leaves are used as a poultice over rheumatic and gouty joints and in skin diseases. It is also grown as ornamental in gardens.
- (97) Botanical Name *Grewia optiva Drum. ex. Burret*
 Local Name Dhaman
 Family *Tiliaceae*
 Habit A medium to tall tree of the foothills
 Flowering Season May, August
 Part Used Fruit, Leaves, Bark
 Indigenous uses Its bark is used as a remedy of dysentery. Fruit is astringent, stomachic and infusion of bark is demulcent. Leaves increase flow of urine, reduce fever, and remove stones from the bladder. Wood is used for making furniture.

- (98) Botanical Name *Vitis vinifera L.*
 Local Name Angoor
 Family *Vitaceae*
 Habit A perennial wild climber, sometimes covering.
 Flowering Season April, May
 Part Used Fruit, Leaves, Root
 Indigenous uses Fruit is edible Ripe fruits are diuretic, treat smallpox, and used as a tonic. The leaves are useful for mouth sores.
- (99) Botanical Name *Echinops echinatus Roxb.*
 Local Name Lay Boti
 Family *Dipsaceaceae*
 Habit Herb, commonly found in fields
 Flowering Season April to May
 Part Used Whole Plant
 Indigenous uses Decoction from whole plant is used to treat cough. Grind the dry roots into powder add water and make a paste. Apply paste to the hair for fifteen minutes to treat lice infestation.
 Other Uses plant is used to make a tonic with aphrodisiac properties.
- (100) Botanical Name *Eclipta prostrata Linn.*
 Local Name Sofad Banghra
 Family *Asteraceae*

Habit	Herb, commonly found in waste places
Flowering Season	July, September
Part Used	Leaf
Indigenous uses	Grind the leaves and make a paste. Apply paste topically to treat allergy, athlete's foot and ringworm.
(101) Botanical Name	<i>Heliotropium strigosum Willd.</i>
Local Name	Gorakh Pan
Family	<i>Hamamelidaceae</i>
Habit	Herb, commonly found on sandy banks of running water
Flowering Season	June, September
Part Used	Whole Plant
Indigenous uses	Put a washed plant in a jug of water overnight. On the next day, remove the plant from the jug and use the red infusion for cooling purposes. Add sugar to infusion for taste.
(102) Botanical Name	<i>Brassica rapa L.</i>
Local Name	Thiper, Turnip
Family	<i>Cruciferae</i>
Habit	Herb, commonly cultivated
Flowering Season	March to May
Part Used	Root
Indigenous uses	Cut fresh napiform roots into pieces. Make a decoction from the cut roots. Feet are dipped

in semi hot decoction and boiled turnips rubbed on feet to treat cracked skin on feet.

Other Uses	The napiform root used as vegetable.
(103) Botanical Name	<i>Eruca sativa Mill.</i>
Local Name	Jumaeha, Rocket
Family	Cruciferae
Habit	Herb, commonly cultivated
Flowering Season	February, March
Part Used	Seed
Indigenous uses	Extract oil from seeds, fry a medium size onion with the extracted oil until the onion turns black. The oil is used to treat dandruff.
Other Uses	Arial parts of plant are used as vegetables.
(104) Botanical Name	<i>Raphanus sativus L.</i>
Local Name	Mooli, Radish
Family	<i>Cruciferae</i>
Habit	Herb, commonly cultivated
Flowering Season	November, January
Part Used	Root
Indigenous uses	Remove epidermis from radish and leave it overnight. Use it in the morning before breaking to treat jaundice. Juice from radish is also applied on the head to treat baldness.
Other Uses	Root is used as vegetable.

- (105) Botanical Name *Opuntia monacantha Haw.*
 Local Name Thoor, Prickly Pear
 Family *Cactaceae*
 Habit Shrub, commonly found in waste sandy soil
 Flowering Season May, September
 Part Used Latex and Fruit
 Indigenous uses Ripened fruit is eaten for diabetes
 Latex is rubbed on paralyzed organs.
- (106) Botanical Name *Spinacia oleracea L.*
 Local Name Palak, Spinach
 Family *Chenopodiaceae*
 Habit Herb, commonly cultivated
 Flowering Season May, June
 Part Used Leaf
 Indigenous uses Add fresh leaves to 50 grams of goat liver.
 Add 25 ml of water and grind the mixture.
 Filter the mixture and add a small amount of
 salt to the filtrate which is drunk to treat
 anemia.
 Other Uses Plant leaves are used as vegetable.
- (107) Botanical Name *Cucumis melo var. agrestis Naudin*
 Local Name Chibbar Wild Water Melon
 Family *Cucurbitaceae*
 Habit Herb, commonly grows in sandy fields
 Flowering Season July, September

Part Used	Fruit and Seed
Indigenous uses	Dry the fruit and seeds in a sheltered place. Grind the dried plant parts into powder. Administer small amount orally to treat skin infection.
Other Uses	Women used dried fruit for quick boiling of meat.
(108) Botanical Name	<i>Cucumis melo var. Utilissimus (Roxb)</i> <i>Duthie & Fuller</i>
Local Name	Ter
Family	<i>Cucurbitaceae</i>
Habit	Herb, commonly cultivated
Flowering Season	April, July
Part Used	Seed and Fruit
Indigenous uses	Remove seed coat and grind the endosperm which is used with milk to treat urethra inflammation, spleen diseases and jaundice.
Other Uses	Fruit is used as vegetable
(109) Botanical Name	<i>Cucumis sativus L.</i>
Local Name	Kheera, Cucumber
Family	<i>Cucurbitaceae</i>
Habit	Herb, commonly cultivated
Flowering Season	April, July
Part Used	Fruit

Indigenous uses	Fruit is cut into very small pieces. Women place the cut pieces on their faces for fifteen minutes to treat inflammation due to makeup.
Other Uses	Plant is used as vegetable.
(110) Botanical Name	<i>Cassia fistula L.</i>
Local Name	Amaltas, Golden Shower
Family	<i>Caryophyllaceae</i>
Habit	Tree, rarely cultivated
Flowering Season	April, May
Part Used	Seed
Indigenous uses	Seeds are boiled in milk. Add sugar and filter the solution. The filtrate is used to treat gastric problems.
Other Uses	The plant is cultivated for ornamental purposes. The plant is used for its wood.
(111) Botanical Name	<i>Cicer arietinum L.</i>
Local Name	Cholay, Black Gram
Family	Gramineae
Habit	Herb, commonly cultivated
Flowering Season	February, March
Part Used	Seed
Indigenous uses	Soaked seeds overnight in water. On the next day, boil the seeds in water for a long time. Filter the seeds and add small amount of table salt to the filtrate, which is drunk to

treat irregularity of menstruation and ease menstruation pain.

Other Uses

Young herbaceous plant is used as vegetable. Seeds are used as local food.

(112) Botanical Name

Lallemantia royleana Benth.

Local Name

Tukm-e-Balangah

Family

Labiatae

Habit

Herb, rarely found in arid area.

Flowering Season

March, April

Part Used

Seed

Indigenous uses

The seeds are soaked in water overnight. On the next morning, add sugar to the infusion, which is used to treat stomach warmth and intestinal troubles.

(113) Botanical Name

Hibiscus rosa sinesis L.

Local Name

Shoe Flower, Ghural

Family

Malvaceae

Habit

Shrub, commonly cultivated in houses.

Flowering Season

Round the year

Part Used

Flower

Indigenous uses

Apply paste made from flowers to burn area to reduce the burning sensation and inflammation.

Other Uses

The plant is cultivated for ornamental purposes.

(114) Botanical Name	<i>Jasminum sambac (L) Aiton.</i>
Local Name	Motia, Jasmine
Family	<i>Oleaceae</i>
Habit	Shurb, commonly cultivated in house Gardens.
Flowering Season	March, August
Part Used	Flower
Indigenous uses	Grind the flowers into a paste and add two teaspoons of rose extract. Use the paste to treat wrinkles on face.
Other Uses	Flowers are used to make garlands worn by local women.

(115) Botanical Name	<i>Desmostachya bipinnata (L) Stapf</i>
Local Name	Dab
Family	<i>Pinaceae</i>
Habit	Herb, local grass in the area
Flowering Season	March, April
Part Used	Leaf
Indigenous uses	Decoction made from leaves is used to treat fever
Other Uses	Plant is used as cattle fodder.

(116) Botanical Name	<i>Saccharum spontaneum L.</i>
Local Name	Sarrout
Family	<i>Pinaceae</i>
Habit	Herb, local grass found near water

Flowering Season	August, October
Part Used	Whole Plant
Indigenous uses	Decoction made from root is used to improve appetite and to treat abdominal pain. It is also used to treat similar diseases in cattle.
Other Uses	Stem is used for roofing Chiks (sheet of stem) are made during summer as sun.shade.
(117) Botanical Name	<i>Citrus grandis (L.) Osbeck</i>
Local Name	Metha, Panelo
Family	<i>Rutaceae</i>
Habit	Tree, rarely cultivated
Flowering Season	February, March
Part Used	Fruit
Indigenous uses	Fruit juice is used to treat malaria.
Other Uses	Fruit is edible.
(118) Botanical Name	<i>Salvadora oleoides Decne.</i>
Local Name	Jhal
Family	<i>Salvadoraceae</i>
Habit	Shrub, rare forest species
Flowering Season	April, May
Part Used	Stem, leaf and seed
Indigenous uses	Decoction made from young branches with Leave is used to treat cough. Oil from seed oil is used to treat rheumatism and

Infections after childbirth.

Other Uses

Stem is used to make tooth brush.

(119) Botanical Name

Tamarix aphylla (L) Karst.

Local Name

Rokh, Tamarisk or Salt Cedar

Family

Tamaricaceae

Habit

Tree, commonly cultivated

Flowering Season

March, April

Part Used

Leaf

Indigenous uses

Infusion made from burning leaves is used to treat external worms of skin and internal worms of nose and ear in livestock. Leaf infusion is drunk with the help of cigarette or hookah to ease toothache.

Other Uses

Plant is grown for its fire wood.

(120) Botanical Name

Acacia nilotica (L.) Delile.

Local name

Kiker

Family

Mimosaceae

Habit

Tree

Flowering season

May, October

Part used

Bark, leaves and branches, wood

Indigenous uses

Bark soaked in water for few hours and that water is used for gargling as a remedy of mouth sores, gum pain and toothache. Decoction is made by boiling leaves in water and used for loose motion.

(121) Botanical Name *Acacia modesta* Wall.
 Local name Phulahi
 Family *Mimosaceae*
 Habit Tree
 Flowering season November, March
 Part used Bark of tree, wood
 Indigenous uses Decoction is made by boiling bark in water or powder of bark is made by grinding the bark. Used for treatment of gas trouble and abdominal diseases.

(122) Botanical Name *Allium sativum* L.
 Local name Thoom
 Family: *Alliaceae*
 Habit Herb
 Flowering season late spring
 Part used: Fruit
 Indigenous uses Five to six pieces of garlic are heated with little mustard oil until red coloration. Oil obtained is used for ear pain (one to two drops).

(123) Botanical Name *Anethum graveolense* L.
 Local name Soye
 Family: *Apiaceae*
 Habit Herb
 Flowering season January, February
 Part used: Seeds

Indigenous uses	Few seeds are taken with water for abdominal pain.
(124) Botanical Name	<i>Azidarachta indica</i> A. Juss.
Local name	Neem
Family	<i>Meliaceae</i>
Habit	Tree
Flowering season	summer
Part used	Leaves
Indigenous uses	Decoction of leaves is taken for digestive and gastric problems. Fresh leaves are boiled in water and tied on wounds. Leaves are dried, crushed and powder is mixed with small quantity of water and taken for the remedy of freckles on face.
(125) Botanical Name	<i>Bryophyllum pinnatum</i> Kurz.
Local name	Zakhm,e,hayat
Family	<i>Crassulaceae</i>
Habit	Herb
Flowering season	Throuthout year
Part used	Leaves
Indigenous uses	Leaves are eaten as remedy for liverstones. Leaves are tied on wounds for two to three days for healing.
(126) Botanical Name	<i>Citrullus colocynthus</i> (L.) Schrad
Local name	Tumma
Family	<i>Cucurbitaceae</i>

Habit	Herb
Flowering season	June, September
Part used	Fruit
Indigenous uses	Fruit is cut, boiled in water and sugar added to make murabba. Used for constipation and abdominal diseases.
(127) Botanical Name	<i>Dalbergia sissoo Roxb.</i>
Local name	Tali
Family	<i>Papilionaceae</i>
Habit	Tree
Flowering season	March, April
Part used	Leaves
Indigenous uses	Leaves are crushed and boiled in water. Filterate is used to wash hair for removing dandruff and for long hair.
(128) Botanical Name	<i>Eucalyptus cammaldulensis Dehn.</i>
Local name	Sufeda
Family	<i>Myrtaceae</i>
Habit	Tree
Flowering season	September, November
Part used	Leaves
Indigenous uses	Five to ten leaves boiled in water and decoction is taken for flu twice a day.
(129) Botanical Name	<i>Fagonia indica Burm. f.</i>
Local name	Dhamian
Family	<i>Zygophyllaceae</i>

Habit	Herb
Flowering season	Most of the year
Part used	Leaves and branches
Indigenous uses	Whole plant without roots is crushed and extract is taken for pimples and acne problem of face. Dried plant is crushed, mixed with black salt and powder is taken for gas trouble.

(130) Botanical Name	<i>Hordeum vulgare L.</i>
Local name	Jo
Family	<i>Poaceae</i>
Habit	Herb
Flowering season	September, February
Part used	Seeds
Indigenous uses	Seeds are boiled in water and decoction is taken for kidney pain.

(132) Botanical Name	<i>Morus alba L.</i>
Local name	Shehtoot
Family	<i>Moraceae</i>
Habit	Tree
Flowering season	Summer
Part used	Leaves
Indigenous uses	Leaves are boiled in water for few minutes and decoction is taken for cough and throat irritation.

- (133) Botanical Name *Nigella sativa L.*
 Local name Kalongi
 Family *Apiaceae*
 Habit Herb
 Flowering season June, September
 Part used Seeds
 Indigenous uses Seeds are taken with water for stones of body organs in many diseases. Kalongi seeds are taken with ajwain seeds for body stones.
- (134) Botanical Name *Ocimum basilicum L.*
 Local name Niazbo
 Family *Lamiaceae*
 Habit Herb
 Flowering season Summer
 Part used Leaves
 Indigenous uses Fresh leaves are chewed to treat mouth sores.
- (135) Botanical Name *Praecitrullus fistulosus (Stocks.) Pangalo.*
 Local name Teenda
 Family *Cucurbitaceae*
 Habit Herb
 Flowering season August, September
 Part used Leaves
 Indigenous uses Leaves are cooked as vegetables and taken for blood pressure.

(136) Botanical Name *Psidium guajava L.*
 Local name Amrood
 Family *Myrtaceae*
 Habit Tree
 Flowering season: Autumn and early winter
 Part used Leaves
 Indigenous uses Decoction made by boiling three to four leaves with one cup of water is taken after lunch for high blood pressure.

(137) Botanical Name *Rosa indica L.*
 Local name Gulab
 Family *Rosaceae*
 Habit Shrub
 Flowering season Throughout summer and spring
 Part used Flowers
 Indigenous uses Extract of flowers (Arq gulab) is used for eye burning. Petals of flowers and sugar are put in jar for two to three days and the product (gulkand) is taken for constipation and abdominal pain.

(138) Botanical Name *Solanum surratense Burn. f.*
 Local name Mahaori
 Family *Solanaceae*
 Habit Herb
 Flowering season Throughout year
 Part used Fruit

Indigenous uses	Fruit is dried crushed and powder is taken for abdomen pain and gas trouble.
(139) Botanical Name	<i>Syzygium cumini</i> (L.) Skeets.
Local name	Jaman
Family	<i>Myrtaceae</i>
Habit	Tree
Flowering season	March, May
Part used	Seeds
Indigenous uses	Dried seeds (guthli) crushed and powder is taken with water for diabetes.
(140) Botanical Name	<i>Carum copticum</i> L.
Local name	Ajwain
Family	<i>Apiaceae</i>
Habit	Herb
Flowering season	November, March
Part used	Seeds
Indigenous uses	Seeds are taken with little salt for gas trouble as stomach tonic.
(141) Botanical Name	<i>Zizyphus nummularia</i> (Burm.f) Wight & Arn.
Local name	Beri
Family	<i>Rhamnaceae</i>
Habit	Tree
Flowering season	Summer and early Autumn
Part used	Leaves

Indigenous uses	Fresh leaves are crushed soaked in water for few hours and filtrate is used for hair washing for shining of hair.
(142) Botanical name	<i>Rhazya stricta</i> Dcne.
Local Name	Vina, Vena
Family	<i>Apocynaceae</i>
Habit	Common Herb
Flowering Season	July, August
Part Used	Flower, leaves, stem.
Indigenous Uses	Its leaves are mixed with other plants and Phaki is made to treat indigestion, and blood purification, it leaves are also fed to the animals having indigestion problems.
(143) Botanical name	<i>Withania coagulens</i> Dunal.
Local Name	Akri, Panir
Family	<i>Solanaceae</i>
Habit	It is a common shrub also grows on degraded, low lying areas from 300 m to 800 m from sea level usually close to the vena plant.
Flowering Season	March, April
Part Used	Leaves, fruit, stem
Indigenous Uses	Leaves are used to treat indigestion problem in buffalo and cow, fruit is also used in medicines used for livestock diseases. It is also a famous ingredient of the Mixtures used for digestion and blood purification.

- (144) Botanical name *Fagonia indica* Brum. f.
- Local Name Dhaman
- Family *Zygophyllaceae*
- Habit It is a common shrub grows in lower elevation as well at higher attitudes. It is common on both sand stone and limestone areas.
- Flowering Season April, May
- Part Used Leaves, stem
- Indigenous Uses It is blood purifier, and is used to treat patients suffering from body heat and indigestion problems as well. Also used in Mixtures to treat pimples in children.
- (145) Botanical name *Mentha longifolia* (L.) Huds.
- Local Name Podina, Pudna
- Family *Lamiaceae*
- Habit It is common herb found along streams and water springs and moist places.
- Flowering Season March, August
- Part Used Leaves, fruit, stem
- Indigenous Uses Dried leaves are used as carminative, also used in tea to stop vomiting. Its leaves are given to animals to treat as antifatulents It is also used to make salad and chutni.



Plate No. 77

***Withania somnifera* (L.) Dunal**

Voucher No. 99

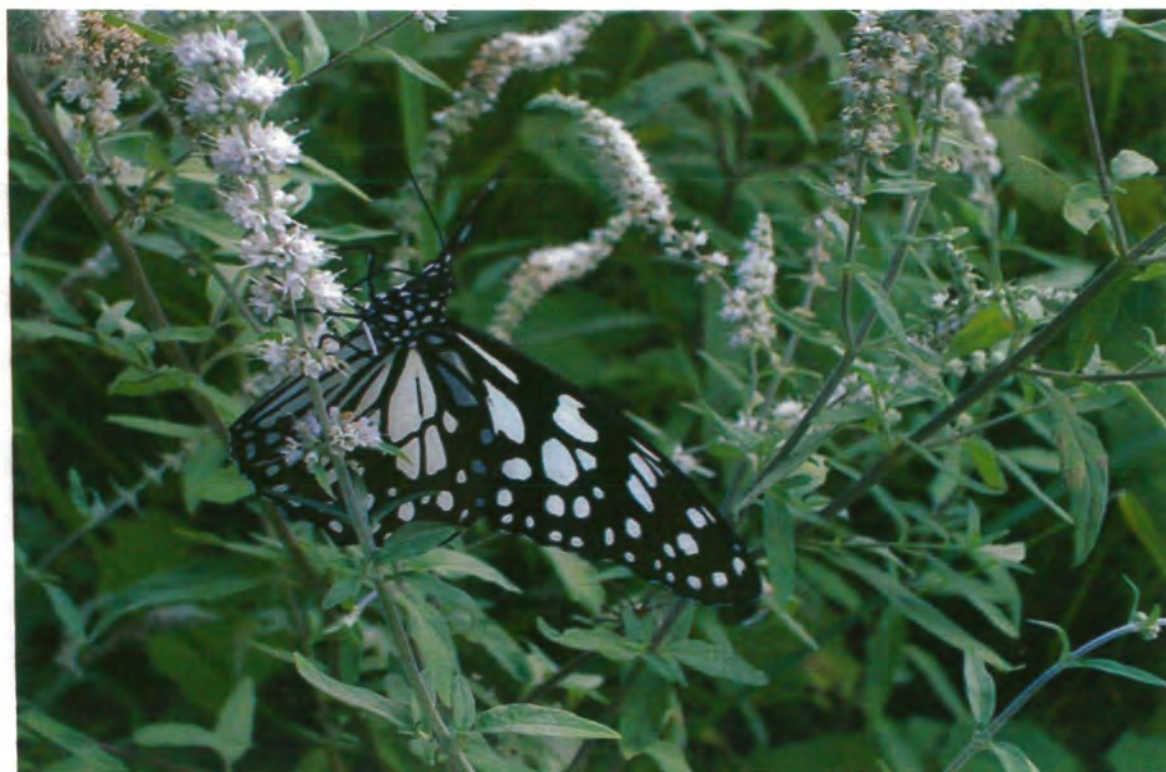


Plate No. 78

***Mentha royleana* Wall. ex. Bth.**

Voucher No. 105

- (146) Botanical name *Solanum nigrum L.*
- Local Name Chich mag/mako
- Family *Solanaceae*
- Habit It is a small herb, grows equally in cultivated fields and on hilly slopes as well.
- Flowering Season March, August
- Part Used Fruit, leaves
- Indigenous Uses It is used in different medicines prepared for livestock diseases. Its roots are used to treat joint pain and antispasmodic.
- (147) Botanical name *Withania somnifera (L.) Dunal.*
- Local Name Aksan
- Family *Solanaceae*
- Habit It is a small herb, grows equally in cultivated fields and on hilly slopes as well.
- Flowering Season May, June
- Part Used Fruit, Roots, leaves
- Indigenous Uses Leaves of the Aksan are used to treat joint pains and swelling and to treat injuries; its leaves are wrapped on the affected part for whole night. Its roots are also used to treat body pains. For pimples, its leaves are soaked in oil and used.
- (148) Botanical name *Aloe barbadensis Mill.*
- Local Name Kuwar Gandal
- Family *Lillaceae*

Habit	It is succulent shrub grows naturally and cultivated as well.
Flowering Season	July, August
Part Used	Leaves, pulp
Indigenous Uses	It is utilized to treat piles and its pulp is used as skin conditioner. Its leaves are fed to animals to treat body heat and also mixed in different other medicines.

(149) Botanical name	<i>Peganum harmala L.</i>
Local Name	Hermal
Family	<i>Zygophyllaceae</i>
Habit	It is a common herb grows along roadside and on the ridges of the cultivated lands.
Flowering Season	March, April
Part Used	Leaves, stem, fruit
Indigenous Uses	Its leaves are dried and are burned inside home to ward off evil. It is a good item to kill worms and germs in poultry farm. It is also used in livestock medicine.

(150) Botanical name	<i>Capparis decidua (Forssk.) Edgew</i>
Local Name	Karia
Family	<i>Capparidaceae</i>
Habit	Low shrub to small tree grows on sand and limestone layers.
Flowering Season	April, May
Part Used	Fruit, branches

Indigenous Uses	It is used as vegetable and its Achar is also made which is used as food item.
(151) Botanical name	<i>Calotropis procera</i> (Aitch.) Aitch. f.
Local Name	Aak
Family	<i>Asclepiadaceae</i>
Habit	It is erect shrub, usually grows in cultivated fields ridges and degraded places
Flowering Season	March, April
Part Used	Fruit, leaves, roots.
Indigenous Uses	Its flowers are used to treat joint pains; while in acute cough its leaves are mixed with coal by grinding. Its milk has anti germ properties and also used in spray.
(152) Botanical name	<i>Carruluma tuberculata</i> N.E.Brown
Local Name	Choughan
Family	<i>Asclepiadaceae</i>
Habit	It is an herb and grows on lime stone layers under grasses and shrubs and in rocks.
Flowering Season	August, September
Part Used	Whole plant
Indigenous Uses	It is used as vegetable and also used to treat diabetics; it is also considered good blood purifier.
(153) Botanical name	<i>Nerium oleander</i> Linn.
Local Name	Kanir
Family	<i>Labitate</i>

Habit	It is medium shrub, usually grows along streams and nullahs near water.
Flowering Season	March, August
Part Used	Flowers, leaves, stick
Indigenous Uses	It is poisonous plant and kills camel instantly; its flowers are boiled and used to treat mouth pain.
(154) Botanical name	<i>Vitex negundo L.</i>
Local Name	Mahori booti, Marwani
Family	<i>Verbenacea</i>
Habit	It grows in watershed and near water spring and is large shrub.
Flowering Season	March, June
Part Used	Leaves
Indigenous Uses	It is used to treat stomach disorder and in gas trouble also treatment of the mouth sores.
(155) Botanical name	<i>Tinospora cordifolia (Wild). Miers</i>
Local Name	Jangli Gloh
Family	<i>Asclepiadaceae</i>
Habit	It is climber and grows on steep sloppy rocks.
Part used	Leaves, branches
Flowering Season	March, April
Part Used	Leaves, branches
Indigenous Uses	It is used to treat stomach disorder in animal and its branches are given to the animals.

- (156) Botanical name *Zizphus mauritiana Lam.*
 Local Name Minha
 Family *Rhamanceae*
 Habit It is a large tree, grows in arid climate.
 Flowering Season April, May
 Part Used Fruit
 Indigenous Uses Fruit of the plant is boiled in water and sugar is mixed and then used, it is an effective treatment of the liver disorder, effective for digestive system and produces blood.
- (157) Botanical name *Cymbopogon jawarancusa (Jones) schult*
 Local Name Khawi Grass
 Family *Poaceae*
 Habit It is a fragrant grass, common on sand stone as compared to the lime stone layers.
 Flowering Season July, August
 Part Used Leaves, branches
 Indigenous Uses Its leaves are used to treat typhoid fever.
- (158) Botanical name *Momordica diocia Roxb.Ex Willd*
 Local Name Charchinda
 Family *Cucurbitaceae*
 Habit It is a climber and grows in between valleys and on large shrubs and trees
 Flowering Season July, August
 Part Used Fruit

Indigenous Uses	It is used as vegetable and also used as treatment of the diabetics.
(159) Botanical name	<i>Adhatoda zeylanica</i> Medik.
Local Name	Vahekar Bansa
Family	<i>Acanthaceae</i>
Habit	It is a common shrub and is dominant on limestone rocks.
Flowering Season	April, August
Part Used	Flowers, leaves, stem.
Indigenous Uses	Flowers of plant is used to make medicine for Asthma and chest, throat problems, dried and fresh leaves are used in mixtures for indigestion problems. Leaves are also wrapped on body parts having swelling and pain.

CHAPTER 4
DISCUSSION

Discussion

4.1 Ethnobotany

Valley soon Sakesar is located in the Salt Range hills and is situated between longitude 71°30 and 73°30 East and between the parallels of 32 – 23 and 33 North latitude.

The area comes under the administration control of Khushab District. Total area of the Soon Valley is 2,36,736 acres out of this 40% area is under different forest categories. There are inter mountain sub valleys including Biakh, Parchun, Tapa, Jahlaer, Karang and several other. Flat lands exist in between mountains where crops are grown while hills tops are covered with various types of wild vegetation. Main valley and sub valleys are in the form of depressions, rain water seep into 3 independent wetlands Ucchali, Khabeki and Jahler which are spread over an area of 1243 hectares. Main water streams inside valley are Vanadha, Suk wahn, Saruli. While major streams originating from the Soon Valley are Tarapi and Gabhir. Population estimate of the area is 1,00,292 persons, due to this heavy population pressure several forest patches are degraded.

The communities of the Soon Sakesar Valley Punjab Salt Range have century's old traditional knowledge of use of plants as fuel as well as medicinal uses. Local people's dependence on these plant resources has changed with the advancement of the technology as well as changes in the living standard of the people. Knowledge about the use of the plants is being transferred from one generation to the other through different agents such as elders and Hakims, Saniasi (Family wise trained herbalist). Current system of the Eastern medicines such as Unani, Ayurvedic, and Homeopathy etc. are entirely based on the medicinal properties of these plants. Knowledge transfer rate is decreasing very rapidly due to several factors.

Hamilton, (2004) reported there are many traditional systems of medicine modified form a practice in China, they may be classified into there broad categories: (1) Traditional Scholarly Medical Systems. With written traditions of documentation of knowledge, pharmacopoeias for doctors and institutions of

training doctors; (2) Traditional Medical Knowledge (Folk Medicine), which is orally transmitted and associated with households, communities or ethnic groups; and (3) Shamanistic Medicine, with a strong spiritual element and which can only be applied by specialist practitioners (shamans). Traditional Scholarly Medical Systems are especially concentrated in Asia. Some of the more widely familiar are Chinese Traditional Medicine, Tibetan Medicine, Ayurveda, Siddha, Unani, and Western Herbal Medicine, the later being rather ill-defined.

Documentation of the traditional wealth of the plants use is necessary in order to preserve the traditional practices. Indigenous knowledge of the plants is eroding rapidly and very few plants uses are being transferred to the next generation. All the medicinal plants and their parts used in the medicines are collected from wild. Due to excessive man made threats and natural factors few species have declined in their distribution range and some are at the verge of extinction. Threats to the medicinal flora include forest fires, deforestation, and grazing utilization as fuel, over harvesting, erosion and use of the land for agriculture purposes. Other factors contributing towards the damage of the medicinal plants includes rapid colonization, roads, building, land leveling for agriculture and vegetation cutting as well as pollution, mining, use of herbicides in crops and the Afghan refugees. Natural factors contributing towards damage to flora and habitats are drought, erosion, floods and climatic changes.

Ethno botanical study of the Soon Valley District Khushab revealed that 127 plant species were of ethno botanical importance. Plants were classified using their major utilization. 127 plant species are used in different recipes as medicinal, while the other uses are fodder 32, fuel wood 24, timber 7, Agriculture tools 12, Construction 10, Wild fruit 28, Wild vegetables 3, Hay fodder 3, Furniture dry fruits 2, Cushion plants 3, Perfume 2, Packing Roping 2, Spice flavoring agent 4, Ink 1, Graveyard things 3, Poison 2, Ornamental 31, Green Pesticide 4, Sticks Handle 4, Fence 2, Hedge Plant 2, Miswak (Tooth brush) 5, Brooms 2, Baskets 1, Wood carving 1, Root stock 2, Narcotic 1, Soil

reclamation 2, Beds 2. Similar results were reported by Jabeen et al, (2009) for Margalla hills and concluded that about 245 plant species belonging to 77 families of which 55 trees species, 54 shrubs, 105 herbs, 15 climbers', 10 grasses and 6 fodder crops have been identified. It has been observed that all of these plant species are being used by the people of Margallah Hills National Park for their varied ethno-botanical importance.

Ethnobotanical uses and properties of the flora of the Soon Valley was studied and it was observed that medicinal, fodder, fuel wood and timber along with ornamental uses are the major properties of the flora. Out of the 46 different use categories of the flora. Food and fruit are also major use of the flora; the results indicate that local people's livelihood is closely linked with different floral species. So the negative impact on flora can have negative impact on communities, so there is a need to give priority to the conservation of floral species particularly those with which the local communities are directly dependent such as fruit, food, fodder, fuel wood.

Jabeen et al (2009) reported similar results for Margallah Hills that major proportion of plant species are used as native medicine (64.89%) and second major use of these plant species is as fodder (32.24%) for their livestock. Forty seven plants (19.18%) are used as fuel wood, thirty three (13.46%) are used as food (fruit), eighteen (7.34%) as food (vegetable), fourteen (5.71%) as timber, six (2.44%) as industrial, four (1.63%) as tannin, three (1.22%) as gum and two (0.81%) are used as fiber.

Flora of the Soon Valley has different multiple uses as well for example Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*) are used as medicinal plant. fuel wood, fodder wild fruit, construction, ethnovetsinary and as stick handles.

Zubaida et al, (2004) while surveying the medicinal flora of Dhibba Karsal reported that (*Acacia modesta*) is the medicinally and economically important species of the area. Bark of this tree is use for dyeing the leather. Wood is used for making door panels and its flowers are used for curing the heart stroke. People of the village used this species so extensively that it becomes rare in that area. Fruit, wood, flowers and bark of (*Albizia lebbeck*) is commonly used

for its antibacterial activity due to presence of saponins and tannis. It is helpful in relieving stress, anxiety and depression. In the village (*Olea ferruginea*) has become rare. The reason for its destruction was tree cutting for fuel and other domestic uses. It is a medium size tree commonly known as kahu. Leaves of this tree are favorite for cattle's. The plant is very nutritional and causes good health in the cattle and there by increase the production of the milk.

Syed Zahoor Hussain et al, (2008) studied the medicinal plant of Morgah Rawalpindi and concluded most of the plants in the study area were used for multi purposes like fuel wood, furniture making, house construction, grazing of animals, animal feed and spices.

Vegetation of the area is facing several multiple threats due to which vegetation cover is reducing day by day. Major threat is fuel wood both domestic use as well as fuel wood export to the other areas as commercial activity. Forest fires, over harvesting, drought, land leveling for agriculture, deforestation and grazing are main threat to the medicinal flora. Due to these threats species such as (*Neolitsea chinensis*), (*Pistacia integerrima*) are facing threats of the extinction. Shinwari et al (2002) enlisted deforestation, overgrazing, erosion, rapid colonization i.e., roads and building construction, population growth, irrigation system, pollution and the Afghan refugees are the main reasons of endangerment. Million of Afghan refugees have taken refuge in Pakistan. They are spending a miserable life here due to the highest poverty level. They are totally dependent on the plants for their daily domestic purposes. The Ghamkol area, Peshawar Road in Kohat was rich in (*Berberis lyceum*) and (*Delphinium kohatense*). Ghamkol Camp was formed in the area in early 80s. (*Berberis lyceum*) and (*Delphinium kohatense*) are now totally lost from the area. Presently, the chief threat is to (*Dodonea viscosa*), which these people are consuming for fuelwood.

Local people mainly depend on agriculture as main income source however livestock rearing is also important economic activity. People are usually dependent on forest for medicinal plant collection, fuel wood, fodder and for construction purposes. Once there was a culture of Saniasi (Family wise trained

herbalist). Saniasi used to visit at regular seasonal trips for collection of medicinal plants. They know amazing properties of medicinal plants to cure all sorts of ailments and diseases. Local people tell that the some time cure very complicated diseases which were not cured by trained doctors. However, Saniasi culture is rapidly diminishing.

Local people knowledge is base for medicinal plant which is eroding rapidly. During study it was observed that young generation is least interested in plant names, their uses and they know very little about different plant species except those communities who are living near reserve forest areas or rearing livestock herds.

Ahmad, (2001) reported that Salt Range has retained a treasury of valuable plant resources along with the traditional knowledge of plant use. All these resources are eroding speedily due to community development at the expense of natural resources and the disintegration of traditional rules regarding the natural resources management and unplanned population explosion. It is therefore imperative to check human activities in the salt range forests for the prosperous lives of their coming generation.

Local peoples of the Soon Valley are quite rich in indigenous Knowledge about medicinal plants but this knowledge is eroding rapidly due to non transfer, documentation of this knowledge, similar results have been reported by Zubaida (2004) for Dhiblia Karsal Village in Mianwali district as traditional knowledge is going to be lost as traditional culture is disappearing.

Local people have less knowledge about collection of the medicinal plants and due to lack of knowledge several species face threat of extinction.

Their knowledge needs to be documented for references and usefulness. Heavy dependence on forest resources, grazing, agricultural activities have great stress on natural resources of the area. Root causes of all these threats are poverty, lack of alternate income generation opportunities.

Hamilton (2004) reported that knowledge of medicinal plants, as once embedded in tens of thousands of indigenous cultures, is rapidly disappearing. Every year, the sum total of human knowledge about the types, distribution,

ecology, methods of management and methods of extracting the useful properties of medicinal plants is declining rapidly – a continuation of a process of loss of local cultural diversity that has been underway for hundreds of years. Due to lack of knowledge three different species Gliote (*Ceropegia bulbosa*), Choughan (*Caralluma tuberculata*) and Zohr Mohra (*Sauramatum venosum*) are uprooted due to which their distribution is now confined to patches, indiscriminate uprooting is affecting growth of these species.

Different other species are also creating problems for example (*Dodonea viscosa*) have occupied several places from where Kahu (*Olea ferrugina*) and Phulai (*Acacia modesta*) respectively have been cut in previous years. Muscat (*Prosopis juliflora*) is spreading fastly in whole area and as an invasive species poses a great threat to the other floral species. Eucalyptus (*Eucalyptus camuludensis*) and paper mulberry (*Broussnetia papyrifera*) have also been planted at cultivated lands and such exotic species have also negative impacts, awareness and lack of scientific knowledge several species distribution and population range is highly restricted now.

Multiple uses of the different plant species have been observed for example Phulai (*Acacia modesta*) is one such plant as it is used as fuel wood, fodder, in construction, used as sticks, furniture, while bark and fruit used in different recipes, several other species have similar multi purpose uses.

Survey of the area revealed that trend of local herbs use has increased in previous years due to high cost of medicines and lack of treatment of certain chronic diseases such as Hepatitis and Cancer and further more poor health system. Similar results were reported by Syed Zahoor Hussain (2009) for Margallah National Park which indicated that people's trend towards using medicinal plants has increased. 50% sellers think people's trends increased while 30% think the trends decreased in the last 10 years whereas 20% sellers think that the trend did not change. Results also show that percentage of people in the area who use medicinal plants was 10% - 20% and financial ability to pay when compared with allopathic medicines.

Cultivation of wild plants as ornamental have also been observed in area for example Kanir (*Nerium oleander*), Santha (*Dodnea viscosa*), Jangli Gulab (*Rosa webbiana*), Niaz Bo (*Ocimum basilicum*), Podina (*Mentha longifolia*), Kuwar Gandal (*Aloe barbadensis*), Chambeli (*Jasminum officinale*) is also common.

Soon Valley flora is important from Bee keeping point of view especially species such as Vahekar (*Adhatoda zeylanica*), Ber (*Zizphus nummularia*) and Phulai (*Acacia modesta*) and due to presence of these plant species in spring season afghan refugees settle in area keep bees for honey and earn a lot of profit.

Seasonal bee keepers also visit area during spring season in order to avail the advantage of presence of species like Vahekar (*Adhatoda zeylanica*), Phulai (*Acacia modesta*), Ber (*Zizphus nummularia*) and several other species. However local level bee keeping did not exist, some people are of the view that this commercial bee keeping is being carried out by Afghan refugees and have negative impacts on indigenous species. The area has the potential for beekeeping activities which needs to be established on large scale for the benefit of local people of the area. The honey obtained from different plant species has different curative properties. Honey obtained from (*Adhatoda zeylanica*) is useful for cough and honey and from Ber (*Zizphus nummularia*) is used as tonic and aphrodisiac.

Shinwari et al, (2002) reported that many species for example, (*Zizyphus nummularia*), (*Prosopis juliflora*), (*Dalbergia sissoo*) and (*Justicia adhatoda*) are also used as honey bee species in the sub tropical and tropical areas of Pakistan on a commercial basis.

Iqbal, (2003) reported that honeybees visit 31 species and important honeybee species are (*Acacia modest*), (*Adhatoda vasica*), (*Cannabis sativa*), (*Cucurbita maxima*), (*Dicliptera roxburghiana*), (*Helianthus annus*).

.There are certain myths related with certain species and local people have belief also for example Shisham (*Dalbergia sissoo*) is not considered a good tree for planting in home that is brings death and home is devastated, similarly

Ber (*Zizphus nummularia*) considered good tree as it brings blessings, similarly Toot (*Morus alba*) is also considered undesirable to plant in home as it resemble like ghost, similarly Dhake (*Melia azedarach*) is considered a symbol of piusness of family. The exact words of the local myth is

Gis Ghar Tahli (*Dalbergis sisso*) woh Ghar Khali (Empty home)

Gis Ghar Ber (*Zizphus nummularia*) us Ghar Kher (Blessing)

Gis Ghar Toot (*Morus alba*) woh Ghar Bhoot (Ghost)

Gi Ghar Dhake (*Melia azedarach*) woh Ghar Nek (Pious)

Harmal (*Peganum harmala*) is considered symbol of good rainy season if it has good fruit in abundant quantity.

Richard (1884) explained the myths of the countries contain allusions to sacred or supernatural plants. The Oak, the strongest of all trees, has been revered as the emblem of the Supreme Being by almost all the nations of heathendom by the Jewish Patriarchs and by the children of Israel, who eventually came to esteem the tree sacred, and offered sacrifices beneath its boughs. Egyptians, Greeks, Romans, Teutons, and Celts, all considered the Oak as sacred,

The Indians adored the tree Ashoka, consecrated to Vishnu; and the Banyan, in the belief that Vishnu was born amongst its branches. To Brahma are sacred the *Buttea frondosa*, the *Ficus glomerata*, the Mulberry (the seed of Brahma), the *Clerodendron Siphomanthus*, the *Hemionitis cordifolia* (leaf of Brahma), the *Saccharum munga* (with which is formed the sacred girdle of the Brahmans), and the *Poaeymosuroides*, or Kus Grass, a species of Vervain, employed in Hindu sacrificial rites, and held in such sanctity as to be acknowledged as a good. The peepul or Bo-tree (*Ficus religiosa*) is held sacred by Buddhists are Holy Tree and the Tree of Knowledge. The Pomegranate-tree was highly revered both by the Persians and the Jews. Pine-cones were regarded by the Assyrians as sacred symbols, and as such were used in the decoration of their temples. Local people have different myths, conceptions and believe about plants.

A local proverb enlisted some of these myths. Khabari (*Ficus glomerata*) is considered a good indicator of plenty of underground water resources.

Similarly Dab (*Desmostachya bipinnata*) is also considered an indicator of water near the surface. Kanir (*Nerium indicum*) is also considered an indicator of water spring in hills or watershed area. Jahl or Jandi (*Salvadora oleoides*) was the sacred tree of the Hindu tribes, there is a myth that place where there is a group of these plants, the place may have remained a battle ground in past and it grows well in place where the human blood fell in abundant quantity. There is a believe that if Pohli (*Carthamus oxycantha*) grows in large areas and bear good fruit, that year is dry year, less rains occur in area. Similarly if Harmal (*Peganum harmala*) plant has plenty of fruit then there are good rains. Boher (*Ficus religiosa*) and Pipal (*Ficus bengalensis*) plants are considered home of evils and ghost.

Richared (1884) described the myths about plant kingdom as Ashwattha is the mundane tree (or Tree of Life) of the Hindus. It is described as having its roots above and branches below. Its branches represent the external visible world of senses, or visible universe. The leaves are the Vedas or the universe in its intellectual or moral character. The roots represent the spiritual world and Supreme Being, or First Cause, the Logos. Vishnu, in one of his incarnations, is shown resting under the Banyan tree and there he taught humanity the philosophy and the sciences. Under the shade of this Banyan tree the gurus teach their disciples lessons of immortality and initiate them into the mysteries of life and death. The Banyan tree is called both the "Tree of knowledge" and the "Tree of life".

Liu et al (2000) reported that the Yi people I NW Yunan have a long tradition of plant worship. In Chuxiong Yi Autonomous Prefecture, local people believe that humans originated from certain plants or survived through calamities with the help of these plants, while some others are associated with gods or spirits. A recent survey conducted in this prefecture indicated that at least 21 species of plants are generally worshiped and protected by local Yi communities for various cultural reasons.

Luo, (2001) reported that in Ninglang Yi Autonomous country, a recent survey conducted showed that tree worship was very popular in rural areas; almost

each household has its own sacred tree(s). Another interesting thing is that certain species been named as tribe name especially in Ucchali village for example there are 2 tribes Kahu and Kanira named after two local species having same name, similarly in Sabhral village one tribe is named as Bata so this shows a great interaction of the local people with plants.

Iqbal et al, (2003) reported similar results for Malam Jaba that twenty-eight species are famous for naming people or places. Native people are very much important by their environment. The common masculine names on the local names of plants are Jawakay (*Artemisia scoparia*), Shamshad (*Buxus sempervirens*), Inzar Gul (*Ficus palmate*), Khona Gul (*Olea ferrugenea*), Anar Gul (*Punica granatum*), Kwanjai (*Pteridium aquilinum*) and Marno (*Myrtus communis*). Feminine names include Sumbal (*Adiantum venustum*), Yasmin (*Jasminum officinale*), Nargis (*Narcissus tazetta*) and Banafsha (*Viola canescens*). Some names of plants are kept as nicknames such as Marchakay (*Capsium annum*) for person with loosing temper, Kadoo (*Cucurbita maxima*) for dull person, Nakhtar (*Pinus roxburghi*) and Chinar (*Plantanus orientais*) for tall person. Kawaray (*Berberis lyceum*), Kabal (*Cyodon dactylon*), Amlook dara (*Diospyrus lotus*), Shangla District (*Euphorbia wallichii*) and Shaltalu (*Prunus persica*) are used in naming places. This trend of naming people has been declining; however, Malam Jabba Valley still shows a rich diversity of such beautiful names.

4.1.1 Fodder

Fodder collection is one of the important activities which have negative impacts on local flora and on certain species of medicinal importance as well. Plant species collected for fodder collection includes 10 Grasses, 38 Herbs, 13 Trees, 13 Shrubs and 12 cultivated crops. It indicates that sufficient fodder resource is available in the area which requires proper management for sustainable use of fodder in the area.

Local communities rear livestock for household consumption as well as for commercial purposes. Fodder is collected from cultivated agricultural lands, fields' ridges boundaries, shamilat-e-deh forest. Local community owned rakhs

and reserve forest as well. Water logged area near Nowshera known as "Dali" is one of the famous grazing and fodder collection site, also lands located at the periphery of the Uchali wetland known as "Tull" is also grazing and fodder collection site. Such grazing lands needs to be conserved to maintain habitat of fodder species intact.

Local people collect fodder from reserve forest usually in winter months when there is an extreme shortage of fodder, usually Bhabber grass (*Eulaliopsis binata*) is collected and stored for a long period. Forest department issues permits for grass cutting which is the usual practice in the area.

In rainy season July, August grasses are abundant in cultivated fields so very few people go to forest for grass cutting. People living at the edge of the reserve forest own their own rakhs their animals are totally dependant on grazing especially herds. There is no concept of feeding fodder to these animals.

Livestock owner living in main valley having turbines and agricultural lands they grow different fodder both during winter and summer season. Popular fodder species are Maize (*Zea mays L.*) during rainy season from April to October, Shutala (*Trifolium alexandrinum L.*) and Lucerne (*Medicago sativa L.*), Jao (*Hordeum vulgare*), Sorghum Jowar (*Sorghum vulgare*) and Moong (*Vigna mungo*) are cultivated on large area as proper fodder crop. Sorghum is also stored for winter months as stall feeding.

During winter months wheat (*Triticum aestivum*), Husk (Bhoosa), Rice (*Oryza sativa*), Stalks (Praley), Sorghum (Tanda), Maize (*Zea mays*), Tanda, and Bhabber grass (*Eulaliopsis binata*) are largely used to feed animals especially during extreme cold branches of the 3 different ever green wild species are cut also during winter as fodder these includes Kahu (*Olea ferruginea*), Ber (*Zizphus nummularia*), Phulai (*Acacia modesta*), Dhaman (*Grewia optiva*) during winter rains. This branch cutting trend cause a significant damage to the trees, camel owner shift to the reserve forest illegally during rainy season and browsing of camel also cause damage to these species.

Several other herbs and grasses are also used as fodder these include Barwa grass (*Sorghum halepense*), Bathu (*Chenopodium album*), Khabel grass (*Cynodon dactylon*), Dab (*Desmostachya bipinnata*) and several herbs. These are common fodder of the area and playing major role to full fill the fodder needs of the cattle of the area.

There is no introduction of the alternate fodder crop in the form of cultivated crop or tree hence the indigenous species are facing the pressure.

Ahmad et al, (2007) studied that the plants of Soon Valley are very important from grazing point of view. The Fabaceae family contains a number of woody species and herbaceous weeds, which are of major significance regarding grazing livestock. (Pearson et al, 1993; Hussain, 2002). Leguminous species are second only to grasses in importance as forage and pasture plants. The high nutritive value leads legumes to be used as a high protein supplement to livestock rations. Leguminous species are famous for having high quantity of Sugars (Carbohydrates and starch), fibre, mineral matter, dry matter, moisture contents and fats, so lavishly consumed by grazing animals. Moreover, the combination of leguminous and non-leguminous fodder reduces the concentrate requirement.

Ahmad et al, (2007) reported that from ruminant's point of view, the nutritive values of leguminous species in this Salt Range is high; however, digestibility of some species is higher in summer and autumn than that in spring. Mineral contents vary significantly among species ranging from inadequate to toxic for livestock production. Generally the concentrations in broadleaf plants including leguminous plants are more than those in grasses and other forages (Belesky et al, 2001; Khan et al, 2006).

Iqbal, (2003) reported that fifty-seven species belonging to 22 families were used in agro forestry development. The livestock feed on 48 plant species in the area. The important families are *Poaceae*, *Moraceae* and *Papilionaceae* represented by 14, 4 and 4 species, respectively.

Leaves of certain non-fruit e.g. (*Acacia modesta*), (*Ailanthus altissima*), (*Morus alba*) and (*Morus nigra*) and mostly the fruit trees also serve as fodder for goats and sheep.

4.1.2 Documentation of Indigenous Knowledge

Indigenous knowledge of local medicinal flora was collected from Ugali, Anga, Naushehra, Chingi, Khura, Chitta, Dhadhar, Chapar Sharif & Uchhali villages. 104 plants species use was documented in Chitta village. 46 in Ugali village. 82 in Dhadhar village, 50 in Chapar Sharif, 44 in Uchhali, 67 in Anga, 50 in Khura, 42 in Naushehra and 38 in Chingi village.

Documentation of the indigenous knowledge revealed that overall 56 different diseases are cured by medicinal plants. 35 diseases in Chitta Village, 34 in Ugali, 46 in Dhadhar, 33 in Chaper Sharif, 26 in Uchhali, 27 in Angha, 32 in Khura Village. About use of the plant parts used in medicines seeds / grain use percentage is (22.50%), followed by leaves (19.21%) and Bark / Stem / Wood (19.41%).

Species use variation extent in study villages shows that 10 plant species falls under the category of the commonly utilized species, 12 plant species as rarely utilized species and 13 plant species as excessively utilized species.

Top ten medicinal species of the area were also documented which are Vahekar (*Adhatoda zeylanica*) with 30% use percentage, Santha (*Dodonea viscosa*) 20% and Kahu (*Olea ferruginea*) and Phulai (*Acacia modesta*) with 15% each. Indigenous knowledge about medicinal plants was collected form different groups these include 40% knowledge contributed by Hakeems, 10% Pansari, and 22% by Mohabazi / Kushta Saz persons.

Ecological and social changes produced by economic and technological development have laid to a deep transformation of attitudes and values regarding plants (Hynes et al. 1997). Most cultural changes in rural communities are associated with increasing, interactions with modern social systems. Consequently, much of the knowledge and use of plant resources, as well as the resources themselves, are disappearing in many regions (Berg 1994; Boom, 1987). Therefore long term conservation of plant resources and the

knowledge associated with them is necessary for the benefit of the local people and for potential use by communities at large. As a science of documenting traditional on the use of plants by indigenous people and assessing human interaction natural environment, ethno botany has great potential for contributing to biodiversity conservation. (Ibrar, 2003).

Around 90% of the medicinal species are used by the people, who are native to the area in which the plants occur. This is indicative of the vast repository of knowledge of plant medicine that is still available for global use, provided of course that it does not get lost before it can be tapped or documented. In Soon valley there is a trend of losing traditional knowledge since the number of medicinal plants traditional users are decreasing such as Saniasi (Traditional herbalist). Hence there is an urgent need to document traditional knowledge from Soon valley. Traditional and indigenous medical knowledge of plants, both oral and codified, are undoubtedly eroding. The main reason for this erosion of indigenous knowledge is the global domination of the monoculture and of only those knowledge systems that are a part of this dominant culture. (Shankar, 1998). Documentation of Traditional knowledge prevailing in different areas of the world will leads towards its conservation. A considerable work is going on in several parts of the world e.g., there is a study, which documents the abundance, distribution and knowledge of medicinal plant species in a Ransa Dayak village and adjoining forest in West Kalimantan, Indonesia. Over 250 medicinal plant species from 165 genera and 75 families were utilized by the local healer (Caniago & Siebert, 1998). Eighty-one herbal drug species in 51 families and 77 genera have been documented from Nepal (Manandhar, 1995).

Little is known about traditional knowledge and practices developed by the society on available plants, animal resources, medicinal herbs and other technologies of high altitude Himalayas, where resources are scarce. Traditional knowledge of some important herbs in their society, traditional cattle breeding achievements, and the traditional handicrafts of high altitude Himalayan is documented and the immediate need for value addition in these

sectors in order to save them from extinction and to add to the income of the people has been suggested (Farooquee & Nautiyal, 1999).

An inventory of Wild edible plants of Indian Himalaya used by local communities has been formulated. Over 675 wild plant species, representing 384 genera and 149 families, are used as food or edible (Samant & Dhar, 1997). By studying the biodiversity of a protected area of West Himalaya (Askot Wildlife Sanctuary), it was reported that plant diversity has been represented by 1262 species of vascular plants, of which about 70 species were found to be used as medicine (Samant et al, 1998).

In Pakistan emphasis on documentation of traditional knowledge about plants has increased in the last one decade specifically. In the past an effort was made to document information on medicinal plants of Balochistan (Hocking, 1958 & 1962). The past and present status of natural tropical thorn forest in Punjab have been described and (*Salvadora oleoides*) has been given special attention because of its great ecological and ethnobotanical importance. The traditional medicinal uses of about 27 medicinal plants found in Makran were described (Leporatti & Lattanzi, 1994). Similarly, traditional knowledge of about 114 plant species was collected from a heterogeneous cultural population living in Balochistan of southwestern Pakistan (Goodman & Ghafoor, 1992). Plant utilization studies of northeastern Balochistan had also been conducted (Shinwari & Malik, 1989). Some preliminary ethnobotanical information was gathered from six districts of Balochistan (Malik et al., 1990). Ethnobotanical information of Kharan district of Balochistan had also been documented (Shinwari et al, 1995).

Traditional utilization of 160 plants has been described, collecting the knowledge from Margalla Hills National Park. The conservation status has also been discussed (Shinwari & Khan, 1998; 1999; 2000). About 58 species of medicinal plants have been preliminary listed from Ayubia National Park Galliat (Shah, 2001). Indigenous knowledge of about 25 medicinal herbs from Kahuta Rawalpindi district have been, reported (Qureishi & Khan, 2001). Similarly traditional uses of about 77 species have been recorded from Shogran

valley, Mansehra (Matin et al, 2001). Ethnobotanical importance of about 48 species has been documented from Kaghan valley, Mansehra (Shinwari et al, 1996). The traditional knowledge of about 69 medicinal plants found in Machyara National Park, Azad Kashmir have also been documented (Bukhari, 1996). Indigenous knowledge of about 85 medicinal plants has been described from Northern Chitral (Khan & Le Feure, 1996). Folk utilization of medicinal plants found in Khair pur district, Nara desert and Cholistan have also explored, according to the Red Data Book of (1970).

4.1.3 Fuel wood

Four different type of the fuel sources are found in Soon Valley which include fuel wood, LPG, Cow dung and Kerosene oil. Fuel wood account for 55% LPG (Liquefied Petroleum Gas) , 35% cow dung 5% and Kerosene oil 5% of the energy needs of the area.

Cutting of vegetation for fuel wood exceed the domestic need and 60% of the fuel wood is exported outside of the area upto Peshawar and other areas, as the Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*) both are slow growing trees and needs 15–20 years to mature and attain a height of five feet tree hence the site from where these trees are cut will remain barren as usually there is no plantation in place of these species. There is no legal ban on export of fuel wood or awareness even in line departments and agencies to reverse the situation. Involvement of the Afghan refugees have further aggravated the situation as they establish fuel wood depots during summer months and sale lot of fuel wood, at least 30 fuel wood points are observed each season. Business of fuel wood is depriving valley from its beauty, flora and have negative impact on local ecology. This trend is not only going to create ecological imbalance as well as fuel wood shortage in next coming year. There is no fruitful effort by conservation programs and project to stop this disaster except from local level NGO's / CBO's. There is a need to evaluate the future fuel wood requirement of the area and complete ban on fuel wood export in order to protect flora and fauna of the area.

Analysis of the data revealed that 19% demand of the fuel wood is met from fuel wood depots or tall, 27% from reserve forest, 30% from local people owned rakhs and 24% from Shamilat deh forest. Overall fuel wood is collected from 3 different forest types. Local people preferences also varies, species wise for instance 43% people prefer Phuali (*Acacia modesta*), 22% Santha (*Dodonea viscosa*), 18% Kahu (*Olea ferruginea*), 7% Ber (*Zizphus nummularia*), 2% Awani (*Otostegia limbata*) and 2% Papper (*Buxus papillosa*). Average fuel wood consumption in the area during summer months from March to September varies from 10–15 maunds while during winter months from (October–February) it is 20–30 maund depending on the availability, fuel source, and household size.

Previous studies in Soon Valley indicated that Awani (*Otostegia limbata*) and Sanaha (*Dodonea viscosa*) shrubs were abundant on the common grazing lands in Dhadar village and are harvested along with Kahu (*Olea ferruginea*). Palm shrubs were also observed on the grazing lands. The villagers indicated that a farmer who developed land on common property areas can protect trees on it and use them for lopping. Fuel wood is collected from both communal and privately owned land-mainly by women. Village women usually leave home at 06.00h and gather about 25kg of fuel wood in three hours;-enough for 4 to 5 days fuel wood supply for an average size household. Derajat male farmers also carry fuel wood on camel back to Dhadar where they sell it on the street at the rate of Rs. 180/- per camel load. The wood depot in Dhadar sells firewood at the rate of Rs. 45/- per 40kg load (PRA, Report 1994).

Similar results were also obtained form Uchali Village where scrub forest is another major natural resource for the villagers. Species known to grow in area are Sanatha (*Dodonea viscosa*), Phulai (*Acacia modesta*), Kahu (*Olea ferruginea*), Vahekar (*Adhatoda zeylancia*) and various fruit trees. People collect fire wood from the community forest and also from the Government forest. The Government forest is relatively dense, - probably because part of it is under the control of the nearby Sakesar military base. As a rough estimate the village requirement of fire wood is around 300 tones. This is based on oral

information and inferences from daily activities of women. People do buy firewood from camel owners who regularly bring camel loads of wood to the Uchali village. An average family with 6-7 members may need around 3 camel loads of fire wood per month. Some people do use cooking gas but they are the exception rather than the rule.

Village men explained that it was possible to get wood from the Reserve Forest areas. With the connivance of local forest guards, men cut and carry fuel wood on camel back and sell it in town for Rs. 160/- per load. Men only go out to forests for fuel wood collection if a tree has to be cut. Village women collect fuel wood every week from the surrounding hills and carry it on their heads or donkeys. Some sell the collected fuel wood to the community. 40-60 kgs fuel wood per week is purchased at the rate of Rs. 160/- (PRA, Report 1994).

In Ugali village 80% of the forest cover on nearby hills has disappeared due to indiscriminate cutting by local people for their domestic use and sale in the market. The villager's energy needs are mainly met from forest produce which are comparatively less expensive. Fuel wood needs have gone up due to increase in the size of Ugali Village. Medicinal plants and minor forest produce were also obtained from forest but their importance for the rural economy was not assessed with the villagers. (PRA, Report 1994).

Shinwari et al, (1996) reported that Pakistan is well populated area of over 140 million. Most of the population depends upon plant resources for fuel wood. Fuel wood consumption of Pakistan is more than 565 million cubic meter and is constantly increasing. Our preliminary investigation showed that more than 80% of the homes all over the Tribal Areas use wood as fuel; 10 percent use animal dung cakes of domestic cooking; 4 percent use kerosene oil; and less than 4 percent use electricity. These people have no alternative but to cut plants to cook their meals.

4.2 Cultivation of medicinal plants

Cultivation of the medicinal plants was carried out to assess the success percentage of the plant species and their mode of reproduction. Cultivation is also one of the important elements in plant conservation. Cultivation trials of

medicinal plants in Soon Valley gave favorable results and these cultivation methods can be used to conserve the gene pool of selected floral species which are threatened due to some factor.

Cultivation trials of selected medicinal plants were carried out through three different techniques including seed sowing, sapling transplanting and through vegetative reproduction. 28 species were cultivated through seed sowing, 10 were cultivated through sapling transplanting, and 16 were cultivated through vegetative reproduction.

45 plant species were cultivated through seed sowing method in Soon Valley area. Most successful and encouraging results were obtained for Jangli Karela (*Momordica dioica*), Dhaman (*Fagonia indica*), Barani moli (*Diplataxis griffithii*) and Jangli Dhania (*Psamometon canescens*) species. Seed collection at proper ripening time and then its sowing at preferred habitat of the specific plant give positive results.

16 plant species were cultivated through sapling transplanting saplings of these species were collected and then were transplanted. Most promising results were obtained in case of Choughan (*Carralluma tuberculata* N.E. Brown) and (*Acacia modesta* Wall).

Sapling transplanting can be used as an important tool in plant conservation both for in situ and ex.situ conservation methods. 19 plant species were selected in vegetative reproduction method. Through this technique successful results were obtained for Jangli Anar (*Punica granatum* L.), Surajan talkh (*Colchicum aitchisonii*) and Surajin Shairin (*Colchicum luteum*), Zohr Mohra (*Sauromatum venosum*), Gilote (*Ceropegia bulbosa*).

Trial using this method proved that species having restricted distribution and threatened can be conserved trials results proved that proper method of propagation of plant species can be used as tool for species conservation programs along with other methods.

Cultivation trials of the flora in Soon Valley also showed that farm level cultivation of species such as Ajwain (*Carum copticum*), Saunf (*Foeniculum vulgare* Mill.) and Til (*Sesamum indicum* L.) is successful and these species if

cultivated at large scale can increase farmer income and better economic return to community.

Cultivation trials also proved that same species which are facing challenge of survival can also be grown successfully and can be conserved through in situ conservation techniques, particularly Gilot (*Ceropegia bulbosa Roxb.*), Surajin shirin (*Colchicum aitchsonii*) and Zohr Mohra (*Sauromatum venosum (Ait.) Schott.*)

In Pakistan in situ conservation status of Margalla Hills National Park, Islamabad (Shinwari & Khan, 1999) and Machyara National Park, Azad Kashmir (Khan, 1996) has been discussed and measures have been suggested for their improvement.

Trease and Evans, (1972) described that ethno medicinally important plants are now obtained almost exclusively from cultivated plants. These include Linseed, Fennel, Cumin, Saffron, Aloe, Ephedra, Artemisia, Rhubarb, Vinca roots and Withania etc. On the other hand, supply of the wild plants is insufficient to meet the demand or because, owing to sparse distribution or inaccessibility, collection is difficult.

Cultivation of medicinal plant is usually viewed not only as a means for meeting current future demands for large volume production of plant based drugs and herbal remedies, but also as a means for relieving harvest pressure on wild populations (Palevich, 1991). (WHO, IUCN & WWF, 1993; FAO, 1995).

Williams (1996) reported that there are many parts of the world in which there is virtually no cultivation on any significant scale. An estimated 99% of the 400-500 species currently sold for use in traditional medicine in South Africa originate from wild sources.

Lange and Schippmann, (1997) reported that medicinal and aromatic plants (MAP) have been an important resource for human health care from prehistoric times to the present day. Between 40,000 and 50,000 plant species are known to be used in traditional and modern medicine systems throughout the world, relatively few MAP species are cultivated. The great majority is still provided by collection from the wild.

How ever it has been recommended that small-scale cultivation by local collectors combined with the research on plant ecology required determining sustainable wild harvest levels and methods for a targeted species will be a better approach for conservation (Pinhiero, 1997).

In situ conservation studies have been reported on aromatic plants such as wild *Mentha* and *Origanum* species from southeastern turkey (Ozguven & Kirici, 1998; Ozguven & Tansi, 1998). In china in situ conservation activities have been taking place for the last more than fifty years. There are 926 reserves occupying 769800 sq. km, which is about 7.64 percent of the total land of the country (An, 1998).

Domestication and cultivation provide numerous advantages over wild harvest for production of plant-based including reliable botanical identification; steady source of raw materials; standardized or improved genotype; and controlled post harvest handling. In addition to loss of markets, benefits and other conservation incentives for local collectors, cultivation of threatened medicinal plant as conservation measure also has some other disadvantages, such as the limited range of genotypes selected for cultivation. Measures to protect wild populations and wild relatives for evolution, and adaptation might be required. The higher cost of research, development and production it likely that all about a few of the more valuable medicinal plant species will continue to be collected from wild. All wild plant species cannot be cultivated, hence cultivation does not necessarily reduce harvest pressure on all wild populations (Leamaan , 1998).

Lange (1998) reported that only 130-140 of the 1200-1300 species that are both traded in, and native to, Europe are derived predominantly from cultivation.

Cultivating different species of medicinal plants under conservation park program should be continued within the community. Pakistan has established reserve areas mainly conservation of medicinal plant resources does no exists, while in situ conservation is still in its infancy. In situ conservation of medicinal plant seeds recently, been initiated at Plant Genetic Resource

institute (PGRI) – NARC, Islamabad, Pakistan where a special chamber named as Hakim Mohammad Said, Chamber has been established.

Schippmann et al, (2002) reported that the total number of species of medicinal plants cultivated on any scale is few, although this does include some species of MAPs that are traded internationally in large volumes, as well as many of the (small) number of species used as starting points for pharmaceutical drugs. China is probably the country with the greatest acreage of medicinal plants under cultivation, but, even here; only 100-250 species are cultivated.

Ibrar, (2003) described in the Northern areas of Pakistan little land available for certain cash crops cultivation. Many wild plants found in these areas that are important for the production of medicine can give much profit and could be cultivated easily for commercial purpose, such as (*Bunium persium*) can be cultivated in Astore, (*Rheum emodi*) successfully cultivated in Kuza Gali and other plants growing at a height of 12000 ft. e.g., Balchar, Babchi, Gaozaban, Jadwar, Kuth, Zeera) all get good price in the market (Qureshi, 1998). Ethnomedicinal plant gardens should be started in Pakistan. Setting up demonstration gardens of interest will encourage local people in farming of medicinal plants to help in the conservation of Ashoka, Asparagus, Cassia, Carthamus, Ephedra, Garlic, Neem, Ocimum, Plantago, Poncirus, Rauwolfia, Viola, Zingiber and other species. Such gardens may act as regional repositories of our cultural and ethnomedicinal history and embody the living tradition of our society's knowledge of medicinal plants.

Schippmann et al, (2006) reported that cultivation is routinely promoted as the preferred (and sometimes the only) solution to the problem of dwindling supplies and over-collection of wild medicinal plant populations, with investment into research and/or associated cultivation efforts documented for all seven species covered by this study. Much less emphasis is being put on development and promotion of sustainable wild plant on development and promotion of sustainable wild collection practices.

4.3 Dependence of birds and Animals on plant species in Soon Valley

It has been observed in Soon Valley 25 plant species are commonly utilized by wild animals and birds. 14 bird species and 19 wild animals are dependent in the Valley on flora of area. The population of these species is directly linked with the abundance of the flora. Some of these plant species are facing serious threats to their survival, so there is a need to conserve these species. Species such as Choughan (*Caralluma tuberculata*) and Boher (*Ficus bengalensis*) are two such species which are threatened and there is a need to devise a strategy to conserve these species.

Wild birds and animals utilization of the flora also revealed that Jackal is the most common wild animal in area, while population of the fox and yellow threatened marten is declining due to various other threats. Similarly due to deforestation, forest fires, feeding of Punjab Urial and Chinkara is also affected and due to feed shortages in potential habitat area animals are forced to eat wheat (*Triticum aestivum L.*) near villages. During winter season Urial and Chinkara has been observed on feeding wheat crop in Dhoke Tilli, Dhadhar area. Some of the farmer of the area closes the entry point to the fields by placing hedge and other obstructions in the fields. Wild animals and birds have also been observed feeding on cultivated crops. Due to damage caused by these birds and animals many farmers intentionally kill these birds and animals. Wild boar, Porcupine, Fox, Jackal, Indian hare are ruthlessly killed and hunted in the area. Usually specially trained dogs are used for hunting, while clothes, hedge fencing are used to keep away animals and birds from cultivated crops. Similar results have been reported earlier where feeding habits of different wild animals has been studied and different floral species which are used as food has been documented.

Feeding habits of Punjab Urial by visual observations have been described (Aleem, 1977) and preferences for plant species was studied by Schaller (1977), Mirza et al. (1980) in captivity.

Johnson and Smith (1980) knowledge of food habits and forage preferences of wild ungulates is necessary to understand their habitat requirements.

Martinez, (2001) described that understanding of a species dietary composition is of fundamental important for management.

Awan (2003) studied total 21 plant species in the diet of Urial. These included 63% grasses, 18% forbs and 19% browse. Seasonally Urial diets were dominated by grass species. The dominant grass genera occurring in the diet of Urial included *Cynodon*, *Paspalidium*, *Digitaria* and *Eleusine*, forbs included *Medicago*, *Polygala* and *Tribulus* while shrubs and trees included *Acacia*, *Grewia*, *Olea* and *Ziziphus*. (*Olea ferruginea*) seeds were found in the faecal pellets of Urial in winter indicating that fallen fruits were consumed by animals.

Bengal fox was observed at separate occasions in the same genera area located close to Surar Kas (Nullah). The area had a sparse vegetation cover predominantly provided by isolated trees or bushes of (*Acacia modesta*) associated with tree species, including (*Tamarix aphylla*), (*Olea ferrugenia*) and (*Capparis aphylla*) appearing as stunted shrubs. (*Gymnosporia royleana*), (*Grewia tenax*) and (*Adhatoda vasica*) constituted the major part of the shrub layers. Agricultural fields were also located close to the wild tracts. (Irshad, et al, 2008)

4.4 Medicinal Plants

127 plant species have been documented in the Soon Valley area which is used in different recipes from time immemorial. Use of these plants was very common when there were no allopathic medicines. Areas such as Sakesar, Sodhi, Khabeki, and Keri were center of the plant collection. Saniasi and Jogis visited these areas and gathered plant material used in different medicines. There were two types of uses one was a specific remedy and the other was general use of the plant part for the treatment of disease. First kind of the knowledge was confined to the specific group such as Hakims, Jogis, and Sanisai, this was very less shared with other people. Usually medicines were made and used by patients but the exact recipe were never made public, a lot of this kind of knowledge lost due to non transfer to the next generation part of this knowledge transferred to the other generation where the second generation

has interest and adopted the profession of hakims, in other cases all golden recipes vanished with the death of the Hakim, Sanisai or Jogi. Second type of the knowledge is based on beliefs, uses and local preferences, liking and home based remedies used by the local peoples, this kind of the knowledge transferred from one generation to the other and remained some what intact. Due to advancement of medicine and more trends towards use of the allopathic medicines use percentage of local herbs has reduced and the younger generations has not adopted the knowledge and uses of the plant.

Due to less use and lack of interest by young generation knowledge is eroding rapidly. 30% of the young population does not identify the wild plants names and their uses, local names of the several plant species are now unavailable due to this non transfer of knowledge, several herbs local names are not known as these name were never documented, written hence now the only word used for these unknown plants is "Jungli Booti". Keeping in view these trends indigenous knowledge of the local flora of the Soon Valley was documented at village level recipes were collected and all these recipes have been documented which were used in man and animal diseases. Several medicinal plants of the area are highly threatened due to collection practices, habitat loss and development activities. Most famous wild medicinal plants of the area includes Vahekar (*Adhatoda vasica*), Phulai, (*Acacia modesta*), Dhammian (*Fagonia indica*), Vena, Akri, Zohr Mohra, Mastiara, Podina, Chougan, Kuwar gandal, Bershaha, Mohari, Papera, Gorak Pan, Isamgol, Majith, Banfsha, Kuri booti, Aak, Kiari, Giloh, Santha and Post. These are commonly used in the area. Top ten medicinal plants of the area were also classified which includes Vahekar (*Adhatoda vasica*) with 30% use percentage value, followed by Akri, Vena, Dhamian, Aksan, Podina and Ajwain. Cultivated medicinal plants are also used in abundant quantity in area, these include Ajwain, Alsi, Halia, Methi, Kasni, Til and Soey. These all are cultivated as minor crops in the area and their cultivated area did not exceed 100 Acres. Ajwain and Podina is essential item of every household as they are used against stomach order and indigestion problem hence they are kept in home like a kitchen item. A local mixture called

“Ghutti” is prepared in Kabeki Village used for indigestion, blood purification and as a general tonic. It is usually made from Ajwain, Podina, Dhamian, Mastiara, Chirata and Vahekar (*Adhatoda vasica*) dried leaves. It is usually recommended for children and is also popular in other areas of Pakistan as well, Price of this product is 100 Per Kilogram and this is in great demand in area. Methi cultivation as cash crop has started in area due to good profit margin, similarly Ajwain is also sent to vegetable markets for sale. Some of the medicinal plants are threatened due to collection method for example Choughan, Banafsha and Gilot are uprooted due to which they have limited distribution range in area. Fuel wood use of the medicinal plant is also significant threat and 3 principal species of the area Vahekar (*Adhatoda vasica*), Phulai and Kahu are used as fuel wood also. Medicinal plants are used for livestock diseases as well for example Kiari and Zohr Mohra bulbs are exclusively used in animal diseases. Similarly Podina and Ajwain are extensively used in livestock indigestion problems. Single use of the plant material along with mixture of several species is also common in area. Different form of the medicines are used these include Phaaki (mixture), Sharbat (Soft drink), Dhoeni (Ash smoke) Goli (Tablet), Majoon (Liquid mixture), Joshanda (Liquid Extract), Muraba (Solid tonic) Karaha (Tea), Halwa (Sweet), Arq (Juice extract), Malam (Cream), Kota (Prepared cooked mixture), Lupri (Bandage), Patti (Cloth bandage), Kushta (Tonic), Plister (Bandage). These are different shapes in which these medicinal plants are used for treatment of different ailments.

There is no reliable figure for the total number of medicinal plants on Earth, and numbers and percentages for countries and regions vary greatly.

Schippmann et al, (2002) estimated that the numbers of species used medicinally include: 35000-70000 or 53000 worldwide (Farnsworth and Soejarto 1991; Schippmana et al. 2002); 10000-11 250 in China (He and Gu, 1997; Xiao and Yong, 1998; Pei, 2002 A); 7500 in India (Shiva, 1996); 2237 in Mexico (Toledo, 1995); and 2572 traditionally by North American Indians (Moerman, 1998). The great majority of species of medicinal plants are used

only in Folk Medicine. Traditional Scholarly Medical Systems employ relatively few: 500-600 commonly in Traditional Chinese Medicine (but 6000 overall) (Pei, 2001); 1430 in Mongolian Medicine (Pei, 2002 B); 1106-3600 in Tibetan Medicine (Pei, 2001, 2002 B); 1250-1400 in Ayurveda, (Dev, 1999); 342 in Unani; and 328 in Siddha (Shiva, 1996). The number of plant species that provide ingredients for drugs used in Western Medicine is even fewer. It was calculated for an article published. It is reported that 25% of all prescriptions dispensed from community pharmacies in the USA between 1959 and 1973 contained one or more ingredients derived from higher plants (Farnsworth and Seojarto, 1991).

(Justicia adhatoda) is one of the most important plant species and dominant vegetation in the Salt Range of Pakistan (Khattak and Gilani, 1985). Its leaves are mostly used in the treatment of respiratory disorder in Ayurveda. The active ingredients present in the leaves possess respiratory stimulant activity (Sivarjan, and Balachandran, 1994). At low concentrations, induced bronchodilation and relaxation of the tracheal muscle.

(Mentha longifolia) Podina is also one of important medicinal plant of area. Its leaves are worldwide used as a condiment and for the preparation of green tea, as salads, and for making chutneys. Tea made from its leaves is used for digestive problems and for the treatment of fevers, headaches, digestive disorders and various minor ailments (Foster. & Duke. 1990). Medicinally it is used as Antiasthmatic; Antiseptic; Antispasmodic; Carminative; stimulant.

(Nerium oleander) Kaner is also one of the important plant of Soon Valley area. It belongs to family Apocynaceae, from medicinal plant of view it is regarded as an antidiabetic, and poisonous. *(Peganum harmala)* Harmal is also used as medicinal plant in Soon Valley. It is used as aphrodisiac, antispasmodic and analgesic (Ahmad et al, 2002).

(Withania somnifera) Ashgand is also used as medicinal plant in Soon Valley. It is being used since thousands of years in India as anti-stress, anti-depressant, rejuvenative, aphrodisiac, and as a body building herb with great promises in Ayurveda. It is an ingredient in many formulations prescribed for a variety of

musculoskeletal conditions (e.g., arthritis, rheumatism), and as a general tonic to increase energy, improve overall health and longevity, and prevention of disease in athletes, the elderly, and during pregnancy (Chatterjee and Pakrashi 1995).

Khan, (2001) studied medicinal plants in Kallar Kahar and Choa Saiden Shah the typical medicinal plant are (*Punica granta*), (*Justicia adhatoda*), (*Plantago lanceolata* L.), (*Morus alba* L.), (*M. nigra* L.), (*Periploca aphylla*), (*Capparis deciduas*), (*Verbasum thapsus* L.) and (*Rosa damascena* Mill) as Cultivated species. The people of this area are commercially utilizing the flowers of (*Justicia adhatoda*) and (*Rosa damascena*) for various medicinal products. Tilla Jogian in Jehlum district is a famous historical place having great potential for medicinal plants in this region. The typical medicinal plants in this area are (*Justicia adhatoda*), (*Coolebrokia oppositifolia*), (*Luffa acutangula* Var. *amra*) and (*Neolitsia chinensis*) maida sak.

Ahmad et al, (2002) reported that dominant vegetation of the valley comprises of (*Justicia adhatoda*), (*Achyranthus aspera*), (*Acacia modesta*), (*A. nilotica*), (*Albizia lebbeck*), (*Melilotus alba*), (*Capparis decidua*), (*Chenopodium album*), (*Calotropis procera*), (*A. farnesiana*), (*Datura metel*), (*Fumaria indica*), (*Olea ferruginea*), (*Peganum harmala*) and (*Mentha longifolia*) (Hussain. 2002). These and many other species are traditionally popular a healing agents and have been used by indigenous people for the treatment of various diseases.

Shinwari et al, (2002) reported that some plants are also used as insect repellent due to their high aromatic properties. Leaves of (*Justicia adhatoda*), (*Nicotiana tabacum*), (*Rhododendron arboretum*) are placed in clothes to get rid of insects. The seeds of (*Peganum harmala*) and leaves of (*Skimmia lareola*) are burnt in houses to remove evil spirits.

Iqbal, (2003) studied plants of Malam Jabba valley that ninety-five species are used as medicinal out of the total 187 species reported. Some of the plants are used individually, while other in mixtures. The same plant drug was generally used for curing several diseases, are (*Acacia modesta*), (*Acorus calamus*), (*Ajuga bracteosa*), (*Berberis lyceum*), (*Buxusi sempervirens*), (*Mentha*

longifolia), (*Punica granatum*), (*Prunus domestica*), (*Podophyllum emodi*), (*Colchicum luteum*), (*Valeriana jatamans*), (*Viola canescens*) and (*Viola betonicifolia*).

Zubaida et al, (2004) studied medicinal important flora of Dhibbia Karsal in Mianwali District and enlisted medicinal uses of the plants as (*Acacia modesta*) is the medicinally and economically important species of the area. Bark of this tree is use for dyeing the leather. Wood is used for making door panels and its flowers are used for curing the heart stroke. People of the village used this species so extensively that it becomes rare in that area. Fruit, wood, flowers and bark of (*Albizia lebeck*) is commonly used for its antibacterial activity due to presence of saponins and tannis in it and is helpful in relieving stress, anxiety and depression. The Neem tree, (*Azadirachta indica*) is native to Southeast Asia and grows in many countries throughout the world. The Neem tree has many medical uses Notable among these are its use as an antiseptic and diuretic. It has been used to cure many illnesses from diabetes to syphilis and is widely relied upon by herbalists in native habitat. The use of (*A. indica*) as a source natural insecticide was discovered approximately 30 years ago.

Zubaida et al, (2004) enlisted the medicinal plants of Dhibbia Karsal and reported that Akri (*Withania coagulans*) is an important and famous plant of Mianwali District. This species is an important source of alkaloids like solanine, scopolamine and atropine. (*Solanum nigrum*) is also very common use for the treatment of hepatitis. These two species are also very important from commercial point of view. Another important plant is (*Caralluma tuberculata*) commonly known as chungu and is member of family Asclepiadaceae very effective for diabetes is frequently.

The milky latex of (*Calotropis procera*) is used to treat asthma, wounds as an astringent and for piles.

Ahmad et al, (2007) studied five species of Salt Range and concluded that people of the area taxonomically classify plants according to their needs, demands, shape of plants and the medicinal function of the plants. In the present study an account is given of and investigation into the taxonomic

parameters and traditional medicinal uses of 5 species, belonging of 5 genera of the Asclepiadaceae from the Salt Range. The species are (*Calotropis procera* (Ait.) Ait. f.), (*Caralluma edulis* (Edgew.) Benth. & Hook. f.), (*Ceropegia bulbosa* Roxb.), (*Periploca aphylla* Dene.) And (*Tylophora hirsuta* (Wall.) Wight). (*Ceropegia bulbosa*) is a highly useful medicinal plant. It is vulnerable due to over exploitation in the Salt Range. In situ and ex situ conservation is suggested for this species. (*Periploca aphylla*) is widely distributed in the Soon Sakasar valley of the Salt Range, in particular in an area located adjacent to Mianwali District. Thus there is a need, to create awareness of the importance of the Asclepiadaceae species among local people and to provide them with guidance and training in their collection and processing in order to enhance their income.

Syed Zahoor Hussain et al, (2008) studied the medicinal plant of Morgah Rawalpindi and enlisted about 40 plants, belonging to the 28 families grown locally *Dhania* (*Corriandrum sativum*), *Podina* (*Mentha longifolia*), *Kulfa* (*Protulacae oleraceae*), *Anar* (*Puncia granatum*), *Makko* (*Solanum nigrum*), and *Kawar Gandal* (*Aloe barbadensis*) for daily use.

The main cause of depletion of medicinal plants from our wild resources and a matter of prime concern is the large-scale exploitation of medicinal plants is undertaken by those engaged in the trade.

Much of the damage is confined to species that are from high altitude zones, particularly because the regeneration prospects of individual species found at this elevation are limited by difficult conditions. A considerable amount of work regarding conservation of medicinal plants has been done in the past, a lot more is going on in different regions of the world but a more comprehensive approach is still needed.

In certain parts of the world, conservation of natural resources is part of the traditions of the local communities living in that area e g, the tribal communities of Meghalava in northeast India (Tiwari et al, 1998), in Mayamba district of Sierra Lione (Lebbie & Raymond, 1995) and in Gwangxi Karst Region of China (Li & Su, 1995). They all have a tradition of environmental

conservation based on various religious beliefs, which have passed from one generation to the other, Based on these beliefs, certain patches of forests on the hills and mountains are designated as sacred grooves or Holly hills under customary laws and are well protected from any product extraction by the community. Such forests are very rich in biological diversity and harbor many endangered plant species including rare herbs and medicinal plants. (Ibrar, 2003)

4.4.1 ANGIOSPERMS

Plant resources of the Soon Valley were also studied and these include 38 trees, 40 shrubs, 167 herbs, 18 cultivated cops, 23 cultivated vegetables, 21 cultivated fruits, 3 fern species, 3 climbers and 26 ornamental plants.

Khan and Chaudri, (1993) studied white headed duck at Ucchali complex and also recorded 62 species of plants belong to 60 genera, 29 families and 11 orders. The percentage of occurrence of trees, shrubs, herbs, climbers and grasses was 20.97; 30.10; 16.13; 3.22 and 22.58% respectively.

Pakistan has a diverse flora containing about 6000 species of phanerogams. Estimates indicate that around 700 plant species are used as medicinal and aromatic plants (Pei, 1992). The wide range of habitats supporting a diverse flora has been explored and reported in the pre emergence era (Kuuz, 1877; Hooker, 1879 and 1885; Chaudhuri, 1936; Kashyap, 1936 and Mukerjee, 1938, 1940) as well as the after the independence by Stewart, (1952; 1958; 1967) listing the flora of Rawalpindi and Lahore. Jafri, (1958, 1966) Chaudhri, (1954, and 1960) worked and gave a detailed account of grass species of Swat and the vegetation of Thar Desert and Kaghan vllay. Baquar and Tasnif, (1967) discussed various species of plants in "Medicinal plants of Southern West Pakistan". Nasir and Robina, (1995) in "Wild Flowers of Pakistan" reported the diversity of Angiosperms of Pakistan. Chaudhri and Qureshi, (1991) elaborated that about 709 species of vascular plants of Pakistan, constituting about one fourth of the vascular flora are in danger of being gradually wiped out or exterminated altogether. Marwat, (2005) worked on taxonomy and diversity of

genus *Cotoneaster* from Pakistan. Such studies are required to complete the regional biodiversity of Pakistan, yet not explored or completed.

The literature regarding pteridophytes in Pakistan is meager and there are some reports like Clarke, (1880) studied the ferns of Northern India and mountains of West Pakistan. Hope (1899 – 1902) reported 27 ferns from Chitral. Stewart, (1957) published a checklist of 127 ferns where 7 species were new records for West Pakistan. These are (*Cystopteris dickieana*), (*Dryopteris oreades*), (*Dryopteris chrysocarpa*), (*Actinopter austrais*), (*Polypodium nudum*), (*Pyrrosia mollis*) and (*Equisetum palustre*). Some ferns of Kaghan Valley were reported by Sheikh, (1962). Shah et al. (1985) published the ferns of Malakand Division. The ferns and fern allies of Kurram Agency comprising 11 families 12 genera and 20 species were listed by Wazir, (1995). A list of 68 taxa of Pteridophytes with their synonyms, distribution and photographs collected from Pakistan, was published in 1992 by Toshiyuki and Malik.

4.4.2 GYMNOSPERMS

Two families of gymnosperms are available in Soon valley; these are Cupressaceae, and Taxaceae. The genera *Cupressus*, and *Thuja* are representing the family Cupressaceae. *Thuja* has single species namely (*Cupressus sempervirens*) and (*Thuja orientalis*). These two species are exotic and are commonly cultivated for ornamental purposes. They are cultivated very widely in the whole valley.

All members of the family are very important from economic, cultural, social and ecological point of views, Elisabeth, (1994). Wolff et al, (1999) reported several active ingredients and the fatty acids of the edible fruits of six *Pinus* species, while Singh et al, (2000) mentioned the wide use of (*Abies pindrow*) in homeopathy. (*Cupressus sempervirens*) and (*Thuja orientalis*) are used for Ornamental purposes only.

4.4.3 FOLK RECIPES OF MEDICINAL PLANTS & ETHNO-VETERINARY USES

It is observed that usually plants are harvested by the application of certain picking tools as knife, digging stick, 'kudal' and sometimes manually. Flowers

and leaves are dried in shade. They are placed under the sun for a very brief period to prevent fungal attack. Barks, woods and twigs are dried under the sun or in thin layers in the open air. Fibrous roots are dried under the sun. Transversely cut fleshy roots and rhizomes have been dried and stored in a cool dry place. A number of traditional methods were used to make herbal remedies, such as infusion, decoction, tincture, syrup, jelly, oils, creams, ointment, and pills. Compress, poultice, steam inhalants, juice etc.

Infusion has been made fresh each day for three doses and drink hot or cold in the same way as tea. In this method, the plant part is kept in boiling water for about half an hour. Decoction has been made by heating the plant part in a water and simmer up to an hour. After straining it has been used hot or cold. This is a sort of soup. Tincture has been prepared by extracting the plants active ingredients in diluted alcohol, which also act as a preservative. Medicine has been taken in dilution. Syrup has been made by gently heating honey or sugar with infusion or decoction. This makes an ideal cough remedy. Oils have been prepared by packing the jar with herb and cover completely with oil. It has been kept for two to three weeks then used in creams, ointments and for external massage. Cream has been made by blending the plant juice, fat or oil or vax with skin. Bees wax has been used as hardener in this regard. Ointment has been prepared by heating oil or fat with the plant till the oil has absorbed and not blends with skin, No water is mixed. The plant is strained out and bees wax has been added to harden, a cloth pad soaked in herbal extract has been applied to accelerate healing of wounds, muscle injuries or for headaches. Poultice has been prepared by chopping fresh herbs and then boiled in water for few minutes. It has been spread on the effected area, Gauze or cotton cloth has been applied to hold the poultice in peace. The poultice is replaced every 2-4 hours.

The Herbal medicines occupy distinct position right from the primitive period to present day. The ethno botanical pharmacology is as old as man himself. In Indo – Pak first record of plant medicine were compiled in Rig Veda between 4500 – 1500 BC and Ayurveda 2500 – 600 BC. This system traces its origin to

Greek medicine, which was adopted by Arabs and then spread to India and Europe. About 80% population of the world depends on the traditional system of health care (Ahmad, 1999). These medicines have less side effects and man can get it easily from nature. Unani system is dominant in Pakistan but the ethno medicinal uses of plants are common in the remote areas.

In china, ethno botany was introduced as a science in the late 1970, but deep rooted ethno botanical knowledge in Chinese culture can be traced back to very ancient times through vast literature on Chinese material medical and Chinese works of agriculture and horticulture (Pei and Manandhor, 1987).

On the other hand due to wide use of Allopathic medicines the preparation and use of recipes from the local medicinal plants has been reduced. But still many aged people use these plants to cure various diseases locally and also to avoid expenses. The preparation of ethno medicinal recipes, dosage, and mode of administration and plant uses re discussed.

(Ajuga bracteosa) is widely used in Soon valley which is very useful for body cooling, blood purification and also as a tonic. *(Menthe longifolia)* is also used in Soon valley recipes are prepared and used for the removal of abdominal pain, body cooling, to make good vision of eyes and also given to cattle to increase their efficiency of giving milk.

(Datura stramonium) is also very popular medicinal plant in the Soon Valley, its recipes are used for flue, nausea, cough, diarrhea, fever, backache, sexual disease and narcotic, Bellew, and (1994) also reported the same uses.

(Cannabis sativa) is one of the popular plants of the Soon valley area. because of its use in the formation of local narcotic recipes called ghota and the preparation of chars. It is also used against shoulder ach, sexual desire and as diuretic, the same uses were reported by (Aikins et al, 1994.)

(Calotropis procera) recipes are used for curing ulcer, paralysis, cholera and as purgative. *(Salvia moorcroftiana)* recipes are used for abdominal pain and external wound(1986) has mentioned the same result. *(Cichorium intybus)* is also very popular pant, the recipes of which are used locally for jaundice, body cooling, as tonic and stomachic. *(Dodonaea viscosa)* is used for

external wound while (*Chenopodium murale*) recipe is used fo abdominal pain and worm expulsion.

(*Pistacia integerrima*) is used by many people usually for body cooling, jaundice and as expectorant. (*Rosa indica*) is used for curing scabies and blood purification. (*Papaver somniferum*) recipes are used as vermifuge. (*Juglans regia*) recipe is used for expulsion of worm as mentioned by Nadkarni, 1927.

(*Foeniculum vulgare*) recipes are used as antidiarrhoeal, gases expulsion; the same has been reported by Wren, 1956 & Wallis, 1985.

Medicinal uses of plants used by local communities were documented from Salt Range Kalar Kahar. The study included 29 species belonging to 18 families. It was found that common diseases such as fever, cold, cough and diarrhea could be treated by simple herbal teas and herbal powders. Knowledge about medicinal plants has been obtained from their ancestors for generations. It was concluded that medicinal plant cultivation may be promoted and plant based industries and markets may also be developed.(Ahmad et al,2008)

Survey of medicinal plants potential was investigated in Salt Range, and more than 94 medicinal plants belong to 45 antispasmoic families are traditionally popular as healing against. Plants are not only used for curing ailments ranging from mild infections to the chronic ulcers, the species of the Litsea, Neolitea and Colchicum in particular are exposed to severe collection and habitat loss pressure.(Ahmad et al,2004)

Shinwari, (2002) reported that in Pakistan, (*Rosa damascena*) is cultivated for rose water, gulcand (petals and sugar) which is used as tonic, its petals are astringent, cardiac tonic, removes bile, and the juice is used for stomach ailments of newborn babies. Rose water is sprinkled on the funeral on the way to graveyard. The flowers of (*Tegetes petula*) are also spread on the graves. Liquid extract of (*Ephedra procera*) is used for controlling asthmatic attacks. (*Mentha longifolia*) is a cooling medicine, its dried leaves are carminative and stimulant. Used as tea, good to use in perfumery and soap industry. Newlywed girls decorate themselves by placing the inflorescence (*Ocimum basilicum*) in her hairs. Narcissus tazetta is used for ornamental purposes. Leaves of

(*Eucalyptus microtheca*) and seed of (*Corriandrum sativum*), (*Foeniculum vulgare*), (*Cuminum cyminum*), (*Benium persicum*) are used as flavoring agents and condiments (*Peganum hermala*) it is used as aphrodisiac, antispasmodic and analgesic. (Ahmad et al, 2002).

(*Withania somnifera*) Asgand, it is being used since thousands of years in India as anti-stress, anti-depressant, rejuvenative, aphrodisiac, and as a body building herb with great promises in Ayurveda. It is an ingredient in many formulations prescribed for a variety of musculoskeletal conditions (e.g., arthritis, rheumatism), and as a general tonic to increase energy, improve overall health and longevity, and prevention of disease in athletes, the elderly, and during pregnancy. (Chatterjee and Pakrashi, 1995).

Jabeen et al, (2009) documented the indigenous uses of medicinal plants of Margalah Hills, Timbar (*Zanthoxylum aromaticum*) fresh and dried both of one cup is used in the morning and one in the evening to cure jaundice. It is also grinded, mix with egg and then women wash their hairs, it used as a conditioner. Its fruit is grinded with Jangli podina (*Mentha royleana*) and mixes with salt for curing pain in stomach. It is sold 7 – 8 rupees per kg. Amla (*P. emblica*), Timbar (*Z. aromaticum*), Jangli podina, (*M. royleana*), Ajwain (*Trachyspermum ammi*) and black salt are mix to make medicine for indigestion. The fruit of Gukoon (*Myrsine africana*) is used for killing the worms in abdomen, for improving digestion and for relief of cough. Green Gukoon is sold 20 rupees per kg while dried is sold 100 rupees per kg. It is collected in December and January, dried and sold.

Sumbal (*Berberis lyceum*) root is boiled in water then mixed with milk when this become thick then Desi ghee, soji flour of maize, sugar and almond is added and used for the pains and arthritis. Sumbal (*B. lyceum*) bark is taken off, dried and then sold for the treatment of pimples. Bhaikar (*Justicia adhatoda*) is used for curing. Diabetes, jaundice and pimples. Young leaves are crushed and juice is taken. It is used during summer. Kao (*Olea ferruginea*) has cold effect and is used in summer. Its leaves are grinded and juices taken for pimples. Kao is used as favorite fodder and fuel wood. Kinglo (*Cassia fistula*) fruit used as

medicine and local people sell it. Their pods are used for curing constipation and pneumonia. These are boiled and decoction taken. The number of plant species used to cure different diseases incorporated in showed that maximum plant species Margallah Hills National Park are being used against the cure of astringent. Twenty three are used as tonic, nineteen against dysentery, seventeen against diuretic, fifteen for cure of diarrhoea, fourteen are used against anthelmintic, snake bite, cough, thirteen against skin diseases, rheumatism, cooling, twelve against worms, eleven for the treatment of laxative, purgative and ten for the cure of stimulant, asthma.

4.4.4 Ethno-Veterinary Uses

Fifty eight species are used in study area in ethnoveterinary uses. Yasmin et al, (2008) found that the leaves of (*Calotropis procera*) possess strong antibacterial properties; Khan (1980) found the antibacterial activity of the root bark of (*Capparis decidua*) and leaves of (*Prosopis glandulosa*). Iqbal et al, (2005) found that the flowers of (*Calotropis procera*) possess good anthelmintic activity against nematodes of sheep, while methanol and petroleum ether extracts of (*Trachyspermum ammi*) seeds showed antihyperlipidaemic effect in albino rabbits. (Javed et al, 2006)

Tipu et al, (2006) has given a detailed account of medicinal properties of different plants. According to these workers, these plants act as antibacterial, antioxidant, anti carcinogenic, antifungal, analgesic, insecticidal, anticoccidial and growth promoters. These plant extracts compete with the synthetic drugs. Majority of medicinal plants do not have the residual effects. (*Azadirachta indica*), (*Zizyphus mauritiana*), (*Ocimum basilicum*) and have strong antibacterial activity, whereas *Ocimum* plant has strong antioxidant, anticarcinogenic, antifungal, analgesic and antipyretic properties. Leaves of (*Azadirachta indica*) are used for feeding and reducing the parasitic load of animals. The fruit of (*Azadirachta indica*) also has the anticoccidial for poultry. Faraz, (2009) studied the ethno-veterinary medicinal usage of flora of Cholistan. Information regarding 31 plants was collected. According to the results, (*Blepharis indica*) was used as galactagogue.

(*Butea monosperma*), (*Calotropis procera*) and (*Phyllanthus nirurii*) were used as emollient, demulcent and antiphlogistic. (*Amaranthus trilocular*), (*Capparis decidua*), (*Clerodendron phlomoides*), (*Phyllanthus nirurii*) and (*Ricinus communis*) were used as carminative and stomachic. (*Capparis decidua*) and (*Calotropis procera*) were used as appetizer. (*Prosopis glandulosa*) had anodyne properties; (*Achyranthes aspera*) had antilithic, while (*Pedaliium murex*), (*Tribulus terrestris*) and (*Barleria prionites*) had diuretic value. (*Achyranthes aspera*), (*Argemone mexicana*), (*Balanites aegyptiaca*), (*Butea monosperma*), (*Cassia senna*), (*Citrullus colocynthis*) and (*Vitex negundo*) were used as vermifuge. (*Alhagi camelorum*) and (*Balanites aegyptiaca*) had aperient properties. (*Barleria prionites*) and (*Mollugo mucicaulis*) had their role in the ripening of an abscess. (*Ricinus communis*) and (*Salvadora oleoides*) aided in the removal of placenta and lochia. (*Anamitra cocculu*) and (*Argemone mexicana*) were used as febrifuge. (*Aerva jananica*), (*Ailanthus excelsa*), (*Amaranthus trilocular*), (*Capparis decidua*) were used in diarrhea and dysentery. (*Argemone mexicana*) and (*Ailanthus excelsa*) were used in ague.

4.5 Marketing of Medicinal Plants

Survey of the markets of the area was also carried out and six main Pansar stores were observed in the area in four main villages of the Valley including Angha, Uchali Naushera, Khabeki. Farmers, traders, vegetable markets, Pansar markets, local trades and outside trades were found involved in marketing of the medicinal plants.

Species such as Alsi (*Linum usitatissimum* L.), Methi (*Trigonella foenum-graccum* L.), Podina (*Mentha longifolia* L.), Til (*Sesamum orientale* L.), Kasni (*Chichorium intybus* L.), Ajwain (*Carum copticum* L.) and Chaughan (*Caraluma tuberculata* N.E. Brown) are some of the medicinal plants which are sold primarily in vegetable markets.

Some of the plant species are sold in the pansar markets which include Vahekar (*Justicia adhatoda* Linn.), Kali Jeri, Saunf, Tumba, Ispagal but their quantity is less. Marketing system of the medicinal plant is not organized, there is no channel previously Sanisai, Jogis collect plant products while at present local

people of the village Dhoke Miani at the border of Soon Valley area is famous for collection of the Akri a medicinal plant and then its commercial sale. Market share of the flora from Soon Valley ranges 1 million. Marketing Issues of the medicinal plant includes adulterated raw material, Poor storage and wrong identification.

Marketing strategy of the medicinal plant was also developed in consultation with local stakeholders; Issues of the marketing system were identified. Marketing strategy includes farm level cultivation, linkages with pharmaceutical companies, awareness raising, research studies and cultivation of the medicinal plants as micro enterprise. Local markets identified include Talagang, Kalar Kahar, Chakwal, Mianwali and Khushab, similarly Kalar Kahar markets survey indicated that Gulgand Vahekar and Arq Gulab (Rose water) are the most marketable items famous all over the country. Effect of harvesting on medicinal plants was also studied, four different levels of harvesting including no harvesting, 25%, 50%, 75% and 100% harvesting at four different sites Sakesar, Keri, Khariat, Rokh Karang and Rakh Gorra, Nawshera, Sodhee Range. It was concluded that Allerga (*Rhus cotinuous*), Banafsha (*Viola canesens*), Choughan (*Caralluma tuberculata*) are threatened due to harvesting.

Plant species medicinal values were also investigated and it was concluded that 10 plant species are used against rheumatism, 10 against skin diseases, 10 in digestive related problems and 10 against constipation, 15 as astringent and 50 in animal diseases.

Market surveys of medicinal plants are one of the important features of ethnobotanical work. This kind of work has been reported from several parts of the world e.g., Pei et al, (1990) presented the results of ethno botanical investigation of plant drugs that are being traded at local markets in North-West Yunan. According to them about 574 species of medicinal plants are traded as crude drugs in various local markets of North-West Yunan, China. These drugs of plant origin have been traditionally used in the Chinese

medicine system throughout the country, and locally used in indigenous medicines by herbal doctors amongst different ethnic groups.

It is estimated that 70-80% of people worldwide rely chiefly on traditional, largely herbal; medicine to meet their primary healthcare needs (Farnworth and Soejarto, 1999 & Pei, 2001). The global demand for herbal medicine is not only large, but growing (Srivastava 2000). The market for Ayurvedic medicines is estimated to be expanding at 20% annually in India (Subrat, 2002), while the quantity of medicinal plants obtained from just one province of China Yunnan) had grown by 10 times in the last 10 years (Pei, 2002 B).

Despite recent awareness of the supply-side challenges of the herbal medicine boom, it is now 15 years since these issues were first given a global profile in the Chiang Mai Declaration of 1988 (Akerle et al. 2001).

According to World Health Organization estimates, the present demand for medicinal plants is about US\$ 60 billion a year and by the year 2050 it would be US\$ 5trillion. (Principe, 1991).

Germany has the largest market in the world for herbal medicines, with annual sales of \$ 1.22 billion representing nearly 25% of the national pharmaceutical market. The USA is the next largest market with sales of \$ 480 million (Thrope & Warner, 1992).

There are at least 2000 species of MAPs marketed in Europe, these originating from over 120 countries.

Although virtually everyone on Earth benefits from medicinal plants, it is the financially poorest who are typically most closely dependent on medicinal plants culturally and for their medicines and income. Only 15% of pharmaceutical drugs is consumed in developing countries. (Toledo, 1995).

During 1992, total world trade in medicinal plants was about US \$ 171234 million, of which 20.9% originated from countries in Asia and the Pacific, Pakistan share was 0.5% of this amount. (Saeed, 1995).

In South Africa, 400 to 550 species are currently sold for use in traditional medicine, of which an estimated 99 per cent originate from wild sources.

(Williams, 1996).

Of the 21,000 plant species listed on the CITES appendices, only 14 have been added expressly because of their exploitation as medicinal plants (Schippmann, 1996).

China's production of medicinal plants from cultivated and wild-harvested source, considered together, was calculated at 1.6 million tones in 1996, with a total value (excluding exports) in terms of finished products of US\$ 3.7 billion (Kuipers, 1997).

Only less than 10 % of the world's known medicinal plants are in national and global trade. During the past decade, a dramatic increase in exports of medicinal plants attests to worldwide interest in these products as well as in traditional health systems. The annual value of trade of the 12 leading countries of export and import in the botanical drug trade have been estimated as 800 million US\$ annually. The world leading country of export is China, main importing countries are Hong Kong, Japan and Germany (Lange, 1997)

The poor have little alternative to using herbal medicine, which, anyway, they may prefer – at least for certain conditions (Marshall, 1998).

Herbal medicine is becoming ever more fashionable in richer countries, a market sector which has grown at 10-20% annually in Europe and North America over recent years (Ten Kate and Laird, 1999).

The role of biodiversity in sustaining human health and well-being is perceived in non western societies in terms that are often spiritual and that certainly reflect deep cultural world views (Bodeker, 2000).

About 380 thousand tones of 40 medicinal plants were imported in 2000-2001 while about 30 thousand tones of 20 medicinal plants were exported in that year from Pakistan (FBS, 2001).

Ahmad, (2001) reported the medicinal plants potential was investigated in Salt Range and more than 94 medicinal plants belong to 45 angiosperm families are traditionally popular as healing agent. Plants are not only used for curing ailments ranging from mild infections to the chronic ulcers, the species of the *Litsea*, *Neolitsea* and *Colchicum* in particular are exposed to serve collection and habitat loss pressure.

Throughout the non-industrialized world, hundreds of millions of rural households are estimated to use medicinal plants for self-medication. While reliable data are scarce, it has been estimated that in India approximately two million traditional health practitioners and around 800 million health care consumers use over 7,500 species of medicinal plants (FRLHT, 2002).

There is high medicinal plant use across regions, with Asia representing the greatest volume of medicinal plants use, both domestically and for export. India, which reportedly harvests 90 per cent of its medicinal plants from uncultivated sources, has an estimated 9,000 manufacturing units using almost 1,000 of 7,500 known medicinal species, with an annual domestic market valued at almost US\$1 billion. Due to habitat loss and over-exploitation, approximately 1,000 medicinal species are under threat in India, where export of raw material and finished herbal products is valued at around US\$100 million per year (FRLHT, 2002).

China, which harvests an estimated 80 per cent of its medicinal plant material from wild sources, exports an estimated 32,600 tons of medicinal raw material each year (Parrotta, 2002).

The total sales' values of drugs (such as Taxol) derived from just one plant species (*Taxus baccata*) was US\$ 2.3 billion in 2000 (Laird and Ten Kate, 2002).

The world market for herbal remedies in 1999 was calculated to be worth US\$ 1904 billion, with Europe in the lead (US\$ 6.7 billion), followed by Asia (US\$ 5.1 billion), North America (US\$ 4.0 billion), Japan (US\$ 2.2 billion), and then the rest of the world (US\$ 1.4 billion), (Laird and Pierce 2002) and a large proportion of even this small percentage is taken by relatively more affluent people.

Shinwari, (2002) reported that almost all of the medicinal plants in Pakistan are collected from the wild. The local collections are unaware of the exact procedure of collecting medicinal plants. The medicinal plants form their center of origin to the national and international market pass through various

middlemen. The price of the crude drug increase more than 100% when it reaches the market.

Siraj-ud-Din et al, (2003) reported that the medicines used in the ailments of flue, cough, fever and refrigerant were fourth in rating of consumption in Peshawar city. Mainly drugs used for treating were (*Berberis lyceum*), (*Cassia fistula*), (*Datura stramonim*), (*Nigella sativa*) and (*Onosma bracteatum*). (*Berberis lyceum*) is being the most consumable and preferred drug for such disorders, with annual consumption of 9,000 kg with a price of Rs.28kg. (*Datura stramonium*), (*Nigella sativa*) and (*Phyllanthus embelica*) had the annual consumption of 9,000 kg, 12,000 kg, with price of Rs. 160/kg Rs. 38/kg and Rs. 26/kg respectively.

In Margaila Hills National Park three species, (*Asparagus adscendens*), (*Berberis lyceum*) and (*Viola canescens*) are found vulnerable due to their parts used, slow growth rate, quantity of consumption and pressures like grazing, erosion and fuel wood collection. . The flowers of (*Jasminum humile*) available at Maralla Hills National Park, are used to extract oil which is very expensive and also useful. It is generally not available in the market. Jasmine oil, which is available in the market, is extracted from other species of jasmine, which is of inferior quality. This plant also needs to be promoted in this area and should be conserved. Commercial value of (*Asparagus adscendens*) is considerable, its tubers are sold about Rs: 800/- per kg in the local market. It is very essential to regenerate and propagate this plant, through propagation and other modern techniques for quick regeneration. This plant can serve as a good source of income from commercial retail for the people of this area.(Jabeen et al,2009)Community-based methodologies for gathering reliable data on patterns of use of medicinal plants along with baseline data on their local conservation status do exist and are prerequisites for establishing effective strategies for sustainable use. Evaluation of such projects has highlighted a model for self-sufficiency in family medicines through the production of home herbal gardens, data from which highlight that significant public health benefits have resulted (Hariramamurthi et al, 2007).

Extensive and historic trade routes exist, with the trade itself characterized by secrecy and generational control over territory, gatherers and access to purchasers. Increased global demand has brought traders into contact with international regulatory regimes, not least of which is CITES. Directly or indirectly, the trade enables others to have access to the healing benefits of plants, which don't occur, in their areas through the use of herbal preparations and for pharmaceutical products made from them. For example quinine from the Cinchona species, native to the Andes Mountains in South America, helps to treat millions of people suffering from Malaria the world over.

4.6 Collection of medicinal plants

Medicinal plants are usually collected by male community due to the fact that it is difficult and time consuming task, 60% men are involved in collection, while 10% children, 10% women are also involved in the collection of medicinal plants. During recent years afghan refugees are also observed in collection of medicinal plants 20% Afghan refugees are involved this activity. Sub-collectors include 5% non resent men 5% herdsmen. It has also been observed that some peoples in Pail and other Villages collect parts of Vaheker (*Justicia adhatoda*) and their livelihood is dependent on this activity. Usually collectors are very poor peoples who carry on this activity as a part time and additional source of income.

Tahri, (2007) also reported that women use of medicinal plants, however, was among the lowest in all six categories in Dhadhar & Koradhi Villages in Soon Valley. Reasons given for low levels of consumption, however, vary between two villages and within individuals in each village. For example, in Dhadhar village lack of sufficient knowledge on different species and their use was the main reason-restraining women from collection. Women were aware of the existence of different species of herbs as they know many herbalists collecting all different types, but they did not know their usages. They preferred to be bought of different species and their usages rather than having to pay and purchase them While, in Koradhi village women had the knowledge but some of them did not have the interest of spending hours and walking on long

distances in order to find particular species. However, there were differences in use patterns observed in different age groups. For example, almost all young participants in discussions preferred to purchase medicinal plants from the market, while older women preferred to collect it from forest, as they were free. Similar results were reported in India, according to one estimate, collection and processing of medicinal plants contribute at least 35 million workdays per year to the “poor and underemployed workforce”. (Anon, 2001).

Negi & Bhalla, (2002) studied that collection of medicinal plants also makes an important contribution to rural household incomes in parts of India. with *(Picrorhiza kurooa)* collection considered particularly important in the tribal areas of Himachal Pradesh who noted that most collectors were “small and marginal farmers” *(Rauvolfia serpentine)* collection from the wild in Thailand and Myanmar was said to be undertaken on an opportunistic basis by local people, often at the same time they are collecting other forest products.

In Pakistan, where *(Dioscorea deltoidea)* was said to be one of the main medicinal species collected in the mid-1990s, collection involves the rural poor.

The path from wild collection to end market generally involves a complex trade chain, a typology of which has been proposed by Olsen & Bhattarai (2005).

Similar studies have been carried out by Shinwari (2009) and listed a number of natural resource on which the livelihood of the communities is directly or indirectly dependent. The case of wild pomegranate *(Punica granatum)* locally known as “anar dana” found in Pakistan is among them to be presented. These anar dana are used in cooking as it has been used as taste enhancer for the dishes; besides having medicinal value. The tree of the wild pomegranate grows naturally in sub-mountainous tracts of the country from 900 to 1,800 m. Reported from Ziarat, and other parts of the Pakistan. Approximately 4,500 to 5,000 people are involved in the collection and processing of wild pomegranate and there were more than 100 dealers only in NWFP who purchase the fresh pomegranate fruit. Women were earning Rs. 300 to 500 for each 40 kg of seed extraction. The unit price of the wild pomegranate is 150 to 200 per kg.

Tahiri, (2007) documented that fruit collection is the other category of interest in Soon Valley. Wild fruits collected from forests are in small quantities which most of the time are consumed in forest or on the way back home. It can be assumed that forests are not only important for providing household requirements but also for recreational aspects. This assumption was tested in focus group discussions where different results were obtained in two villages. Everyone in Koradhi village go to forests in particular times of the year to collect seasonal fruits regardless of the hours they have to walk in search of fruits. In addition, women thought fruit collection is one of the only fun activities they do along with their children, other member of the family, and neighbors. There was even one family who has recently started going for fruit collection after seeing everyone else going and having fun. However, in Dhadar village fruit collection is not considered to be a special event or a fun activity and women collect fruits whenever they go to bring fuel wood or fodder. In this case, given that women are carrying heavy loads of wood or fodder on their heads they prefer not to take young children with them to have fewer responsibilities. Women in both villages were dependent on forests in one way or another in all six categories of fuel wood collection, building material, animal grazing, medicinal plants fruit and vegetable, collection. The level of dependency, however, varies within each category and between villages. Most women interviewed were highly relying on forests for fuel wood collection.

4.7 Conservation

Soon Sakesar Valley is part of the Salt Range hills and is surrounded by Punjab plains and Thal Desert in southern side while in northern side Pothwar plateau is located hence a diverse type of flora exist in valley. Geologically there are two distinct layers sand stone and limestone, vegetation differ on these layers to great extent. The present study is the first ever record of the flora of the area, this includes Angiosperms, Gymnosperms and Pteridophytes species. The flora of soon valley was evaluated and it was classified as 34 critically endangered, 16 endangered, 34 vulnerable and 71 are infrequent.

Local people of the area were also interviewed about the plant cover, threats and conservation status of medicinal plants. Response of the local people provides a look in to the awareness of the people about conservation of their resources. The conservation status was assessed according to the criteria mentioned in material and methods. Different localities were visited for plant material collection.

Certain species are facing multiple threats to their survival these includes (*Asparagus adscendens*), (*Colchicum aitchisonii*), (*Carruluma tuberculata*), (*Rhus cotinus*), (*Ceropegia bulbosa*) these species need immediate conservation measures before being extinct from the area.

According to the Red Data Book of IUCN (1970), the status of commercially important indigenous species (in terms of threatened condition) can be determined using the following four parameters: Availability, Collection, Part Used and Growth. Using these parameters the relative importance of specific medicinal plants can be classified into Endangered, Vulnerable, Rare, Infrequent and Dominant.

In Pakistan there are only few reports available which have indicated the conservation status of some plant species. Without using IUCN criteria about 709 plants (Chaudhri & Qureshi, 1991) and 2 trees (Oldfield et al, 1998) have been declared as threatened and endangered based on herbarium material. Approximately 37 species have been cited as threatened from Ayubia National Park (Shah, 2001). Using IUCN criterion 1970, fifty- five medicinal plant species from 3 districts of Malakand division have been reported as threatened (Gul et al, 2000).

Ibrar, (2003) described that Pakistan has a wealth of more than 4000 species of medicinal plants. Eastern System of Medicine described uses of more than 1,100 species of medicinal plants. In active trade there are 456 medicinal plants which are used to manufacture around 350 classical formulations to treat various ailments.

So far a number of medicinal plants have been assessed to be under various degrees of threat. In wild, such species include (*Aconitum heterophyllum*,

Citrullus colocynthis, *Cissampelos patirra*, *Dioscorea pareira*, *Dioscorea deltoidea*, *Fumaria parviflora*, *Murraya koenigii*, *Withania somnifera*) etc. (Williams and Zahoor, 1999). Germplasm conservation is one of the most important and urgent need to be established especially in Pakistan where many species are threatened e.g. (*Bergenia cilliata*, *Ephedra gerardiana*, *Juniperus excelsa*, *Taxus wallichiana*, *Valeriana jatamansi*) etc.

Adopting IUCN criteria 1994, twenty plant species have been identified as target species from Pakistan (Shah & Baig, 1999) been explored (Chaudhri & Arshad, 1987; Ansari et al, 1993; Bhatti et al, 2000).

There have been several attempts to construct systems for setting priorities for conservation on a national or regional level (Sparrowe & Wight, 1975; Nieme, 1982; Milisap et al, 1990; Daniels et al, 1991; Master, 1991; Avery et al, 1995; Gärdenfors, 1997; Catling & Porebski, 1998). A variety of different criteria, used in different combinations and systems have been suggested. However, Red Lists and Red Data Books of IUCN have been used for over 30 years to draw attention to threatened species the world over. The IUCN categories of threat have become internationally accepted and are now used, in a wide range of settings, by varied groups of people involved in the conservation of biodiversity.

Indiscriminate and non-systematic collection of medicinal plants in various parts of the world has led to severe pressure on the availability of medicinal plants, many of which are now rare, threatened or endangered. What is the conservation status of medicinal plants and how many species of medicinal plants are threatened today? No one knows. "Knowing what species are traded commercially is the foundation for identifying threatened plants". According to recent figures from the IUCN Threatened plant database (Walter and Gillet, 1998) approximately 32,000 species of plants are threatened with extinction. This figure represents approximately 13 per cent of the estimated 250,000 species of higher plants and bryophytes on earth, but does not take into account the many species whose status has not yet been assessed. A widely quoted estimate by Farnsworth and Soejarto, (1991) based on records in the

NAPRALERT database, is that 28 per cent of plants have been used in ethno medicine. Putting these estimates together (28 per cent of 13 per cent of 250,000 plant species) allows the conclusion that roughly 9,000 species of medicinal plants are threatened worldwide. This figure excludes, of course, all the species with uses still undocumented or unknown (Leaman, 1998).

About 15% i.e., 4000-5000 out of total 30,000 vascular plants in China is estimated to be rare and endangered. (An, 1998).

Six species (*viz.* *Aconitum heterophyllum*, *Podophyllum hexandrum*, *Nardostachys jatamansi*, *Picrorhiza kurrooa*, *Swertia chirata* and *Bergenia ciliata*) were considered as test cases for successful conservation for a large number of species in Sikkim that are claimed to have therapeutic value and whose survival in the wild is being threatened. (Rai et al, 2000).

Shinwari et al, (2000) conducted studies to calculate the approximate number of endangered plant and it indicates that more than 10% flora is endangered while another 10% is threatened or vulnerable.

In 1994, IUCN adopted new criteria to assess risks of extinction at a global scale, and it became apparent that they could produce misleading results when applied at the regional or national level, Revised criteria are more objective, numerical, and scientific as well as having greater applicability across taxon groups and are meant to be used for all organisms except microorganisms. The consideration for the selection of species is: 1) Global / international recognition of the species; 2) Rapid destruction of its limited habitat; 3) Extensive hunting pressure for food and trade; 4) Representation of each major group; 5) Economic importance of the species; and 6) Distribution of the species. Revised categories (in 2002) are 'Extinct', 'Critically Endangered', 'Extinct in the Wild', 'Endangered', 'Vulnerable', 'Low risk', 'Data Deficient' and 'Not Evaluated'. Another approach for prioritization of Medicinal Plants for conservation was developed after analyzing the available information on various aspects of medicinal plants of the Indian Himalayan region. Prioritization was based on three indices: (i) use value index (IUVI) indicates threats imposed by users, (ii) sensitivity index (SI) reflect conservation

concerns of biologists, and (iii) importance value index (IVI) is the cumulative value of (i) and (ii) to prevent biased approach. Twenty top ranking Medicinal Plants are identified for conservation in each life form (Dhar et al, 2000).

Ahmad, (2001) reported that genera like *Colchicum*, *Litsea* and *Neolitsea*, which are disappearing from the Salt Range, needs urgent rehabilitation .its extraction may immediately be checked. Cultivation of (*Litsea monopetala*), (*Neolitsea chinensis*), (*Pistcia integerrima*) and (*Colchicum aitchisonii*) may be encouraged for rehabilitation of the species and as income generating sources of the communities. Base line data regarding conservation status and red list of the endangered species may be prepared. Collectors may be made aware regarding the life cycle of the desired plant and the impact of improper collection time on the quality and conservation of species. Improved culture and post harvest technologies regarding medicinal plants may be popularized, so that their farm cultivation may reduce pressure on natural forest.

Shinwari et al, (2002) reported that thousands of Afganees have taken refuge in Pakistan. They are spending miserable life here due to highest poverty level. They are totally dependent on the plants for their daily domestic purpose. The Ghamko Area, Peshawar Road in Kohat was rich in (*Berberis lyceum*) and (*Delphinium kohatense*) (a local endemic species). The Ghamkol Camp was formed in the area in early 80s, the (*Berberis lyceum*) and (*Delphinium kohatense*) is now totally lost from the area. (Shinwari et al, 2002). According to Chaudheri and Qureshi, (1991) nearly 37% (266 species) of the total 709 endangered species are endemic to Pakistan. The recent study (Shinwari et al, 2002) has revealed that the endemic species of indo-Pakistan are over 600. The center of radiation is Kashmir, N. Balochistan and Chitral.

It is estimated that 70-80% of people worldwide rely on traditional, largely herbal, medicine to meet their primary healthcare needs (Farnsworth and Soejarto, 1991; Pei, 2001).

There is no reliable estimate for the number of medicinal plants that are globally threatened, variously calculated as 4160 or 10000 (Vorhies, 2000; Schippmann et al, 2002). There would seem little doubt from theoretical

considerations (Holsinger and Gottlieb, 1991; Menges, 1991) that many medicinal plant species that have been listed as threatened, and indeed others that have not, must be suffering from genetic erosion now, or will do so in the near future. The number of species of medicinal plants known to have become globally extinct is very few and conservationists are advised to avoid exaggerated claims in this respect. One of the best advertised cases is *Silphion*, a plant apparently found formerly in the dry hinterlands of the Middle East and much prized by the Ancient Greek. It is believed to have become extinct in 250 BC, with over-harvesting thought to have been a contributory factor (Lambert et al, 1997). It should be noted that many medicinal plants are rather widely distributed. (Phillips and Meilleur, 1998).

It has been estimated that over exploitation threatens 150 species of MAPs in at least one European country (Lange, 1998). Many of the threats to medicinal plant species are similar to those causing endangerment to plant diversity generally. The most serious proximate threats generally are habitat loss, habitat degradation and over-harvesting. (Hamilton, 1997).

The global demand for herbal medicine is not only large, but growing (Srivastava, 2000). The market for Ayurvedic medicines is estimated to be expanding at 20% annually in India (Subrat, 2002), while the quantity of medicinal plants obtained from just one province of china (Yunnan) has grown by 10 times in the last 10 years (Pei, 2002 B).

(Lange & schippmann, 1997, Srivastava et al, 1996, Xiao pei-gen, 1991) reported that in global strategy for plant conservation over 60,000 species have been evaluated for conservation status according to internationally accepted criteria, of which 34,000 are classified as globally threatened with extinction (IUCN, 1997). In addition, many countries have assessed the conservation status of their own floras. There are currently about 270,000 known species. Of those still to be evaluated, sufficient information for a full assessment is only available for a proportion. Thus, only a preliminary assessment will have been carried out on the remaining, "data-deficient" species. Subsequently, further

fieldwork will be essential to enable more comprehensive assessments to be undertaken.

The most commonly cited figure for the fraction of the global flora threatened with extinction 13% is known to be a serious underestimate, because it does not include a reliable tally of species at risk in the tropical latitudes where most of the world's plants grow. The vast proportion of potentially threatened tropical taxa (~121,000 species) are endemic to countries in biodiversity hot spots where high floristic diversity and massive habitat loss coincide. (Pitman, 2002).

4.8 Threats

Several threats to the biodiversity of the Soon Valley area has been identified during field surveys and interaction with local communities of the Soon Valley. These threats are posing a serious challenge to the survival of the plant species and their associated wild birds and animals. Identification of threats to plant biodiversity was an important part of the study. During field survey and interaction with local peoples, these threats were identified and their scale and impact were also studied. Overall habitat degradation, Soil erosion, Grazing, Deforestation, Drought and frost, fuel wood collection, Mining, Forest fires, Invasive species are major threats to the plant diversity. Review of the literature also revealed that these threats have been identified in previous work in study area as well.

4.8.1 Habitat Degradation

Floral habitat of the area is highly degraded due to several mixed factors and due to this degradation regeneration and growth of the plant is highly effected. This factor has been observed in reserve forest, Shamilat-e-deh area. Plant species distribution is restricted and several floral species are confined to specific localities.

Deterioration of the vegetation cover and lack of regeneration has been identified as one of the serious issue in the area due to this factor distribution range and habitat of certain floral species are highly threatened similar results were reported (Said, 1952) as destruction of soil cover by excessive grazing, illicit lopping, browsing and felling is causing soil erosion and denudation of

hillsides. Landslides are frequent and bare and sterile rock is exposed which cannot support any vegetation.

Insect and wild animal also damage flora but this damage is not quite significant similar observation was made by (Said, 1952) insect's damage to the flora is not of any significant value but they do damage Phulai seed while on tree.

According to (Said, 1956) and Champion, Seth and Khattak (1965). Lack of natural regeneration of (*Olea ferruginea*) and (*Acacia modesta*) tree species is a major forestry problem of the area, natural regeneration of these two tree species was almost absent in the entire tract. It is probably due to high grazing pressure since both the species are highly palatable and or because of the type of silviculture system (coppice with standards) under which the forests of the area were managed to date.

Past abuse, overgrazing and heavy firewood extraction have eliminated many of the forest and degraded most of the existing ones. (Sheikh, 1987).

With (2002) stated that habitat loss, fragmentation and invasive species collectively pose the greatest threats to biodiversity.

4.8.2 Soil Erosion

Soil erosion is one of the major threats to the plant resources of the Soon Valley as it washes the top fertile layer of the soil, thus leaving bare soil which affects the growth of the medicinal plants in area.

WWF – P, Report (2001) described that the Salt Range denuded by over grazing and excessive tree cutting has severe soil erosion very large areas, estimated to be about half a million acres have been eroded.

Ali, (2004) reported that reduction in forest cover in the watersheds increases soil erosion and leads to siltation of wetlands. In particular the community owned forest has been severely extracted at Uchali wetlands complex.

Similar results were reported in a project (DMPP, 2006). Annual sediment load for Kaila nullah is 2.8 acre feet, Sabhral 0.9 acre feet, Kuradhi 4.9 acre feet, Gub 29 acre feet, Jabba 0.4 acre feet, Gohra 9.4 acre feet in Soon Valley area which shows high erosion rate.

Kafeel, (2008) reported that extensive and uncontrolled grazing in the Soon Valley accompanied by aridity has accelerated the erosion process. The unweathered exposed rocks have no longer remained capable of supporting even herbaceous vegetation.

4.8.3 Grazing

Grazing in range, forest and agricultural lands have been identified the most serious threat to the vegetation. Similar observation were made by Said, (1952) that grazing is also one of the serious threat to the vegetation in area and negative impacts of the grazing are very clear in the area especially in Shamilat-e-deh and state reserve forest, due to uncontrolled and heavy grazing distribution range of the many species have been affected, Salt Range forests have been subjected to the browsing by military camels from 1908 to 1945.

(Said, 1956; Sheikh, 1987) reported that the requirements of the people which include grazing for their cattle, sheep, goats and camels; firewood for heating and cooking; small timber for agricultural implements and for building purpose are met with from these forests. People have rights to graze their cattle and collect firewood (dry and dead). Grass cutting is also generally allowed. However, illicit lopping and felling are common.

Velazco Macias and Nevarez de Los Royes, (2000) concluded that the effect of live-stock grazing could be a threat to the populations.

Results indicated that stresses such as grazing, browsing and trampling were important than edaphic factors in determining community composition (Rajvanshi et al, 1985).

Khan et al, (1994) reported that all three types of community (Shamilat-e-deh), government (Reserved), and private rakh forest exist in Dhadar and the reserved forest is managed by the Punjab Forest Department. Community forest is badly degraded due to lack of clear ownership rights, which has led to communities over exploitation of forests for fuel wood collection and animal grazing.

Stunted growth of the Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*) have been observed in area due to heavy grazing. Shamilat-e-deh and reserve

forest vegetation is highly degraded due to heavy, unplanned grazing both by local community livestock as well as nomads and Afghan refugees herds grazing. It has been estimated that over exploitation threatens 150 species of MAPs in at least one European country (Large, 1998). Many of the threats to medicinal plant species are similar to those causing endangerment to plant diversity generally. The most serious proximate threats generally are habitat loss, habitat degradation and over-harvesting. (Hamilton, 1997).

The plant communities are also losing their species richness at high rate due to clear cutting (Johnson et al, 1993) and extensive exploitation of grasslands for rearing animal herds. (Peet et al, 1983).

Awan, (2001) reported that different nomads of Bakarwal with flocks of livestock mainly sheep and cattle also visit Salt Range on a seasonal basis from Azad Kashmir and use the range for 3–4 months. They pay some money to the locals for access to their lands for grazing. The estimated density of livestock in the Salt range was 119 animals per km² with variable figures i.e 65 goats / Km², 15 domestic sheep / km² and 39 cattle /km².

Hussain, (2002) reported that due to overgrazing and poor management practices the grass species are restricted to specific areas are more vulnerable such as (*Paspalidium flavidum*, *Enneapogon persicus*, *Lolium sp* and *Chloris dolicostachya*). There are various factors which are instrumental in the deterioration in the habitat of grasses. Due to growth in live stock population in the area, there is more grazing pressure in the area. There is unrestricted grazing except the protected areas, and no body is responsible for conservation, resulting in ruination of the area. It is also observed that in some areas of Salt Range, nomadic tribes migrate from the warm low lands to pass the summer and their nomadic herds increase pressure on fodder species of grass, which are already being heavily grazed.

Ali, (2004) reported that although communal grazing lands have been most affected Government forest also suffer from grazing pressure where access is uncontrolled.

Overall, the increasing population pressure in the Soon Valley is the greatest threat not only to plant bio-diversity, but also to all the natural resources (Hussain, 2002). It is possible that 'the forest has been destroyed both by the biotic influence and due to desiccation confronting this area.

4.8.4 Deforestation

Deforestation in study area has been observed at wide scale and up to the extent that all shamilat deh forest are devoid of vegetation in Soon Valley. reserve forest devoid of good tree cover of the Phulai (*Acacia modesta*) and Kahu (*Olea ferruginea*). Local fuel wood collection and fuel wood export have destroyed even the fast private protected areas in the Valley, as observed in field surveys, extent of the deforestation is at wide scale due to weak regulatory mechanism and limited restriction on fuel wood export to the other areas.

Undoubtedly, fuel, timber and fodder are important commodities for livelihood and wood cutting for these essential items is a great dilemma. Unwise cutting and clearing-of forests result in extensive loss of plant and animal biodiversity (Chaughtai & Yousaf, 1976). So cutting of a large, number of plants in the forests of Soon Valley being a routine practice may also be regarded a major threat to plant diversity (Khan, 1960; Ali et al, 1987; Marwat, 1988).

Large deforestation has progress increased the regional temperature (Ahmed, 2002) and devastated the vegetation of the entire Soon Valley. Large scale deforestation in the adjoining area of Soon valley has devastated the environment of the valley. The slopes once covered by lush green forests are now barren. Along with the global warming effect, the alarming rate of deforestation in the area has led to steadily progressive rise in temperature. Similar results were reported by (Ahmed, 2002). According to meteorological reports, this rise has been between 3-4°C during the last two decades (Horticultural Research Station Nowshera, 2002).

If we scrutinize the data, it is easy to ascertain that the temperature rise in the valley has been directly proportional to the rate of deforestation (Hussain, 2003).

Kafeel, (2006) reported that according to this view the present arid conditions in this region are man made. It might be pointed out here that there is no definite evidence to show that arid conditions are due to deforestation. Moreover, it is unlikely that there has been any progressive desiccation in the last two thousand years. Forest destruction was also one of the major factors responsible for fewer rains, as the numbers of trees were inadequate to generate the amount of moisture in the atmosphere required to trigger rains.

4.8.5 Drought

Drought and other natural calamities such as frost have also negative impacts on flora of the Soon Valley, as these impacts have been observed in 2007, when due to drought and frost heavy damage to the flora was observed. Drought is one of the serious threats to the biodiversity of area and 1997 drought have negative impact on flora and fauna.

There were three wetlands in Soon valley, namely Uchali, Khabeki and Jahlar. These lakes are with brackish to saline water and support little marsh vegetation (Akbar, 1990 Chaudhry and Akhtar, 1991) and a little aquatic vegetation without extensive reed beds, mostly surrounded by Agricultural fields due to previous five years dry spell Khabeki lake has not even a single drop of water and is totally dry in 2003.

Hussain, (2002) reported that the subsoil water of the region has fallen very deep and the lakes have completely dried that has resulted in extreme aridity and proving an additional set back to the natural vegetation.

Drought and salinity were the most serious threats to agriculture and to the environment in many parts of the world (Altman, 2003).

The direct evidence to account for the presence of poor vegetation is the aridity of the valley. It is also reported in the literature that 2000 to 3000 years ago heavy rainfall was observed in this region followed by progressive desiccation was noted (Hussain, 2002, 2003).

Saeed, (2002) reported that unfortunately the introduction of the more profitable off-season vegetables has led to the increased exploitation of underground water, Three decades ago, there were only a small number of bull-

drawn dug wells in the valley to enable farmers to water conventional crops like maize and sorghum. After the introduction of cauliflower, the number of dug wells increased rapidly, for now the community was earning four to five times more from farming off-season vegetables. In the last 15 years, the farmers shifted from dug wells to peter engines and started pumping water at much higher rates. When water recharge was reduced, the additional income from the sale of off-season vegetables induced the farmers to install small tube wells to irrigate even more land. Today, due to the indiscriminate use of groundwater by the farmers in the Soon Valley, the water level has gone down in the dug wells in the valley and is affecting the biodiversity of area.

Soon Valley vegetation suffered a serious set back due to drought cycle. The average rainfall in the area before the onset of the drought was over 300 mm, however it received only 55 mm of rain in 1998 and even less than that in each of the subsequent two years. This has resulted in a rapid shrinking of wetland areas Khabeki lake dried up completely during drought cycle. (DMPP, 2006).

Kafeel, (2005) reported that another harmful effect of deforestation was the large scale erosion of slopes that result in land slides, which are a common in the valley. This area lies in the arid and semi arid region, characterized by low rainfall, high temperature, and low humidity. There are frequent droughts and the forage capacity fluctuates greatly with rainfall under such conditions. Efforts are required to prevent overgrazing, as once vegetation is lost; it is very difficult to restore it. There is also a need to introduce reforms that can increase the role of government along with communities to manage it on scientific lines. Frost is also one of the important factors which effect vegetation negatively as similar observations were made by Said, (1951). Severe frost are rare, but previous record shows that in December 1950 the severe frost killed many species of bushes particularly Santha and at some places leading shoots of Phulai were killed.

4.8.6 Fuel wood Collection

Fuel wood collection is one of the major uses of the forest resources of the area. Fuel wood collection and trade is one of the serious threat to the plant

species. Due to fuel wood collection several species are threatened and tall trees of the Kahu, Phulai, Ber are disappearing mainly used as fuel wood. Fuel wood smuggling and unregulated trade has devastated several community owned rakh, and due to increasing trend there is likely fear of fuel wood shortage in next coming years as Phulai and Kahu are slow growing species and 30-50 years to reach up to full maturity.

Awan, (2001) reported in a research that an estimated 278, 950 persons spend at least 15 hours / week in the Uri habitat for fuel wood and fodder collection. In the site most of the villages are located at an elevation of 750 meter, above sea level, so it takes 'more time to cook food due to slightly lower atmospheric pressure and chilling in winters. These factors enhance the requirement 'of fuel wood. Furthermore Kahu (*Olea ferruginea*) branches are frequently cut to fulfill the demand of the local market; these branches are processed into fancy walking sticks and sold in the markets of large cities of Pakistan. (Ahmed, 2002), (Husain, 2003). All these anthropogenic factors thereby disturbing the plant diversity and lead to deforestation of the area Lopping of wood for grazing the domestic animals and cutting of woods and shrubs for fuel purpose are the two main disturbances to the entire local vegetation. At some places accidental fires caused due to the carelessness of legal and illegal honey hunters also, sometimes become uncontrollable which wipe out the vegetation from a large area.

Hussain, (2002) reported that the inhabitants of Soon Valley seem very eager for the conservation of natural vegetation in general and some endangered leguminous (*Acacia modesta*) and non leguminous (*Olea cuspidata*) species in particular subject to the provision of some alternate fuel and fodder resource.

Waseem, (2002) reported that getting fuel for cooking and heating is very common due to poverty and non-availability of alternate sources of energy. Stunted trees, which have not been allowed to grow, have a story of exploitation to tell. No immediate solution seems possible but deterrence and monitoring can reduce the extent of damage.

Awan, (2004) reported that Koradhi Village has all three types of community, government and private forests. The major threats to forest include deforestation, forest fires, and mismanagement.

Kafeel, (2006) reported that woodcutting for fuel is a dilemma of developing countries. Poverty stricken people are dependent on the forest for their livelihood and fuel requirements. Each day tons of wood is collected from the forests of the Salt Range. Daily, before dawn, groups of women emerge from the villages of the Soon Valley to cut and collect firewood from the forests. They form -long queues before entering the forest area. After collecting the wood in huge bundles, by first light they are ready to return home. As part of the culture of Soon, all the heavy-duty tasks are carried out by the women. The reason wood is cut and collected before dawn is so that the women will confront minimum resistance from the forest guards deployed on duty. Recently World Wildlife Fund - Pakistan provided fuel- efficient stoves to the locals, which will reduce the need for fuel wood. Kao branches are quite in demand in the local markets. Each Kao stick having a diameter of 1- 2 inches and a length of 4-5 feet may fetch up to Rs. 100. These branches are treated and finished into fancy walking sticks, which are sold in the markets of big cities. Walking sticks of Kao wood are very durable and naturally termite- proof. The local men carry out such branch cutting jobs, as they can expertly identify the right sized branches for making the walking sticks. Kao trees stripped of branches are a common sight in the Salt Range.

Tahri, (2007) reported that there is no law in the government forest that restricts the amount of wood collected by individuals. However, cutting fresh branches or trees and having tools such as axes are restricted by forest guards. The common belief is that, camel owners start fires so that trees burn and become dry. In this case, they are collecting only dry branches and derbies and are not questioned by forest guards. Women are engaged in wood fuel trade. Wood extraction is undertaken both for the domestic fuel market and for supply to urban centers Local people also extract honey and other forest product supplement their income. The effects on Shamilat (Community forests) have

been devastating leading to excessive deforestation and government owned forests are under pressure mainly due to lack of enforcement, non-participatory approaches to forest management and lack of alternatives for fuel.

Tahri, (2007) reported that fuel wood collection activity is carried out both men and women, usually women in group of 5 – 10 goes to the forest and carry load of 15 – 30 kg. Commercial fuel woodcutter use camel, donkey and trolley where there is road access. Women communities are more dependent on government forests for fuel wood collection than community forests Shamilat-e-deh as later or severely degraded. Women are highly dependent on forests for household fuel wood requirements, while the government reserved forest are primary sources of fuel wood and fodder collection in Koradhi and Dhadar villages women journeys in search of fuel wood and fodder are longer than before due to over exploitation of resources in both community and the Government forest.

Tahri, (2007) reported that fuel wood collected from forests is used for cooking and heating in winter seasons. The main products collected included branches of Kahu (*Olea ferruginea*), Phulai (*Acacia modesta*), Snatha (*Dodonea viscosa*), and Papper (*Buxus papillosa*). Women were predominantly depending on the government-reserved forest for fuel wood requirements. There were different responses in focus group discussions to the question of why women depend more on the government forest for their requirements compared to the communal Shamilat-e-deh forests. One of the main reasons for high levels of dependency on government forests is due to the fact that most community forests are severely degraded. The fuel wood collected by women is mainly used for cooking and heating the house in winter times.

The area does not have supply of piped gas and the main fuel consumed is wood collected from forests. Even though, gas cylinders were available in two villages, however, this option is extremely expensive compared to wood collected from forests (WWF, 2006, Tahri, 2007)

4.8.7 Mining

Mining activities has been observed in Soon Valley area on a large scale especially Coal mining, limestone collection and sand exploration. Mining activities are spread over the whole area and have destroyed vegetation cover of the area through tracks, residues and deterioration of the soil. Some of the areas like Koradhi, Gorra and Sodhee forest areas are the examples of this deterioration.

Awan, (2001) reported in a research study that the exploration of mines in the Salt Range was speeded up in 1975 when the Punjab Government established Punjab Mineral Development Corporation (PUNJMIN) and further in the early eighties when the private sector was involved in exploration. Presently more than 700 mines are operating in the Salt Range and there has been 70 % increase in the number of mines in the last ten years. Mining was indicated as posing potential future risk to the ecological integrity of the Salt Range, due to redevelopment of old mines site, the non rehabilitation of mine sites and the expansion of the existing operations, air pollution and increased human access.

Hussain, (2002) reported that Salt Range is very rich in natural resources and since centuries mining operations are being carried out at extensive scale for the mining and recovery of coal, salt, sand, gypsum and oil. The laborers hired for the mining and transportation purposes along with their animals exert additional pressure on the regional biodiversity including that endemic to Soon Valley. Whilst the pollution created by extracted ores, and the remains of the ores along with impurities additionally pollutes the environment and exerts great stress on the biota.

Waseem, (2002) reported that mining for red clay is used in ceramic industry is being undertaken at a number of places around the Sakesar area.

4.8.8 Forest Fires

Forest fires in recent years have caused a significant damage to the vegetation of the area, several high value protected and good vegetation cover areas has been degraded due to forest fires and it has been observed during surveys in Soon Valley in present study.

The primary cause of forest destruction was the frequent forest fires. In the summer 2003-2004 there were 20 incidents of fires in just 45 days, the local herdsmen deliberately ignited most of them. This was done prior to the Moon Soon season, as the burnt areas produced more fodder for the cattle and sheep of the local people after the rains. Due to extensive grazing pressure very little litter was accumulated which can cause natural fire (Khan et al. 1994). However some incidents of accidental fires caused by illegal honey hunters normally such fires were self-extinguished after a day or two. However, there were three incidents where the forest fire spread over large areas and enormous efforts were needed to extinguish it. (*Olea ferruginea*) trees containing an oily substance, which is highly inflammable. Hence the (*Olea ferruginea*) tree burns like a torch and reduced to ashes in a matter of minutes (Ahmad, 2002).

Hussain, (2002) reported that due to the extensive grazing pressure very little litter is accumulated which can cause natural fire. However, in some Government reserved Forests incidents of accidental fires caused by illegal honey hunters have been reported very common which sometime become uncontrollable and wipe out very pristine vegetation on large scale. The training of indigenous people on voluntary basis to fight with such accidental fires seems the best solution of this problem.

Tahri, (2007) reported that women community in two villages of the Soon Valley Koradhi and Dhaddar agreed that forest fires are started by honey collectors, while camel owners are also responsible for forest to collect more dry fuel wood. The issue of forest fires was raised several times by women in different context. In this context all women agreed that forest fires were one of the reasons behind forest depletion. According to them fires are started by honey collectors from other villages using the government forest. "Honey collectors smoke the trees and sometimes trees catch fire, it is not a deliberate act but forests suffer a lot". Nevertheless, no one from the participants has seen anybody setting the forest on fire in particular the honey collectors. "We never saw them (the honey collectors), we hear it from our husbands and fathers and they hear it from the forest guards". In addition, some women thought that

camel owners are responsible for forest fires in the government forest. "The camel owners who bring wood from the forest to sell in the market deliberately set forest on fire so that they can collect more wood".

Droughts were also mentioned as causes of forest destruction. According to women, previous droughts in the region that lasted up to 2005 caused forest fires in many forests in Soon Valley. In addition, they said that the number of medicinal plants is less due to less rainfall and fire that occurred two years lack. "Forests were on fire for 2-3 days and no one did anything to stop the fire". Data of forest department reveals that from 1998 to 2008, 50 incidents of forest fire occurred in 22 different forest patches resulting in burning of 2223 acres of reserve forest (Range forest office record, 2008).

4.8.9 Invasive Species

Invasive species spread is also one of the serious threat to the biodiversity of the area and Mesquite (*Prosopis glandulosa*), (*Opuntia monacantha*), (*Tyha domingensis*), (*Lantana camara*), (*Parthenium hysterophorous*) are spreading fastly in area, Some of these species have occupied the habitat of the natural vegetation in Soon Valley area and it is restricting the distribution range, frequency and cover of other plant species.

(Randall & Marinelli, 1996) observed that human induced disturbances in the removal of native vegetation for activities such as farming, forestry and mining. These provide an open niche for alien invasiveness due to lack of competition and altered soil structure, availability of moisture and nutrients. Similar results have been reported by Hussain, (2002) that biotic interference is visible everywhere in the Salt Range forests but its impact is greater in the open-to-excess areas, than the protected areas. The protected areas in some cases are badly invaded by the Invasive introduced species e.g. (*Prosopis spp*) introduced in the Sodhi Game Reserve has not only delimited the movement of Punjab Urial but is also threatening the existence of local vegetation in the protected area.

The introduction of alien plant species can have serious and far-reaching effects on indigenous ecosystems. (Pascher, 2003).

Zubaida et al, (2004) described that in Mianwali District another problem of the area like many other part of the Pakistan is unplanned introduction of exotic species. Eucalyptus species is one of the exotic species that effected the native vegetation badly.

(Shabbir, & Bajwa, 2007) documented that (*Parthenium hyterophorus Linn.*), (*Asteraceae*), an alien invasive species, commonly known as (*Parthenium*) weed in an annual or short-lived ephemeral herbs of neo-tropical origin that now has a pan-topical distribution. In Pakistan, this weed is spreading aggressively in wastelands, degraded areas, rocky crevices, along water channels, roadsides and railway tracks. It has recently also been reported in cultivated lands. This noxious weed can affect crop production, animal husbandry, human health and biodiversity.

4.9 Future conservation Action plan for medicinal plant resources of Punjab Soon Valley

Hussain, (2003) reported that deteriorating environmental condition. Such as aridity, soil salinity, soil erosion and acid rain in different parts of the world had forced the ecologists to devise suitable measures for the conservation of highly endangered plant communities. Soon valley conservation efforts include initiatives in forest conservation sector include capacity building and training of local community fire brigades to combat forest fires, creation of community based forest management with the help of local people invigilating illegal cutting, and a conservation project carried out by elderly people in order to manage the reserved forest. Earlier initiatives, however, have terminated due to failure in bringing tangible changes could benefit the communities involved. Additionally, over the 30 years, the government has done so little effort for managing and conserving forests in Soon Valley. (Habeb et al, 2000, SVDP). During the last decade especially severity of environmental factors like aridity, and anthropogenic disturbances has caused severe damage to wetlands and plant communities in general and their important components animal and plant species including legumes in particular. The inactivation of strict governmental laws and provision of alternate fuel and fodder sources is required very

necessary otherwise the remaining plant diversity may not be expected to remain capable of resisting the threats to their survival. (Ahmad et al. 2008).

Ahmad, (2008) proposed that to protect this valuable treasure, over grazing and clear cutting should be prohibited. The inhabitants should be educated about the importance of medicinal plants. The low rain fall deficiency can be compensated up to some extent by constructing dams and operating tube well system in the valley by the government. Similarly inhabitants should be provided alternate source of fuel, forage and timber. So that valley once again may become a rich source of this green treasure.

Future conservation action plan has been developed through broad consultation with all stakeholders.

1. Community Participation in conservation of Plant resources. Local community involvement is essential in order to conserve local plant resource basis, they can be involved in following activities.

- (i). Awareness raising
- (ii). Sustainable harvesting
- (iii). Documentation of local knowledge.
- (iv). Cultivation of the plant resources

2. Promoting commercial use of the medicinal plants through community involvement.

3. Gene Pool Conservation and Establishment of Seed Bank. Due to rapid development in Salt Range there is a need that gene pool of the selected species may be preserved and a seed bank may be established to ensure survival of the threatened plant resources.

4. Management of Protected Areas

Protected areas of the Punjab Salt Range are poorly managed by Punjab Wildlife and Forest department; furthermore various government projects in these areas have degraded these areas. There is a need that these protected areas are managed on scientific basis.

5. Establishment of new protected areas

From the floral biodiversity point of view Salt Range protected areas have played an important role, so there is a need that some important

areas may be brought under protected area system. Management plan be developed and scientific study may be conducted with respect to status of flora of protected area. The study proposes following areas to be considered for this purpose which are not part of already existing network of protected area.

- (i). Gorra reserve forest (covering Southern Side of the Salt Range)
- (ii). Sakesar Reserve forests.
- (iii). Rakh Khariot reserve forest and Kinhati garden.

6. Control Of Exotic Plant Species:

There is a need that invasive exotic species spread may be controlled so that natural forest vegetation is not affected, some of the exotic plant species identified in study area includes.

- (i). Mesquite (*Prosopis glandulosa*): It is most common in Sodhi, Kalyal, and biakh villages.
- (ii). Lantana (*Lantana camara*): This is spreading fastly in northern Salt Range in Jabba village.
- (iii). Paper Mulberry (*Broussonetia papyrifera*): Paper mulberry has spread on cultivated lands in whole area.
- (iv). Eucalyptus (*Euclyptus camaldulensis*): Eucalyptus has been planted in school, hospitals, and on cultivated lands and under present circumstances of depletion of the underground water resources its spread is harmful. As these plants are spreading on cultivated and Range lands and are affecting growth and spread of medicinal herbs and shrubs by occupying their habitat their control is necessary to flourish medicinal plant diversity.

7. Research studies on Ethno botany

There is a need that sufficient resources are available for field level research carried out by students' so hat new facts and figures may be investigated. There is a need that special research grants may be provided for these studies to fully investigate the less studied aspects of the sector.

8. Comprehensive fire fighting plan for Soon Valley

Forest fires are one of the most destructive aspects which destroy the forest resources of the area. There is a need to involve local in fire prevention and control measures.

9. Buffer zone creation around protected areas

Buffer zone may be created around the protected areas for minimizing direct interventions in the protected areas and conserving the wild medicinal plant resources.

10. Involvement of Government departments:

Government departments especially Punjab wildlife and Mine department may be involved in conservation program as the Mineral departments is playing a havoc with plant diversity of Salt Range by allowing new leases in reserve forest areas, while forest department have no management plan for Salt Range forest after 1960 working plan.

11. Proper Harvesting and Processing of Medicinal Plant Products

12. District Level Legislation to Regulate supply and demand of herbs.

13. Establishment of small scale sustainable environment and enterprise development scheme to promote cultivation.

14. Micro credit facility for business training and marketing support.

15. Cultivation, harvesting and marketing through private enterprises through Qarshi Industries, Hamdard Dawakhana.

4.9.1 Conclusions

1. Traditional knowledge about medicinal plant is depleting rapidly and there is lack of knowledge transfer from one generation to the other.
2. Potential habitat of medicinal plant is threatened due to deforestation forest fires and drought cycles.
3. There exist no proper marketing system and the marketing system is unorganized, complex and less profitable to local people.
4. Shamilat-e-deh lands have degraded to great extent while forest areas have better plant cover.

5. Propagation of the wild medicinal plants needs special care and green house structures.
6. Very few medicinal plants are cultivated on agricultural lands, while the trend of farm level cultivation is not satisfactory.
7. Harvest level of the some species is non sustainable.
8. There exist no legal or social control limits on harvesting level of the medicinal plants.
9. Mining and degradation of the protected area is also one of major threat to plant biodiversity.

4.9.2 Recommendations

Keeping in view the findings of the study, following recommendations for future research work and follow up activities are proposed.

1. Some medicinal plant species needs special conservation measures through their gene pool conservation and Ex-Situ conservation measures such as
 - (i). Mosli Safed (*Asparagus adscendens*)
 - (ii). Maida Sak (*Neolitsea chinensis*)
 - (iii). Suranjan Shirin (*Colchium aitchisonii*)
2. Establishment of botanical garden at suitable sites such as Kinhati garden, Nurwari garden, Sodhi garden, Phulwari garden.
3. Farm level cultivation of the following species may be started in area on larger scale.

(i). Alsi (<i>Linum usitatisimum</i>)	(ii). Aniseed (<i>Pimpinella anisum</i>)
(iii). Cassafron (<i>Crocus sativus</i>)	(iv). Ajwain (<i>Carum copticum</i>)
(v). Saunf (<i>Foeniculum vulgare</i>)	(vi). Kalonji (<i>Nigella sativa</i>)
(vii). Podina (<i>Mentha longifolia</i>)	(viii). Ispaghol (<i>Plantago ovata</i>)
(ix). Tukhm Malanga (<i>Lallemantia royleana</i>)	
(x). Tulsi (<i>Ocimum basilicum</i>)	(xi). Safflower (<i>Carthamus tinctorius</i>)
(xii). Kuwar Gandal (<i>Aloe barbadensis</i>)	(xiii). Kasni (<i>Cichorium intybus</i>)

4. Cultivation trials on farmer lands.
5. Collaboration with Qarshi industries and other Pharmaceutical companies.
6. Research studies on some selected medicinal plants.
7. Marketing system study at national and regional level and its linkages with regional level through LUMS and other universities.
8. Intellectual property rights for medicinal flora
9. Better management of the existing protected areas.
10. Formulation of the regional strategy on conservation, cultivation, and commercialization of medicinal plants for ecological, cultural and economic enhancement.
11. Conservation and awareness program on wild herbal flora.
12. Formulation, implementation of new Forest Act for Punjab forest department for better floral diversity protection.
13. Collaboration of Research organizations, universities local CBO and local Hakims.
14. Publication of a Booklet on medicinal plant for better identification.
15. Special research assistance on Punjab Salt Range.
16. Development of a demonstration site and vegetation exclosures for research and demonstration purposes.
17. Phyto chemical Pharmacology research on drug from natural resources plants.
18. Collection and plantation of exotic germplasm of medicinal herbs at herb garden
19. Standardization of production technology for selected medicinal plants post harvest management and seed multiplication.
20. Institutional strengthening at district level.
21. In situ conservation and Ex. Situ conservation at selected sites.
22. Marketing linkages for national and international markets.
23. Micro credit facility and enterprise development facility as SME (Small and Medium enterprise in medicinal plant sector.

24. Range land production potential may be increased by planting commercial olive plantations.
25. Shamilat-e-deh forest may be transferred to the forest department in Khushab district for better management like Chakwal and Jhelum District.
26. Ban on cutting of Phuali and Kahu may be imposed from all type of the forest including, reserve forest, Shamilat deh and private rakhs with immediate effect.
27. Fuel wood transportation may be banned outside of the area for the period of 5 years.
28. Local forest and wildlife guard may be appointed in reserve forest.
29. Fire lines may be developed in all reserve forest areas by forest department.
30. Royalties may be provided to the local village Union Council in mining activities occurring within the jurisdiction of the respective Union Council.
31. Mining in Shamilat-e-deh forest may not be allowed until and unless approved by village representatives.
32. Prior E.I.A of the mining activities may be made compulsory before granting lease to mine holders.
33. 25% of the total revenue generated from mining activities must be spent on rehabilitation program of respective area.
34. Range land management program which is under implementation in Chakwal District may be extended to Khushab District by Punjab Government.
35. Forest Department may be provided resources to develop nursery within Soon Valley and regular afforestation may be carried out in reserve forest areas.
36. Forest and wildlife guards may be provided motorcycles for better mobility through Punjab Government Scheme.

37. Seasonal fuel wood depot of Afghan refugees may not be allowed in Soon Valley area.
38. Setting up of new fuel wood depots may be banned for the period of 5 years.
39. New working plan of reserved forest be developed and resources be allocated for its implementation, as the working plan has not been developed after 1982.
40. Grazing fee collection rates may be revised after evaluation of forage production and quality.
41. Range land enterprises such as medicinal plant cultivation, Apiculture may be developed.
42. Ecotourism be developed for selected range land areas having high tourist potential values.
43. Women community of the area may be involved in protection and management of the resources.
44. Scientific studies on range livestock may be carried out to determine its significance, issues and management options.
45. Intensive micro level watershed activities may be started in tributaries of main nullahs.
46. E.I.A of the storage dams may be carried out on nullahs directly feeding Uchchali Wetland an international Ramsar site.
47. Strict punishment and heavy fines be imposed on individual involved in forest fires.
48. Integration of resources and adoption of community participation model for range land and watershed management and projects for plant resources conservation.
49. Local level sustainable harvest of the medicinal plants as income generation activity may be started at community level.
50. Plant conservation strategy may be developed for whole Salt Range including Soon Valley based on habitat protection, land use planning and In-situ and ex-situ conservation of plant species.

51. Gene pool conservation of floral diversity be started through research and development projects.
52. Vegetation enclosures are developed in all type of forest to encourage local communities in conservation of plant resources.
53. Awareness raising on conservation of plant resources be initiated at Village level to protect and conserve threatened floral .
54. Community based management of the state resource forest and protected area be started in future.
55. Protected areas flora be ranked through surveys from conservation point of view and floral database be develop.
56. Flora of the historical gardens of British period in Soon Valley especially Kinhati, Sodhi and Nurwari garden may be protected instead of uprooting in development projects.
57. Flora around Khabeki, Ucchali and Jahlar wetland catchment area in radius of 3 kilometer may be protected and all type of cutting be banned with immediate effect in order to conserve and maintain wetlands habitat intact.
58. Future research studies be planned on association of flora and fauna and their inter linkages.
59. Floral habitat of the Punjab Urial, Chinkara, and Chukor is protected for conservation and management of these critical species.
60. Local flora plantation is encouraged in area and exotic species spread and introduction be discouraged.
61. Shamilat-e-deh forest management is transferred to the forest department and protected areas management be transferred to the wildlife department.
62. Private protected areas (Rakhs) are one of the hotspot of floral diversity their existence is threatened due to fuel wood trade, program may be developed at government and NGOs level to manage and sustain them effectively.

63. Graveyards of the Soon Valley also contain some of the unique floral species, vegetation cutting especially tall trees and fencing of the graveyards may be given priority in government development schemes at tehsil and union council level.
64. Wetlands of the Valley Soon Sakesar Uchali, Khabeki and Jahlar are international Ramsar site, they have great significance in terms of floral values both aquatic, and terrestrial flora, so conservation of wetland biodiversity must be ensured through field interventions in future like Pakistan wetlands program by WWF-Pakistan.
65. Scientific studies on grazing pressure and its impact on vegetation may be explored for grazing management in Soon Valley area.
66. A full scale agriculture research station may be established in area with wild life and range management branches.
67. Environment department at district level and wild life department may be brought under EDO agriculture.
68. Wild life check posts may be established and activated for effective control on illegal hunting.
69. Regular survey/census of important wild life species may be carried out on annual basis.
70. Species conservation plan for Punjab urial and white headed duck may be developed.
71. Uchhali wetland game reserve may be declared wild life sanctuary and fishing activities at khabakji wetland may be banned.
72. Development of the wild life breeding centers both at government and private level may be encouraged.
73. A Metrological station may be established in area.
74. Ban on hunting for the period of 10 years may be imposed at Tehsil khushab level.
75. A district level conservation forum consisting of line department and civil society may be formed for natural resource conservation.

4.9.3 Relevance of the recommendations with official's legal mechanism

The official mechanism with relevance to the flora and found is Punjab Forest Act, 1935 and Punjab Wildlife Act, 1974. Under these two acts Punjab Forest and Wildlife department are operating in area. However the effectiveness of both the department is limited. In case of the Forest department forest guards are poorly equipped, with no mobility and having no residences. They have to rely on local people for food and residence. Their also exist a corrupt system, in which camel owner and wood cutter pay fixed amount to the guards, as identified by local peoples Millat system, due to this system wide spread damage is occurring to forest and wildlife. Camel owner cut fuel wood on daily basis, some glaziers have oven no grass cutting permits but they use grass for grazing. In rainy season some herdsmen and camel owner stay in forest, although which is illegal but they have illegal permission from the forest guards. Hence the forest protection system is failed, has no check and balance and is in favor of the wood cutter. Same is the case with wildlife department, where watches are fully ill equipment, no mobility and also having no proper residences or accommodation. Usually they have to check huntress which are on vehicles, so their effectiveness reduces. Outside watchers are also employed which know very little about area. Due to political pressure, lack of mobility, low salaries and corruption the existing system is not playing any effective role in conservation of the flora and fauna, so a set of the recommendation is proposed keeping in view the above mentioned factors. There is a need to enforce Punjab wild life and forest act in efficient manner and political interference may not be allowed in working of these two critical sectors. There is also need to evolve a mechanism of community participation in conservation and sustainable utilization of natural resources.

CHAPTER 5
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QUESTIONNAIRE (1)

Name of Student : Malik Farooq Ahmed
 Department : Plant Sciences
 Institution / Organization : Quaid-i-Azam University
 Name of respondent : _____
 Village / Union Council : _____
 Dated : _____

Marketing survey medicinal Plants

1. Name of the Pansar Store / Owner

2. From which market you bring raw material which is used in medicines
3. At local level who bring the raw material of the medicinal plant.
 a. Men b. Women c. Herdsmen
- Place / village -----
4. What percentage of the raw material of medicinal plants is obtained from local market?
5. Percentage of medicines raw material obtained from outer market
6. Local level medicinal plants raw material / seed
 a. ----- b. ----- c. -----
7. In your opinion which medicinal plants can be cultivated at local level?

8. Any experience / success / Failure about medicinal plant cultivation.
9. In your opinion how market of the local medicinal plants can be improved.
10. Use of the medicinal plants have increased or reduced.
11. Enlist plants utilized in higher quantity.
12. Which medicinal plants can be collected at local level?
13. Do your Pansar store bring more material from outer market in past or now?
14. How medicinal plant cultivation can be improved.
15. List of the plants sold in outer markets collected locally.
16. How medicinal plant cultivation and used can be improved.
17. Information about product / medicinal plant in Pansar /store.
 - i. Name of the product / Plant
 - ii. Use Less / more
 - iii. Local market rate
 - iv. Whole sale rate
 - v. Major use
 - vi. Source Local market Outer Market
18. Top ten medicinal plants of area

19. Plant used in animal diseases
20. Response about plant cover
21. Awareness percentage about conservation status of flora

QUESTIONNAIRE (2)

Survey of indigenous knowledge / Hakeems and others

- Name:- _____
1. Period associated with this field _____
 2. Do you practice and how many patients visit your clinic _____

 3. From where you get material for medicines local Markets _____
_____ outer markets _____.
 4. From which market you bring material
a. _____ b. _____ c. _____
 5. Do you prepare medicines in your clinic _____
 6. Percentage of medicines prepared by yourself. _____

 7. How many people sell their material at local level. _____

 8. How medicinal plant market can be improved _____

 9. Name of medicinal plants which can be prepared locally _____

 10. Name of local medicinal plants used in preparation of medicines _____

 11. Names of medicinal plants which are endangered _____

 12. 5 Rare and high priced local medicinal plants _____

 13. Name of plants which vanished from valley _____

 14. Names of local plants whose markets can be developed. _____

15. Medicinal plants exported outside of area
16. Collection of Agents of medicinal plants
17. Medicinal plants sold in vegetable markets
18. Medicinal plants sold in Pansar markets
19. Price of selected species
20. Local markets for medicinal plants
21. Harvesting effects

QUESTIONNAIRE (3)**Ethnobotany Biodiversity and natural resource management analysis**

1. Name of interviewed -----
2. Village ----- 3. Union Council -----
4. Major Tribes in villages
 1. ----- 2. ----- 3. -----
 4. ----- 5. ----- 6. -----
 7. ----- 8. -----
5. Major occupation / source of income
 1. ----- 2. ----- 3. ----- 4. -----

Fuel Wood

1. Fuel wood source (i) Wood (ii) LPG
(iii) Cow dung (iv) Herbs others
2. Preferred fuel wood species
i ----- ii. ----- iii ----- iv -----
3. From where you get fuel wood
i. Government reserve forest ii. Own forest / Rakh
iii. Fuel Wood depot iv. Shamilat deh
4. Average monthly fuel wood consumption
i. Summer (March - September) ----- mounds.
ii. Winter (October - March) ----- mounds.
5. Who Collect fuel wood
i. Women ii. Men iii. Children
6. How much time you spent on fuel wood
If collected from forest
----- Hours
i. How much load -----
ii. Which species you collect -----.

- iii. How much dry fuel wood collects -----.
- iv. Do you get permit for fuel wood collection -----.
- v. No. of trips in one month winter ----- summer -----
- vi. Type of tool used in wood cutting
 - a. ----- b. ----- c. -----
- vii. Have you ever been fined on fuel wood collection.
- viii. Literacy Ratio
- ix. Family status
- x. Household source of income
- xi. Threats on forest
- xii. Pressure on forest
- xiii. Biological importance of area
- xiv. Threats to medicinal plants
- xv. Threats to flora in water shed
- xvi. Threats to flora in private rakh
- xvii. Major threats to biodiversity