

Report

BASELINE SURVEY

For the project

Establishment of Participatory Support System to Protect
Juniper forest in Zarghoon Valley



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Executive Summary

The aim of development, is to improve the quality of human life. It should enable people to realize their potential and lead lives of dignity and fulfillment. The new approach must meet the fundamental requirements. One is, to secure a widespread and deeply held commitment to a new ethic, the ethic for sustainable living and to translate its principles into practice. The other is, to integrate conservation and development. The conservation to keep our action within the carrying capacity, and to enable people everywhere to enjoy long, healthy and fulfilling life.

Balochistan, with its climatic conditions, ranging from sub tropical to temperate and hyper and to semi-arid spatially, is the largest province of Pakistan. The diverse topography from sea level to lofty mountains of Kirther, Suleman and Zarghoon ranges in the north, provides a variety of climate and edaphic conditions.

The Juniper forests of Balochistan are believed to represent one of the largest remaining tracks of Juniperus excelsa in the world and are, therefore, of global significance. The National Conservation Strategy (NCS) and the Biodiversity Action Plan have identified these forests, as one of the most critically threatens ecosystems in Pakistan. This ecosystem is also the focus of the Balochistan Conservation Strategy (BCS), particularly for its biodiversity and watershed values. Consequently, these forests are also believed to be among oldest in the world. Legend has it, that they can live for several thousand years and the ancient Chinese worshipped them for being what they considered to be the oldest living creatures on earth.

Zarghoon, situated about 65 km away from Quetta, has a juniper forest, which is one of the most fragile ecosystems in Pakistan. The forest, has an extremely slow growth rate and faces very harsh climatic and geophysical conditions. The survey conducted by different groups has confirmed the presence of important wildlife species and medicinal plants. The main threats are, cutting trees for fuel wood and other uses by the local communities (domestic and commercial). All the adverse climatic, edaphic and socioeconomic factors have jointly contributed to make this forest deficient a treeless tract. If the current state of affairs continues, this natural heritage, which can aptly be called a 'living fossil' would disappear forever.

The present approach to the management of these forests is limited and involves policing to check the unauthorized cutting of trees, control the grazing of livestock and prevent the poaching of wildlife. Natural regeneration is almost, insignificant due to heavy grazing and very little viability of the berries. However, a large segment of the juniper forest in Zarghoon was hidden till a decade ago.

The project area, generally has hilly and rugged terrain with a number of narrow valleys formed between hill ranges. A number of gorges, formed primarily due to high rate of soil erosion, are also found in the area. It lies beyond the direct influence of the sub-continent's monsoon regime. Due to the presence of physical factors such as, relatively higher altitudes and series of mountain ranges near the project area, climatic characteristics of the project area are different from the nearby areas.

Most of the streams in the project area are ephemeral. The springs are mostly perennial; however, their yield fluctuates throughout the year. Primary land uses are, related with grazing and forest growth. However, in limited areas, where the land is flat and water is available, people have developed barren land into agricultural land.

On altitudes higher than 2,000 meters, Juniper (*Juniperus excelsa*) forms the dominant species, with occasional presence of *Fraxinus xanthoxyloides*, and *Pistacia khinjuk*. The condition of the Juniper forest improves with increase in elevation provided sufficient soil is available.

A total of 23 bird species are reported to be resident of the project area.

The mammals that may be present in these and sub tropical forests are: *Capra aegagrus* (Persian Wild Goat) in the extreme south, *Capra falconeri jerdoni* (Markhor) in the far north, *Martes foina* (Stone Marten) found possibly everywhere else in the and mountain forest zone, *Meriones persicus* (Persian Jirds), found at altitudes between 6,000ft and 11,000ft, *Ochotona rufescens* (Collared Pika)

The pattern of settlement is mostly scattered. There are only scattered clusters of mud houses located near streams and springs. The significant human settlements within the project area are Torshor, Wala, Sharki Kach, Damandae, Sarobi, Mirzo, Dilwani & Karkan.

The status of existing infrastructure is poor. The unpaved road through Urak valley has facilitated transportation and access to market. The area, has no electricity power or telephone connection, and no potable water supply system. In the entire Zarghoon area, no health facility is available, except, a dispensary building was constructed by the Government in early 90s in Torshore village, due

to inadequate maintenance and nonavailability of staff; it is no longer serving the people. Akin to human diseases, the livestock diseases and mortality is also widespread.

The prevailing situation can be circumvented appropriately through coordinated efforts of all the stakeholders. The communities should be organized/mobilized to enable them, take pragmatic efforts to conserve natural resources by revitalizing their conventional resource use pattern. Secondly, the limited means of livelihood should be enhanced through feasible small income generation activities, so that dependency as major pressure on Juniper ecosystem may be minimized. Thirdly, to meet the heating &, cooking requirements especially, during the harsh climatic conditions, it is imperative to utilize the streambeds &, marginal lands for agro-forestry with the combination of fuel-efficient technologies &, practices. Fourthly, the rich biodiversity of the area requires the promotion of ecotourism. Lastly, continued efforts should be made by the civic sector particularly print &, electronic media with regard to declaration of these Juniper forests (*Livingfossils*) as National heritage.

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Part-A

Objective & Methodology

Prior to, discuss the methodology of the baseline survey, it is imperative to give its reader an overview of the baseline survey. The overview, aims to orient its readers about the background of the baseline. Center for Peace and Development CPD is mandated to carry out a twenty-one months duration project that aims to protect Juniper Forest in Zarghoon Valley. The project titled "Establishment of participatory support system to protect Juniper Forest in Zarghoon" situated in Union Council Khost, Tehsil Harnai, and District Sibi, only 65 kilometer far from Quetta City.

The project, is seeking to establish some sort of protective shield to conserve the rich forest ecosystem of Zarghoon Valley. Undoubtedly, this idea can be materialized with active participation of local communities and collaborative cooperation of line departments and concerned civil society organizations. Another important pre-requisite aspect to project success is to have better understand of the core and associated issues regarding juniper forest and the threats, that it is faced with due to current consumption of resource use patterns. The objective of better understanding, can only be achieved, through scientific methods of data collection, analysis of data and opinion building through a baseline / benchmark survey. The survey besides directing project activities to make difference would definitely help at the end of the project to assess, gauge and compare the success of project and its impact on the life of masses and status of juniper forest.

The methodology of baseline survey, is intentionally divided into three main components to make it simple, easy to understand and replicable by other organizations in future. Each part of the methodology covers certain sequential activities that are undertaken to complete the baseline survey.

1. Pre-data collection phase.

The baseline survey, started with initial discussion with project staff and office bearers of different relevant stakeholders of the project. These initial discussions helped in focusing the survey by incorporating certain relevant aspects into the subject matter. Besides, the initial discussion also revealed that for better implementation of project and the implementing organization i.e. Center for Peace and Development (CPD) would need to further, strengthen its professional relationship and links.

With all concerned line departments and actors of civil society organizations, such as, IUCN, WWF, Media, Academicians and indeed, the local communities of the project area.

1. 1. Review of relevant literature.

Apart, from intellectual discourses with key stakeholders all available literatures were also reviewed. These include,

- Firstly, the biodiversity report prepared by WWF, Peshawar office.**
- Secondly, the project proposal and the participatory situation analysis report prepared by Center for Peace and Development CPD, the certain documents with regard to forest related policies.**
- The working papers available with Forest and Wildlife Department, Government of Balochistan, Quetta. After detailed review of literatures, a series of field visits, meeting with community members particularly, influential community leaders were also conducted, in order to better assess the situation and its totality. These efforts have helped to develop a comprehensive interview scheduled for data collection.**

1.2. Tool for data collection.

Interview schedule was selected, as a tool for collecting basic data from the respondents. The justification for selection of this other tools is that the majority of resident of project areas that inhabit in 17 villages are totally illiterate. Interview schedule is an appropriate tool while the respondents of any survey or study are illiterate and ignorant.

1.3. Development of interview Schedule

A detailed interview schedule was initially prepared. After the preparation of initial interview schedule, it was shared with project team particularly, with counterpart surveyor for incorporating all social aspect of the survey. The detailed discussion with co-worker and project staff the interview scheduled was developed.

1.4. Pre-test.

Subsequent to development of interview schedule it was pre-tested from the field, to further improve it by adding relevant or subtracting irrelevant questions. The pre-testing session helped further improve the interview schedule.

1.5. Training of team of surveyors.

A one-day workshop was also conducted to orient and train the surveyor about the project, the baseline survey, the interview schedule, its certain parts and concepts that are associated with different questions. Besides, the surveyors were also trained about methodology of data collection, rapport development with respondents and entry of data into interview schedule. The training workshop helped to ensure maximum authentic data.

2. Data collection Phase

Two surveyors (male and female) were assigned to collect data from different villages in the project area. 90 respondents were interviewed for data collection, belonging to all villages representing 17 to 70 years of age. Beside male at-least two female per village were also interviewed. Selection of respondents was carried on the basis of number of houses, situated in a given village to get representative sample. Besides, interview schedule, the following PRA tools were also applied to add into understanding of situation and issues.

Respondents

Total number interviewed	90
Age	17-70
Sex	both (male and female)
Education	totally illiterate
Villages	all 10 villages

- **Social mapping**
Short meetings were held at different villages to conduct session of social mapping in-order to best understand the issues, identify resources and gaps in the project areas.
- **Transect walk**
Transact walks were carried out to further increase understanding of the situation and problems that prevail in the different villages with regard to livelihood of residents.

3. Post data collection phase

After completion of data collection, all interview schedule was reviewed to remove errors and deficiencies. Subsequent to review all interview schedule were serialized and master sheet was prepared to better analyze the data and information. Data were analyzed in

detail, to find the root causes of prevailing socioeconomic problems that causes deforestation and depletion of natural resources in the project area of Zarghoon Juniper forest i.e. union Council Khost, Tehsil Hurnai, Sibi District.

3. 1. Report writing

A comprehensive report, is then, prepared after analysis of both primary and secondary data on the basis of concrete surveillance. The report includes, the Global perception of development, General status of the area, its Physical environment i.e. *topography, soil, geology, climate, water resources and drainage*, Biological environment comprising of flora, fauna (*birds, reptiles and mammals*), *livestock stock and rangeland, protected areas and wetlands*, Socio-economic environment for instance, *land use, population & communities*, Existing infrastructure like, *communication & transport, Education, Health, Distribution of work*, Major findings encompassing *Root cause, Core Issues, Associated issues*, Recommendation &, Suggestions.

Part -B

1. Introduction.

Humanity must live within the caring capacity of the earth. There is no other rational option in the long term, unless we use the resources of the earth prudently and in a sustainable manner. We must adopt lifestyle and develop paths that respect and work within the nature's limit. We can do this, without rejecting the many benefits that modern technology has brought, provided that technology itself works within those limits. Because of the way, we live today our civilization is at risk. World population may double in 50 years, but the earth will be unable to support everyone, unless, there is less waste and extravagance, and a more open and equitable alliance between rich and poor. Even, then, the likelihood of satisfactory life for all is remote unless, present rate of population increase are drastically reduced.

The new approach must meet the fundamental requirements. One is, to secure a widespread and deeply held commitment to a new ethic, the ethic for sustainable living and to translate its principles into practice. The other is, to integrate conservation and development. The conservation to keep our action within the carrying capacity and to enable people everywhere to enjoy long, healthy and fulfilling life.

The aim of development, is to improve the quality of human life. It should enable people to realize their potential and lead lives of dignity and fulfillment. Economic growth is part of development, but can not be goal in itself. It cannot go on indefinitely. Although people differ in the goal they would set for development some are virtually universal. These include a long and healthy life, education, access to resources for a decent standard living, political freedom, granted human rights and freedom from violence. Development is real only if it makes lives better in all these respect.

Balochistan, with its climatic conditions ranging from sub tropical to temperate and hyper and to semi-arid spatially is the largest province of Pakistan. The province lies between 24 and 30 to N latitudes and its typical of the Mediterranean type of climate. The diverse topography from sea level to lofty mountains of kirther, Suleman and Zarghoon ranges in the north, provides a variety of climate and edaphic conditions which enable the area to produce different types of crops, fruits, vegetable and other vegetation. The waste rangeland support more than 40 % of the country. Thus, Balochistan is the land of opportunities with vast potential

for development. However, needs commitment and dedication on the part of decision makers and professionals.

The constraints and problems that need to overcome include and climatic conditions, fast growing human and livestock population pressure and lack of financial resources. Thousand of livestock roam around unchecked trying to sustain themselves on the vast unproductive rangelands and devour, whatever, vegetations appear in spring. The people need wood to cook their food, keep warm themselves, in chilly weather and to construct rooms to provide shelter to their families, especially, in the absence of basic necessities of life i.e. electricity, gas, roads and other infrastructure. Rangeland constitutes 79% of the total areas of Balochistan and provides more than 90% of the total feed requirements of sheep and goats etc. Their watershed and biodiversity is also important. Range based livestock production system are one of the major source of livelihood for people living in rural areas. Small ruminants such as, sheep and goats are better adapted to Balochistan's harsh environment and greatly outnumber large ruminants such as cattle and buffalos. Balochistan's rangelands are managed under two properly regimes, classified as common or open rangeland. Tribes traditionally own common rangelands with customary institutional arrangements for their management. Open rangeland have unrestricted access and are usually in poorer condition.

The Juniper forest of Balochistan are believed to represent one of the largest remaining tracks of Juni-perus excellsa in the world and are, therefore, of global significance. The National Conservation Strategy (NCS) and the Biodiversity Action Plan have identified these forests as one of the most critically threaten ecosystems in Pakistan. This ecosystem is also the focus of the Balochistan Conservation Strategy (BCS), particularly, for its biodiversity and watershed values.

The most extensive and best-known examples, are known in Ziarat and Zarghoon hills. They occur at elevation between 1,980 to 3,350 m. The growing conditions are harsh. Annual precipitation averages 328 mm and falls mostly as snow. The forests are quite open, depending on site condition. Trees are very slow growing. Consequently, these forests are also believed to be among oldest in the world. Legend has it that they can live for several thousand years and the ancient Chinese worshipped them for being what they considered to be the oldest living creatures on earth.

The present approach to the management of these forests, is limited and involves policing to check the unauthorized cutting of trees, control the grazing of livestock and prevent the poaching of wildlife. Natural regeneration, is almost insignificant due to heavy grazing and very little viability of the berries. The only forest work plan ever prepared for the juniper forest in 1961-62 which was not implemented. It is pertinent, to mention that these juniper forests of Balochistan are an ecological and cultural treasure of the country. However, a large segment of the juniper

Forest in Zarghoon was hidden till a decade ago. It has revealed that Zarghoon is richer in plant diversity and in wildlife species, than any area found, anywhere in juniper ecosystem. The local demand for timber and fuel has severally depleted and degraded the resources.

Nonetheless, the area received attention after the Premier Oil exploration Company (PKP) was granted concession licensee to explore Oil &, Gas. As an evident of corporate social responsibility, the existing single/unpaved road has been improved and further extended the accessibility to far flung areas. Moreover, schools were also constructed in some villages adjacent to their well sites.

1. 1 General characteristic of Juniper.



An evergreen tree, bark reddish brown to grey, exfoliating in fibrous strips, leaves of two types. Flowers mono-cious, the male at the tips of branch let, the female terminating short site branch let. The formation of small green berries takes

place, soon after pollination and can be seen in the month of May, very minute in size, growing bigger with the passage of time. They become fully mature in November- December of next year. Fruit 0.73cm diameter, blue- black, very resinous seeds. Pungent, slow growing, drought and frost hardy, usually branched right up to ground level and present a conical appearance, pronounced taper stem, fragrant wood, sap wood pale yellow, heart wood bright pink to

reddish brown. The tree assumes a bushy habitat at the low limit of its occurrence on bare rock and in area of low rainfall. While best growth of juniper is found between 2700 m to 3200 m, with a growing season of some 5 - 6 month per year.

2. Project Description

2.1 Location.

Zarghoon situated about 65 km away from Quetta, has a juniper forest, which is one of the most fragile ecosystems in Pakistan. The forest has an extremely slow growth rate and faces very harsh climatic and geophysical conditions. The survey



conducted by different groups in the area determined the status and the threats to this forest ecosystem have confirmed the presence of important wildlife species and medicinal plants. The main threats are debarking and cutting trees for fuel wood and other uses by the local communities (domestic and commercial). All the adverse climatic, edaphic and socioeconomic factors have jointly contributed to make this forest deficient a treeless tract. If the current state of affairs continues, this natural heritage, which can aptly be called a 'living fossil' would disappear forever.

The preservation of the human environment in the juniper tract is essential to several sectors of the national economy. These include agriculture, fruit culture, forestry, animal husbandry and tourism. For instance, if the watershed of the areas is denuded the orchards, raised by the locals with sweat and blood will turn into a vast heap of boulders.

2.2 Physical Environment

2.2.1 Topography



The project area, generally, has hilly and rugged terrain with a number of narrow valleys formed between hill ranges. The valleys lie at elevations of about 1,500 meters and are surrounded by hills having maximum altitude of 2,250 to 3,000 meters.

Presence of conglomerate and sandstone, which are resistant to weathering, has formed steep slopes and cliffs in some areas. The slopes range between 10 to 60 percent the common range between 20 to 4 percent. The narrow valleys between hill ranges have deeply incised drainage channels formed due to the presence of steep slopes and limited thickness of overburden. A number of gorges, formed primarily, due to high rate of soil erosion, are also found in the area.

2.2.2 Soil

The soil of the project area, is light grey or brown in color. At places patches of reddish or grey clays are formed as a result of weathering of shale. The soil is highly calcareous, non-saline and moderately alkaline due to the presence of



carbonates. The organic matter content of bare soil is negligible and partially decayed, humus is only present under trees and ground vegetation. The soil has shallow profiles with cliffs and upper reaches of the slope having maximum depth limited to only a few millimeters. However, the soil found at foothills or near the bed of streams, has depths of a few meters. The soil in the area is poorly developed due to the limited amount of annual rainfall (average being

in the range of 300 to 400 mm) and steep slopes that cause rapid runoff and decrease effective rainfall. The properties of soil are therefore, governed by the depths of the profiles and their physical nature, i.e., texture including gravel content, water infiltration and moisture holding capacity, and land features such as, topography and drainage rather than their chemical make-up. Soil erosion in the project area is high, due to the existence of steep slopes, low cover of vegetation and, in some areas, presence of gravel and sandy soil.

2.2.3. Geology



The project area is located in the Central Brahvi range oriented in the North-South direction. It lies near the junction of 'Sibi Trough' and "Kalat Antclinatorium" tectonic zones. The geology of the area is dominated by series of parallel,

intensively folded and faulted, consolidated formations. These formations have been uplifted and differentially eroded resulting in alternating, generally parallel mountains and valleys. The main rocks in the project area are Mesozoic and Tertiary sedimentary rocks comprising Conglomerate, Sandstone, limestone and Shale of the Siwalik group. Surface exposures of interbedded fine to medium Sandstone and Mudstone with areas of limestone deposits are common. Various rock formations present in the area. Due to the presence of a number of active faults, the area has high seismic activity.

2.2.4. Climate

The project area, lies beyond the direct influence of the sub-continent monsoon regime. Due to the presence of physical factors, such as,



relatively higher altitudes and series of mountain ranges near the project area, climatic characteristics of the project area are different from the nearby areas. Different climatic parameters, such as, precipitation, temperature and wind speed show marked variations over short distances. However, meteorological record available from different stations located in nearby valleys of Harnai, and Urak can be used to indicate the magnitude and range of variations in precipitation and temperature. The project area is characterized by excessive cold winter and mild summer. In the absence of any "representative" meteorological station for the project area, data from Quetta station can be used after applying modifications to take account of altitude. Daily temperatures range from a mean maximum of 32 oC in July to a mean minimum of -6.3 oC in January. Mean monthly temperatures vary from 24 oC in July to 25 oC in July. Rainfall in the project area is erratic. The heaviest precipitation occurred during the period from November to March this year (2004-2005) when snowfall and frost was frequent on higher altitudes. The lowest precipitation occurred during the period from September to November. Events of short afternoon rainfall are common during the months of July and August. On the basis of average monthly record of precipitation from different stations located in the nearby areas, the average annual rainfall in the project area can be estimated in the range of 300 to 400 mm. The ratio of summer (May to August) to winter (October to February) precipitation is, however, highly variable. The general wind direction in the area is West-Northwest. Winds are common and blow in the area throughout the year, with mean monthly wind speed varying between 1.5 to 3 meters per second.

2.2.5. Water Resources and Drainage



The project area is located in a mountainous region, that is part of the upper catchments of the Nari River. Water resources in the area are characterized by a few perennial streams fed by melt water from winter snows. Surface flow in these streams

varies between 2 to 5 meters per second, with peak flow occurring during the months of June and July. Base flow is generally low, as the thickness of overburden in valley bottoms is limited, only to a few meters and the soil has poor water retention capacity. Most of the streams in the project area are ephemeral; however, they have the potential to cause short duration floods. The nallah has a catchment area most of which has thick formations of limestone. The hydrogeology of the project area is largely influenced by the presence of rock formations such as limestone, sandstone and shale at shallow depths. Availability of groundwater is limited, primarily, due to the limited thickness of overburden in the area and generally steep terrain leading to high runoff with limited contribution to aquifer recharge. The presence of rock at shallow depths and the occurrence of limestone, with high secondary permeability, have given rise to a number of springs in the project area. These springs are mostly perennial; however, depending upon the amount of precipitation, their yield fluctuates throughout the year. Combined flow from springs forms a major part of stream flows in the area. Seasonal variations in stream flows are therefore, linked with fluctuations in the yield of springs. The water has low level of concentration and is chemically fit for drinking purposes. Events of intense rainfall cause, quick and short duration floods in streams. These floods are characterized by relatively high flows with peak discharge occurring in 6 to 8 hours after the peak rainfall.

Natural Spring, is the major source of irrigation in the area. However, in some parts the people have also excavated wells to meet the water requirements of agric-crops as well as for their domestic requirements.

2.3 Biological Environment

2.3.1 Flora

The project area lies in the Irano-Turanian plantgeographical region, comprising high to mid altitude regions. Vegetation in this area is predominantly, steppe-like or a sparse thorny



scrub and is affected by a combination of extremes of temperature and poor soil conditions. The floral diversity in the project area is therefore low.

Typical plant species of this and mountain area are shrubs, such as *Sipraea brahuica* and *Prunus eburnea*, and grasses such as *Pennisetum oriental* and *Stipa pennants*. On altitudes higher than 2,000 meters, Juniper (*Juniperus excelsa*) forms the dominant species, with occasional presence of *Fraxinus xanthoxyloides*, and *Pistacia khinjuk*. The condition of the Juniper forest improves with increase in elevation provided sufficient soil is available. The trees are stunted on rocky slopes and flat surfaces on high, wind swept ridges. Better type of growth is usually found on rounded hilltop, lower hill slopes and banks of streams traversing the centre of narrow valleys. Juniper trees of different ages are present in the area. However the older trees are mostly affected by top drying and die back of side branches. This incidence is greater on warmer, drier slopes and shallow soils, and less on cooler moist conditions and deeper soils. The juniper forest region, located in and around the project area, represents a distinctive ecosystem. The area, due to its climatic conditions, has allowed penetration of cold temperate plant of Central Asian affinities into the subtropics and is considered important for biogeographic interest. It is reported that certain areas support *Artemisia maritima*, *Ephedra nebrodensis* and a number of other medicinal plant species.

Artemisia and *Ephedra* are commonly used for medicine purpose. *Shkarai*, *Andropogon* and *Artemisia* are also used by the animals. *Pistachia* which is found in the Zarghoon hills is eaten by small ruminants. Some of the vegetation like Juniper and Pistachio trees is used for fuel purpose.

However, Juniper berries due to its medicinal value and demand in the nearby town markets is collected for commercial exploitation, wherein, these berries are consumed by the Pharmaceutical companies and herbal medicinal (Pansar) stores. As the collection of berries is being done on unscientific bases mostly by damaging the shoot/branches has a great adverse impact. More importantly the berries with very little viability are the sole course of regeneration at the moment.

2.3.2. Fauna

The project area, lies in, the Central Brahui range that is part of the dry mountain zone located within the eastern boundary of the Palearctic faunal region and at the western edge of the Oriental faunal

region. The area also lies at the southern end of the invasion routes for Sino-Himalayan species. The faunal diversity of the project area is therefore, dominated with a mix of Pale-arctic and Sino-Himalayan species that can tolerate harsh dry climates.

(a) Birds

A total of 23 bird species are reported to be resident of the project area. These include species of Eagle, Vulture, Partridge, Pigeon, Owl, Lark, Pipit, Warbler, Laughing Thrush, Long-tailed tit, Nuthatch, Tree Creeper, Tree-Pie, Sparrow, Finch, and Grosbeak. The breeding season for these species extends from March to July. Most of these species are common, however, four species are considered important for conservation concerns. These include Cinerous or Eurasian Black Vulture (*Aegypius monachus*), Lammergeier or Beard Vulture (*Gypaetus barbatus*), Bonelli's Eagle (*Hieraetus fasciatus*) and Golden Eagle (*Aquila chrysaetos*). Birds that come to the area for summer breeding include species of Swift, Buzzard, Hawk, Eagle, Vulture, Heron, Cuckoo, Nightjar, Bee-eater, Dove, Lapwing, Swallows, Martin, Shrike, White-throat, Warbler, Rose-finch, Redstart, Stone-chat, Wheater, Sparrow, Lark, Flycatcher, Bunting, and Wagtail. These species start arriving in the area from March and remain there until August. Habitat and distribution of some of these species is linked with Juniper forest ecosystem. These include White-capped Bunting (*Emberiza stewarti*), Common Rosefinch (*Carpodacus erythrinus*), Spotted Flycatcher (*Muscicapa Striata*), Plain Leaf Warbler (*Phylloscopus neglectus*), Lesser White-throat (*Sylvia curruca*), Black Redstart (*Phoenicurus ochrures*), Isballine Shrike (*Lanius isabellinus*) and Eurasian Sparrow Hawk (*Accipter nisus*). All of these seven species are considered common and abundant in the area. Birds that come to the area during winter include species of Finch, Accentor, Thrush, Wheater, Lark, Redstart, Bunting, pipit, Crane, Coot, Sandgrouse, Grebe, Falcon, Sandpiper, Bittern, Egret, Buzzard, Vulture, Harrier and Hoopoe. Among these species only Mistle Thrush (*Turdus viscivorus*), considered common in the area, is associated with the Juniper forest ecosystem.

(b) Reptiles

The herpetofauna i.e., reptiles and amphibians of Balochistan comprise of some 100 species. As is the case with other vertebrates, the herpetofauna of Pakistan is composed of Oriental and Palaearctic elements in an approximate ratio of 2: 1. In the Balochistan province

the Palearctic fauna dominates. The species are Reptilia sauria (lizards) and Reptelia serpentes (snakes). The lizards found in Balochistan include geckos, agamids, skinks, lacertids and monitors. Snakes found in Balochistan include worm snakes, sand boas, colubrids, kraits, cobras and vipers. Reptiles that have been observed in the Ziarat Juniper forest areas include Agama Caucasia (Caucasian Rock Agama) and Pseudocerastes persicus (Persian Horned Viper).

(c) Mammals



The mammals that may be present in these and sub tropical forests are: *Capra aegagrus* (Persian Wild Goat) in the extreme south, *Capra falconeri jerdoni* (Markhor) in the far north, *Martes foina* (Stone Marten) found possibly everywhere else in the

and mountain forest zone, *Meriones persicus* (Persian Jirds), found at altitudes between 6,000ft and 11,000ft, *Ochotona rufescens* (Collared Pikas), *Cricetulus migratorius* (Migratory Hamsters), *Calomyscus bailwardi* (Mouse-like Hamster) not found at altitudes below 4500ft and *Hemiechinus auritus megalotis* (Afghan Hedgehog). At high altitudes large mammals such as, the Himalayan black bear (*Selenarctos thibetanus gedrosianus*) may be present.

2.3.3 Livestock and Rangelands

The Rangeland provides feed requirements of the livestock i.e. sheep and goat. The Rangeland, falls under the category of Mediterranean climatic agro-ecological zone with annual rainfall of



more than 300+ mm. most of the rain fall occur in winter and spring seasons. The Rangelands are communal property of the entire Dumar Tribe. However, as per their traditional hospitality they allow the nomads to graze their livestock while passing by the migratory routes. To meet the basic needs of life the livestock are sold out in nearby towns as well as the Quetta City. The table II shows the current livestock population village wise in the project area.

2.3.4. Protected Areas and Wetlands

There are two wetlands located within a radius of 45 km from the project area. These include, Bund Khushdil Khan, and Hannah Lake. Bund Khushdil Khan is a man-made reservoir located 42 km north-west of the project area and has the status of a Game reserve. There are two game reserves named Gogi and Wam located within a radius of 30 km area. In addition to these areas a number of protected forest areas are also located. Juniper trees on higher altitudes of the nearby areas are protected and the Reserve Trees Act 1966 and the Balochistan Forestry Amendment Act 1974 prohibit their cutting.

2.4 Socio-Economic Environment

2.4.1 Land Use



Most of the land in the area is barren and, on altitudes greater than 2000 meters, covered with Juniper forests. Therefore, primary land uses are related with grazing and forest growth. However in limited areas, where the land is flat and water is available, people have developed barren land into agricultural land. These areas, located either close to a stream or a spring, are generally 3 to 8 acres in size. Recreational use of forest and other natural features is limited. Land grazing is in the form of nomadic herding of a wide variety of sheep, goat, camels and donkeys are practiced. Livestock migrate from the surrounding low laying areas to higher elevations of

to project area during summer. It is reported that some land areas, which lie in the migratory path, have deteriorated due to over grazing and, as a result, lost nutritious species of vegetation.

On agricultural land, people have traditionally grown wheat and vegetables with only limited area for orchards. However, agricultural practices are shifting towards cash crops, as the area under orchards is being expanded gradually. Most of the agricultural area, is now under apple orchards with a small area of mixed vegetables for domestic use. Wheat is the staple diet and grown as Rabi crop. Lack of irrigation infrastructure is considered an important limiting factor for the extension of agricultural land in the area. The use of chemical fertilizer on agricultural land is very low and farm-yard manure is used to replenish soil fertility, mostly for orchard crops. Moreover, the drought period has posed an adverse impact on their resources i.e. trees, shrubs, orchards and livestock

The average family owns about five to eight acres of land for agriculture purpose. The land and mountains is divided among various sub tribes clans on the basis of the geographical demarcation.

2.4.2. Population & Communities

The population density in the project area is very low and pattern of settlement is mostly scattered. There are only scattered clusters of mud houses located near streams and springs. The significant human settlements within the



project area are Torshor, Wala, Sharki Kach, Damandae, Sarobi, Mirzo, Dilwani & Karkan. The villages consist of clusters of houses and several hamlets located at some distance from one another. Daverzai, Nukarzai, Barakzai, Paizai clans of the Dummer tribe inhabits in these villages. Each of the lineages is sub-divided into households. Each lineage, has an equal share in the land and water rights. The total numbers of people living in the area are more than 12,000 souls. They belong to 680 households. A vast majority of the

households used to migrate to Harnai &, other nearby towns during winter. However with the development of new orchards, which require year-round attention, this pattern of seasonal migration to a greater extent has been reduced. Almost all households own little number of small ruminants and wander the upper rangeland during summer. The social organization is tribal and the clan is led by a "Malik" (elder of the clan) who is leader of the community and provides mechanisms for collective decision making and mediation of disputes within the community. Group solidarity is maintained by the kinship ties between the members of the clan. Tribal background, land and water user rights are areas of significant importance in community life.

2.4.2.1 Some of the Local Notable Malik / Sardar

Sardar Abdullah Khan is the Chief of Dumar Tribe in the area.

- | | |
|----------------------------|-------------------------|
| 1. Torshore: | Malik Wahid |
| 2. Walla: | Malik Sahib Khan |
| 3. Karkana: | Malik Saeedullah |
| 4. Sharki Kach | Malik Pakar |
| 5. Shaban | Malik Pakar |
| 6. Mirzo / Sarobai: | Malik Pakar |
| 7. Damandai: | Malik Pakar |
| 8. Lai Zavar: | Malik Pakar |

2.5 Existing Infrastructure

2.5.1 Communication & Transport

The status of existing infrastructure is poor. The area was not accessible by road until 1975 when an unpaved road was built through the Takatu Mountain. Access through this route was unreliable due to lack of appropriate maintenance arrangements. In 1995, the Pakistan Army constructed a new unpaved road from the Urak valley. Until recently past, livestock farming and labor in the Coal mines of the Harnai area had been the major economic activities of most inhabitants. Agricultural development began in the area during mid 1980's and was boasted in 1989 due to the construction of irrigation scheme on the Oblun Nallah. The scheme constructed of a weir and conveyance system that irrigates small area of Toreshore and Aghbargi. The unpaved road through Urak valley has facilitated transportation and access to market. As a whole, the area has poor connectivity links with surrounding regions through dirt/unpaved

roads which mostly remain close in the winter season. Very few people have their own transport. The area has no electricity power or telephone connection, and no potable water supply system.

2.5.2. Education



Most of the population is illiterate. There are only three primary schools having two rooms building has been constructed/opened by the Government/Gas Exploration Company with one teacher each in Torshore, Walla and

Sharki Kuch Villages, while no teacher is available to teach. As the people of the area are poor and the sources of income are very limited, therefore, cannot afford to send their children for education in nearby towns. There are few children studying in Madrasa to learn the Holy Quran etc.

2.5.3. Health

In the entire Zarghoon area, no health facility is available, except a small private medical store in Dilwani villages. Nonetheless, a dispensary building was constructed by the Government in early 90s in Torshore village, due to inadequate maintenance and non-availability of staff; it is no longer serving the people. The local people are applying the wild



medicinal plants for the treatment of different diseases. In the case of any serious health problem they rush to reach the doctor in Quetta

and nearby towns. Due to non availability of the public transport, they travel for a whole day to get to the nearby towns, to fetch / purchase the basic necessity of live and required medicines. It has been observed and investigated that the mortality and morbidity rate is very high. However, death rate of other male group is also high, even from the common epidemic and general minor diseases due to improper, rather absence of any treatment facility.

The common diseases/ailments in the area are (1) Hepatitis (2) Malaria (3) TB (4) Cancer (5) Diabetes (6) Pneumonia (7) Respiratory diseases (8) Asthma.

Akin to human diseases the livestock diseases and mortality is also widespread. Similarly no facility for the disease control of the livestock exists in the area. Even like health department, no one from livestock or agriculture department staff has ever visited the area.

2.6 Distribution of Work (Men, Women, Children)

Collection of wood, water, forage, wild / medicinal plants is the responsibility of women and girls. In case, the resources are situated far from the village then it becomes the responsibility of male heads of the house to arrange.

The livestock rearing, grazing, milking is some what a common job for both male and female. However, the boys are mostly involved in carrying the livestock for grazing.

Planting of trees and sowing of the agric-crop is the sole responsibilities duties of the male head i.e. mane and boys. In some cases, the women are involved in weeding and harvesting of the crops.

As a whole, house keeping is done by the women and girls, which include cleaning, dish washing, laundry cooking etc.

The women are least involved in any decision except in household commodities choice and marriage ceremony arrangements.

2. Major Findings

a) Core issue	Poverty and lack of awareness: the people of the area mostly poor with very meager resources on their account. Moreover, the literacy rate is very low in even with very less exposures.
b) Cause	1) The juniper forest is depleting drastically due to indiscriminate cutting by the local and adjacent communities for fuel and commercial purpose. 2) In some areas, few juniper seedlings were observed which shows great stress on regeneration of species due to overgrazing. 3) Commercial exploitation / illicit cutting of the juniper trees and other bushes are commonly visible especially during weekends by the inhabitants of the project area as well as the adjacent communities through pack animals i.e. donkeys. 4) In absence of any grazing system in the area, the livestock are grazed without keeping in view the carrying capacity of the range lands. The activity carried out till the area is totally exhausted. 5) The land use pattern is extensively changing. It seems that the life in the area is proceeding towards permanent settlement. This is why, more land is being converted for agricultural purposes.

	<p>6) Due to resources constraints in the Forest Department t protection and implementation tool remains in effective.</p> <p>7) There is no data available about the quantity of exploit wood. Historically, nomads have been involved in exploitation of wood. In the recent past, locals &, adjace population have been found cutting the trees. It may attributed-to the high wood price, poor management of For Department, and above all, need of the poor who have alternative as fuel.</p> <p>8) The vegetation, having medicinal value, is largely used villagers, as they believe, that the use of these vegetation h no side effect moreover, they are easily available and cheap.</p> <p>9) A major portion of the Juniper berries & other medici plants are marketed without considering any management conservation practices. The uncontrolled exploitation of the may change the ecosystem/ecology of the area.</p> <p>10) In winter the roots of bushes like Artemezia etc. are us as fuel in the villages and its twiggy branches are used as fe for small ruminants.</p>
<p>c) Associated issues</p>	<p>1) Lack of infrastructure i.e Health Education etc.</p> <p>2) Insufficient ways &, means of communication</p> <p>3) Non availability of the alternate fuel to minimize the stre on natural resources.</p> <p>4) Limited career opportunities</p>

4. Recommendations / suggestions

- 1) Alternate fuel i.e. coal, LPG etc should be made available accessible for cooking and heating purposes on affordable prices.**
- 2) Fuel efficient technologies & practices should be promoted.**
- 3) More people should be employed in the public sector department especially, in forest department for the purpose of effective implementation of the protection laws, rules and regulation.**
- 4. Promotion and financial support for alternative ways and means of income generation i.e. Bee keeping, apple jam making, poultry farming etc.**
- 5. Plantation of fast growing tree species on the marginal lands and stream / nullah bed to utilize the perennial water to meet the fuel wood requirement.**
- 6. Coordinated efforts for integrated development through public, private and NGOs**
- 7. Infrastructure i.e. hardware and software should be developed for provision of basic necessities of life e.g. health, education, vocational and technical training centers**

8. **Involvement of different segment of the community on sustainable basis through changing attitude, capacity building and sense of ownership to address the different kind of social, economical etc issues.**
 9. **The traditional system of grazing i.e. pargoth or Aazz should be reintroduced in the area to minimize the soil denudation, degeneration of juniper seedlings and rangeland degradation.**
 10. **Efforts should be made to establish close coordination and collaboration with the forest and wildlife department in protecting and conserving the natural resources in an appropriate manner.**
- II Series of training session on different issues should be carried out e.g. nursery raising, bee keeping, apple Jam making, vocational (for women).**
12. **The valuable medicinal plants of the area should be exploited on sustainable basis.**
 13. **Extensive awareness campaign on environmental issues of the area for both local and adjacent communities.**
 14. **Initiative for establishment of close interaction among local and adjacent population.**
 15. **Sustainable Alternate Economic Incentives: The people of the area rely on livestock rearing as their sole means of sustenance, this has resulted in Urial habitat degradation, and due to this population influx a significant reduction in the density of Juniper trees. If alternate means of earning a livelihood are identified for the people of the area it may have a three fold effect of providing livelihood to the people, encouraging increase in the ungulate population and decreasing felling pressure from the Juniper forests of the area.**
 16. **NGO's should increase their role in the field; creating awareness among the population involved and promoting community participation is something the NGO's might give priority in this respect.**

Table I

Current Livestock Population during Survey

S#	Name Of Village	No. of Goat	No. of Sheep's	No of Donkeys / Horses	Cattle's
1	Torshore	830	150	80	1
2	Wala	275	65	30	--
3	Shirki Kach	480	250	65	--
4	Damandae	1700	600	34/10	--
5	Mirzo	745	255	40	--
6	Sarobae	525	145	22	--
7	Dilwani	2700	700	33	--
8	Loezawar	3210	435	30/8	--
9	Karkana	270	80	30	80
10	Shaban	1750	380	60	--
11	Dab	165	87	12	--
12	Kala Ragha	245	60	12	--
	Grand Total	12,895	3,207	448/80	81

Note:The number of livestock was far greater then the present situation due to long drought period and non availability of palatable food maximum number of livestock has died.

**Table II
Species of Flora Found in the project Area**

Family	Scientific Name	Local Name	Known characteristics & use
Trees			
Anacardiaceae	Pistacia Khinjak	Khinjak, Shen e	
	Pistacia cabulica	Shrawan	
Oleacea	Fraxinus Xanthoxyloides	Shang, Siachob	
	Olea cuspidate	Deene Showan	
Coniferse	Juniperus excelsa	Obusht	
Common Shrubs			
Compositae	Artemisia maritime	Khrara	
Leguminosae	Caragana ulcina	Makhi	
Rosaceae	Cotoniaster Nummularis	Sharavgi	Occur at high elevations
	Caragana ambigua	Zarg	
	Prunus eburnean	Kazhaghanai	Occur at high elevations
	Sipraea brahuica	Tirkha	Medicinal use, Prefers deep soil, mostly found at lower elevations
Round Thorny Bushes			
Berberidaceae cruciferae	Berberis baluchistanica	Spin-azghai	
Caprifoliaceae	Lonicera quinguelocularis	Ghrinjai	
Compositae	Cousinia onoporoides	Sparai	
Gnetaceae	Ephedra nebrodensis	Oman	Medicinal use
Leguminosae	Sophora alopecuroides	Walaghunai	
Rhamnaceae	Sageretia brandrethiana	Tarawangai	
Thymelaeaceae	Daphne oleoides	Ghozera	Occurs in heavily overgrazed areas
	Abelia triflora	Zralg	Medicinal use, occurs along stream and high moisture areas

Grasses			
Gramineae	Pennisetum orientate	Weezha	Occurs at higher elevations and cooler slopes
	Stipa pennanta	Washta	Occurs at higher elevations and cooler slopes
	Dicanthium annulatum	Margha	
	Melica persica	Lawanai butai	Considered to be poisonous
	Cymbopogon Jawarancusa	Sargarai	Coarse and of low palatability
	Eulaliopsis binata	Barwaza	Occurs at foothills, Coarse and of low palatability

**Table III
Resident Birds of the Project Area**

No	Common Name	Scientific Name	Status	Status Breeding
1	Bar-tailed Tree- creeper	Certhia himalayana	Common	April, May
2	Black-billed Magpie	Pica pica	Common	March to May
3	Black Crested Tit	Parus rufonuchalis	Common	May, June
4	Bonelli's Eagle	Hieraaetus fasciatus	Scarce	April, May
5	Booted Eagle	Hieraaetus pennatus	Frequent	
6	Chukar or Rock Partridge	Alectoris chukar	Common	April, July
7	Cineros or Eurasian Black Vulture	Aegyptius monachus	Scarce	March, April
8	Crested Lark	Galerida cristata	Abundant	April, May
9	Eastern Rock Nuthatch	Sitta tephronota	Common	March to May
10	Eurasian Tree Sparrow	Passer montanus	Common	April to June
11	Golden Eagle	Aquila chrysaetos	Scarce	March, April
12	Grey Tit	Parus major	Common	April, May
13	Indian or Long-billed Rock Pipit	Anthus similis	Common	May, June
14	Juniper Hawfinch	Mycerobas Carnipes	Frequent	May, June
15	Lammergeier or Beared Vulture	Gypaetus barbatus	Scarce	March
16	Northern Eagle Owl	Bubo bubo	Frequent	
17	Red-billed Chough	Pyrrhocorax pyrrhocorax	Abundant	April, May
18	Red-fronted Serin or Gold-fronted Finch	Serinus pusillus	Abundant	
19	Red-mantled Rosefinch	Carpodacus rhodochlamys grandis	Frequent	
20	Rock Pigeon or Dove	Columba livia	Abundant	
21	Scrub Warbler	Scotocerca inquieta	Frequent	May, June
22	Streaked Laughing Thrush	Garrulax lineatus	Common	May to July
23	White-cheeked longtailed tit	Aegithalos leucogenys	Frequent	April, May

Table IV
Mammals that could be found in the Vicinity of the Project Area

No.	Common Name	Scientific Name
1	Urial*	Ovis vignei
2	Suleman Markhor*	Capra falconeri jerdoni
3	Stone Marten	Martes foina
4	Persian Jirds	Meriones persicus
5	Collared Pikas	Ochotona rufescens
6	Migratory Hamsters	Circetulus migratorius
7	Mouse-like Hamster	Calomyscus bailwardi
8	Afghan Hedgehog	Hemiechinus auritus megalotis

*** Likelihood of presence of Urial and Suleiman Markhor is very low**