

# **Report on status distribution and assessment of alien species with in the district Mansehra at Sustainable Forest Management in Targeted Sites of Kaghan and upper Siran valley.**

## **Introduction**

The KPK is one of the four provinces of Pakistan. The KPK occupies the northwestern part of the country east and south of Afghanistan. This province has its boundaries with Afghanistan (Pamirs) in the North, parts of Baluchistan and Punjab provinces in the south, Gilgit, Kashmir and part of Punjab in the east and Federally Administered Tribal Areas (FATA) in the west. Peshawar is its provincial capital.

## **Ecological Characteristics of the Province**

A wide variety of habitat is found in Pakistan. However, very few natural habitats remain, due to the wide extent of human activities. Habitat types have not been comprehensively studied and described in Pakistan. Champion et al. (1965) were the first to describe forest types of Pakistan. They divided vegetation of the country into broad forest types. These broad categories included sub alpine, Himalayan dry temperate, Himalayan moist temperate, subtropical pine, dry sub tropical, tropical thorn, and littoral and swamps. Beg (1975) defined major habitat types as cold deserts, alpine scrubs and pastures, sub-alpine forests, Himalayan moist temperate forests, dry temperate forests, subtropical pine forests, dry subtropical semi evergreen forests, tropical thorn forests, tropical dry deciduous forests, and tropical littoral and swamp forests. All of these forest types, except littoral and swamps, are represented in KPK (Beg 1975). Roberts (1977), too, described habitat types and associated wildlife species in Pakistan. He further elaborated and explained his basic habitat types in 1991 and provided a comprehensive classification of natural terrestrial ecosystems (Roberts 1991). These range from the permanent snowfields and cold deserts of the mountainous north to the arid sub-tropical zones of Sindh forests of the inner

Himalayas to the tropical deciduous. A brief description of targeted habitat and the associated floral composition of the province are as follows.

### **Montane Temperate Forest**

**Dry Temperate Coniferous Forest** This habitat type is found in the Hindukush mountain ranges. These are open evergreen forests with open scrub undergrowth. Both coniferous and broad-leaved species are present. These types occur on the inner ranges and are mainly represented in the north-west. Dry zone deodar, *Pinus gerardiana* (Chalghoza), and *Quercus ilex* are the main species. At higher elevations, blue pine communities occur and in the driest inner tracts, forests of blue pine, *Juniperus macropoda* (Abhal, Shupa, Shur), and some *Picea smithiana* are found locally (e.g. in Gilgit). This habitat is found in lower Chitral District and the inner Himalayan ranges of Mansehra, Kohistan, Swat, and Dir Districts of KPK. This area receives usually low rainfall in summer and heavy snowfall in winter. The habitat is confined to more sheltered slopes between 1,225 m and 3,300 m (Malik 1987). This habitat is partially used by markhor in winter (Champion et al. 1965).

**Himalayan Moist Temperate Forest** the evergreen forests with some mixture of oak and deciduous broad-leaved trees fall in this category. Their undergrowth is rarely dense, and consists of both evergreen and deciduous species. These forests occur between 1,500 m and 3,000 m elevation in the Western Himalayas except where the rainfall falls below about 1000 mm in the inner ranges, especially in the extreme north-west. These forests are divided into a lower and upper zone, in which species of conifers and/or oaks dominate. In the lower zone, *Cedrus deodara* (Deodar, diar), *Pinus wallichiana*, *Picea smithiana* and *Abies pindrow* (Partal) are the main coniferous species in order of increasing altitude, with *Quercus incana* (rin, rinj) at lower altitudes and *Q. dilatata* above 2130 m (Champion et al. 1965). In the upper zone, *Abies pindrow* and *Q. semecarpifolia* are the dominant tree species. Pockets of deciduous broad-leaved trees occurs daphically conditioned, in both the zones. Alder (*Alnus* sp) colonizes new gravels and sometimes Kail (*Pinus willichii*) does the same. Degraded forms take the

shape of scrub growth in the higher reaches; these parklands and pastures are generally subjected to heavy grazing. This habitat type is found in the outer Himalayan ranges in the Districts of Mansehra, Abbottabad, Swat, and Dir between 1,500 m and 3,000 m elevation (Malik 1987). This habitat type is inhabited by Himalayan Monal Pheasant, Kalij Pheasant, Koklass Pheasant, and the lower reaches of this habitat are used by gray goral. The forests of Pakistan are classified into various types, mainly based on climatic variations. These climatic variations support the growth of different tree species in different climatic regions and divide Pakistan into nine distinct ecological zones, that is,

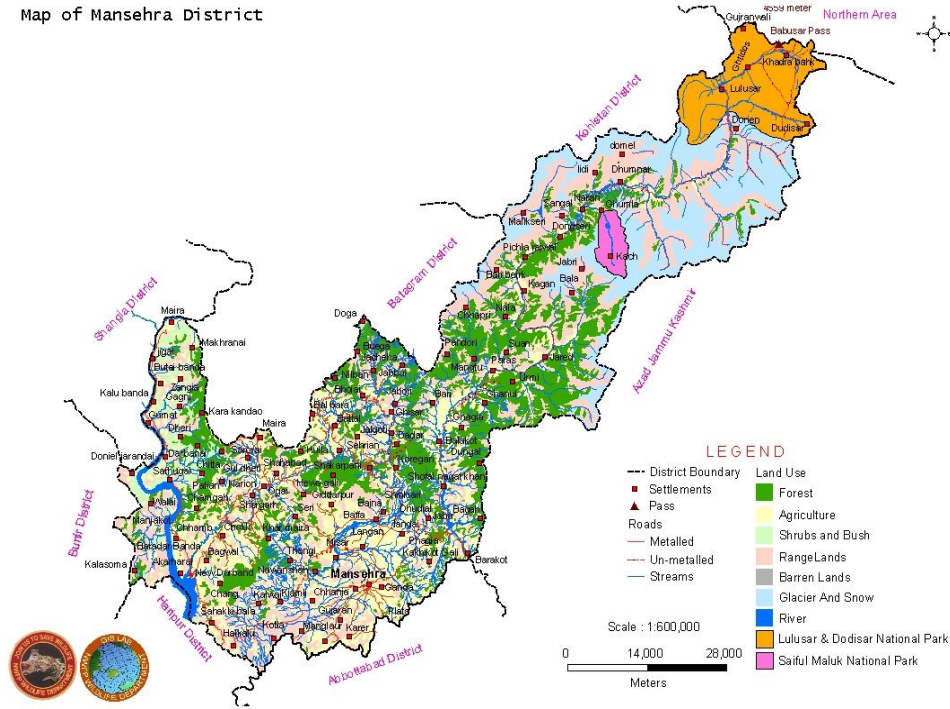
### **Introduction to the Study Area:**

Mansehra Wildlife was established in 2001 with a total area of 4,579 sq km and the Mansehra district is located in the Hazara region of the Khyber Pakhtunkhwa Province in north eastern Pakistan.. The city is located at an elevation of 3570 fts from sea level to 13500 fts. Mansehra city is well known throughout Pakistan for its pleasant weather, natural beauty, high standard educational institutes and military establishments. It remains popular hill station attracting thousands and millions of tourist every year.

### **Landscape of Mansehra:**

Mansehra mountains landscape is characterized by vertical vegetation variations which occur along sloping terrain. With its unique bio ecology and a diverse ecosystem, the district offers a rich natural environment to support a variety of wild flora and fauna. Of the 12 habitat types in the Khyber Pakhtunkhwa identified, four habitats are found in Mansehra. Plant researchers have reported 80 endemic species in the Hazara area. Of these species, more than 50% are said to occur in Mansehra. The district supports approximately 1,300 plant varieties, 18 wild mammal species, 149 resident and migratory bird types, and 19 different reptiles.

Map of Mansehra District



Map of Mansehra

The sustainable project management in Khyber Pakhtun khwa is mainly focusing on the moist temperate forest with High Conservation Value in Tehsil Balakot of Mansehra District.

The proposed sites of interventions includes assess and map alien invasive species in Kaghan and Siran valleys. The sites include four Kamal ban, Sharan, Malakandi, Manur , Noori, Nagah. in Kaghan and Panjul, Jacha, Manda gucha, Una, Deoli etc. in Siran.

### **Introduction to Exotic, Alien and invasive species and distinction.**

Exotic and invasive species have not been well understood even by some of the science graduates due to the lack of scientific acumen. Unless the definitions of these terms are not sorted out correctly, the actual meaning would not be easy to understand, especially when there are two species with one being an exotic and the other being an invasive. The main reason for this confusion is that both invasive and exotic species are involved in living outside the natural distribution

range. This article aims to emphasize the important difference between invasive and exotic species.

## **Exotic Species**

Exotic species could be defined as any organism that happens to live outside its natural distribution range as a consequence of anthropogenic activity, or activities through deliberate or accidental introduction to a new habitat. The primary understanding about an exotic species is that, it is a non-native or non-indigenous in its new location. They are also known as alien species, as some authors refer. An exotic species could be a plant, an animal, or a bacterium. Since it is related with the distribution range of a particular species, an exotic species to one place would not be exotic to another. In fact, a native species of one particular habitat could become an exotic species in another. However, there are many ways of occurring exotic species in a particular area, ecosystem, or habitat; deliberate introduction could take place as a mean for agricultural or livestock production and controlling pest or nuisance species. Alien species are capable of successfully competing for the natural resources with the native species mostly due the lack of natural predators in the new habitat, and they could become invasive if the reproduction could take place. There are situations in which the biodiversity and bio-productivity have increased after introducing of exotic species into natural habitats; the introduction of some exotic plant species in New Zealand from North America has been beneficial for the vegetation and biodiversity of the particular habitat. However, in many places of the world, the exotic species have not been friendly with the environment and cause to become invasive.

## **Invasive Species**

Invasive species have been one of the major problems for the environment, ecology, and economy of many places. According to the definition, an exotic

species becomes invasive when the population starts to increase through reproduction that happens because there are no natural enemies in the new habitat. It is a serial process of becoming invasive from exotic, involving few steps starting from the introduction, survival, reproduction, thriving, and invading. After an exotic species is being introduced into a new habitat deliberately or accidentally, the already existing occupied ecological niches might prey upon it. If the exotic species could survive, the ability to compete for resources and the possibility for production to take place would start to matter them. Usually, the introduced species are greatly capable of successfully compete over others, as there are no natural competitors and enemies. When they can start to breed, the population grows without breaks. Therefore, they start to thrive and become dominant with the invasion of the environment. That can cause many problems to the naturally evolved ecosystems, as the natural species face food spatial crises. The ecosystem loses the delicate balance of energy flow after that, and it can lead to detrimental effects. These consequences could cause the agriculture and other human related activities also to go down. Therefore, the exotic species should be seriously considered prior to introduction, as the consequences may be serious.

### **What is the difference between Exotic and Invasive species?**

- Both are non-native species occurring in a particular area, but exotic species may or may not raise concerns, while invasive species always raise serious concerns on many aspects.
- Exotic species could be either wild or captive, while they would become invasive in wild.
- Exotic species may or may not have natural competitors and enemies, whereas invasive species do not have any danger of such barriers

## Upper Siran Valley.

### KUND AND SHAHEED PANI OF PANJUL RESERVE FORESTS:

The identified potential site that is include with in the mandated of the Sustainable forest management project in the upper siran includes , Panjool Reserve compartment 1-12 with a total area of , Manda Guccah Guzara 1-29 Comaprtments, Jacha Guzara 13- compartments , Uhna Reserve forest 1-7 compartments , Devli Guzara forest 1-49 compartments.

The above target area starts from bottom ridge of Musa Maslah includes Kund Bangla, Shaheed Pani and last compartment is 12 Rf which ends on the Druakh forest and unioun council Bogarah Mang which is the lower boundry of the siran. The (Panjul R.F) is located at a distance of 26 Km from shinkiari and is accessible through an un-metalled /Kacha road. Whereas it is also accessible from Balakot through Sat Bani road which is stretched over 18Km length. The ridge / sky line of these reserve forests is stretched over a distance of 10Km from Kund to Shaheed Pani. This ridge further extends to Shudal Galli, Musa Ka Musalla, darwaza galli, Nakra Parh and ends at Babu sir Top, thereby, making a corridor from Kund to manshi Reserve Forests and further up to Lulu Sar-Dudi Pat Sar National Park. The vegetation of these reserve forests is predominantly of Moist Temperate Forests interspersed with Sub Alpine and Alpine Forests especially on higher altitudes. While moving from Kund Bangla to Shaheed Pani the right side of the ridge of the reserved forests is contiguous with Guzara Forests of Kaghan Forest Division, where as left side is adjoined by Reserve Forest of Siran Forest Division.

The major flora of the area is Fir (*Abies pindrow*), Spruce (*Picea smithiana*), Blue Pine (*Pinus wallichiana*), Deodar (*Cedrus deodara*), Wall nut (*Juglan regia*), Ban Khor (*Aesculus indica*) etc

While major fauna of the area is Monal Pheasant (*Lophophora impejanus*), Koklas Pheasant (*Pucrasia macrolopha*), Common Leopard (*Panthera pardus*), and Black Bear (*Selenarctos thibetanus*)

The area harbors more than 100 different medicinal Plants. Important medicinal plants of the area are Mamekh (*Paeonia emodi*), Ratton jog (*Bergenia himalacia*), Banafsha (*Viola rupestris*) Sumbal (*Berberis lyceum*), Patmewa (*Bergenia ligulata*) Kori jar, Mushaq bala (*Angelica glauca*), Trepatra etc.



### Pictorial Glimpse of the target intervention area

Since the area is mostly comprised of reserved Forests largely free from any rights and is only seasonally utilized by the locals for their live stock grazing on sub alpine meadows and also the fact that it harbors very important flora and fauna and can be a potential site for promotion of ecotourism the study in question was carried out to collect all the relevant data for the purpose of its future possible declaration as National Park.

### Location Map:





## **Birds Sighted in Kund an Shaheed Pani Reserved Forest during the survey**

**Animals** of the area frequently sighted include Common leopard, Fox, Jackal ,Flying Squirrel, Monkey, Languor, Wild cat, Porcupine while in birds Mage pie Kalij Pheasant, Monal Pheasant

### **FLORA:**

*Cedrus deodara* (Deodar), Kail (*Pinus wallichiana*), Fir (*Abies pindrow* ) ,Spruce, *Picea smithiana*, Horse Chest nut(*Aesculus indica*) Akhrot (*Juglan reggia*), Kala kath (*Prunus podus*), Trakana (*Acer ceasium*)

### **MEDICINAL PLANTS**



### **Manda Guccha Block.**

This includes Reserve forest of Panjool From 1-7 , Unha Reserve forest compartment 1- 3 and Manda Guccah guzara Compartment 1-29 falls within the jurisdiction of the following villages. From Compartment 1- 4 having rights of Siryala & shair Baila Saddat are the main villages whom residents are dependent on the above four compartments.

Jaccha , Sukkian, Morri Chapra and Phandar communities are dependent on jaccha guzara

Compartment Rf 5-7 have dependencies of the villagers Sundi, Sachan , sachari, Tundri, Arbahn, Maik Bori.

The population of the above villages has a house hold of 2997 , with an estimated population of 21209. The migration from downward area in summer is also frequent and included in population estimation.

This area is having 8 primary school and one middle school while there is only a single Basic health unit in Saccah, Panjool and nawaz abad , The police Chowki is also established and functional in Nawaz abad .

The Main agriculture crop is Maize, while in vegetables fresh beans, and pea bean are cultivated over there. Peas and Potato cultivation is also being adopted by locals since last five years.

#### **Alien Species:**

No alien species are planted in reserve and guzara forest while on community lands and with in the vicinities of the houses on private and farm lands three main species of exotic nature is introduced which serve as alien species of the sites that is eucalyptus, Robania and Populus ciliate.

Robania and popular are in abundant quantity covering maximum area with in cover area of alien species, Popular is getting shape of invasive species due to its consumption and fast growth as well as commercial value the local trends is practicing and increasing its plantation.

This also results to disaster during wind fall due to its weak shallow root system, all most all of its population is raised with cuttings which lack tap root having function of strong anchorage.

#### **Devli Block**

This comprises unha RF -4 to 7 and Devli Guzara compartment 1-49. The dependency of villagers of Jabbar a revenue village, Nallah, Kund and Kanchajri , Niral Banr, Devli, Sair Chinar Kot , chingari, Thanda Bella , Jabbar, Mail But, Keri Sadat, Baila Jabbar Gali , Katah Balla , Katah Nakot , Jabbar Kund , Landi Sair, Chairri Kalas and Doodh Patti.

The population of the above villages has a house hold of 4351 , with an estimated population of 28756. Beside from this migratory people from down hill areas including mansehra Abbottabad and other district do come and reside here in summer

This area is having 6 primary school and one middle school and higher secondary school at Nawaz abad. There is only a single Basic health unit in Saccah, Panjool and nawaz abad , The police Chowki is also established and functional in Nawaz abad . The Nawaz abad lies with in the centre and mid of devil and Manda Guccah block from here main road is split in two to link roads leading to Devli Niral barn and Manda Guccah

The Main agriculture crop is Maize, while in vegetables fresh beans, and pea bean are cultivated over there. Peas and Potato cultivation is also being adopted by locals. In above reserve and Guzara forest there are no alien species while on community land Btap Plantation. Eucalyptus is in minimum quantity, as the area receives heavy snow fall due to which Eucalyptus trees are broken down.

**Robania ,Alithus and eucalyptus:**

Total plantation area is 330 hectare = 55 % is Robanina of tsunami, 1 % of Eucalyptus about 1000 thousands, and Ailanthus spp 20 %, 24 % Chir and other locals. The local perception was that there were no losses and has more benefits of the alien species.

**Jabori Block.**

This includes Reserve forest of Panjool from compartments RF 8-10 falls within the jurisdiction of the following villages. main villages whom resides with in the vicinities and are dependent are Sundi , Kaiyyan, Jhangi and Dabber Katha, Mehtal and banda Gisach fulfilling the dependency from both above and RF compartment 11-12 of Panjool Resrve while hafeez abad balanda, Bandodar, Khilarian , Sul Bandi kund , Basala , Sarbori and Dagra.

The above are all permanent residential areas where no seasonal migration is carried out.

The population of the above villages have a house hold of 1871 , with an estimated population of 17349. beside from this migratory people from down hill

areas including Mansehra Abbotabad and other district do come and reside here in summer

This area is having 7 primary school and one middle school at Methal and one higher secondary school at Jabbori exit there while there is only a single Basic health unit in Jabbori.

The Main agriculture crop is Maize and wheat while in vegetables fresh beans, and pea bean are cultivated over there.

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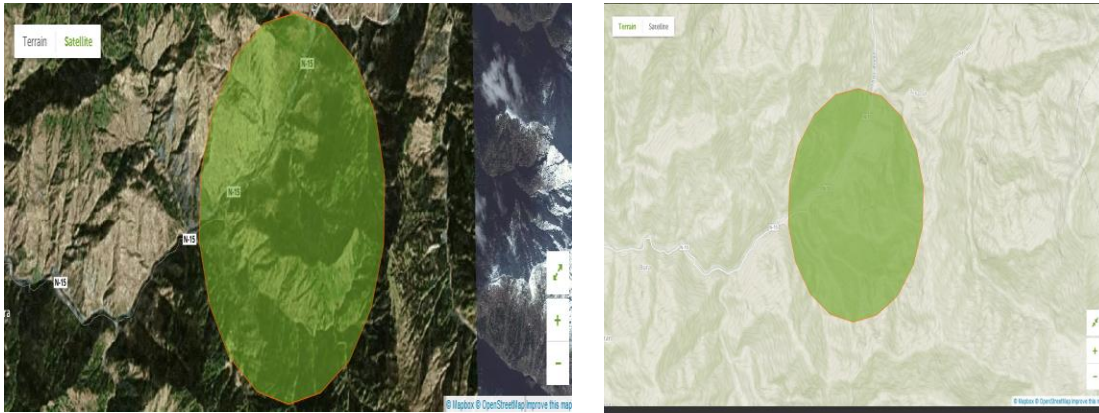
Beside from this the agriculture alien species and grasses which are common in all blocks but are limited for personal consumption and are not marketable includes apple, apricot ,Plum and. The total area covered by the above fruit trees are \_\_\_\_\_- and approximately number in size \_\_\_\_\_. Dear human conflict is dominant over here in shape of depredation of crops , and livestock losses as well as human causalities and deaths. The leopard attacks are also reported major on live stock predation.

### **Kaghan Forest Division.**

#### **Manshi Reserve Forest/Wildlife Century**

This compromises of Manshi Forest compartments including reserve and guzara forests. The Manshi Wildlife Sanctuary is situated in valley of Kaghan on the

east bank of the Kunhar River, 12km north of Paras Village. The sanctuary is accessible via Paras along a very poor track, which is impassable during winter snow. 34°48'N, 73°34'E. Declared a wildlife



sanctuary in 1977. Originally designated a reserve for a five-year period ending in 1973, having an area of 2,321ha.

Terrain view of Manshi wildlife Sanctuary with references: to UCN Directory of South Asian Protected Areas

The mammals have not been surveyed, but are known to include common langur *Presbytis entellus* and Royle's pika *Ochotona roylei* (Wayre, 1971). Himalayan black bear *Selenarctos thibetanus*, Himalayan musk deer *Moschus chrysogaster* (V) and occasionally leopard *Panthera pardus* (T) are also present (M.M. Malik, pers. comm., 1987). The avifauna is rich in species. There is prime habitat for koklass pheasant *Pucrasia macrolopha* and monal pheasant *Lophortyx impejanus*, both of which are numerous (Wayre, 1971; T.J. Roberts, pers. comm.). The sanctuary is one of the few known breeding locations in Pakistan for white-bellied redstart *Hodgsonius phoenicuroides*. Long-legged buzzard *Buteo rufinus* and lammergeier *Gypaetus barbatus* also breed here (T.J. Roberts, pers. comm., 1986). Five species of fish occur in Kaghan Valley but their distribution within the sanctuary is not specified (Mirza and Hussain, 1985).

**The World Database on Protected Areas (WDPA)** ID of Manshi is **6731** and the reported area is **23.21 km<sup>2</sup>** and **data provider** is “The Asian Bureau for Conservation (ABC)” . This wildlife century falls in the category IV of IUCN management Category.

The main attributes include its status as designated and its type as nation. This was declared as wildlife century in 1977. This is situated in district mansehra at northern part of Khyber pakhtoon khwa. The management authority is wildlife department and presently there is no management plan effective.

The already established VCC of Manshi will be replaced with an effective and functional PAC. The total estimated population of Manshi is 5885 personal with a literacy rate of 25.5%. There are approximately 3548 house holds and the main crops are maize and wheat. The 60% of the locals are depends on agriculture as their profession while 25 % are related with business and only 15% people are engage in jobs.

<b>A.No</b>	<b>Name of Village</b>	<b>Total house hold</b>	<b>Population</b>
1	Bantuhdar	95	1095
2	Khalarian	119	2355
3	Kund Sarbori	96	1322
4	Meithal	98	1500
5	Hafzabad	89	1075
6	Dabbar Katha	53	948
7	Jihngi	102	2116
8	Gallian Khetar	81	1144
9	Kayan	190	3695
10	Rawalli	117	2658
11	Lundi	35	625
<b>Total</b>	<b>1075</b>	<b>18533</b>	<b>18533</b>

## **NOORI RESERVE FOREST:**

Noori reserve forests is situated at a distance of 80Km from Mansehra city and are assessable through two Jeep able roads i.e. Noori Chitta Parh road and Manoor Bela road which stretch over a distance of 14km and 22Km. Total area of the Noori Reserve forests is 2709.5Ha (6695 acre) 80% of the area is comprised of moist Temperate forests with active moon soon during May to September and 20% of the area comprising of upper reaches is composed of scenic alpine and sub alpine meadows. Famous alpine and sub alpine meadows of the area are Upper Besri, Lower Besri, Drawa galli (on North of which lies Machiara National Park Azad Kashmir), Qadir Galli, Phurraj and Shakharan (the ridge of which further extends to Saiful Maluk National Park).The area harbors important flora and fauna like Monal Pheasant (*Lophophora impejanus*), Koklas Pheasant (*Pucrasia macrolopha*), Western Horned Tragopan (*Tragopan melanocephalus*), Musk Deer (*Moschus chrysogaster*), Himalyan Ibex (*Capra ibex*), Common Leopard (*Panthera pardus*), Snow Partridge, Goral (*Naemorhedus goral*) and Black Bear (*Selenarctos thibetanus*) etc, besides harboring the typical vegetation of Moist temperate forests like Fir (*Abies pindrow*), Spruce (*Picea smithiana*), Blue Pine (*Pinus wallichiana*), Rhododendron, Deodar (*Cedrus deodara*), Wall nut (*Juglan reggia*), Yew (*Taxus baccata*), Ban Khor (*Aesculus indica*) etc. and more than 100 different species of medicinal plants which have their traditional ethno botanical uses.



Pictorial Glimpse of Noori Reserve Forests

Since the area is mostly comprised of reserved Forests largely free from any rights and is only seasonally utilized by the locals for their live stock grazing on sub alpine meadows .

*Cedrus deodara, Pinus wallichiana, Abies pindrow, Piecea smithiana ,Taxas bacata, Aesculus indica,Juglan reggia, Ailenthas alticiemia and Prunus podus are the main trees,*

*The medicnal and aromatic plants include*

*Paeonia emodi, Saussurea lappa, Podophyllum hexandrum, Bergenia ligulata ,Cannabis sativa, Viola rupestric, Mentha longifolia, Rumex hastatus, Adenantha Pavnina, Commelina benghalensis, Solonum nigrum, Berberis lyceum and Angelica glauca*



### **Glimpse of Medicinal and aromatic plants**

#### **Alien and invasive species.**

#### **Purpose of the study**

Different components of biodiversity play an important role in maintaining ecological balance in forest ecosystem. However, alien and invasive plant species cause severe disturbance to natural ecosystem. Alien species cause competition for food and space and transmit pathogen and parasites to individual organisms which may lead to population decline and species extinction. People



living in and around forest may also suffer from allergic and other negative reactions to the alien and invasive species.

### **Objectives**

The following are objectives of consultancy.

- To conduct assessment of alien invasive species in project sites in Kaghan and Siran valleys;
- To map extent of alien invasive species and their distribution in project sites; and
- To train staff of forest and wildlife department in identification, assessment and mapping of alien invasive in high value conservation forest.

#### **4.1. Data Collection:**

All the study area is included in Sustainable forest Management Project area within district Mansehra. It comprises Manshi, Kammal Ban, Noori, Naghan, Tared, Shohal Muzallah, Jared, Paras, Bhunga and Hangrii villages as well as Devili, Sacha, Manda guccah Una etc. Records of these villages are maintained by Revenue Officer. In all these villages farmers either themselves or department have carried out soil conservation works in field. So data was collected from all these villages to evaluate the soil conservation measure applied in the area. The data was collected with the help of pre-tested questionnaire which has been attached at the end of thesis. Secondary data regarding type and extent of erosion, its controls and soil conservation techniques applied in the area was collected from the office of Sirin watershed.

#### **4.2. Material.**

Material includes:

- Map of the area.

- Satellite Image of the area
- Review of literature.
- Censes report
- Forest Department data
- Questionnaire
- Software i.e. Ms Office, Excel, Google Earth & SPS

### **4.3. Methodology.**

#### **Review of available Record and literature.**

The available record of history files, working plans, reports project documents , national and international research work papers on alien species are reviewed.

#### **Mapping extent of alien invasive species and their distribution:**

The Survey was conducted in selected areas by using grids Map with Gps in all the land use classes of the target area. The presence or absence of alien and invasive species sign of existence either individual or in chunk in each sample block provides an estimation of the proportion of alien species approximate population with their exact location.

#### **Assessment of domestic knowledge and impact of Alien species on locals:**

Questionnaire surveys will be conducted to establish database on domestic knowledge and professional knowledge in the study area. Information will be collected about the alien species, in their inducted habitat, its role and dependency of locals on about with impact on the socioeconomic status, assess its status with respect to area coverage. Informal interviews will be conducted and information will be collected from selected villages of the study area. The respondents will be selected from various groups such as farmers, community members, government officials, and villagers who may have lost livestock and crops due to bear conflicts or injured by black bears. A cross section of at least 15 villagers representing each group of people will be approached in each

village. Data on aspects such as alien and invasive species existence either individual or changes, this may include designated forests, community own land , farm forestry practices, agriculture crop and fodder, In addition, some cases that occurred in which an alien species has turn invasive over the area and its impact in comparison of surrounding habitat with normal vegetation will be investigated to under stand the circumstances leading to any ecological change and behavior of local dependent communities towards it. The respondents (focused groups) will also be asked to suggest feasible measures to mitigate harsh impact of alien species on the environment . All the villages and where possible, sites of alien and invasive species of all plants variety will be marked with a GPS location to map the Reserve Forests, Guzara Forest, Community lands, Wood Lots , human settlements and surrounding agriculture fields as well in order to determine their pattern and their impact on the Natural habitat.

#### **Training of the staff:**

##### **4.3.1. Questionnaire Construction:**

Keeping in view the objectives of research, questionnaire was constructed under the supervision and guidance of advisor.

As majority of the peoples are illiterate therefore data obtained for identification of impact and evaluating domestic knowledge of invasive and alien species and its impact on socio- economic conditions and ecology contained sample question which were easy to understand and non-sensitive, were included in the questionnaire. The questionnaire was composed of two parts, i.e. part I for community peoples and part II for forest department and other Relevant departments.

##### **4.3.2. Sample Size:**

The study was conducted through random sampling of the community. And transits walk in designated forests as well as community lands, agriculture fields and settlements. Under the present time constraints it was not possible to study the whole area in of human settlements and to record the accurate number

of alien and invasive species. Due to this fact only 15% sampling intensity were contacted from the whole area. Interviews were conducted on the basis of designated questionnaire schedule from people and other organization.

#### **4.3.3. Data Analysis:**

After the data collection the data was transferred to the tally sheets, which was, facilitated the analysis of the data. Simple statistics techniques of the mean, median, mode, and standard deviation were used for analysis of data. Both quantitative and qualitative analysis were made

#### **Interventions:**

#### **Assessment of alien invasive species in project sties in Kaghan and Siran valleys;**

Initially to establish the base line and to fruitfully achieve the activity, transact walk was conducted.

#### **Meeting and interviews**

Meeting and interviews of forest, wildlife, live stock, Agriculture and watershed department were conducted to enlist the key exotic species being introduced in the area in the past and their effect and impact on the ecosystem and socio-economic conditions of the locals. The record of all the above mention department were reviewed for any relevancy or supportive material to add to this study.

#### **Focus Group Discussions Forest & wildlife Field Staff.**

For effective baseline and timely accomplishment of the task the most relevant person of the forest the relevant beat and block in charges or person that have served maximum service within the targeted area of the project . Their inputs serve as basic pillar with practice of keen observation.

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## **Manshi Sharran.**

There are 12 number of compartments in Bagjar Guzara Forests over an area of 4000 acre. The dependency of the community having rights include Bela Sach over compartment 1 and 2, while of on compartment three Sacha Nadi residents are dependent and on compartment 3 Bela Sacha Nadi. Saccga and Paror & Paror Bela village have rights over compartment f4, while the rest having cumulative dependences fulfillment of Patlang, Mang and Mom Chati, Baghar Villages. Two plants of alien species of *Quercus* being introduced from United Kingdom before partition of Pakistan is presently surviving there. No regeneration of it is reported and it do produce seeds. This is located at Sharan Rest house with in the premises of the forest rest house. In reserve forest no alien plants except in reserve forest of 14, 16 and 9 compartment.

### **Compartment 16**

It comprises of approximate 3 acre of the total area of the compartment is 315 acre and approximately 60 to 70 number of plants with a dia of 7 inches – 22 inches and age ranging from 20-25 years. There is no impact on the regeneration and *Pinus wallicina*

### **Compartment 9.**

The planting of cutting of popular is also carried out in last three four years and presenting existing on an are of approximant 5 acre .

### **Natural Regeneration of Alien/ Invasive *Populus ciliata* in Compartment 14.**

Approximately per acre 110 plants per acre is the regeneration in this compartment. The total area covered by this regeneration is approximately 1.35 acres. Kail, fir and spruce regeneration is also present there. Shallow root system and is reported to be fallen down during windy season. Though it serve as disaster catalyses. The over all impact is its benefit locals. As well as it help in reduction of land cutting, saves coniferous forest by being an easy available source of fuel wood and shattering, fodder. Losses : regeneration disturb with

felling ,Populus Ciliata is also being planted here while the natural dominant species in Guzara forest are Pinus wallichina, Fir spruce, asculus perth prunus pedrus. In reserve forest at compartment 10 and 13 about 8 acre of land is lease out to the potato research centre in which they grow the alien vegetables. Potato and some cases turnips while alien. The status of guzara forest is of low quality only compartment 1st and 2 is in good condition .Kail and Chir are the major trees. Enlistment of alien Species with socio economic details in community land and dependant villages. Major crops of the dependent village are maize , beans , While potato and turnip are also alien species being introduced and are alien while the cultivation of potato has increased to make it an invasive agriculture crop.

### **Bela**

This is a village with an average house hold of 505 household and having 3000 population. They are dependent on Guzara 1, 2, Reserve 1 and Reserve 2 .One middle school for boys and one primary school each for girls. The road is non metallic. The main species kail, and fir rarely. On the community lands one cherry orchard is present at 0.5 acre as an alien species. Apple orchard is also present on an area of 1 acre. Maximum walnuts are present in every house hold Diospyros kaki Japani pal trees are also found around 30 in number in the village.

### **Robania ,Alithus and eucalyptus:**

Total plantation area is 330 hectare = 55 % robanina of tsunami, 1 % of Euclyptus about 1000 thousands, and Alithus 20 % , 24 % chir and other locals.

### **Saccha Kund & pror.**

One girls primary school and two boys school . about 80 % people dependent on agriculture. The road is Kaccha road.

The total house holds are 470 houses with approximate 3200 people. The native plants include disopourus lotus , juglian regia, No alien species were reported

and found in this area. Except in fruit trees of khubani , The above two are the permanent residents.

### **Mom Chatti.**

They are migratory, which goes to live in summer mostly. The permanent residence is 40 house holds in which about 250 locals resides through out the year. In summer the house hold reach up to 200 houses with a population of 1440 people live there. There is only one primary school for both girls and boys.

### **Teer mangloor.**

This is also a seasonal place where people migrate. No body resides here permanently. During summer the number of house hold are 160 with a population of 1125 people resides .No school and other government facility. No invasive species and alien, Maize is major agriculture crop of the area.

### **Der barasi & Perth Kot.**

This is seasonal population and is only limited to live for two months of July and august .No school, BHU, or other government infrastructure. These people mainly depend on live stock and agriculture. There were no alien species within the vicinities.

### **Paras Block.**

There are 19 compartments are of Reserve forest and 4 compartments of Guzara Forest and Reserve forest area include 3362 acre while guzara is 740 area and a total area of 4003 acre. The major vegetation is Kail, fir spruce at top.

### **Reserve forest Alien Species.**

The main species which is alien and exist is Ailunthus althisima. This is food in low quantity in Malkandi Reserve forest, it occurs in abundant in compartment, 4, 5 , 6 , 7and 8.

### **Compartment 6.**

3700 number of trees are estimated to be found in chunks in the forest compartment 6 at the lower elevation 8 acre area. 5 % of the over all compartment area is covered by ailanthus. No other regeneration grow in the area and with passage of time this has invade the population of Pashoor and Kainthi shrubs is suppressed and Alianthus spp is at peak of its climax species and is also consumed goats. Old leafs are edible to them while the newly fresh. The bad smell which were reported initially comes from the leaves is now disappeared and it is consumed mostly by goats.

#### **Compartment 4 .**

The total area is 70.8 acre , the deodar, and kail are main vegetation. The alien species in this compartment are Robania Pseducasia and Ailnthus Altisima .About less then one acre area is covered by the Ailathus with estimated population of 1330 trees which maximum age up to 8 years while the less age is one year new regeneration is found there which suppress the growth of Kainthi and Puchair. More than 4 thousand plants of Ailanthus species were estimated with coverage of 4 acre area on the road side. The regeneration is prominent and had suppressed the growths of the plants and its regeneration.

#### **Compartment 7.**

The kail deodar spruce and fir are natural vegetation which the alien species includes . Robania with a total area coverage of about 113 acre in which approximate, 2 acre of the total compartment having 2250 trees present with age class of 8- 10 years maximum and 75 % of population is under three years that shows its invasive growth. These are limited to grow on 5000 below feet in Malkandi block. The Ailanthus quantity estimated is about 1800 plants was estimated in the compartment on the road side of Bonja link road. 1 acre of approximately area is covered of the total compartment. The Bonja and Chirri are the main villages dependent on them

#### **Compartment 8**



*Ailanthus altissima* is approximately estimated as 3990 number of plants being estimated in the compartment with approximately 3 acre of area is covered of the total compartment. The Shezad village and ochiri and kawali are the main villages dependent on them .

### **Parras .**

The total population is about 10 thousand people with house hold of 1500 villages. There is only One BHU , one high school for boys and girls each, three primary girl schools and three boys school primary. The main road is metallic and other link roads are Kacchaa. The agriculture dependency is low as 20 % while the rest people involved in employment and daily wedge. In this village council where *Disopourus kaki* is only abundant alien species with a population size of 1200 plants with a coverage of 12 acre area. Every farm field is surrounded with *Alinthus altissima*, which is approximately 2 percent of the total area, under plantation of community . This shows fast regeneration While the *Robania Spp* much fever in number and the cover area of the community land is less than one percent of the community own lands .But due to the recent plantation in BTAP project approximately 30 acre of the total 150 acre of plantation which is twenty percent of the total population.The impacts of this is whole positive and have only impact on the grass . it was observed that all the ground grass vegetation under *Robanina* Chunks are weak condition.Mud grass are in very low quantity while every house hold have planted 3 to 4 trees of apples on their land on average which is also a non native species and being introduced. Walnuts are also abundant and pears are locals.

### **Charrali, jabbri , Naka Chiri & Tunia Kelo & shezad ,**

30 to 40 house hold exist as permanent residence in which about 210 people resides, There is one primary school for boys only and maize is main crop while beans cultivation is also practiced. There are no alien species in the area.

## **Ochri.**

The total population is person with a house hold of 167 houses with a population of 1140 persons. There were no alien species reported in the area. Two primary school for boys and there is no separate school for girls. There were no alien species were found in the area and rarely Ailanthus and Robanina is found in shezad but is too fever in population to be considered.

## **Bonja Block.**

This block compromises of 27 compartments of Guzara forest which lies with the vicinities Kawayi uniuon Council with an area of 7611 acre. The reserve forest Chitta par reserve comprises of 7 compartments and the total area of 1614.89 acres. The total area is 9225..89 acres.

### **In Chitta par Reserve forest**

No alien spices were found while local vegetation is Fir spruce kail walnut. Guuch. bermi

### **In Guzara Forest there are no alien species were found.**

The impact of this is whole positive and has only impact on the grass. it was observed that all the ground grass vegetation under Robanina Chunks are weak condition.

### **Community land.**

Less than one percent of the plantation area include plum, apricot ,and apples. The following villages are dependant on above compartments.

## **Sahri.**

One high school for boy's one middle school for girls and one BHU is present along with police chowhki. The total number of House Holds area 100 with a population of 680 people. This is the centre of the Boja valley. Aside from apple, Plum and apricot is alien species. Apple is in abundant tree. The land cover is

less than only about 0.75 percent of the community self planted land of farm forestry with land coverage of about 5-7 acre. Every house hold have planted 3 to 4 trees on apples on their land on average which is also a non native species and being introduced.

**Danna ,**

Total house hold of 200 and population is 1400. Walnut is abundant while rest abundant is not found.

**Sharan, Andaira baila :**

Total houses are 560 houses with total population of 37800. No other government school . No alien or invasive specie in the area.

**Mangal grah .**

The total houses are 270 in numbers with a population is 1700 personal. These are the permanent residence. There are no alien species reported in this area.

**Nadi Block**

The total area of reserve forest is 5811 acre and guzara is 1024 acres. The Naghan reserve forest comprises of 18 compartments of the reserve. There are 3 guzara beats include baghar , hangrayi, and ganila, In Guzara forest the major species are Pinus wallichina, while in reserve forest Fir spruce, Aesculus, Perth Prunus Pedrus. No alien species with major chunks were reported.

In Baghar Guzara forest fir and spruce are dominant while in the reserve forest are in good condition , compartment 5 and 4 include open value, Compartment 7 , 17 and 18 are extreme high value forest in good conditions. In Guzara forest Hangrayi is best while rest compartments need intensive care and management of restoring.

Haygrayi is natural way.

Alien species in reserve and Guzara forest are rare while in private lands the major alien species is Robina and Ailanthus altissima

Robania is in major alien species being prior by local communities on community plantation, About ; 25 % of the total 500 acre plantation is cover with Robanina. The same crop was introduced from 30 -35 years, but recently Tsunami plantation is also planted here . No bad impact on ecology. While its consumption demand includes use as fodder, shattering and fuel wood as this is a fast growing species with a local rotation age of up to 10 years. Beside this it also adds to soil stabilization and in some cases for construction of furniture as well.

About one percent of the local needs are fulfill with this plantation. As 300 house holds are beneficiaries of these plantation.

Maize is the major crop of the area while potatoes are also being introduced as alien agriculture crop which is now invasive and yet its area of cultivation is spreading

The main villages of Nadi block include

### **Hangrai,**

The population of hangrai is about three thousand with 302 number of houses where 50 % of locals are dependant on agriculture. One high school of boys is there while Five schools of primary and middle of girls are there .

One BHU is also there with Robania compact plantation with about 40 plants is present in Sayar hangrai with an age of 12-14 years.

### **Gannela**

There are 275 number of houses in Ganela with a population of 22000 and 5 primary school in which 3 are for girls and two for boys.

Robania plantation about 15 acre is present at Raishu village ganela community land with an age of 2. Moras alba is also being introduced from the past about

100 plus trees were examined amongst which the prominent population is in ganela village.

### **Baghar**

50% of the population is dependent on agriculture while after earth quake it maximum population is shifted to the settle areas of Balakot and Mansehra there are 103 villages with 609 populations living there. There is one primary school for boys and girls each. No Invasive species are reported as massive.

### **Danna.**

There are 65 houses with a population of 400 peoples while there is only one School and mud Grasses is also found in small quantity being introduced here by agriculture and livestock department and no prominent exotic species are there.

### **Makan Mori.**

The Total house hold are 48 houses and about 300 population resides. One school is functional with out building in the mosques and one community centre. While No exotic species were reported and found here other plants are Pamara. Paghar, fig plant, walnut , kangar,

### **Mang :**

Total population is 120 houses with a population of approximately 800 hundred. Two schools for girls and boys one each at primary each. In total 200 acre of plantation about 10 % of the plants planted are alien in shape of Robania. Alinthus is also being observed around the houses .10 % of the area comprises of Robanina plantation. 15% of the total farm forestry is comprises of Robania and Ainthus as alien species.

### **Baghar.**

Total population is about 100 houses per village and the estimated population is about 700 persons. 100 acre plantation done by watershed of Robania from last

three years. Approximately on an average 12 thousand per year is the benefit from these plantations to the locals in shape of fuel wood and agriculture consumption. One Primary School for each boys and girls. The road is pakka and is about 16 km south from Balakot. The fruit plants only indigenous walnut.

**Review of available Record:**

For this purpose the work plans from 1906 to date were reviewed other reports of watershed and wildlife department to know the history of plantation of invasive and native species with in the area beside from this the utilization of local aged scientist and old forest and wildlife staff with age margin was also involved. International article were also reviewed for purpose of getting knowledge and identifying its impact but plantation but no evident were found except plantation of watershed and Btap small chunks and free distribution of alien species as multipurpose species were found. The major relevant data are tabulated below.

**MALKANDI SHOGRAN RESERVED FOREST**

compartment	Area	Elevation (Feet)	S Q	Density	Slope	Soil	Spp composition
1	130.2	7747	Medium	0.7	20	Deep	Deodar =40 Kail =60
2	110.5	7710	Medium	0.5	70	Deep	Deodar =30,B.L =30 Kail =40
3	112.2	7650	Medium	0.6	80	Deep	Fir =30,Deodar =20 Kail =50
4	70.8	7310	Medium	0.7	75	Deep	Deodar =3 0, Kail =40

5	63.7	7500	Good	0.5	68	Deep	Deodar =60 Kail =40
6	45.2	7110	Good	0.4	75	Shallow	Deodar =30 Kail =70
7	113.7	7250	Medium	0.7	80	Deep	Deodar =10,B.L =40 Kail =50
8	125.2	7400	Medium	0.6	70	Fairly Deep	Deodar =60,Fir =20 Kail =20
9	105.5	7930	Medium	0.6	85	Deep	Fir =30,Spruce =60 Kail =10
10	100.2	7856	Good	0.7	81	Deep	Deodar =20,Spruce =30 Kail =50
11	89.8	8050	Medium	0.8	85	Shallow	Fir =60,Spruce =20 Kail =20
12	80.5	8200	Poor	0.7	70	Shallow	Deodar =40 Kail =60
13	41.3	8450	Medium	0.6	80	Deep	Fir =20,Spruce =20 Deodar =30
14	57.5	8670	Medium	0.7	90	Fairly Deep	Fir =20,Deodar =40 Kail =40
15	105.2	8805	Medium	0.6	90	Fairly Deep	Fir =30,Spruce =40 B.L =30
16	121.0	8900	Medium	0.5	80	Fairly Deep	Fir =50, Spruce =50

17	105.2	8970	Medium	0.7	98	Deep	Fir =60,Deodar =20 Kail =20
18 a	93.4	9000	Medium	0.4	95	Shallow	Fir =20,Spruce =60 Kail =20
18b	62.0	9105	Medium	0.7	90	Shallow	Deodar =10.Spruce =10 Kail =20, Fir =60
19a	48.6	9200	Medium	0.7	80	Shallow	Fir =60,Spruce =20 Kail =20
19b	129.5	9250	Poor	0.6	85	Shallow	Fir =40 Spruce =60

### GENERAL DESCRIPTION

#### KAMAL BAN

VCC	POPULATION	LITERACY RATE	HOUSE HOLD	CROPS	PROFESSION
Kamal Ban	8090	39.5%	2550	Pea-Maize-Potato	Business 10% Agriculture 75% Jobs 15%



FAUNA	FLORA
Musk deer ( <i>Moschus moschiferus</i> )	Kail ( <i>Pinus wallichiana</i> )
Ibex ( <i>Capra ibex</i> )	Deodar ( <i>Cedrus deodara</i> )
Common leopard( <i>Panthera pardus</i> )	Fir ( <i>Abies pindrows</i> )
Monkey ( <i>Macaca mulatta</i> )	Spruce ( <i>Picea mamithiana</i> )
Languor ( <i>Presbytis entellus</i> )	Walnut ( <i>Juglans regia</i> )
Koklas ( <i>Pucrasia macrolopha</i> )	European Yew ( <i>Taxus baccata</i> )
Grey goral ( <i>Naemorhedus goral</i> )	Wild rose ( <i>Rosa muschata</i> )
Kalij ( <i>Lophura leucomelana</i> )	Climber ( <i>Hedera</i> )
Cheer pheasant ( <i>Catreus wallichii</i> )	Ailanthus Spp ( <i>Ailanthus altissima</i> )
Monal ( <i>Lophophorus impejanus</i> )	Chestnut ( <i>Castanea dentate</i> )
Porcupine ( <i>Erethizon dorsatum</i> )	Ban khor ( <i>Aescolus indica</i> )
Black bear ( <i>Selenarctos thibetanus</i> )	Kikar ( <i>Acasiaa spp</i> )
Wolf ( <i>Canus lupus</i> )	
Bulbuls ( <i>Pycnonotous atriceps</i> )	
Magpie ( <i>Pica pica</i> )	
Snow cock ( <i>Tetraogallus</i> )	
Pigeon ( <i>Columba livia</i> )	
Flying squirrel ( <i>Sciuridae</i> )	
Snow cock ( <i>Tetraogallus</i> )	

## DEPENDENCY OF VILLAGES ON FOREST

COMPARTMENT	VILLAGES
1	Katha Maneen
2	Maneen
3	Dhano
4	Dhani
5	Dermyana Kamal Ban
6	None
7	None
8	Pechla Kamal Ban
9	Doga
10	Rajri
11	Chapran
12	Bari
13	Khanian
14	Khanian
15	Khanian
16	None
17	Tahya
18	Tahya
19	Charanda
20	Charanda



**KAMAL BAN RESERVED FOREST:**

There are twenty compartments in this mainly comprises of

**KAMAL BAN RESERVED FOREST SALIENT FEATURES**

<b>compartment</b>	<b>Area</b>	<b>Elevation</b>	<b>S Q</b>	<b>Density</b>	<b>Slope %</b>	<b>Soil</b>	<b>Spp composition</b>
1	66.4	2200	Medium	0.6	78	Shallow	Deodar =90 B.L =10
2	87.8	2800	Medium	0.7	70	Deep	Deodar =30 Kail =40 Fir =30
3	106.0	2900	Medium	0.7	68	Fairly Deep	Deodar =20 Kail =20 Fir =60
4	84.5	2950	Medium	0.8	75	Deep	Deodar =30 Kail =50 Fir =20
5	93.1	2700	Medium	0.8	60	Fairly Deep	Deodar =30 Kail =10 Fir =60

6	96.8	2700	Good	0.7	75	Deep	Spruce =40 Fir =60
7	63.1	2965	Good	0.7	65	Deep	Spruce =20 Fir =80
8	77.7	2680	Medium	0.7	70	Non	Deodar =80 Kail =20
9	130.4	2964	Medium	0.6	70	Fairly Deep	Spruce =50 Fir =50
10	141.6	2356	Good	0.3	65	Deep	Deodar =45 Spruce =20, Kail =35
11	87.0	2888	Medium	0.5	80	Fairly Deep	Kail =10 Fir =90
12	186.2	2890	Good	0.6	100	Non	Deodar =20 Kail =20 Fir =60
13	90.6	2888	Medium	0.7	80	Shallow	Deodar =40 Spruce =20, Fir =30 Kail =10
14	67.6	2880	Medium	0.6	90	Shallow	Deodar =50 Spruce =20, Fir =30
15	23.9	2900	Poor	0.8	75	Shallow	B.L =60 Kail =40
16	63.1	2700	Poor	0.6	70	Shallow	B.L =60 Kail =40
17	145.7	2700	Medium	0.5	85	Fairly Deep	Deodar =30 Kail =40 B.L =30
18	130.5	2950	Medium	0.7	80	Shallow	Deodar =40

							Kail =60
19	118.6	3040	Medium	0.6	70	Shallow	Deodar =20 Spruce =40, Fir =40
20	38.4	3300	Medium	0.8	85	Fairly Deep	Kail =30 Spruce =40  Fir =30

In Reserve and Guzara forest no exotic species or plantation were reported while on community lands Robania Pseducaisa, Alithus Altisima were reported rarely eucalyptus were also planted by common but its growth and maturity is questionable due to excessive snow fall.

### GENERAL DESCRIPTION

#### MANSHI

VCC	POPULATION	LITERACY RATE	HOUSE HOLD	CROPS	PROFESSION
Manshi	5885	25.5%	3548	Maize- Wheat	Business 25% Agriculture 60% Jobs 15%

FAUNA	FLORA
Musk deer ( <i>Moschus moschiferus</i> )	Kail ( <i>Pinus wallichiana</i> )
Ibex ( <i>Capra ibex</i> )	Deodar ( <i>Cedrus deodara</i> )
Common leopard( <i>Panthera pardus</i> )	Fir ( <i>Abies pindrown</i> )
Monkey ( <i>Macaca mulatta</i> )	Spruce ( <i>Picea mamithiana</i> )
Languor ( <i>Presbytis entellus</i> )	Walnut ( <i>Juglans regia</i> )
Fox ( <i>Vulpes vulpes</i> )	European Yew ( <i>Taxus baccata</i> )
Grey goral ( <i>Naemorhedus goral</i> )	Wild rose ( <i>Rosa muschata</i> )
Kalij ( <i>Lophura leucomelana</i> )	Climber Hedera
Cheer pheasant ( <i>Catreus wallichii</i> )	Ailanthus Spp ( <i>Ailanthus altissima</i> )
Jackal ( <i>Canis adustus</i> )	Chestnut ( <i>Castanea dentate</i> )
Porcupine ( <i>Erethizon dorsatum</i> )	
Koklas ( <i>Pucrasia macrolopha</i> )	
Wolf ( <i>Canus lupus</i> )	
Bulbuls ( <i>Pycnonotous atriceps</i> )	
Magpie ( <i>Pica pica</i> )	
Snow cock ( <i>Tetraogallus</i> )	
Monal ( <i>Lophophorus impejanus</i> )	

## DEPENDENCY OF VILLAGES ON FOREST

### List of Compartments and villages

COMPARTMENT	VILLAGES
1	Bela Sachan
2	Bela Sachan
3	Patlang
4	Patlang
5	Patlang
6	Baghair, Patlang
7	Baghair, Patlang
8	Darshi
9	Bana, Balakot
10	Shran
11	Bela
12	Bela
13	Bela
14	Nakka Shangri
15	Nakka Shangri
16	Nakka Shangri
17	Nakka Shangri

The above table shows the villages which are adjoining to the jurisdiction of the compartment and local of the said villages are mainly fulfilling the needs from the mention compartments.

### MANSHI RESERVED FOREST

Compartment	Area (ha)	Elevation (Feet)	S .Q	Density	Slope %	Soil	Spp composition
1	106.4	7620	Medium	0.5	60	Deep	Kail=50 Fir =30 Spruce =20
2	88.2	8116	Medium	0.7	55	Shallow	Fir =50 Spruce =30 Kail =20
3	91.5	7367	Medium	0.7	70	Shallow	Deodar =40 Spruce =30, Fir =30
4	202.3	8945	Good	0.5	75	Shallow	Deodar =40 Kail =40 Fir =20
5	128.7	8052	Medium	0.6	80	Deep	Deodar =30 Kail =30 Fir =40
6	174.8	8030	Poor	0.8	68	Shallow	Deodar =40 Fir =30 Kail =30
7	135.2	8392	Medium	0.6	60	Shallow	Kail =30 B.L =30 Spruce =30
8	170.4	8820	Medium	0.7	75	Fairly Deep	Kail =40 B.L =30 Spruce =30
9	58.9	8500	Good	0.6	70	Fairly Deep	Spruce =40 Fir =50 Kail =10
10	115.3	8600	Medium	0.7	40	Deep	B.L =60 Spruce =20 Fir =20



11	94.3	9700	Medium	0.7	85	Fairly Deep	Spruce =60 B.L =30 Kail =10
12	245.2	9050	Medium	0.7	70	Deep	Fir =50 Spruce =40
13	130.3	8000	Medium	0.6	75	Deep	B.L =30 Kail =30 Spruce =40
14	126.7	8034	Poor	0.6	60	Shallow	Kail =30 Spruce =40 B.L =30
15	131.5	8950	Medium	0.6	70	Non	Spruce =30 Kail =20 Fir =50
16	242.3	8750	Medium	0.5	80	Shallow	Fir =40 Spruce =30 B.L =30
17	257.4	8000	Medium	0.7	75	Shallow	Spruce =40 Fir =40 Kail =20

**The details of approximate area coverage will be shared in the second draft report.**

**Mapping extent of alien invasive species and their distribution in project sites;**

To achieve this objective intervention of Geo Mapping of alien and invasive species was made via GPs Co-ordinates of the alien species plantation chunks were taken during the survey beside from this a transit walks were made with in the community lands and villages to identify the population and size of land cover by alien species and GPS were also taken along with elevation.

**Note. The Geo reference map is under construction and will be shared in second draft report and Graphical representation charts will also be shared in 2<sup>nd</sup> draft**

**Training staff of forest and wildlife department in identification, assessment and mapping of alien invasive in high value conservation forest.**

The proposed intervention is a step forward to strengthen the knowledge of field staff of forest and wildlife department in introduction, identification of alien species its classification into alien or as invasive species, its socio economic benefits and its harsh impact on the environment. This activity was set to achieve the set forth objectives assessment of alien and invasive species with in the vicinities of the project targeted area. For this purpose Two day Training of wildlife staff and Forest Department staff at range and subdivision of the project area was a parted in which an orientation to them was given by the consultants regarding identification invasive and alien species its demarcation and classification as alien or invasive species The methodology of the training was base on informal method of teaching which is the most effective way for sensitizing elder age class other components include Brian storming and presentation methods were used to familiar them with the concept of alien species and invasive., The exotic species were also discussed with them. Group work and field demonstrations were also conducted.

**Note: Pictorial representation and rest details regarding above activity will be shared in second draft.**

### **Discussion and Conclusion**

The overall study reflect that the occurrence and abundance of alien and invasive species in the designated forest are so far pure in nature with no plantation of alien and invasive species except in few cases where along road side land stabilization water shed has carried out plantation of Ronbania spp, Ailthus spp

and Eucalyptus spp, the trend of encouraging the use of these multi purpose trees.

The maximum identified plantation on community lands of alien plant Robania spp was on 100 acre done by watershed since last three years. The Approximately average monetary benefit to an individual is 13500 rupees per year from the plantation of alien species with in the project area to meet the requirement of fuel wood priory followed by consumption as fodder rare cases as for furniture and shattering per year is the benefit from these plantation to the locals in shape of fuel wood and agriculture consumption.

This is concluded from the above facts and proofs that less than 1% percent alien and invasive species are found in the targeted areas including farm forestry community plantation and designated forest.

The study also reveals that these species are fast growing species with commercial value as well as value as fodder and fuel food. The impact over all seem to be in control and positive with out causing any disturbance to the local ecology in the targeted area but where ever any chunk is there it has suppressed the growth of the natural vegetation.

### **Recommendations.**

This is recommended that to conserve high value forest with in natural state the plantation of native and invasive species must be discouraged to be planted in massive way.

This plantation also helps to sustain the erosion and land degradation process.

These species may be allowed to be planted in farms and with in the vicinities of houses such as apple, Disporous spp, Robania and mud grasses, the agriculture invasive vegetable are Potato and peas.

**ASSESMENT OF ALIEN AND INVASIVE SPECIES IN SUSTAINABLE  
FOREST MANAGEMNT PROJECT AT UPPER SIRAN AND KAGHAN  
VALLEY DISTRICT MANSEHRA.**

**QUESTIONNAIRE**

**Form No.** ----- **Date:** ----- **Locality:** -----  
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GPS Co-ordinates: \_\_\_\_\_ Elevation: \_\_\_\_\_  
\_\_\_\_\_

**PART I: General information of respondent:**

- 1) NAME (Optional) \_\_\_\_\_
- 1.2) Farmer's Name: \_\_\_\_\_
- 1.3) GENDER \_\_\_\_\_
- 1.4) AGE (years) \_\_\_\_\_
- 1.5) CNIC \_\_\_\_\_
- 1.6) OCCUPATION \_\_\_\_\_
- 1.7) EXPERIENCE (years) \_\_\_\_\_
- 1.8) Tehsil. \_\_\_\_\_
- 1.9) Forest Sub-Division/Range \_\_\_\_\_
- 2) Education:
  - Illiterate       Primary
  - Middle       Secondary
  - Intermediate       Graduate
  - Post graduate

Part II

3) Ever visited a forest?

Yes  No

3.1) Any liking for forest?

Yes  No

If No give reason: \_\_\_\_\_

If yes \_\_\_\_\_

4) Have you any Dependency of Forest?

Yes  No

If yes,

4, 1) What Sort of Dependencies?

Fuel Wood  Construction  Grasses/Fodder

NTFPP collection.  Specify other if any, \_\_\_\_\_

5) Have you any Knowledge and interest about Forests?

Yes  No

If yes \_\_\_\_\_

6) What Sort of Trees is grown here?

\_\_\_\_\_

6.1) Have you ever heard about alien invasive (Exotic) species?

Yes  No

If yes,

6.2) What are the main alien/invasive/exotic species in Reserve Forest ?

Sr	A/A.Spp	T. Area in Acre	Compartment	Block	Plants QTY	Area covered	Livelihood dependency, type	Ecological Impact	Economic gain/loss in Pkr per year.
1									
2									
3									
4									
5									
	Total								

6.3) What are the alien species in Guzara Forest

Sr	A/A.Spp	T. Area in Acre	Compartment	Block	Plants QTY	Area covered	Livelihood dependency, type	Ecological Impact	Economic gain/loss in Pkr per year.
1									
2									
3									
4									
5									
	Total								



- Prolong Droughts \_\_\_\_\_
- Drastic Rainfall\_\_\_\_\_
- Strong Wind**\_\_\_\_\_
- specify if other** \_\_\_\_\_

6.4.5 What are your suggestion regarding promotion or discouraging of invasive species?

- To Be Promoted
- To be discourage
- Nothing
- Do not know

6.4.6 Promotion suggestion.

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6.4.7 Discouraging Suggestion

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6.4.8 If Nothing Explain Why

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"THE END"

(THANKS FOR YOUR PATIENCE)

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**Questionnaire for geo mapping and population status assessment of Alien Species in field surveys for Upper Siran and Kaghan Valley.**

Serial No: \_\_\_\_\_

Date: \_\_\_\_\_

1. Name of area/site : \_\_\_\_\_

2. Beat and Compartment

No: \_\_\_\_\_

3. Transect no : \_\_\_\_\_

4. GPS coordinates transect start: N \_\_\_\_\_, E \_\_\_\_\_, Elevation \_\_\_\_\_m

5. GPS coordinates transect end: N \_\_\_\_\_, E \_\_\_\_\_, Elevation \_\_\_\_\_m

**A.**

Plot no	Area (m <sup>2</sup> )	Tree species	Alien Species				Total Nos of Plants
			Grass es	Herbs/shrubs	Tree s	Life stag e	

**B.**

Plot no	North	East	Elev (m)

**C.**

Signs (Tree marking, foot print, Stone digging, Den)	North	East	Elev (m)

Sub transect no:	Start	Elev (m):	End	Elev (m):	GPS start to close point no:	Distance covered (m)=
	N		N			
	E		E			
Sub transect no:	Start	Elev (m):	End	Elev (m):	GPS start to close point no:	Distance covered (m)=
	N		N			
	E		E			
Sub transect no:	Start	Elev (m):	End	Elev (m):	GPS start to close point no:	Distance covered (m)=
	N		N			
	E		E			
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	E		E			
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	N		N			
	E		E			