## CHAPTER-3

# RENEWABLE NATURAL RESOURCES

## Land cover classes

## FOREST

Composition and condition of the crop

In general the vegetation of the area can be classified into the following types:

1. Pure deodar forests.
2. Pure Kail forests.
3. Pure fir and spruce forests.
4. Mixed forests of fir, spruce, deodar and Kail.
5. Grazing lands and pastures.

The vegetative cover of the area varies with the change in climate, especially the rainfall. In area with scanty and erratic precipitation and that too in the form of snow, deodar is the major species while areas within the reach of monsoon zone are occupied by Kail. Silver fir and spruce form a continuous belt of varying width above deodar and Kail. In addition to climate, soils, slope, aspect and biotic factors are also responsible for the distribution, composition and condition of the crop.

On gentle slopes without adverse biotic factors where the soil is fairly deep and suitable for growth, stocking is dense and crop is of best quality. In very steep and precipitous slopes which are characterized by shallow soil or absence of soil, the crop is open, stunted, malformed and poor in quality.

Aspect plays an important role in the composition and quality of the crop. Northern and north eastern aspects bear’s good quality crop, whereas the crop on southern and south western aspects is generally of poor quality and open.

***Pure deodar forests***

Deodar occurs on elevation from 1660 meters to 2420 meters on cooler aspects and 1820 – 2870 meters on hotter aspects. The forests are mostly confined to hot exposures having very steep to precipitous slopes. Deodar forests cover 33% of the total forest area and contribute 29% towards the total growing stock. Volume percentage of Deodar is higher in Gornai, Balakot Ramat, Mankial and Torwal blocks. It occurs in scattered groups or in pure small patches in some sub-watersheds. At some places like Daral, Asrit, Mankial, and Torwal Khawar Deodar forms either pure crop or occurs in association with Kail. In such forests Kail is confined to moist pockets of deep soil while deodar dominates exposed shallow soils. Deodar mostly occurs on southern aspects. The regeneration of deodar is satisfactory in Mankial, Balakot and Torwal blocks.

The main broad leaved associates are *Prunus Padus, Quercus ilex, Quercus dilatata, Judlans regia, Aesculas indica* and *Acer species. Undergrowth mainly consists of Parrotia species, Plectranthus species, Spiraea* and *Indigofera* species. The list of common plants is given in Annexure-VI.

***Pure Kail forests***

Pure Kail forests occupy 20% of the total area and constitute 18% of the entire growing stock. Kail occurs predominantly on the fertile deep soil at northern aspects. In some valleys pure patches of Kail occur at the same elevation on ridges of the southern and western aspects while the depressions on northern and western aspects are occupied by fir/spruce. Beautiful young stands of Kail are found in Gornai, Chell, Beshigram and Bahrain blocks. In some locations it forms 80% of the crop where the density ranges from 40% to 70%. Regeneration of Kail is abundant in almost every block. Due to variation in soil and topography Kail percentage decreases gradually up to Peshmal. Broad leaved associates of the blue pine grow on moist shady locations on the northern slopes. These associates are *Quercus ilex, Quercus dilatata, Prunus padus, Juglans regia, Pyrus pashia* and *Ulnis nitida* in moist places.

Undergrowth consists of *Berberis* species, *Vibernum* species, *Rosa* species, *Plectranthus* species, *Indigofera* species, *Skimmia laureola*, and *Rubus* species etc.

***Pure fir/spruce forests***

Silver fir and spruce cover about 47% of the area and constitute 52% of the total growing stock. These forests occupy the highest altitudinal range (2420-3320 meters) as compared to other tree species and grow on the cooler aspects in the upper limits. They generally form a narrow strip between other types of forests and alpine pastures. In Chell, Beshigram, Daral, Bahrain, Gurnai, Ramet and Tirat these forests occupy quite large patches. The crop is found in pure stands or mixed with Kail and deodar especially in the transitional zone. At such places Kail grows on ridges and spurs in groups and fir/spruce occur in cooler depressions. Generally the quality of the crop is good, while the crop density ranges from 50% to 100%.

On gentle slopes and deep soils regeneration of fir/spruce is satisfactory but inadequate in other places. At places Kail can be seen coming up in profuse regeneration in the fir spruce areas. The crop is generally open and scattered trees are available through out the zone. Some permanent blanks have also been created in these forests by human intervention and natural hazards. The broad leaved associates are holy oak (*Quercus dilatata*) brown oak (*Quercus semicarpifolia*) Horse chestnut (*Aesculus indica*) walnut (*Juglans regia*), Bird chary (*Prunus padus*), Maples (*Acer* specie) and birch (*Betula Utilis*) Brown oak forms pure patches with scattered silver fir and spruce in the upper reaches.

The undergrowth is comprised of *Viburnum* species, *Skimmea* species, Rosa species, *Rosa* species, *Parrotia* species, *Berberis* species, *Podophylum* species, *Artemesia* species, ferns, and grasses.

***Mixed forests of Fir, Spruce, Deodar and Kail***

The mixed silver Fir (Charu), Spruce (Reeun), Kail (Chogoi), and Deodar (Beetch) Forests are generally found in almost all compartments in the form of a belt above Deodar zone, at elevations ranging from 2285-3355 M (7500’ - 11000′) with variation in altitudinal level according to aspect. The Fir, Spruce crop generally has mixture of Deodar at lower elevations and sporadic mixture of high altitude Kail, birch (*Betula utilis*) and Oak (*Q. dilatata*) in upper reaches. Odd trees of Horse chestnut (*Aesculus indica*), Maple (*Acer caesium*), Bird’s cherry (*Prunus padus*), Walnut (*Juglans regia*), Jhaand (Q. baloot), amlok (*Diospyros lotus*), Salix spp, are met with in cool shady places in the lower limit.

These forests are situated below the silver fir zone in all the blocks. The crop is of mixed types consisting of fir, spruce, deodar and some Kail. The mix in different proportions according to the local conditions suitable for each species. The broad leaved associated are Acer species in the upper reaches and *Quercus ilex, Asculus indica, Prunus padus* and *Acer pictum* in the lower reaches. The under growth is composed of *Parrotia jacquomontiana*, *Indigofera* species, Rosa species and Viburnum species.

These forests are generally uneven aged. The stocking on the whole is fairly dense and established except on hot aspects and rough localities. The quality of all the coniferous species is generally good or fair. Mostly the Fir and spruce trees are sporadic and mature to over mature. Regeneration is very scanty on hot southern and western aspects and hardly satisfactory in almost all cool shady places and on northern and eastern aspects. On cooler aspects the Fir and Spruce predominate and descend to lower elevations, whereas on warmer southern aspects deodar and Kail are superior in number.

Regeneration of Kail is also scanty. In the most favorable spots however, the regeneration of Kail comes up in groups but on the whole it appears to be unsatisfactory. The area being outside the influence of the monsoon rains, therefore, the climatic factors are less favorable to the reproduction of Kail as compared to that of Deodar, and the former thus fails to compete successfully with the later.

***Grazing lands and pastures***

All the un-cultivated areas in the valley bottom, forest grazing lands and alpine pastures are the source of fodder for the bulk of livestock in the area.

Valley bottom grass fields

All the un-cultivated area in the valley and on the slopes up to the forest line is included in this category. These fields are located from 1830 meters to 2500 meters. They cover approximately 10-30% of the agriculture surface area. Since the introduction of potato as a cash crop, each year considerable part of such land is converted into potato fields, thus reducing the pasture area and making fodder scarcer. The following are the common species growing in such areas.

*Chrysopogon* species, *Agropyron canium, Potentilla* species*, Trifolium repens, Agrostis* species*, Plantago major, Setaria* species*, Bothriochloa* species.

***Forest grazing land***

All the forest grazing lands (sub Alpine pasture) ranging from 2500 m to 3000 m inside the forest region are the permanent grazing grounds, either on moderately level ground or steeper slopes. These pastures are used for grazing during seasonal migrations from valley bottom lands to alpine pastures in early summer and in fall during the reverse migration. Temporary huts are found in these pastures. Potato can be grown in such areas if roads are built as has been recently done in the upper Mankial valley. Considerable part of such pastures is irrigated during summer but generally these pastures are rain fed. The following are the common species growing over here.

I*ndigofera* species, *Plantago* species, *Potentilla* species, *Fragaria* species, *Triforlium* *repens, Agrostis* species, *Dactylic glomerata* and *Aster* species

***Alpine pastures***

The high alpine pastures are located above the dense forest areas at an altitude of 2700 m to 4200 m. These are the large pastures which form an important source of fodder for the livestock of the local people as well as the migratory Gujars. The lower pasture lands lay with in the tree line depending on the physiology of the ground and the density of the forest. The upper limit is usually defined by permanent snow, glacier, rocks, and the steepness of mountain, however in certain places such as Mankial, Daral, and Beshigram etc. the pastures reach to the top f mountains. The better forage species in the area are:

*Trifolium thalli, Lotus alpinus, Leontodon hispidus, Alchemilla* species, *Poa* species, *Phleum* species, *Dactylic glomerata*

##  Injuries to the forest

The forests are subject to various injuries caused by the following factors:

##  Natural Factors

***Snow***

Damage by snow, though insignificant and limited in the lower portion, is rather pronounced in the upper most reaches in almost all forests of the Valley. In such areas the continuity of the forests is usually broken by regular snow slides. The paths of snow slides (avalanches) are usually devoid of Forest cover. The damage by snow is visible in the upper parts of the forest where considerable damage is done on account of snow slides in the nullahs.

***Erosion***

The valleys have a very rugged topography. The only insurance against erosion and Landslides is an effective vegetative cover. As a result of fast track decimation of the forests by uncontrolled irregular & illicit cutting, clearing of land for cultivation and excessive grazing the hillsides are subjected to traumatic and life threatening erosion since a score of years. The cultivable land is quite limited. The locals have to feed themselves, therefore, they resort to clearing of forests, terracing the land, leveling and using it for growing of agricultural crops. The problem of erosion starts, once the permanent vegetative cover is removed and ultimately lost forever. There are also other problem spots such as areas excessively trampled by grazing animals and those close to nullah beds. Such areas either slide down or are washed away by unprecedented run-off generated due to commonly occurring cloudbursts. The hill sides are subject to erosion as a result of excessive grazing, browsing and lopping in addition to clearing of forest land for cultivation. Besides the faulty practices of cultivation the erosion hazard become more dangerous on steep slopes.

 ***Frost***

The frost of severe intensity occurs in winter but it does little or no damage to the forests. However, occasional late season frost does kill the young plants and the growing parts of the mature ones.

***Drought***

Intensity of drought also depends on the aspect, geological formations and soil conditions of the area. Effects of drought are pronounced on hotter rocky aspects with shallow soils. The damage to young seedlings due to drought is not recorded. The effect of drought is not much important for the natural regeneration of the conifers in the area but is of significant importance if forests are to be rehabilitated artificially.

Excessive drought results in the death of young seedlings, the extent of damage due to drought is not known.

***Lightning***

Lightening frequently occurs especially in the upper reaches of the Forests on Mountain tops. Fir trees are the usual victims of lightening. A ribbon of bark in spiral shape is usually stripped off the main stem from top to bottom in Kail and Deodar stands. This damage is beyond the control of human agency and is a part of the ecosystem of high hill Forests. Lightening is a potential cause of injury but the damage caused by it is not marked.

 ***Windfalls***

The damage by wind storms or hurricanes is rare but it does occur in the area. The damage to trees due to wind storm, whenever occurs is to Kail or Deodar trees hollowed for torchwood or which have been damaged by fire. Torch weed extraction of Kail and Deodar trees can be seen near dwellings “Bandas” or along village paths passing through the Forests and sometimes it is quite heavy. The locals are thus compelled to extract torchwood to light their way at nights. There is no way to eradicate this damage unless the socio-economic lot of the locals improves.

The frequency by number and quantum by volume of the windfalls is not that much which have illicitly been harvested by the locals during the last one score of years under the guise of acquired political bribes in the shape of different so called “ Dry standing and windfalls Policies “. The first ever policy which was accorded by the government triggered the trend of making windfalls by any possible means in the locals even large scale illicit cutting of forests were made to harvest the green standing forests under the cover of different dry windfall policies. This menace of windfalls policies has grown to the level that green standing forests are being cut in the quantum of thousands of trees and millions of Cft. of converted volume uncontrolled and illicitly. The extension of working plan prescriptions by projection are made and approved which are technical deviations from the standard operational procedures of scientific forest management and by no way can be justified on any standards or arguments. In no any part the high valued natural environmental assets are allowed to be consumed for livelihood support as is being done in this part of the world. Although lose already done can never be reversed over the centuries however, still it is not too late to stop the furtherance of it.

***Flood***

The recent unprecedented floods during 2010 & 2011 have caused devastation to both lives and properties of people. The infrastructure, living houses, livestock dens, agricultural lands, bridle paths were badly damaged. These floods being the worst ever experienced in the history of the area. All the Government departments and civil society organizations came for the rescue, relief and rehabilitation activities but the trauma was so severe and big that those who suffered were hardly compensated up to the desired levels. The reconstruction works are being handled at a very slow pace which may take considerable time to get completed. Special priority has to be given to this neglected and poverty struck area simply to restore the livelihood level to one from where it declined.

***Earthquake***

The geomorphologic studies of Swat reveal that this area of land is prone and susceptible to earthquakes .The damage seen in the area during the earthquake of early seventies can never be forgotten when whole of Swat was shuffled like anything yet it happened again on the October 8th, 2005.This earthquake was equally devastating in Swat as in other parts of Khyber Pakhtunkhwa and AJK. It resulted in the loss of precious lives and hundreds of injured in addition to a serious loss of infrastructure, livestock, which included buffaloes, cows/oxen, sheep/goats and horses/donkeys. Most of the deaths were caused by rolling boulders from steep slopes while the people were busy cutting grass for winter fodder. Like many other areas the distribution of damage over the area was not uniform, but instead a patchwork of destruction over latitude and elevation was observed. Main roads and bridle paths were badly damaged. The exact assessment of damages and their documentation for rehabilitation is hardly available with any government agency because of the fact that the area being rugged and difficult in terrain to cruise through.

* + 1. **Biotic Factors**

***Insects and fungi***

The damage by insects and fungi is negligible in the area. In addition to limited incidences of stem and bark borers like Ips longifolia (*scolytidae, coleoptera*) on Fir and defoliator such as Ectropis deodarae (*Geometriidae, lepidoptra*) on Deodar, no other damage by insects worth to mention has been observed in the Forests.

The usual victims of fungi are those trees having injuries deep to the heart wood through lopping, logging etc., in the living trees. The dead wood is attacked only by Lenzites species in the Forest, as well as, in the storage. Phellinus Pini (*Fomes Pini*), the red-ring-rot fungus attack living heartwood of the conifers and of them the most susceptible species is the blue pine. Polyporous schwinitzi known as red velvet fungus causes the butt and root-rot in Fir and Spruce. Famous Species are the deadly destructive pathogens causing serious heart-rot in Oaks. A few specimens of Trametos pini are observed on Kail. The bark beetles of Deodar are also notices.

***Illicit felling and loping***

There is no control of Forest department over lopping and felling of broadleaved or coniferous species for fuel or fodder purposes. Generally, lopping of broadleaved (*Qurcus baloot*) is done for fuel and fodder, and conifers are not damaged, however, for constructional purposes and clearing of land for cultivation, excessive felling of conifers is a common practice. Fortunately due to ignorance of the people, remoteness from timber markets and non-availability of developed roads, the illicit felling for sale (commonly called timber smuggling) was not at all practiced in the past but during the last one decade the smuggling of high valued Deodar timber to down districts is at full boom through all possible means of transportation via River Swat and roads network. As a result of the involvement of a large number of timber traders and ex-forest contractors by buying forests (timber standing and converted) from local people, there is a great risk for timber pilferage and illicit removal when forest extraction commences. The damage is in the form of removing green trees for dry/wind fallen, vigorously growing instead of diseased and dying, good quality against the suggested malformed and wolf trees, as well as felling more than the prescribed yield. Men of proven integrity must, therefore, be posted for running the affairs of such remote and timber rich Forest divisions.

A good number of poles and trees of coniferous species are cut every year without any restriction for making fences around the agriculture fields and the home-gardens to protect their vegetable, crops and fruit trees from the cattle. Broad leaved trees are also cut and lopped for fodder and firewood.

***Grazing and browsing***

The forests have been considerably damaged on account of heavy grazing and browsing and the process is still going on un-checked. The damage is more visible near the habitations, water points and rest places of cattle. The grazers have constructed their huts inside the forest. They graze and browse their animals till it becomes difficult for them to stay due to cold. Some nomadic Gujars from other areas visit these areas along with their goats and cause damage to the vegetative cover.

***Forest fires***

Fires are mostly accidental as a result of negligence by glaziers or travelers. In some areas these are deliberately caused so as to clear land for cultivation or to encourage grass growth. The damage due to fire is not extensive, however, there are a number of places in the valley where fire had occurred in the past, thus damaging Forests in small patches of 4-6Ha (10-15 acres). Occasional small fires usually occur in Kail, Deodar zone. There is no record of the extent and damage on account of fires but it appears that there were frequent fires in some of the localities. The causes of fire are either rivalry in order to harass and damage the property of other tribes or burning wood, grasses etc. for cooking and heating by carefree people.

***Encroachment***

A lot of good forest area has been encroached upon in the past for making agriculture fields and is still in progress in some areas by converting forest potential areas for cultivation and grazing.

***Grazing and browsing***

Grazing and browsing are ever increasing and incessant processes, being visible phenomena of the socio-economic scene in the poverty ridden hilly regions of the province, and have done much damage to these Forests. Although from silvicultural point of view light grazing may, under certain conditions, help natural regeneration and retard fire hazard by keeping down the grasses, herbs and shrubs. However, excessive grazing tramples the soil, reduces soil aeration, permeability, and plant cover, and accelerates soil erosion. Indiscriminate grazing may totally eliminate Forest growth and may bring about ecological changes which are detrimental to Forest conservancy. Damage by grazing and browsing is generally more near the habitation and water points. The most seriously hit Forest type is Q. baloot, where regeneration is unsatisfactory and the trees have been turned to bush form. In addition to the cattle of the locals, ponies, herds of sheep, goats and are brought by Gujar nomads during summer when the locals lease out the high-hill pastures and Forest land to seasonal glaziers. These herds also do considerable damage to the Forests on their way to and from the pastures. Grazing and browsing are two of the many social problems plaguing forestry in hilly regions which are the hardest of all the prevailing problems to be solved by foresters alone, and require political-administrative-technical-financial-cum-socio-economic solution. Of course the sincerity of purpose and constitutional commitments of all concerned, Governmental agencies and the people of the area are the most important factors in solving such problems and developing renewable natural resources for the benefit of all.

**Grass cutting**

Grass is cut by the local people in order to have sufficient stock of hay for their cattle in the winter. Seedlings of coniferous species are damaged and cut along with the grass. The people by nature are not favourably inclined to trees except to those from which some returns are forthcoming in a short span of time, like fruit trees including walnut and Amlok. Local people as a common practice protect grass on comparatively flat grounds in summer for making hay at the beginning of autumn for feeding their cattle during winter months. Flat grassy/grounds are looked after and valued like agricultural fields and are regularly irrigated to get more grass. In many places check dams like structures are raised to hold soil and water, and encourage good grass growth. However, in Deodar, Kail or Fir/spruce zone seedlings of coniferous species are eliminated from areas maintained for production of grasses so as to obtain more grass for making of winter feed (hay). Palatable shrubs like *Indigofera* species, which is a weed from forester’s point of view in regeneration areas is ironically a valuable fodder for Swat Kohistanis. Thus areas once cleared for agricultural or grass productions usually do not become available for growing trees.

***Torch wood extraction***

Near habitations, bases of the standing trees of Kail and Deodar are constantly scooped for the extraction of torchwood. Such trees ultimately fall or are uprooted by winds. This practice is much in vogue near “Bandas” situated in the high-hills. The locals have no facility of electricity, fossil or other fuel, living 32-40 (20-25 miles) inside valleys. Moreover, they are extremely poor to afford any of these facilities, therefore, they are compelled to light their way in the forest during night or the surroundings in the mosque or hujra under a roof by burning the extracted torchwood. May it happen that poor people of Kohistan are also given the priority to avail the opportunities and facilities being provided to other parts of the province and country at large.

***Destruction of fauna***

The Forests are rich in Mammalian and Avian Wildlife species, of which the following species are worth motioning:

Snow leopard, Bear and Leopard; Monal, Koklas and Tragopan Pheasants, Himalayan snow cock and snow partridge. The Wildlife of the area is ruthlessly destroyed by the locals. This practice must be checked through strong and effective implementation of Wildlife Act 1975, and giving incentives to the locals. Commercialized hunting of game animals and birds be started and at least 25% of the revenue realized must be distributed among the right-holders of the Forest tract in whose territory hunting is done. A full fledge Wildlife Division is now performing in Swat district however the protection and propagation of existing Wildlife is hardly possible without the active involvement of locals through Village Plans.

##  Cultivated Plants

In and around the villages besides Oak, locals also grow trees for fruit, firewood and shade. The most popular tree grown for nuts is Walnut (Aghozan). Fruit trees are also getting popularity among the locals, however, scattered trees of pear (*Pyrus communis, Amlook (Diospyros lotus*), Apple (*Prunus bokhariensis*) and grape (*Vitis vinifera*) are seen growing in the area. The valley has a great potential for a variety of fruit trees such as Pomegranate (*Punica granatum*), Sweet cherry (*Prunus avium*), Peach (*Prunus Persica*), Fig (*Ficus carica*), Almond (*Amygladus communis*), Pists (*Pistacia vera*),Apple,Grapes , Plums, Apricots and Walnut. Forest and Agriculture departments have recently introduced valuable fruit and fast growing energy plants so as to provide an additional source of income and energy to the locals living under extreme socio-economic depression. This will on the one hand help improve the socio-economic status of the locals and on the other reduce excessive pressure on the dwindling sorest resources of the valley. This will more effectively be planned and executed at household levels through Village Plans (VP) according to the productive potential of the areas available with the communities.

## Wild animals

Flying squirrels and monkeys eat the unripe cones of the conifers. Monkeys peel of the bark of blue pine poles. They also do considerable damage to seedlings and saplings.

## Markets and marketable produce

The major marketable produce is timber, which is extracted in the form of logs and scants. Firewood is also in demand in towns and big villages of Swat district.

**Timber**

There is no substantial local demand of timber as most of the timber is obtained free by the local people. Most often the timber granted to people is sold locally for use in hotels and other building construction. The nearest commercial market of timber is Dargai and Chakdara from where it is transported to other markets of the country.

***Fire wood***

The demand of fire wood is greater than timber in the area as no alternative source of energy is available for heating and cooking. Mostly dry trees are used for firewood but in the nearest forests even green trees are illicitly cut.

***Other minor forest produce***

The primary minor forest products are honey, walnut, persimmon (Amlook) and dandasa (Bark of walnut). Medicinal herbs like Kakora (*Podophylum emodi*), Banafasha (*Viola serpens*), Zankai (*Carum* species), Nazar panra (*Skimmia laureola*) Tarkha (*Artemisia* species), Lassora (*Saussurea lappa*), Belladonna species are found in the forest area. Ghuchi and some other edible mushrooms are also found in the forests. The secondary minor forest products are fodder trees and shrubs, grasses, edible herbs and torch wood. Male fern (Kunji) growing in abundance in early summer after snow melt is the famous edible herb commonly used by the local people.

***Lines of export***

Timber is extracted from the forest to the road side depot by road, skidding, slides and in some places skylines. It is further transported through trucks to the market. The main road between Kalam and Mingora is the only way of communication from the area, where as some forests are connected by means of Kacha roads with the main road. Moreover, extraction of timber by floating in the river between Madyan and Landaki is also possible.

## Method of exploitation and their cost

All the exploitation operations are done through Forest Development Corporation (FDC). The trees are marked by Forest Department and marking lists are handed over to the FDC. The FDC awards two types of contracts i.e. (i) for felling, conversion and carriage from roadside depot to timber market. The harvesting operations are done by labours engaged by the FDC contractors. Felled trees are cross cut into logs and the size depends upon the market demand. Logs are then rolled down to forest roadside and to skyline loading places from where it is transported in trucks to the market. In case road construction, ropeways and skyline installation is not possible, then the logs are converted into scants manually and are extracted by scantling slides, mules and jeeps.

**Current prices**

According to the net sale proceed systems the cost on timber harvesting and its carriage, taxes/duty, managerial charges and 20% profit on the FDC investment are deducted from the sale proceeds. The net income is divided into 60% and 40%. The government share (40%) is paid to the forest department and the share of the right holders (60%) is paid to them through the district administration.

The timber extracted from the forests of Bahrain Tehsil is generally sold in Chakdara FDC timber market. Some departmental timber is brought to Shagai central depot and will be auction accordingly. The average auction rate for scants and logs are as follow:

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Species** | **Scants** | **Logs** |
| 1. | Deodar | Rs 2000 | Rs 1300 |
| 2. | Kail | Rs 1300 | Rs 800 |
| 3. | Fir/Spruce | Rs 450 | Rs 200 |

##  Agriculture

The plan area represents only a small portion of land as agriculture. The main reason for limited agriculture land is the occurrence of steep and high mountains all over the area, which offers little space for farming. Nevertheless, the people from the days of early settlement have been striving to carve out farm lands by removing forest cover even on steep slopes and this practice still continues and its intensity is increasing due to population growth.

## CHAPTER-4

## BIODIVERSITY

## 4.1 Biodiversity Status

## 4.1.1 Flora

The Forests of Kalam and Bahrain valleys have characteristics of the dry sub-tropical broadleaved, moist temperate, Himalayan dry temperate and sub-alpine temperate regions. According to the species composition these can be divided into the following Forest types:

* 1. Scrub Forests;
	2. Dry Oak (*Quercus Baloot*) Forests;
	3. Dry Zone Deodar (*Cedrus deodara*) Forests;
	4. Mixed Silver Fir (*Abies Pindrow*), Spruce (*Picea Smithiana*), Kail (*Pinus Wallichiana*) and Deodar Forests.
	5. Sub-Alpine Scrub.
	6. Alpine Pastures.

The major species include Oak (*Quercus baloot*), Kao (*Olea ferruginea*), Phulai (*Acacia modesta*), Gurgura (*Monotheca buxifolia*), Pomegranate(wild) (*Punica granatum*), Amlok (*Diospyrus lotus*), Ash (*Fraxinus xanthoxyloides*), Maple (Acer cappadocicum), Kangar (*Pistacia chinensis*), Willow (*Salix tetrasperma*), Fig (*Ficus palmate*), *Celtis caucasica, Berberis lyceum, Dodonea viscoa, Daphne oleoides, Pinus wallichiana, Quercus floribunda, Aesculus indica, Juglans regia and Prunus padus, Vibernum nervosum, Berberis lyceum, Cotoneaster bacilliaris, Lonicera spp, Rosa spp, Quercus spp. Populus ciliate, Birch (Betula utilis), Parrotia jacquemontiana,Taxus baccata, Vibernum nervosum, Indigofera spp, Abies pindrow, Picea smithiana, Cedrus deodara (Deodar), Rhamnus spp., Ephedra gerardiana, Juniperus squamata, J. communis , Sexatilis spp., Delphinium uncinatum, Dracocephelum nutens, Pumex dentalus, Chenopodium album, Polygonum babatum, Polygonatum alfins, Digitalis sp., Conyza sp., Achillea millefolium, Caltha polustens, Nipeta alipteca, Microsisybrum sp., Ranunculus lactus, Setaria viridis, Panicum anulatum and Festuca spp.*

## 4.1.2 Fauna

The valley has quite a rich variety of Mammalian and Avian fauna. Precious and rare animals like Markhor, Keel, Musk deer, Snow leopard, Brown and Black bear, Himalayan ibex, and leopard cat are available in the area. The valuable birds found are Monal, Koklas, Kalij and Tragopan pheasants, Ram chukor, snow partridge, chukor and Himalayan Golden eagle.

In Kohistan district no special category of Wildlife protected areas are notified so far however, the exact status of various wildlife species, particularly in Khandia and Uthor Forests is not available. The detailed Biological survey is required to be conducted for the purpose. Swat Wildlife Division confirms only the occurrence of various species of animals and birds in these valleys.

A list of key wildlife birds and animals is elaborated in appendix -14

## 4.2 Threats to biodiversity

While low human populations have historically limited anthropogenic impacts on the biodiversity of the Bahrain Forest Range, the present situation is typified by an acceleration of threats— spurred by demographic, economic and social change in the region. Proximate threats to species and habitats can be summarized as follows:

* Ruthless cutting of trees especially conifers mainly for commercial purpose and also to meet the domestic needs.
* Degradation of rangelands by domestic livestock, leading to a loss of habitat quality for wild ungulates.
* Hunting of wild animal for food by local villagers and for sport by outsiders.
* Over harvesting of medicinal plants and other economically useful flora.

Disease transmission from livestock to wild fauna, particularly closely related species.