Journal of Biodiversity and Environmental Sciences (JBES)
ISSN: 2220-6663 (Print) 2222-3045 (Online)
Vol. 7, No. 4, p. 108-117, 2015
http://www.innspub.net

INNSPUB
RESEARCH PAPER
OPEN ACCESS

Baseline Ethno-phytological study in Danyore Valley, Gilgit District, Gilgit-Baltistan, Pakistan

Rizwan Karim[1], Yawar Abbas[2*], Aamir Saleem[1], Fazal Karim[1], Saeed Abbas[4], Ejaz Hussain[4], Muhammad Awais Rasool[3], Nawazish Ali[5]

[1]*Department of Forestry and Range Management, PMAS-Arid Agriculture University, Rawalpindi, Pakistan*

[2]*Department of Earth and Environmental Sciences, Bahria University, Islamabad, Pakistan*

[3]*Department of Wildlife Management, PMAS-Arid Agriculture University, Rawalpindi, Pakistan*

[4]*WWF-Pakistan, GCIC, NLI Colony Gilgit, Pakistan*

[5]*Department of Agriculture and Food Technology, Karakoram International University, Gilgit, Pakistan*

Article published on October 29, 2015

Key words: Ethno, Phytology, Vegetation, Altitudinal level.

Abstract

Gathering knowledge about vegetation and its different uses has always been a desire for researchers. This study was conducted in Danyore Valley, 10 Kilometers North of Gilgit city, Pakistan. Data regarding vegetation samples and anthropogenic impacts was collected from different predefined altitudinal levels, starting from 1440 meters to 3000 meters during late summer and mid-spring seasons. Nearly 71 species belonging to 41 families were encountered, out of which 32 were herbs, 14 were trees, 12 were grasses and 13 were shrubs. *Asteraceae* family was the dominant family with 9 species followed by the family *Poaceae* with 8 different species, mostly with grass species. Several types of vegetation found are utilized by local community as source of medicine, food, feed, shelter, construction, income and recreation; red marking already depleted resources into line of extinction. However, these resources are being utilized without any planning prevailing and management. Management and conservation planning of forests, medicinal and economic plants, rangelands and agricultural areas is the vital need for current and future need of communities residing in the valley.

***Corresponding Author:** Yawar Abbas ✉ yawar_zaid@yahoo.com

Introduction

It is estimated that there are about 300,000 plant species present on the earth, out of which 250,000 i.e. 83.3% plant species have been studied by human (WCMC, 1992). Pakistan has a particular geography, encompassing a great diversity in flora. It is estimated that this region contains some 5700 plant species with 400 (7.8%) endemic species are confined to the region (Stewart, 1972). described by various researchers, belonging to 22 families and nearly 150 genera. The flora of region is a blend of six phyto-geographical regions *viz*, the Mediterranean, Saharo-Sindian, Euro-Siberian, Irano-Turanian, Sin-Japanese and Indian. (Nasir and Ali, 1970-95). Nearly 183 pteridophytes (ferns and their allies) have been found. Nearly 87genera and 3,383 species of fungi have been reported from Pakistan (Shah and Baig, 2001). The number of species per genus is quite lower than the global average, thus showing a high genetic variation (Ali and Qaiser, 1986).

The Gilgit-Baltistan region of Pakistan lies between 71° and 75° E (longitudes) and 32° and 37° N (latitude), stretching over an area of 72,496 square kilometers, divided into seven districts *viz*; Gilgit, Diamer, Skardu, Ghanche, Ghizer, Astore and Hunza-Nagar. The human population is about 1.8 million with growth rate of 2.47 % and with 8 individuals as average household size. Hardly 1 % of the area is under agriculture while rest is covered by mountains, rivers and glaciers (66 %), rangelands (32 %) and 6 % forests (IUCN, 2002). Nearly 70% of the region has glaciers, lakes and rugged towering mountainous ranges (Karakorum, Pamir, Hindu Kush & Himalayas), with distinct altitudinal divisions of climate, flora types and land use systems thus forming up different ecological zones of flora and fauna. Based on ecological zonation, five main types of forests exist in Gilgit-Baltistan, namely, Mountain Sub tropical Scrub, Mountain Dry Temperate Coniferous, Mountain Dry Temperate Broad leaved, Sub-Alpine and Northern Dry Scrub with unique environmental conditions with unique flora and fauna. About 80 % of flora of Pakistan is located in northern mountainous ranges and nearly 1000 species found in Gilgit-Baltistan (IUCN, 2002; Ali and Qaiser, 1986).

A research was carried out in Rama valley, District Astore of Gilgit-Baltistan, Pakistan to reveal floral diversity and endemic richness in Trans-Himalayan, sub alpine and alpine vegetation zones of Western Himalayas. In analyzing the data the results predicted a mixed floral structure and distribution due to intermixed environmental conditions. About 83 speciesof 31 floral families were encountered. On general, the floral diversity and richness were found negatively correlated with altitude, slope and moisture content, whereas evenness was revealed to be positively correlated with altitude, slope and moisture content.(Shaheen *et al.*, 2011).

Most of the population in Gilgit-Baltistan is residing in rural areas and has limited resources and basic life amenities of food, fodder, shelter and medicine; thereby posing a pressure on vegetation to meet food, shelter, fuel, medicinal and other requirements, with an increasing demand for these species as they are freely available (Sundriyal and Sundriyal, 2004). The intensity of exploitation can be accessed from the fact that only in the Himalayan ranges, about 70% of the medicinal flora and fauna are used as wild species and 70-80 % of the inhabitants are dependent on traditional medicines using plants to cure their common ailments (Hussain *et al.*, 1995).

A baseline study was conducted in Doyan Valley in Astore District of Gilgit Baltistan to enlist the existing floral vegetation species using random plotting method along different altitudes of the valley with total of 20 plots of size 100 x 100 meters each. During the research some 80 plant species belonging to different families were recorded after identification of plants specimens collected. During the study several important tree species of olive, Chilgoza, birch and spruce were abundantly found in the study area. Moreover, a number of plant species are utilized as fuel wood and for construction purpose foremost, Sea

buckthorn, Fir, Spruce, Kail, Birch, Artemisia spp. and Juniper; bringing these resources almost on the brink of extinction (Rehmat *et al*, 2014).

The illicit cut and collection, and marketing of certain vegetation species to meet basic needs have created threats for their survival in some parts, especially in approachable forests. It is hereby becomes important to know the distribution of flora, particularly in anthropogenic context to use it for future management and conservation (Malik and Husain, 2006). With the aim of acquiring a baseline detail for the available vegetation species in Gilgit-Baltistan generally and in Danyore valley specifically, as this valley is an important buffer zone point in Central Karakorum National Park; the largest National Park of Pakistan. For CKNP, researchers in this phyto-geographically important part of the country have conducted very few vegetation surveys apparently due to lack of expertise, inaccessibility and remoteness of the area.

Therefore with the aim of understanding the baseline floral distribution knowledge and aiding in future natural resource management needs of the valley infront of all beneficiaries, this study was designed with the objectives of:

- To enlist the encountered vegetation species found in the valley
- To entail the current situation of utilization of this flora by communities within and around the valley.

Materials and methods

Study Area

The study was conducted in Danyore Valley, situated about 10 km north of Gilgit city, surrounded by mountains of Karakorum Range. It lies between 35° 91'Nto 36° 06' N latitudes and 74° 23' E to 74°39' E longitudes with elevations of 1450 meters at river bank to 1509 meters above sea level in valley plains up to 4500 meters at higher altitudes. Total area of the valley is about22484.2 hectare (including Sultanabad village). Forest cover area of valley is approximately 2136 hectare (9.5%).

The population of valley is approximately 29000 individuals according to union council records and surveys stating it the largest village in Gilgit-Baltistan in terms of area and population. The area has an undulating and rugged topography; however the area with settlements is somehow plain. Gully erosion is high especially on barren sites of mountains (LSO, 2011).

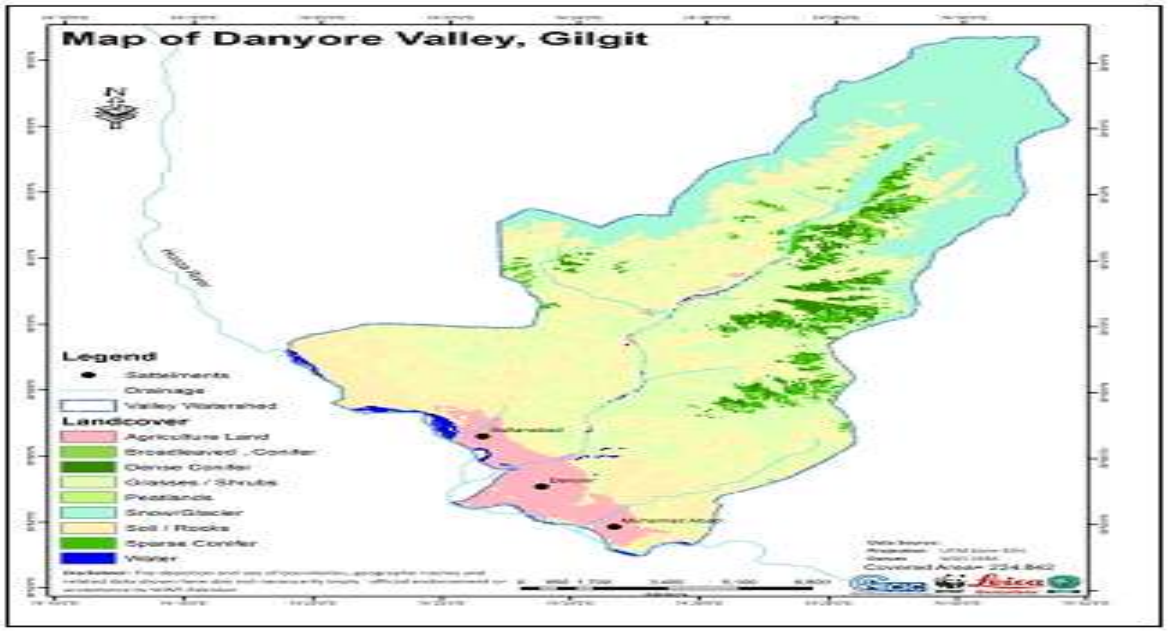

Fig. 1. Map of study Area.

Climatically the area falls under the arid (Temperate) region. The temperature varies with temperature of 3 °C to 6 °C in the month of December and January and 27 °C in the months of July and August. However, change in temperature variations has been experienced for last few years. Frost occurs from November to January sometimes up to February. Average precipitation annually varies with minimum of 0.01 millimeters in January to maximum of 1.9 millimeters in month of May.

Sampling and Plotting

Field visits for study were extensively conducted in August, 2013 and April, 2014.Data was collected from altitudinal variations starting from 1440 meters to 3700 meters, divided in to three ranges keeping in view the altitudinal transitions, i.e. from 1450 meters to 2200 meters, 2200 meters to 2900 meters and 2900 meters to 3800 meters, during late summer and mid-spring seasons. Random transects were laid on slopes, plains and near waterways, depending upon vegetation heterogeneity and site conditions. For trees and shrubs, approximately 135 quadrates and for grasses 270 quadrates were laid in all three altitudinal ranges. The sampling intensity was decided 1.5 % of entire Danyore valley, keeping in mind accessibility problems in upper 2 altitudinal levels.

Sample Collection and Identification

The plant samples collected were enumerated and listed on basis of their morphological characteristics for easy identification in the laboratory. Herbs, forbs, trees and shrubs were identified through specimens with matching taxonomic keys following (Nasir and Ali, 1970-1995), in Biological sciences department of Karakorum University, Gilgit,Pakistan and Botany Department of Arid Agriculture University, Rawalpindi, Pakistan.

Data regarding Ethno botany and local use was collected in form of short interviews for different flora and field observations.

Equipment used In the Field

i GPS (Geographical Positioning System) for recording the different coordinates of the sampling sites.

ii Measuring tapes (50 meters & 20 meters).

iii Stationery (Map, register, pencil, pen, plastic bags, newspaper sheets and blotting paper).

Analysis of Data

The gathered data was first arranged into different flora forms/types, then tabulated separately and arranged with the details such as; scientific name, common name and family. Data regarding anthropogenic influences on flora was obtained through observations on field sites.

Results and discussions

Composition and floristic lists of plants found in Danyore valley Gilgit-Baltistan

The valley of Danyore lies in the Gilgit-Baltistan region of Pakistan whereby possessing fair level of phyto-endemism. During site visits to three different altitudinal levels in seasons of summer 2013 and spring 2014, about 71 different species belonging to 41 different families were encountered, out of which 32 were herbs, 14 were trees, 12 were grasses and 13 were shrubs. *Asteraceae* family was the dominant family with 9 species followed by the family *Poaceae* with 8 different species, mostly with grass species as Shown in figure 2.

Most of the vegetation was encountered during summer expedition while few were collected during spring visit. Summer visits were conducted in the month of August while spring visits were made in late April 2014. As general endemism was high at the level-3 i.e. the upper most altitudinal level of shared a good number of common species, probably due to the animals and humans being the study area.

Some species were common in all three altitudinal levels. Level-2 and Level-1 source of seed disbursement as they easily use to move between

these two altitudinal levels. Moreover other biotic &a biotic factors are also an important and valid reason for the species distribution in both levels. Mountain regions of the world retain unique biological communities with high level of endemism, due to their distinct topography and history (Gentry, 1993).Plant community of a region is the product of time function, sometimes along with the role of altitude, slope, aspect, latitude, rainfall and humidity (Kharkwal *et al.*, 2005). Grasses and Herbs are shown in Table 1.

Table 1. Grasses & Herbs of Danyore Valley.

Scientific Name	Common Name	Family Name	Type
	Grasses and Herbs		
Thymus linearus	Himalayan Thyme	Lamiaceae	Herb
Poa bulbosa	Bulbous Bluegrass	Poaceae	Grass
Cynodondactylon	Bermuda grass	Poaceae	Grass
Phragmitesbarlra	Reed	Poaceae	Grass
Aristidaadscensionis	Six weeks three awn	Poaceae	Grass
Eragrostispoides	Love grass	Poaceae	Grass
Rumexhastatus	Arrow leaf Dock	Polygonaceae	Grass
Trifolium pretense	Red Clover	Papilionacea	Grass
Trifoliumrepens	White Clover	Papilionacea	Grass
Heteropogoncontortus	Bunch spear grass	Poaceae	Grass
Saccharumbengalense	Sarkanda	Poaceae	Grass
Imperatacylindrica	Cogon grass	Poaceae	Grass
Setariaviridis	green foxtail grass	Poaceae	Grass
Rubusirritans	Raspberry	Rosaceae	Herb
Plantago major	Broad Leaf Plantain	Plantaginaceae	Herb
Taraxacumofficinale	Dandelion	Asteraceae	Herb
Cirsium falconeri	Falconer's Thistle	Asteraceae	Herb
Urticadioica	Stinging nettle	Urticaceae	Herb
Verbascumthapus	Great Mullein	Scrophulariaceae	Herb
Artemisia brevifolium	Wormwood	Asteraceae	Herb
Chenoopodiiumambrosoides	Mexican Tea	Chenopodiaceae	Herb
Primuladenticulata	Drumstick Primrose	Primulaceae	Herb
Ephedra gerardiana	Somlata	Ephedraceae	Herb
Geranium pratense	Meadow geranium	Geraniaceae	Herb
Polygonumhydropiper	Water pepper	Polygonaceae	Herb
Achiellamelifolium	Common Yarrow	Asteraceae	Herb
Adiantumaethiopicum	Common maidenhair fern	Pteridaceae	Herb
Anaphalisnepalensis	Nepal Pearly Everlasting	Asteraceae	Herb
Acantholimonlycopodioides	-	Plumbaginaceae	Herb
Impatiens glandulifera	Himalayan Balsam	Balsaminaceae	Herb
Bistortaaffinis	Pink Mountain Fleece flower	Polygonaceae	Herb
Bergenia ciliate	Frilly Bergenia	Saxifragaceae	herb
Cichoriumintybus	Chicory	Asteraceae	Herb
Capparisspinosa	Caper Bush	Capparidaceae	Herb
Sophoramollis	Yellow pea-flower plant	Fabaceae	Herb
Menthasylvestris	Horse Mint	Lamiaceae	Herb
Mentharoyleana	Royle's Mint	Lamiaceae	Herb
Plantagolanceolata	Ribwort Plantain	Plantaginaceae	Herb
Astragalushoffmeri	Yellow leaved Milk-Vetch	Paplionaceae	Herb
Artemisia dubia	Roxburgh's Wormwood	Asteraceae	Herb
Atropa acuminate	Indian Belladonna	Solanaceae	Herb
Echinopsechinatus	Indian Globe Thistle	Asteraceae	Herb
Onopordumacanthium	Cotton Thistle	Asteraceae	Herb

Extent of Herbaceous Vegetation Utilization in the valley

In Danyore valley and rest of Gilgit-Baltistan, non-woody (herbaceous) vegetation for many decades has been utilized as medicine, fodder and shelter for livestock. However with the passage of time, usage of this flora as medicinal resource has reduced in the study area, where very few herbs have medicinal use at present compared to past due to the excessive commercialization and availability of western medicine. From field information (short interviews from locals) it was revealed that medicinal plants like *Thymus linearus, Ephedra gerardiana, Chicoriumintybus, Verbascumthapsus, Bergenia ciliate, Capparisspinosa, Utricadiocia, Menthasylvestris, Artemisia dubia, Plantago major*, and *Taraxacumofficinale* are still used though in low scale against treatment for different human ailments and sometimes against livestock ailments at household level and sometimes sold to herbal physicians in the urban centers to earn money.

Table 2. Trees & Shrubs of Danyore Valley.

Scientific Name	Common Name	Family	Type
Trees & Shrubs			
Clematis orientalis	Indian clematis	Rananculaceae	Shrub
Berberislycium	Indian Barberry	Berberidaceae	Shrub
Hippophaerhamnoides	Seabuckthorne	Elaeagnaceae	Shrub
Ribesorientalis	Indian Currant	Grossulariaceae	Shrub
Rosa webbiana	Web's Rose	Rosaceae	Shrub
Myricariasquamosa	False Tamarisk	Solanaceae	Shrub
Rhammnellagilgitica	Gilgit's wild berry	Rhamnaceae	Shrub
Viburnum spp	Guch, Viburnum	Caprifoliaceae	Shrub
Juniperouscommunis	Dwarf Juniper	Cupressaceae	Shrub
MyricariaAfricana	African false tamarisk	Tamaricaceae	Shrub
Prunusjacquemontii	Himalayan Bush Cherry	Rosaceae	Shrub
Daphne mucronata	Kashmir Daphne	Thymelaeaceae	Shrub
Tamarixarceuthoides	Tamarisk	Tamaricaceae	Shrub
Betulautilis	Birch	Betulaceae	Tree
Juniperusexcelsa	Cedar, Juniper	Cupressaceae	Tree
Elaeagnusaungustifolia	Russian silver berry	Elaeagnaceae	Tree
Morus alba	White Mulberry	Moraceae	Tree
Piceasmithiana	Spruce	Pinaceae	Tree
Pinuswallichiana	Blue Pine	Pinaceae	Tree
Populusciliata	Himalayan Poplar	Salicaceae	Tree
Salix tetrasperma	Indian Willow	Salicaceae	Tree
Juniperousmacropoda	Pencil cedar	Cupressaceae	Tree
Populusnigra	Black Poplar	Salicaceae	Tree
Salix alba	White willow	Salicaceae	Tree
Populous alba	White pollar	Salicaceae	Tree
Rhobiniapseudoacacia	False acacia	-	Tree
Ailanthus altissima	Tree of heaven	Simaroubaceae	Tree

Floral diversity and richness along environmental gradient has been of immense importance for the ecological investigation for last few years and it has been defined in context of productivity, climate, anthropogenic interventions, biotic interactions and habitat variability (Currie and Francis, 2004).Pakistan has rich medicinal and aromatic flora diversity due to unique phyto geographical location along with diverse climatic settings. Northern region of Pakistan is considered the richest region in the country in terms of biodiversity and utilization of medicinal plant resources (Malcolm *et al.*, 2002). The northern mountainous regions of Pakistan provide a naturally favorable environment for floral growth and

people are using plants in several means like in medicines, as timber wood, as firewood, as food and fodder (Hussain *et al*., 1995).

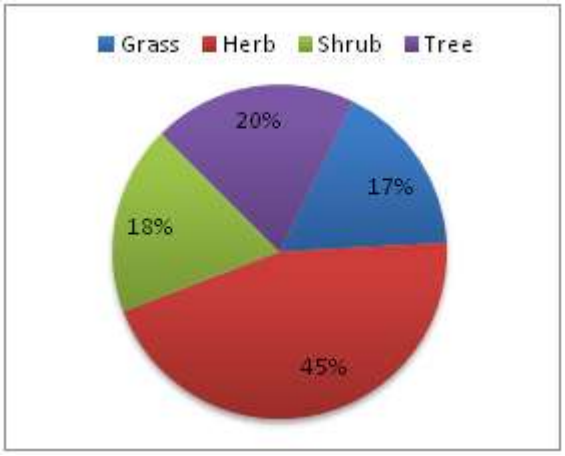

Fig. 2. Percent composition of vegetation in Danyore valley.

Moreover, this herbaceous vegetation is extensively grazed by livestock in alpine pastures as this flora becomes available in good amount due to favorable environment. However some of the species grow only at these altitudes as we didn't observe the selective species down around the settlement. Annually all these pastures are grazed by livestock exceeding 1000 in numbers, from the month of March to end of September to lower rangelands. Grass species of *Poa bulbosa, Cynodondactylon, Phragmitesbarlra, Aristidaadscensionis, Eragrostispoides, Trifoliumpretense, Trifoliumrepens*and *Heteropogoncontortus*are mainly found in meadows and are grazed by livestock, while the grasses like *Saccharumbengalense, Rumexhastatus,Imperata cylindrical and Setariaviridis* are found at lower altitudes and grazed by all types of livestock.

Different herbaceous flora, particularly grasses at lower altitudes is harvested by farming community to use it in stall feeding during shortage seasons of autumn and winters. Sometimes, it is also used in building of stall houses and roofs of corals. Altitude and anthropogenic disturbances poses direct impacts vegetation attributes such as diversity, richness, distribution and maturity (Schuster and Diekmann, 2005).

The illicit harvesting for household and commercial uses, excessive grazing, change in climate and lack of interest in development of rangelands by concerned public and private organizations has marked these endemic resources on brink of extinction. Factors like Overgrazing may cause a decrease in the primary yield with increase in water and creation of areas devoid of vegetation and negatively effects faunal activity, particularly of the birds due to livestock presence in an area (Khan, 2003). This study area's most of the population is associated with farming and is exploiting the herbaceous vegetation for different needs. Moreover, poverty, lack of awareness about importance of flora, population pressure and political ill-will are the reasons behind the near extinction of the existing; exploitable flora. For climate change impacts on floral distribution, O'Brien, (2000) revealed that the collaboration of temperature and moisture affects the biological processes and competitive interactions among species and hence affects species richness and distribution along the altitudinal gradients.

Current situation of Woody Vegetation and its Utilization in the valley

Table 2 illustrate Trees and Shrubs of Danyore Valley. During our visits to altitudinal level 2 and 3, we observed patches of coniferous, broadleaved and mixed forests grown on plains, slopes and along water ways. While at the valley settlements, mostly shrubs grow on mountain slopes and water ways. Further analysis of the information revealed that valley forests were dominated by shrubs in species composition (no of species for vegetation type), followed by trees. Important economical and medicinal shrubs observed were *Berberis lyceum*, *Rosa webbiana*, *Daphnemucronata Hippophaerhamnoides*,*Prunusjacquemonti* and *Juniperous communis*, found mostly at upper altitudes, are consumed as medicinal plants and a good source of fuel wood; particularly *Berberis lyceum*, which is a famous medicinal shrub used in back ache and bone fracture treatment .*Hippophaerhamnoides* is said to have good

treatment potential against the ailment of cancer. Many of these species are browsed by livestock. According toFossa (2004), mountain ecosystems across the globe contain diverse biological communities and a high level of variability in flora because of landscape, history and climatic variables.

The Important coniferous species present in the valley are *Pinuswallichiana, Piceasmithiana, Juniperousmacropoda* and *Juniperusexcelsa*. Good quality wood of these conifers has led them as economically important where people extensively harvest them legally or illegally and bring them in use by either at household level or sell them mainly in market mainly as construction timber and sometimes as fuel wood. Especially species of *Pinuswallichiana* and *Piceasmithiana*are being cut illicitly bringing them on verge of endangered, thus bringing ecological and economic imbalance in the study area.

A predictable assessment on deforestation in Pakistan has revealed that rural societies are overexploiting the forests for local consumptive use. This assessment is based on the understanding the abridged relationship between deforestation and population pressure in the Hindu Kush Karakorum Himalaya region (Lall and Moddie, 1981; Myers, 1986), which consents that rapid population growth is subject factor that has led to loss of forest cover.

*Betulautilis*is vital broad leave tree species found at higher altitudes of valley. Birch is used as fuel wood, its leaves are browsed by livestock and its bark is utilized to preserve cheese for prolonged periods and used in houses as insulator against moisture and insects; thus harvesting this economically and ecologically vital specie on large scales, bringing it to endangered levels.

At the valley settlements, shrub species of *Hippophaerhamnoides, Myricariasquamosa, Tamarixarceuthoides* and *Ribesorientalis* grow in plenty, and is utilized as fuel wood in almost every household and also browsed by livestock in winters and spring. Tree species of *Elaeagnusaungustifolia, Morusalba, Salix tetrasperma, Populusnigra, Salix alba, Populous alba*and *Rhobiniapseudoacacia* can be found in good populations. These species either growing naturally are planted by farming community on cultivable lands with purpose of getting construction wood, fuel wood and fodder for their livestock. For instance, *Populusnigra* and *Populous alba* are primarily utilized for construction purpose with rare use as fuel wood, while their leaves serve as fodder, thereby serving as multipurpose species. Species of *Elaeagnusaungustifolia, Morus alba, Salix tetrasperma, Salix alba*and *Rhobiniapseudoacacia* are utilized primarily as fodder source and their wood is used to make various agricultural tools, however this form of utilization is very less compared to past. While, *Rhammnellagilgitica* and *Ailanthus altissima*are only utilized as fuel wood species.

Conclusion

In general all shrub and tree species have important ecological functions like controlling erosion, climate amelioration and provision of livelihoods and household needs, subjected to the sustainable use of these resources. Unfortunately almost all species types either trees or shrub species are being harvested illicitly at the higher altitude forest patches and around valley settlements, thereby posing eminent threats of ecological disturbances, social and economic disparity and imbalance between the residing communities.

Acknowledgements

This work has been carried out with the cooperation of respected by Dr. Aamir Saleem, Assistant Professor, Forestry Department, Arid Agriculture University, Rawalpindi and Mr.

Yawar Abbas, Graduate Researcher, Department of Earth and Environmental Sciences, Bahria University, Islamabad, Pakistan for their contribution from methodology development to compilation of final manuscript. The first author is thankful to colleagues who as a part of this study were involved in field data collection and compilation of results in text form.

References

Ali SI, Qaiser M. 1986. A phytogeographic analysis of the Phanerogams of Pakistan and Kashmir, Proceeding of the Royal Society of Edinburgh 89B: 89-101.

Fossa AM. 2004. Biodiversity patterns of vascular plant species in mountain vegetation in the Faroe Islands. J of Diversity and Distributions **10,** 217-223.

Gentry AH. 1993. Pattern and floristic composition in neo-tropicamontane forests. Proceedings of Neotropical montane ecosystem symposium, New York.

Hussain F, Mustafa G. 1995. Ecological Studies on some pasture plants in relation to animal u.se found in Nasir Abad valley, Hunza, Pakistan. Pakistan Journal of Plant Sciences **1(2),** 263-272.

IUCN. 2002. IUCN Red List Categories And Criteria: Version 3.1-IUCN species survival commission, IUCN Gland Switzer Land and Cambridge, UK.

Khan G. 2003. Rangelands and livestock. Background paper for NASSD. IUCN Pakistan, Northern Areas Programme, Gilgit, P. 47.

Kharkwal G, Mehrotra P, Rawat YS, Pangtey YPS. 2005. Phyto diversity and growth form in relation to altitudinal gradient in the Central Himalayan (Kumaun) region of India. J of Current Science **89(5),** 873-878.

Lall JS, Moddie AD. 1981. The Himalaya: Aspect of Change. Oxford University Press, New Delhi.

LSO. 2011. Primary Survey data of Danyore and Sultanabad Village Conducted by Local Support Organization, Danyore.

Malcolm JR, Liu C, Miller LB, Allnutt T, Hansen L. 2002. Habitats at risk: global warming and species loss in globally significant terrestrial ecosystems. Gland, Switzerland: WWF Fund for Nature.

Malik RN, Husain SZ. 2006. Classification and ordination of vegetation communities of the Lohibehr reserve forest and its surrounding areas, Rawalpindi, Pakistan. Pakistan Journal of Botany **38(3),** 543.

Myers N. 1986. Environmental repercussions of deforestation in the Himalayas. Journal of World Forest Resource Management **2,** 63–72.

Nasir E, Ali SI. 1970-95. Flora of Pakistan. Islamabad and Karachi: National Herbarium/ NARC and Department of Botany, University of Karachi.

O'Brien EM, Field, Whittaker RJ. 2000. Climatic gradients in woody plant (tree and shrub) diversity: water–energy dynamics, residual variation, and topography. Journal Oikos **89,** 588–600.

Ali R, Khan B, Ali A, Khan M Z, Khan G, Abbas S, Hussain E, Ali M. 2014. Baseline Study of Vegetation in Doyan Valley District Astore, Gilgit-Baltistan, Pakistan. International journal of Emerging Trends in Science and Technology **01(01),** 07-19.

Schuster B, Diekmann M. 2005. Species richness and environmental correlates in deciduous forests Northwest Germany. Journal of Forest Ecology and Management **206,** 197-205.

Shaheen H, Ahmad N, Alam N, Mehmood K, Ullah Z. 2011. Phytodiversity and endemic richness in high altitude Rama Valley, Western Himalayas, Northern Pakistan. J of Medicinal plants research **5(8),** 1489-1493.

Shah M, Baig KJ. 2001. Threatened Species Listing in Pakistan: Status, Issues and Prospects. Proceeding: Regional Consultative Workshop for South and Southeast Asia: 70-81.

Stewart R. 1972. An annotated catalogue of Vascular plants of West- Pakistan and Kashmir. Karachi: Fakhri Printing Press.

Sundriyal M, Sundriyal R. 2004. Wild edible plants of the Sikkim Himalaya: Marketing, value addition and implications for management. Journal of Economical . Botany **58(2),** 300-315.

WCMC. 1992**.** Global Biodiversity: Status of Earth Living Resources. World Conservation Monitoring Center, Cambridge, UK.