

PHYTODIVERSITY, ETHNO BOTANICAL STUDIES AND BIOLOGICAL SPECTRUM OF AGRO-ECOSYSTEM AT KOWARDU VALLEY DISTRICT SKARDU GILGLIT-BALTISTAN

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**Abstract**

This study was conducted at Kowardu valley from May to October 2019. This study was inventorying, uses of agro ecosystem phytodiversity, habit categories and life form classification at Kowardu valley. The inventory of the current study was comprised of 102 plant species belonging to 85 and 31 families. The most dominant family were Poaceae comprising of 13 species, followed by Asteraceae and Rosaceae both have 11 species, Brassicaceae with 8 species, Fabaceae and Solanaceae were with 7 species in each, while the Chenopodiaceae, Polygonaceae were with 04 species in each. The largest genera were prunus having 6 species, solanum having 4 species and Brassica, artemisia, populus were with 2 species each. It was also observed that majority of plants were angiosperm dicots having 86 species, belonging to 70 genera and 27 families while the angiosperm monocots were with 15 species belonging with 14 genera and 03 families. One gymnosperm species was found which belonged to the group Gnetophyta (*Ephedra gerardiana*). The habit categories of collected plants also studied and results show that dominant habit category was Herbs (72 species), Trees (21species), shrubs (7 species) and under shrubs (2 species). The life-form of flora were also studied during the research, which comprised the Hemicryptophytes (35 species), followed by Therophytes (30 species), Phanerophytes (24 species), Chamaephytes (6 species) and cryptophytes (7 species). After collecting the ethonobotanical information , we come to know that 35 species and 32 genera belonging to 22 families were medicinally important plants. The most important plant species used by local peoples are *Elaeagnus angustifolia*, *Hippophae rhamnoides*, *Artemisia* species, *Capparis spinosa* and *Fagopyrum esculentum*.

## INTRODUCTION

The uses of plants by human beings are defined in a term called ethno botany. The world ethno botany was first used by the US botanist John Hershberger in 1896. According to (Amjad *et al.*, 2015) the traditional study of plants which includes how people observe the plants, how they gave naming and their uses and how they organize the information about the plants is called ethno botany. According to (Martin, 1995., Cunningham, 2001) ethno botanical studies makes someone able to create a close relation and communication with local peoples and facilitate the enlargement of plant management by participation of local people without having any severe impact on their life. According to the studies of (Norsia *et al.*, 2006; Ugrulu *et al.*, 2007; Ahmed *et al.*, 2012) from all over the world many studies have been carried out on ethno botanical uses. According to (Ahmed *et al.*, 2012) in Pakistan the ethno botanical studies are going to suppurate now a day and many studies have also been documented from different part of the country. (Pervaiz., 2014; Tareen *et al.*, 2010) said that in different areas of Pakistan ethnobotanical studies has been done. About 6000 species of wild species are reported from Pakistan. 600 species are used by animals and humans in different types of disease and for other purposes. (Amjad *et al.*, 2017) revealed that the mountainous region of Pakistan has the great diversity of plants that has estimated about 1572 genera and 5521 species of plants. (Abbas *et al.*.,2014) said that world widely 60-80% of people to fulfill their basic health care needs, are dependent on traditional herbal medicines. The treatment of various diseases medicinal plants has been used since prehistoric period (Qureshi *et al.*, 2009). Khan *et al.*, (2011) mentioned that to protect against germs, infections and cold some women in

villages use wildflowers, berries and stem decoction on face, feet and hands as a cosmetic. (Qureshi *et al.*, 2009) said that there is a deep interaction between people and plants ever. (Abbas *et al.*, 2014) said that world widely 60-80% of people fulfilling their basic health care needs are dependent on the traditional herbal medicines. The study of (Qureshi *et al.*, 2014) demonstrates that the distributions of plants are different at different geographical zone. The proper identification of plants and documenting their scientific and traditional uses floristic survey is very helpful (Adu *et al.*, 2017). Inventorying of flora by taxonomist achieved great information about plants throughout the world. According to (Soladolye *et al.*, 2015) to document the diversity of species within country a taxonomic survey played an important role. The determination of diversity of plants helps to assess the conservation status of a species whether that species is rare, endanger, endemic, frequent and help in determining the economic importance of plants (Amoroso *et al.*, 2009). (Badshad *et al.*, 2013) mentioned that the total number of species within a boundary is the floristic diversity of that region. (Hyder *et al.*, 2014) make the inventory of agro biodiversity of province Gilgit Baltistan. (Abbass *et al.*, 2013) report 141 species belong to 107 genera and 48 families from Naltar valley of Gilgit Baltistan. (Badshah *et al.*, 2013) revealed that the Raunkiaer classification of life form 1934 which is based on the position and degree of perennating bud during harsh or unfavorable condition is most trustable classification. (Klimes *et al.*, 2003) states that in 1910 simple life-form classification system is made by Raunkier, that was totally based on the length of dormant buds with respect to the soil surface. Raunkiaer's system was improved

many times and Phanaerophytes, Chamaephytes, hemicryptophytes, geophytes and Therophytes were general fundamental categories. The main propose of this study to give a proper list of plants of agro ecosystem of mentioned area to local inhabitant and government through which the government and local inhabitant may be taken initiatives to prevent the endangered plant species.

## Material and methods

### Study area

This research has conducted in adjacent village of Skardu city kowardu, which valley is located between North latitude at 35°11 to 35°22 an East longitude between 75°35 to 75°40 and elevation of 2079 meters above sea level. Geographically this valley is present at north-east of Skardu at 14 kilometers. Population of Kowardu is approximately ten thousand two hundred and ninety according to 2017 senses comprising of 700 hundred houses. The whole area is further divided into fifteen valleys. Balti is the only language spoken by the inhabitant. The valley has some beautiful mountain scenery, pastures and waterfalls. This area has shortage of water, most of the irrigation system depends on water coming from mountain by melting of snow. Only a small portion of this area uses the Indus river water for irrigation purpose. The denizen traditionally grows many crops, vegetables and variety of fruits to fulfill basic domestic requirements. The main crops grown in the study area are wheat, barley and maize. Wheat and barley are used as a food while maize is growing for only fodder purposes to feed domestic animals. In cereals and vegetable's potato, tomato, chilly, onion, carrot spinach etc are cultivated. The famous fruits in that area are apricot, apple, pear, cherry and grapes etc. This area is occupied by great diversity of plants but unfortunately no

research work has been done on this area till now.

### Data collection

To collect the field data several field surveys were conducted to collect required data during the research period from May to October (Abbas *et al.*, 2017; Shedayi *et al.*, 2012). The plant specimens were collected from different areas of Kowardu valley during the specific study time. The habit categories and habitat of plants were also recorded in the field. The Biological spectrum is recorded by following (Raunkiaer's 1934) classification system. . The local name and traditional uses of plants were documented during surveys by interviewing local well knowledge, aged and well experienced people. The ethno botanical information was collected by interviews from well knowledge and aged people wood seller, hakims and through questionnaires. As the study of (Abbas *et al.*, 2017; Shedayi *et al.*, 2012) shows that ethnobotanical data collected through interviews and questionnaires. Life forms were determined by following the (Raunkiaer 1934) and habit categories determined by (Theophrastus 1916 & 1926). The collected specimens when mounted on herbarium sheets were properly identified with the help of literature and flora of Pakistan (Ali and Qaiser 1995-2007, Ali & Nasir, 1989-1992).

## Results

### Floral diversity

During the research a total of 102 Plant species, belongs to 31 families and 85 genera were collected (table 1). The collected plants belong to two plant groups named Gymnosperm and angiosperm (dicot and monocot). The Gymnosperm is further categorized into division Gnetophyta which contained only one species i.e *Ephedra*

*gerardiana* belonging to Genus *Ephedra* and Family *Ephedraceae*. The most prevailing plant group was angiosperm. The angiosperm dicot was comprised of 86 species and 70 genera belonging to 27 families while angiosperm monocot was comprised of 15 species and 14 genera belonging to 03 families. The most dominant family were *Poaceae* comprising of 13 species, followed by *Asteraceae* and *Rosaceae* both have 11 species, *Barssicaceae* 8 species, *Fabaceae* and *Solanaceae* 7 species in each, *Chenopodiaceae* and *Polygonaceae* 04 species in each, *Apiaceae*, *Lamiaceae*, *Papilionaceae*, *Plantaginaceae*, *Salicaceae* consist of 3 species each, *Amaramthaceae*, *Cucurbitaceae*, *Elaeagnaceae*, *Moraceae* comprising 2 species each and the remaining families i.e. *Alliaceae*, *Capparaceae*, *Caryophyllaceae*, *Convolvulaceae*, *Ephedraceae*, *Iridaceae*, *Juglandaceae*, *Malvaceae*, *Nitrariaceae*, *Platanaceae*, *Punicaceae*, *Simaroubaceae*, *Vitaceae* and *Zygophyllaceae* have 1 species in each.

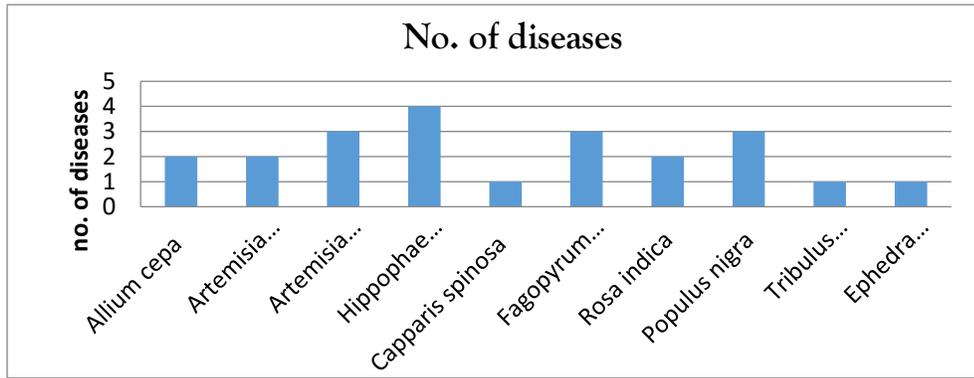
### Life form

In my collection 72 species there were herbs, shrubs were 7 species and under shrubs were 2 species. While the three species were 21. In my collection the leading life form was *Hemicryptophytes* with 35 species, followed by *Therophytes* with 30 species and *Phanerophytes* with 24 species. The remaining *Chamaephytes* and *Cryptophytes* were with 6, and 7 species respectively shown in (figure 1).

### Ethnobotanical uses

There were 75 ethno botanically important plants recorded from the study area. Most of the plant species are used as fodder 36, Medicine 35, food 33, fuel 17, timber 08 and 7 plants used for other purposes. A total of 22 families containing 32 genera with 35 species were medicinally important. The most medicinally important family was *Rosaceae* 04 species, followed by *Asteraceae* and *Plantaginaceae* each containing 03 species, *Apiaceae*, *Chenopodiaceae*, *Elaeagnaceae*, *Fabaceae*, *Poaceae* and *Salicaceae* each having 2 species, and the remaining families i.e. *Barssicaceae*, *Solanaceae*, *Lamiaceae*, *Papilionaceae*, *Amaramthaceae*, *Moraceae* *Alliaceae*, *Capparaceae*, *Ephedraceae*, *Juglandaceae*, *Nitrariaceae*, *Punicaceae*, and *Zygophyllaceae* each having 01 specie. The local inhabitants used these plants to treat different diseases. The most important plant species used by local peoples are *Elaeagnus angustifolia*, *Hippophae rhamnoides*, *Artemisia* species, *Capparis spinosa* and *Fagopyrum esculentum*. The top ten plants used to treat different diseases are shown in (figure 1). The fruit of *Elaeagnus angustifolia* is used to treat cough, bronchitis, the fruit of *Hippophae rhamnoides* used to stomach ulcer, heart problems, hepatitis and cough etc. There were 16 plant species used to treat abdominal related diseases and other number of plants species used to treat diseases.

Figure 2.  
ten plants  
to treat  
different  
diseases



Top  
used

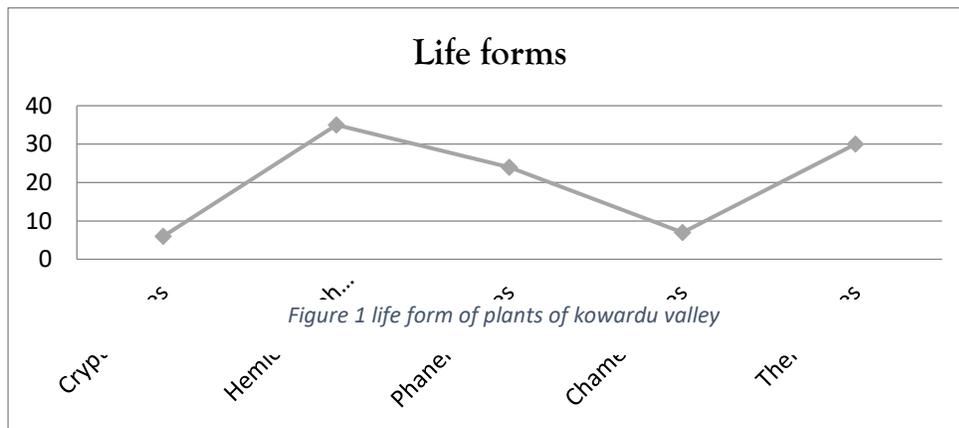


Figure 1 life form of plants of kowardu valley



Table 1. Cumulative checklist of plants of Kowardu valley

S.no	Family	Botanical name of species	Common name	Habitat	Habit	Life form	Part used	Medicinal uses
1	Alliaceae	<i>Allium cepa</i> L.	Xhon	Cul	Herb	Cr	Bulb, leaves	Vomating, indigestion, curries
2	Amaranthaceae	<i>Beta vulgaris</i> L.	Chuqandr	Cul	Herb	Cr	Tuber, Leaves	Curries, constipation
3	Amaranthaceae	<i>Amaranthus retroflexis</i> L.	Shorot	Dry soil	Herb	H	Whole plant	Fodder
4	Apiaceae	<i>Foeniculum vulgare</i> mills.	Badyan	Cul	Herb	H	Seeds	Gastric problems, abdominal pain
5	Apiaceae	<i>Daucus carota</i> L.	Warfu	Cul	Herb	Cr	Tuber, Leaves	Urithritis food and fodder
6	Apiaceae	<i>Coriandrum sativum</i> L.	Osu	Cul	Herb	Th	Leaves	Spices
7	Asteraceae	<i>Carduus</i> ssp.	Xhoq	Moist stony slope	Herb	H		
8	Asteraceae	<i>Artemisia latifolia</i> Ledebour, Mem.	Bursay	Dry area	Herb	Ch	Whole plant	Medicine and fuel
9	Asteraceae	<i>Helianthus annuus</i> L.	Nima mindoq	Plane dry area	Herb	Th		
10	Asteraceae	<i>Galinsoga parviflora</i> Cav.	Siniarma stoa	Dry place	Herb	Th	Whole plant	Fodder
11	Asteraceae	<i>Brachyactis umbrosa</i> (kar. And kir.) Benth	Gkarstoa	Dry area	Herb	H		
12	Asteraceae	<i>Conyza variegata</i> Sch.Bip.ex A.Rich	Apomindoq	Dry area	Herb	H		
13	Asteraceae	<i>Artemisia sieversiana</i> Ehrh.ex.Willd	Karfo bursay	Stony area	Herb	Ch	Stem, branches and leaves	Intestinal worm and blood pressure
14	Asteraceae	<i>Echinops echinatus</i> Roxb.	Apo xhoq	Stony area	Herb	Th	Leaves	Fodder
15	Asteraceae	<i>Tegats</i> spp	Khashoshim	Dry area	Herb	Th		
16	Asteraceae	<i>Taraxacum officinales</i> F.h.Wigg.	Apomindoq	Dry	Herb	H	Whole plant	Fodder

17	Asteraceae	<i>Cichorium intybus</i> L.	Shantha	Dry	Herb	H	Root	Medicine
18	Brassicaceae	<i>Brassica oleraceae</i> L.	Karam	Cul	Herb	Th	Leaves	Curries, salad
19	Brassicaceae	<i>Lepidium letifolium</i> L.	Chunma	Dry soil	Herb	H	Whole plant	Fodder
20	Brassicaceae	<i>Brassica rapa</i> L.	Molo	Cul	Herb	Cr	Tuber, Leaves	Hepatitis, curry, salad
21	Brassicaceae	<i>Metthiola flavida</i> Boiss, Diagn.	Gonaqstoa	Stony slope	Sub shrub	H		
22	Brassicaceae	<i>Malcomia africana</i> (L.) W.T. Aiton.	Kiarstoa	Dry area	Herb	Th		
23	Brassicaceae	<i>Descuriania sophia</i> (Linn). Webb. Bath	Chuma stoa	Dry area	Herb	Th		
24	Brassicaceae	<i>Arabidopsis</i>	Xhunma stoa	Moist	Herb	H		
25	Brassicaceae	<i>Raphanus raphanistrum</i> L.	Dolfo	Cul	Herb	Cr		
26	Capparaceae	<i>Capparis spinosa</i> L.	Traba	Stony area	Shrub	Ch	Fruit, leaves	Back pain, Knee pain and arthritis
27	Caryophyllaceae	<i>Cerastium cerastoides</i> (L.) Britton, Mem.	Yoqpa	Moist place	Herb	H		
28	Chenopodaceae	<i>Salsola tragus</i> L.	Jirinjiringmo	Stony area	Herb	Th		
29	Chenopodaceae	<i>Chenopodium album</i> L.	Snew	Dry silty soil	Herb	Th	Leaves, whole plant	Fodder, medicine
30	Chenopodaceae	<i>Kuchia scoparia</i> L.	Fianma	Moist soil	Herb	Th	Leaves	Hypertention
31	Chenopodaceae	<i>Spinacia oleracea</i> L.	Palak	Cul	Herb	Th	Leaves	Food
32	Convolvulaceae	<i>Convolvulus arvensis</i> L.	Trimtrimmo	Dry soil	Herb	H	Whole plant	Fodder
33	Cucurbitaceae	<i>Cucumis sativa</i> L.	Laro	Cul	Herb	Th	Fruit, whole plant	Food and fodder
34	Cucurbitaceae	<i>Cucumis melo</i> L.	Ghon	Cul	Herb	Th	Fruit, whole plant	Food and fodder
35	Elaeagnaceae	<i>Elaeagnus angustifolia</i> L.	Sarsing	Cul	Tree	Ph	Fruit, leaves, Whole plant	Cough, bronchitis, fuel and fodder

36	Elaeagnaceae	<i>Hippophae rhamnoides</i> L.	Xhoq	Moist sandy soil	Shrub	H	Fruit	Stomach ulcer, Hepatitis
37	Ephedraceae	<i>Ephedra gerardiana</i> Wall.ex stapf.	Xhay	Moist place	Shrub	Ch	Branches, root	Tooth ache
38	Fabiaceae	<i>Sophora alopecuroides</i> .L.	khakhuroo	Dry area	Herb	H	Root	Joint pain
39	Fabiaceae	<i>Astragalus gummifer</i> Labill.	Bia charchu	Dry stony	Shrub	Ch	Root, branches	Tooth ache, use to block mouses etc.
40	Fabiaceae	<i>Robinia pseudoacarcia</i> L.	Kikar	Cul	Tree	Ph	Whole plant	Fuel
41	Fabiaceae	<i>Melilotus officinalis</i> L.(pall).	Kar boqsuk	Dry soil	Herb	Th	Whole plant	Fodder
42	Fabiaceae	<i>Phaseolus vulgaris</i> L.	Mutho	Cul	Herb	Th	seeds, whole plant	Food and fooder
43	Fabiaceae	<i>lens culinaris</i> Medikus.	Stangjun	Cul	Herb	Th	Seeds, whole plant	Food and fooder
44	Fabiaceae	<i>Pisum sativum</i> L.	Poqstn	Cul	Herb	Th	Seeds, whole plant	Food and fooder
45	Iridaceae	<i>Iris lactea</i> Pall.	Trasma	Dry soil	Herb	H		
46	Juglandaceae	<i>Juglans ragia</i> L.	Starga	Cul	Tree	Ph	Leaves, seeds, branches	Teeth pain and Asthma, food, fuel, oil
47	Lamiaceae	<i>Dracocephalum bipinnatum</i> Rupr.	Cololo	Dry soil	Sub shrub	H		
48	Lamiaceae	<i>Elsholtzia ciliata</i> (Thumb) Hynel.		Moist area	Herb	Th		
49	Lamiaceae	<i>Mintha longifolia</i> L.	Foling	Moist place	Herb	H	Leaves	Diarrhea
50	Malvaceae	<i>Abelmochus esculentus</i> L.	Bindi	Cul	Herb	Th	Fruit	Food
51	Moraceae	<i>Morus alba</i> L.	Osy	Cul	Tree	Ph	Fruit, Leaves, branches, root and stem	Blood tonic, Bronchitis, food,fodder, timber,fuel
52	Moraceae	<i>Ficus carica</i> .L.	Injeer	Cul	Tree	Ph	Fruit	Food
53	Nitrariaceae	<i>Peganum hermala</i> L.	Isman	Dry slope	Herb	H	Seeds	Asthma, religiously important

54	Papilionaceae	<i>Trifolium repens</i> .L.	Darba mindoq	Moist area	Herb	H	Leaves	Wounds
55	Papilionaceae	<i>Medicago sativa</i> L.	Boqxhuq	Cul	Herb	H	Whole plant	Fodder
56	Papilionaceae	<i>Astragalus falconeri</i> Bunge.	Chukstan	Moist pastures	Herb	H		
57	Plantaginaceae	<i>Fagopyrum esculentum</i> Moench.	Bro	Cul	Herb	Th	Grains	Stomach pain, Blood pressure
58	Plantaginaceae	<i>Plantago major</i> L.	Bokhna	Dry place	Herb	H	Seed	Constipation
59	Plantaginaceae	<i>Plantago lanceolata</i> L.	Larno laqsuk	Moist soil	Herb	H	Leaves	Wound, abdominal pain
60	Platanaceae	<i>Palatanus orientalis</i> L.	Shingial	Moist place	Tree	Ph	Branches, stem	Timber, fuel.
61	Poaceae	<i>Seteria italica</i> L.	Xha	Cul	Herb	Th	Grinded grains and whole plant	Food and fodder
62	Poaceae	<i>Hordium vulgare</i> L.	Nas	Cul	Herb	Th	Grinded grains and whole plant	Stomach ulcer, food and fodder
63	Poaceae	<i>Triticum aestivum</i> L.	Tro	Cul	Herb	Th	Grinded grains and whole plant	Constipation, food and fodder
64	Poaceae	<i>Vetivera nigriflora</i> (Benth).stapf.	Dambo	Dry place	Herb	H	Whole plant	To make Basket, chitayi, fodder
65	Poaceae	<i>Bambusa vulgaris</i> J.C.Wendl.	Bans	Dry place	Shrub	Ph		
66	Poaceae	<i>Setaria viridis</i> (L.) P.Beauv.	Stoa	Dry soil	Herb	Th	Whole plant	Fodder
67	Poaceae	<i>Zea mays</i> L.	Makai	Cul	Herb	Th	Grains and whole plant	Food and fodder
68	Poaceae	<i>Saccharum filifolium</i> Steud.	Sha stoa	Dry area	Herb	Ch		
69	Poaceae	<i>Sorghum halepense</i> L.	Yoqpa	Sry soil	Herb	H		
70	Poaceae	<i>Eriochloa fatmansis</i> (Hochst and steud)	Xhy xhy stoa	Moist soil	Herb	H		
71	Poaceae	<i>Enneapogon persicus</i> Boiss.	Apostoa	Dry area	Herb	H		

72	Poaceae	<i>Digitaria sanguinalis</i> (L.) Scop.	Spanstoa	Dry	Herb	H		
73	Poaceae	<i>Panicum milliaceum</i> L.	Xhy xhy	Cul	Herb	Th	Grains and whole plant	Food and fodder
74	Polygonaceae	<i>Rumex spp.</i> L.	Mindoq stoa	Moist area	Herb	H		
75	Polygonaceae	<i>Rumex thjanschanicus</i> Losinsk.	Fultoroq	Dry area	Herb	H		
76	Polygonaceae	<i>Fagopyrum gilesii</i> (Hemsl.) Hedb.	Jini bru	Dry sandy soil	Herb	H		
77	Polygonaceae	<i>Polygonum persicaria</i> L.	Sniarma stoa	Moist	Herb	H		
78	Punicaceae	<i>Punica granitum</i> L.	Siu	Cul	Shrub	Ph	Fruit	Fever, food
79	Rosaceae	<i>Cydonia oblonga</i> Mills.	Charol	Cul	Tree	Ph	Fruit, leaves	Medicine, food
80	Rosaceae	<i>Malus pumila</i> . Mills.	Kusho	Cul	Tree	Ph	Fruit, Leaves, branches, root and stem	Weakness, fuel, food and fodder, timber,
81	Rosaceae	<i>Rosa indica</i> L.	Mindoq	Dry soil	Tree	Ph	Flower	Abdominal pain, Fever
82	Rosaceae	<i>Pyrus communis</i> L.	Nuri	Cul	Tree	Ph	Fruit, branches, leaves	Fruit, fodder, fuel
83	Rosaceae	<i>Prunus armenica</i> L.	Chuli	Cul	Tree	Ph	Fruit, seeds, Whole plant	Constipation, food and fodder, fuel, oil, timber
84	Rosaceae	<i>Prunus persica</i> L.	Tiaq kusho	Cul	Tree	Ph	Fruit, Leaves and branches	Food ,fodder and fuel
85	Rosaceae	<i>Prunus avium</i> L.	Glass	Cul	Tree	Ph	Fruit, Leaves and branches	Food, fodder, fuel
86	Rosaceae	<i>Prunus dalsis</i> (mill) D.A. Webb.	Badam	Cul	Tree	Ph	Fruit, stem, seeds, branches and leaves	Medicine , fuel, food ,fodder, oil, timber
87	Rosaceae	<i>Prunus domestica</i> L.	Alubukhara	Cul	Tree	Ph	Fruit and leaves	Food, fodder
88	Rosaceae	<i>Prunus spp.</i>	Myon	Dry slope	Tree	Ph	Fruit, branches, leaves	Food, fuel and fodder

89	Rosaceae	<i>Crateagus songarica</i> K.Koch.	Locot	Dry stony area	Tree	Ph		
90	Salicaceae	<i>Populas alba</i> L.	Karbiar	Cul	Tree	Ph	Stem, root, branches and leaves	Fuel, fodder, timber
91	Salicaceae	<i>Salix alba</i> L.	Changma	Cul	Tree	Ph	Inflorecense, Leaves, whole plant	Post birth bleeding, timber, fuel
92	Salicaceae	<i>Populas nigra</i> L.	Naqbiar	Cul	Tree	Ph	Bark, stem, branches, root	Ringworm and juindice, timber, fuel
93	Simaroubaceae	<i>Ailanthus altissima</i> (Mill).swingle.	Ranthus	Cul	Tree	Ph	Stem, branches	Fuel
94	Solanaceae	<i>Nicotiana tobacum</i> L.	Tambaco	Cul	Herb	Th	Leaves	Smoking
95	Solanaceae	<i>Solanum nigram</i> L.	Drombi shoqlo	Moist place	Herb	Th	Stem	Tooth ache
96	Solanaceae	<i>Solanum lycopersicum</i> L.	Pagan	Cul	Herb	H	Fruit, whole plant	Curries fodder
97	Solanaceae	<i>Datura starmonium</i> L.	Datura	Dry soil	Herb	Ch		
98	Solanaceae	<i>Capsicum annum</i> L.	Siniarma	Cul	Herb	H	Fruit, whole plant	Spices,used in curries, fodder
99	Solanaceae	<i>Solanum tuberosum</i> L.	Aloo	Cul	Herb	Cr	Tuber, Leaves	Curries,food and fodder
100	Solanaceae	<i>Solanum melongena</i> L.	Bangan	Cul	Herb	Th	Fruit	Curries
101	Vitaceae	<i>Vitis venifera</i> L.	Rgon	Cul	Shrub	Ph	Fruit, branches, leaves	Food, fuel and fodder
102	Zygophyllaceae	<i>Tribulus terrestris</i> L.	Cocoring	Dry stony area	Herb	H	fruit, Whole plant	Urithritis and fodder

Life forms: Ph= phanerophytes, H= Hemicryptophytes, Ch= Chaemaephytes, Th= Therophytes

### Discussion

During the field survey 102 plant species and 85 genera belonging to 31 families were collected from Kowardu valley. The dominant family was Poaceae in my collection. (Hyder *et al.*, 2014) collected 200 plant species belonging to 102 genera and 34 families from the district Hunza Nagar of Gilgit Baltistan while collecting the baseline data of plant diversity. Amjad (*et al.*, 2017) revealed that the mountainous region of Pakistan has the great diversity of plants that has estimated about 1572 genera and 5521 species of plants. (Jabeen *et al.*, 2015) document the importance and usage of local plants of Ghizer district. She reported that 49 plants species belong to 26 families. Among that Asteraceae were the dominant families which consisted of 10 species. The collected plants are grouped into Gymnosperm and Angiosperm. The Gymnosperm is further categorized into Gnetophyta which contains one family, one genus and one species i.e. *Ephedra Gerardiana* belongs to family Ephedraceae and the Angiosperm also divided into Angiosperm dicotyledons comprising of 86 species with 70 genera belonging to 27 families, and Angiosperm monocotyledon having 15 species with 14 genera and 03 families. (Jabeen *et al.*, 2015) documented 46 species were angiosperms and 3 species were gymnosperms while studying the importance and usage of local plants of Ghizer district. (Khan *et al.*, 2008) reported that 85 species were dicot, 12 monocots and 1 species belong to pteridophytes at Haramosh and Bugrot.

Based on habit classification in my collections 72 species were herbs, shrub 7 species, under shrub 2 species and 21 species trees. The dominant habit form was herbs comprised of 72 species. The study conducted by many other researchers showed that herbs are also dominant in their collections. (Jabeen *et al.*, 2015) reported 29 herbs, 10 trees and 10 shrubs while

documenting importance and usage of local plants of Ghizer district. (Abbass *et al.*, 2013) report 141 species belong to 107 genera and 48 families from Naltar valley of Gilgit Baltistan. Among these reported species 91 species were herbs and 23 species were shrubs. The study of (Khan *et al.*, 2017) reveals that 174 species belonging to 86 families from the valley of the western Himalayan region of Pakistan and the maximum species were herbs which consisted of 84 species.

The Raunkiaer 1934 stated that Hemicryptophytic plants fit to high altitude or high longitude and cold humid climate. In my investigation the prevailing life form was Hemicryptophytes 34.31%, Therophytes 29.41%, Phanerophytes 23.52%, Chamaephytes 5.89% and Cryptophytes 6.86%. According to (Batalha *et al.*, 2002) Raunkiaer 1934 used such type of traits that indicates plants adaptation at climates that protect the perennating buds. In Their investigation the dominant life forms were Hemicryptophytes and Phanaerophytes. The study of (Badshad *et al.*, 2013) revealed that Therophytes were dominant.

The study of (Badshad *et al.*, 2013) at district Tank of Pakistan comes to know that 205 species belonging to the 56 families and Poaceae was at the top of list on the basis of number of species. In the (Abbas *et al.*, 2017) the dominant family was Fabaceae. In my collection the dominant family was Poaceae comprising of 13 species, followed by Asteraceae and Rosaceae both have 11 species, Brassicaceae 8, Fabaceae and Solanaceae 7 species in each, Chenopodiaceae 04, Polygonaceae 04, Apiaceae, Lamiaceae, Papilionaceae, Plantaginaceae, Salicaceae consist of 3 species each, Amaranthaceae, Cucurbitaceae, Elaeagnaceae, Moraceae comprising 2 species each and the remaining families i.e. Alliaceae, Capparaceae, Caryophyllaceae, Convolvulaceae, Ephedraceae, Iridaceae, Juglandaceae,

Malvaceae, Nitrariaceae, Platanaceae, Punicaceae, Simaroubaceae, Vitaceae and Zygophyllaceae have 1 species in each.

We also collected the ethno botanical knowledge by indigenous people. The indigenous peoples used plant as fodder, spices, timber, medicines, fuel and food. There were 75 ethnobotanically important plants. (Abbass *et al.*, 2013) report 141 species from Naltar valley. These species were used for medicinal purposes, fodder and forages, fuel, timber and veterinary uses. The most important plant species used by local peoples are *Elaeagnus angustifolia*, *Hippophae rhamnoides*, *Artemisia* species, *Capparis spinosa* and *Fagopyrum esculentum*. The fruit of *Elaeagnus angustifolia* is used to treat cough, bronchitis, the fruit of *Hippophae rhamnoides* used to stomach ulcer, heart problems, hepatitis and cough etc. The bulb, seed, fruit, leaves and sometime whole plants are used as medicines. According to (Bano *et al.*, 2014) at Skardu valley 50 medicinal plant belongs to the 25 families and 44 genera which were used for 33 different types of disease. The mostly used parts in medicine were leaves after that root, flower, fruit, seed, blub and barks respectively. Most of the plants were used for stomach aches. (Khan *et al.*, 2015) conduct a survey on medicinally important plants of Turmic valley of Gilgit Baltistan. These plants were used for 35 different types of disease, some are flu, fever, joint pain, low blood pressure liver disorder constipation, stomach problems bronchitis and abdominal problems. From this research we come to know that the collected medicinally important plants are used to treat different kind of diseases like heart problems, jaundice, stomach problems, abdominal problems, arthritis, urithritis, cough and fever in the study area. Most plants used to treat abdominal diseases.

### Conclusion

From the whole study we come to know that the Kowardu valley has great diversity of plants and variety of useful and ethnobotanically important wild and cultivated plants. The dominant plants belonging to family Poaceae contain 13 species after that Asteraceae and Rossaceae both have 11 species in each. In our investigation the dominant life form was hemicryptophytes and on the basis of habit categories Herb was dominant. A variety of plants used as food medicine, timber, and fodder in the study area. The most of inhabitant depends on Plants for medicines 35% of plants used as medicine in the study area unfortunately there is no way to conserve these Plants. The floras of the study are at high risk to become extinct due to overgrazing, lack of conservation system, and negligence from government side and less knowledge about the importance of plants especially present in agro ecosystem. From the observation during the field survey, we come to know that two species of Rossaceae family both have one individual plant in the whole study area i.e. *Prunus* species and *Crateagus songarica*.

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