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DEPARTMENT, PARKS & WILDLIFE CIRCLE GILGIT-BALTISTAN

PARTICIPATORY ADOPTIVE MANAGEMENT PLAN FOR SERMIK WETLANDS COMPLEX, SERMIK VALLEY SKARDU DISTRICT, GILGIT-BALTISTAN

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List of Acronyms

CBO	Community Based Organization
NGO	Non -Governmental Organization
PWD	Public Works Department
IUCN-P	International Union for the Conservation of Nature, Pak
WWF-P	World Wide Fund for Nature, Pakistan
MAB	Man and Biosphere
AKRSP	Aga Khan Rural Support Program
DCC	District Conservation Committee
KADO	Karakorum Area Development Organization
BWCDO	Baltistan Wildlife Conservation and Development Organization
MGPO	Mountain and Glacier Protection Organization
SDO	Skardu Development Organization
PTDC	Pakistan Tourism Development Corporation
EPA	Environments Projection Agency
UNDP	United Nation Development Programme

Acknowledgements

The Participatory Adaptive Management Plan for Sermik Wetland Complex has been developed as part of the project "Participatory Adoptive Management Plan for Sermik Valley Skardu District, Gilgit-Baltistan" funded by Government of Gilgit-Baltistan through Forest, Parks and Wildlife Department Gilgit-Baltistan. This plan has been meticulously crafted through extensive consultations and coordination with various stakeholders, including local communities, government departments, and NGOs. The invaluable contributions of all participants during meetings, field surveys, and group discussions are sincerely appreciated. While it is challenging to individually acknowledge every person involved, we would like to express our deep gratitude to the following key individuals:

- Chief Conservator Dr. Zakir Hussain for his support and guidance throughout the assignment in Skardu, Baltistan and at site.
- Mr. Syed Naeem Abbas, DFO, Wildlife Skardu and his entire team in Skardu for your sincere support, providing opportunity.
- Mr. Altaf Hussain, Forest and wildlife Expert, Miss Kaneez Fatima, Mrs. Khoshbo, Mr. Safiullah Baig, Miss Rasheeda Shoukat for your efforts during field survey, data collection
- Vibrant Community of Sermit for their time, sharing experiences, and providing indigenous knowledge

We extend our heartfelt appreciation to all stakeholders who contributed their time, knowledge, and efforts to the development of this Participatory Adaptive Management Plan for the Sermik Wetland Complex. It is through our collective dedication and collaboration that we can ensure the long-term conservation and sustainable management of this invaluable natural resource.

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Executive Summary

Baltistan is one of the most beautiful divisions of Gilgit-Baltistan with four districts which are Ghanche, Skardu, Kharmang, and Shigar that are collectively referred to as Baltistan, a land renowned for its striking beauty and cultural richness. Baltistan, an expansive region located on the map between 34° and 36° North and 73.3° and 80° East, is dominated by massive mountain ranges and elevated terrain, with almost all of its area lying above 2500 meters.

The Sermik Valley wetland, located in Skardu Gilgit-Baltistan, is a vital and diverse ecosystem. The wetland, nestled amidst the breathtaking beauty of the Northern Areas' Baltistan region, is renowned for its cultural richness and striking landscapes. It supports a diverse array of plant and animal species, including rare and endangered ones, making it a regional ecological hotspot. The wetland plays a vital role in maintaining water quality, providing flood protection, and supporting the livelihoods of local communities through various ecosystem services. The wetland supports a rich array of plant and animal species, including several rare and endangered ones, making it an ecological hotspot of regional significance. Furthermore, the wetland plays a crucial role in maintaining water quality, providing flood protection, and supporting the livelihoods of local communities through various ecosystem services. Despite its ecological importance, the Sermik Valley wetland faces numerous challenges. These include habitat degradation, encroachment, and pollution from human activities, invasive species, and conflicting land use practices. In order to address these issues and ensure the long-term sustainability of the wetland, the Management Plan incorporates a range of strategic actions aimed at protection, restoration, and sustainable management. The SerMik Wetland Management Plan outlines a comprehensive approach to effectively manage and conserve the unique and ecologically significant Sermik Valley wetland ecosystem. The plan is based on an extensive analysis of the wetland's current state, including its ecological value, threats, and stakeholder inputs. It provides a strategic framework to protect, restore, and sustainably manage this invaluable natural resource.

The primary objective of the Sermik Wetland Management Plan is to achieve a balance between conservation and sustainable use of the wetland's resources. By implementing this plan, we aim to safeguard the ecological integrity of the Sermik Valley wetland while also promoting the well-being of local communities and enhancing their understanding and appreciation of the wetland's values. Through collaboration with stakeholders, effective monitoring, and adaptive management, we aspire to create a model for wetland management that can be replicated and scaled up to protect and conserve wetlands beyond the Sermik Valley.

Introduction

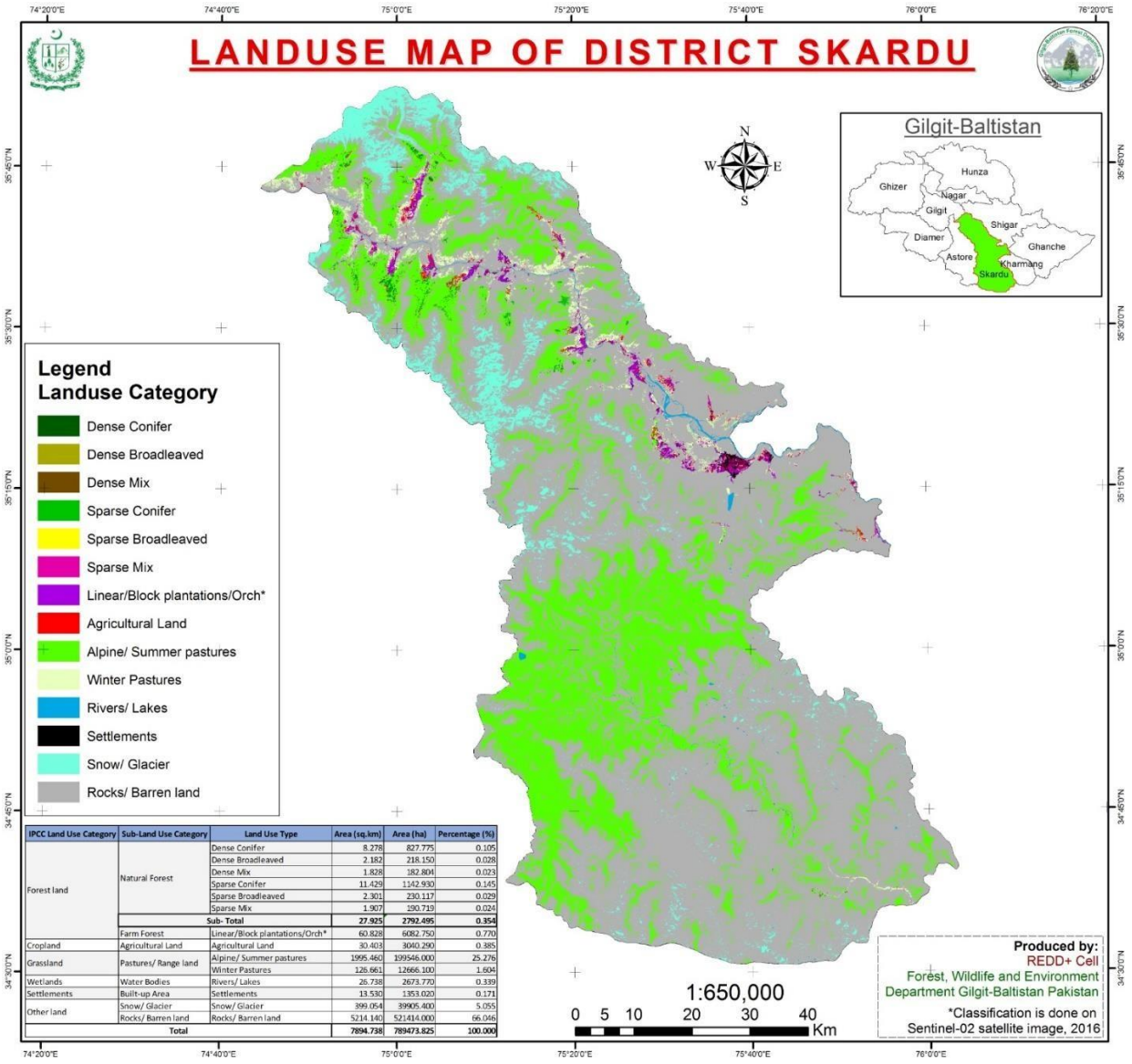
General Information

Gilgit-Baltistan cover an area of about 72,971 square kilometers and this region has population of 1,884,387 billion. Gilgit-Baltistan is located between 35.7°N to 37.8°N latitudes and 72.6°E to 76.7°E longitudes area shares common boundary with Afghanistan in the North, China in the North-east, Kashmir in the South and Chitral district of NWFP in the west. Gilgit-Baltistan is administratively divided into three divisions: Baltistan, Diamer and Gilgit, which, in turn, are divided into fourteen districts. These areas are located at the junction of three great mountainous ranges i.e. Karakoram, Himalaya, & Hindukush. Most parts of the Gilgit-Baltistan lie within the watershed of Karakoram, Himalaya, and Hindukush mountain ranges. The area is surrounded by snow covered mountains with deep gorges and narrow valleys. The region boasts of some of the most towering peaks on the planet, including K2 standing tall at an impressive 28,250 feet, followed by Nanga Perbat at 26,600 feet, Gashabroom at 26,470 feet, Broad Peak at 26,444 feet, Mushabroom at 25,660 feet, and Rakaposhi at 25,550 feet. Notably, the area is also home to some of the world's most significant glaciers, such as the Siachin glacier, which adds to the region's grandeur and magnificence. The Himalayan, Karakorum and Hindu Kush mountain ranges consists of more than two hundred high altitude wetlands in the region of Gilgit-Baltistan and they are enacting key role in the local communities, livestock and biodiversity of Gilgit Baltistan. These wetlands are the main sources of fresh water in the region with diverse and unique flora and fauna. Therefore, there role and importance cannot be ignored while relating it with climate change and eco-tourism on the one hand and their impact on eco system in that particular area on the other.

Introduction to Skardu Valley

Baltistan is one of the most beautiful division of Northern-Areas with five districts which are Ghanche, Skardu, Kharmang, Shigar and Roundu that are collectively referred to as Baltistan, a land renowned for its striking beauty and cultural richness .The term Baltistan, consisting of the adjective Balti, is employed by Kashmiris and neighboring communities to refer to the region, which is named after the Persian rendition of Baltistan or the land of the Baltistan-Baltistan, an expansive region located on the map between 34° and 36° North and 73.3° and 80° East, is dominated by massive mountain ranges and elevated terrain,with almost all of its area lying above 2500 meters. At the heart of Baltistan lies the city of Skardu, situated on the left bank of the majestic Indus River, serving as the bustling hub of commerce and governance forthe entire region. Skardu district shares borders with Gilgit to the North, Kashmir to the West, Ganche district to the East, and Ladakh to the South. The area falls within the dry Temperate Zone, experiencing cold winters and warm summers, although the climate varies with altitude. In low-lying valleys such as Skardu proper, Shigar proper, Rondu, and Karmang, the weather is hot and dry during the summer months, while higher altitudes like Deosai plains, Shella valley, and other mountainous regions enjoy moderate temperatures in the summer and extremely cold weather during winter. District Skardu boasts a rich diversity of vegetation, including medicinal plants that thrive in a range of habitats. The most significant area for medicinal plants is the Deosai plains, located to the south of Skardu city. This region issituated above the tree line and is uninhabited, presenting a unique Arctic Tundra-like ecosystem on the northern slope of the main Himalayan range. When the snow melts around the end of June, the entire area bursts into a lush green carpet of blooming flowers. In 1972, R.R. Stewart visited the area and collected approximately 600 species of plants, all of which are naturally occurring snowmelt Himalayan

plants. The region features very few ferns, and no trees, with only dwarf shrubby willows and junipers adorning the landscape. Fig: 1 Shows the Land Use Map of District Skardu Valley.



IPCC Land Use Category	Sub-Land Use Category	Land Use Type	Area (sq.km)	Area (ha)	Percentage (%)
Forest land	Natural Forest	Dense Conifer	8.278	827.775	0.105
		Dense Broadleaved	2.182	218.150	0.028
		Dense Mix	1.828	182.804	0.023
		Sparse Conifer	11.429	1142.930	0.145
		Sparse Broadleaved	2.301	230.117	0.029
		Sparse Mix	1.907	190.719	0.024
	Sub- Total		**27.925**	**2792.495**	**0.354**
	Farm Forest	Linear/Block plantations/Orch*	60.828	6082.750	0.770
Cropland	Agricultural Land	Agricultural Land	30.403	3040.290	0.385
Grassland	Pastures/ Range land	Alpine/ Summer pastures	1995.460	199546.000	25.276
		Winter Pastures	126.661	12666.100	1.604
Wetlands	Water Bodies	Rivers/ Lakes	26.738	2673.770	0.339
Settlements	Built-up Area	Settlements	13.530	1353.020	0.171
Other land	Snow/ Glacier	Snow/ Glacier	399.054	39905.400	5.055
	Rocks/ Barren land	Rocks/ Barren land	5214.140	521414.000	66.046
Total			**7894.738**	**789473.825**	**100.000**

Fig: 1: Land Use Map of District Skardu Valley

Sermik Valley

Sermik is a word derived from Balti words "khsair" means Gold and "mik" ers to eye or hole. It is said that in ancient time deposits of gold was nd here. It is comprises about 5 small villages. The total households are Total population is about 5,016 according to census report .The Sermik valley is a cluster of numerous small villages located on the left bank of the Indus River, 40km away from Skardu City, at an elevation of 2500m above sea level. The village extends up to the alpine zone, reaching an elevation of 4000m. It is flanked by the Indus River to the East, Skardu City to the North, Deosai plains to the West, and Mehdiabad village to the South.

Fig: 2 Shows the beautiful Landscape of Sermik Valley Skardu

Shella Valley

The village is located in the last inhabited valley, situated at an elevation of 3200 meters. It is positioned above the "C" line, indicating its higher altitude. The village is bordered by the Deosi plains to the west. The village is connected to Sermik by a 20-kilometer long jeepable road. However, due to the high altitude, the road is closed during the winter months. The road passes through areas of high elevation, where the vegetation is dense. The primary livelihood source for the villagers is agriculture and crop cultivation. The growing season spans from May to August, during which the villagers rely on farming for their sustenance. Additionally, the region is rich in important medicinal plants, and the indigenous knowledge about these plants is still preserved among the locals. The name of the village, "Nik," is derived from the Balti words "khsair," which means gold, and "mik," referring to an eye or hole.It appears that the village of Nik is situated in a remote and mountainous region with limited accessibility during the winter season. The villagers primarily depend on agriculture and have valuable knowledge of medicinal plants. The village's name reflects its connection to the local language and possibly signifies a significant aspect of the area's natural resources or cultural heritage.

Fig : Landscape of Shella Valley

The presented data in Table 1 outlines the elevations, no. of household and population of villages found in the Sermik valley.

S.NO	Name of Village	No. of Household	Population	Elevation
1.	Proper Sermik	300	3000	2400m
2.	Brookchut	72	540	2900m
3.	Kariko	36	360	2800 m
4.	Korako	60	516	2700m
5.	Shella	72	600	3300m

Table 1: Population, Elevation and No.of Households of Villages of Sermik Valley

Agriculture is the backbone of economy of area. A large number of people serving in army and civil services. 80% people depend on agriculture. The western side of the valley is primarily dominated by pastures. These pastures are distributed in different ecological zones. The presented data in Table 2 outlines the elevations of pastures found in the Sermik valley.

S.No	Pastures	Altitude
1.	BrookChut	2900m
2.	Korako	2700m
3.	Kariko	2800m
4.	Khonmore	3300m
5.	Moorkoh	3400m
6.	Sheila	3500m
7.	Naqpoo	3700m
8.	Reeboo	3700m
9.	Koshpq thung	4000m
10.	Laylongba	4500m

Table 2: Elevations of Pastures

Land Use/Cover of Sermik Valley, Skardu Baltistan

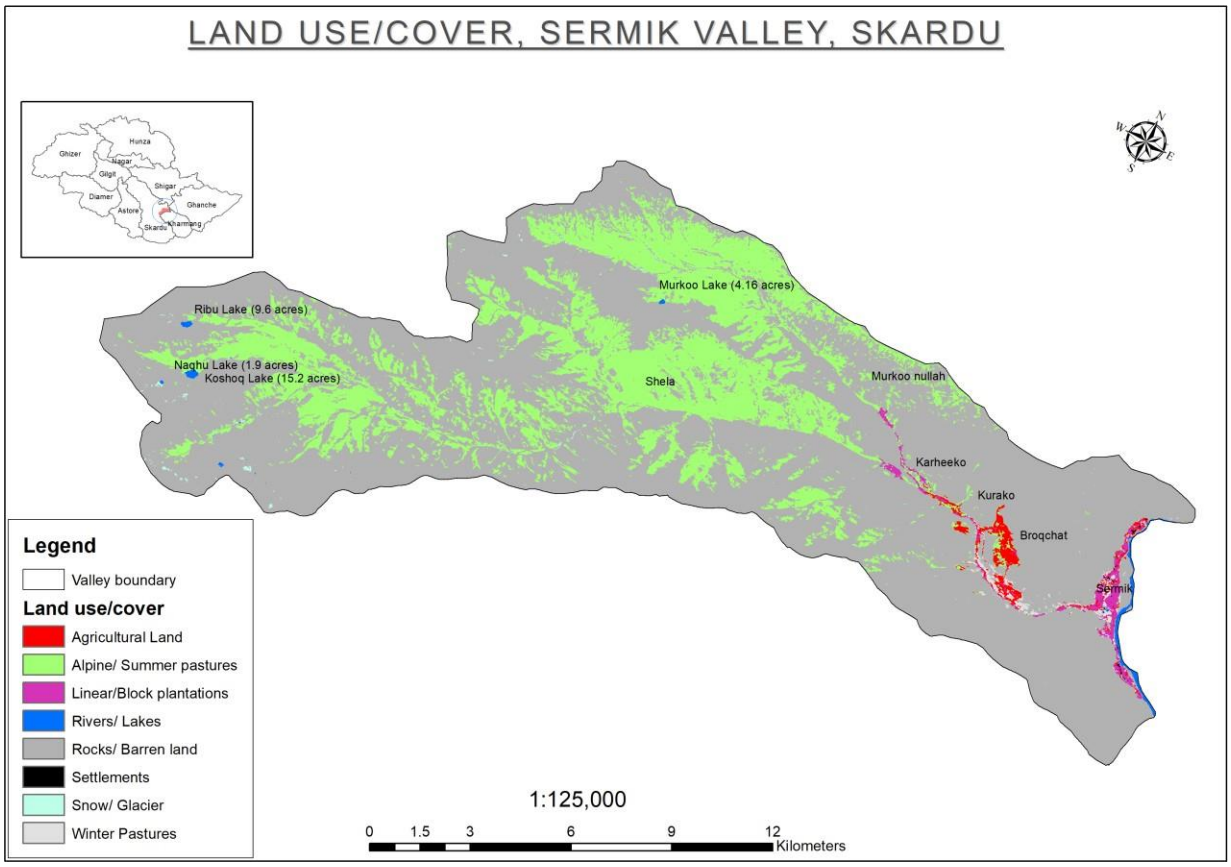


Fig: 03 Shows the Land Use/Cover of Sermik Valley SKardu

Climate

The climate in the region exhibits a range of variations, depending on the elevation, with the lower altitudes along the Indus River experiencing different temperatures than higher elevations, such as Shelia valley. During the summer months, temperatures can rise as high as 40°C, making it arid and hot, while the winter season can be extremely cold, with temperatures dropping below the freezing point to about -25°C. Although summers are pleasant, winters are harsh. As the area is located beyond the monsoon zone, the annual precipitation is minimal. The relative humidity is higher during the colder months, while it decreases during the warmer months. Additionally, wind velocity is higher in the summer as compared to the winter season.

Rainfall

Skardu typically receives about 85.17 millimeters (3.35 inches) of precipitation and has 198.55 rainy days (54.4% of the time) annually. Table 3 displays the average monthly precipitation in the area for the year 2020."

S.NO	Month	Average Rainfall in MM
1.	January	1.49mm | 0.06in
2.	February	0.65mm | 0.03in
3.	March	1.79mm | 0.07in
4.	April	1.89mm | 0.07in
5.	May	1.55mm | 0.06in
6.	June	5.4mm | 0.21in
7.	July	7.41mm | 0.29in
8.	August	6.32mm | 0.25in
9.	September	1.61mm | 0.06in
10.	October	0.36mm | 0.01in
11.	November	1.62mm | 0.06in
12.	December	1.11mm | 0.04in

Table 3: Average Precipitation

Temperature

During the summer months, temperatures can rise as high as 40°C, making it arid and hot, while the winter season can be extremely cold, with temperatures dropping below the freezing point to about -25°C. Table 4 displays the average monthly temperature in the area for the year 2020."

S.NO	Month	Maximum	Minimum
1.	January	3.2C (37.76°F°F)	-9.2°C 15.44°F)
2.	February	11°C (51.8°F)	-2.4°C (27.68°F)
3.	March	16.5°C (61.7°F)	1.05°C (33.89°F)
4.	April	20.5°C (68.9°F)	7.7°C (45.9°F)
5.	May	29.1°C (84.38°F)	11.8°C (53.24°F)
6.	June	31.4°C (88.52°F)	14.8°C (58.64°F)
7.	July	34.6°C (94.28°F)	18.3°C (64.94°F)
8.	August	33.8°C (92.84°F)	16.72°C (62.096 °F)
9.	September	26.7°C (80.06°F)	9.5°C (49.1 °F)
10.	October	23.4°C (74.12 °F)	4.4°C (39.92°F
11.	November	13.5°C (56.3°F)	-2.1°C 28.22°F)
12.	December	5.8°C (42.44°F)	-5°C (23°F)

Table 4: Average Temperature

From the above table it can be concluded that July and August are the hottest months of the area due to lack of monsoon whereas January and December are the coldest months of the year.

Humidity

The humidity in the valley varies depending on the time of year, but it generally remains low throughout the year due to the dry climate. During the winter months, the humidity can increase slightly, but it still remains relatively low compared to other parts of the world. Overall, the Sermik Valley offers a dry and comfortable climate with low humidity, making it an ideal destination for travelers looking to escape the hot and humid conditions of other regions.

S.NO	Month	Morning	Evening
1.	January	84%	65%
2.	February	69%	33%
3.	March	62%	21%
4.	April	55%	25%
5.	May	52%	37%
6.	June	57%	25%
7.	July	53%	31%
8.	August	57%	26%
9.	September	68%	31%
10.	October	64%	28%
11.	November	75%	38%
12.	December	86%	66%

Table 5: Average Humidity

The above table shows that the humidity in the evening is low as compare to humidity in the morning due to the higher air temperature in the afternoon. Humidity remains maximum during winter in the months of December and January.

Hydrology

The Sermik valley is drained by the great river Indus (Singhay Cho), but during the summer season, the river experiences high flood conditions that make irrigation infeasible. As a result, the Sennik Nallah serves as the main source of irrigation, drinking water, and electricity generation for the region. The Moorkoh Nallah, Reebo Nallah, and Naqpo Nallah are important tributaries of the Sennik Nallah, which are fed by lakes such as Koshok Thong lake, Reebo lake, and Moorkoh lake. These lakes are primarily fed by melting snow and glaciers. The entire valley relies on the Sennik Nallah for irrigation, with each village having its own canals to distribute the water evenly. A designated person called "Choorapa," recommended by the local people, is responsible for water distribution, and the villagers pay him in grains. The Nallahs and the river are home to many species of fish. Fig: 2 Shows the Hydrology and elevation of Sermik Valley SKardu.

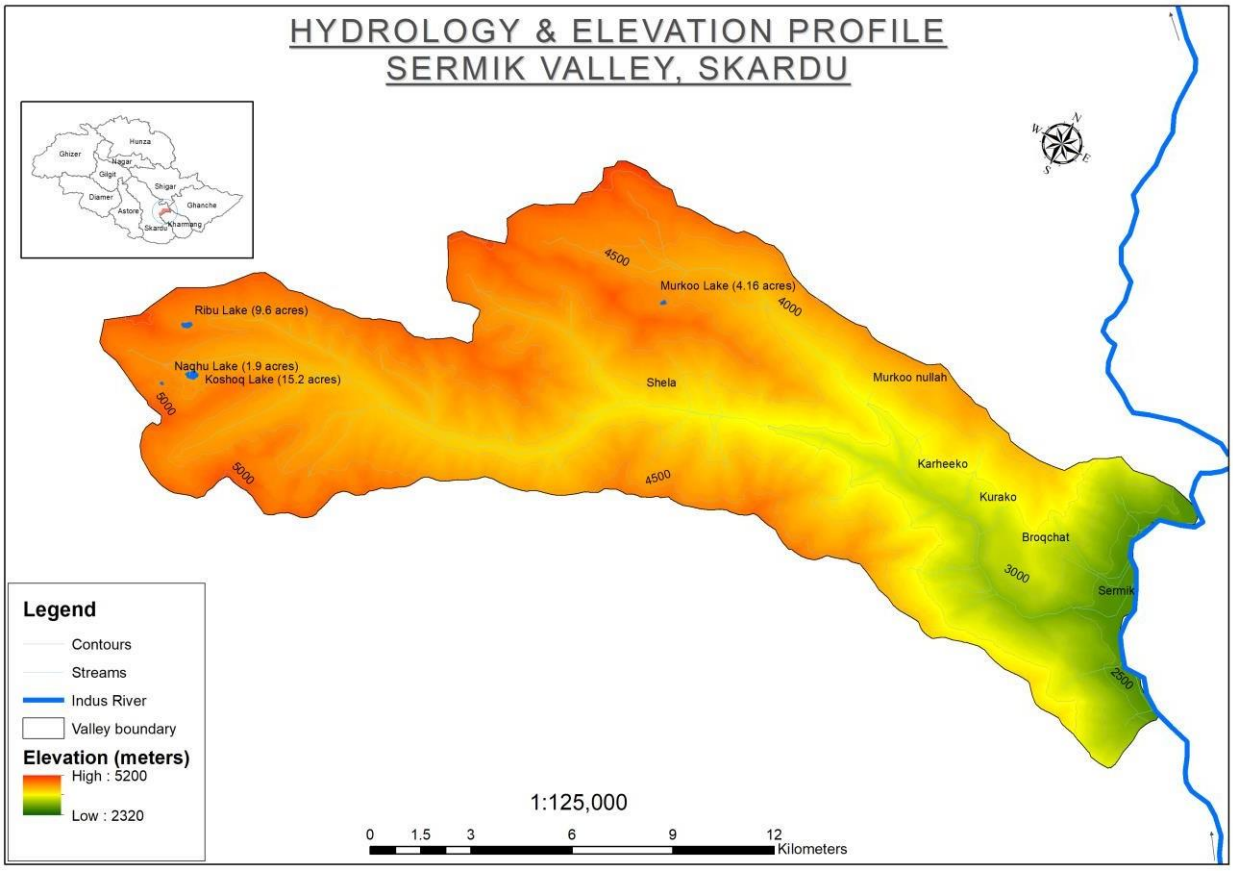


Fig: 2 Shows the Hydrology and elevation of Sermik Valley SKardu.

Ecological and Socio-economic values of Sermik Valley

The vegetation distribution in Sermik valley and its surrounding areas exhibit a distinct ecological pattern consisting of three dominant zones, namely, the dry temperate, subalpine and alpine. As a result, the vegetation types have been categorized into the primary ecological zones based on their respective characteristics. Sermik village falls in dry temperate zone, here the natural forest is rarely found. However a vast area is covered with cultivated forest, with dominated plants of the various species of Salix, Poplus and Prunus. Wild tree of the area comprises, Russain olive (Elaeagnus angusiifolia), Vilayati kiker (Rubania pseudoacacia) and Junipers. Shrub included Hippophae rhamnoids (seabucthorn) Berberis lycium (Berbere) Myrcaria elegans & Colutea nepalensis. Herb includes Capparis spiinosa, Clematis baltistanica, Swertia petiolata, Geranium wallichianum, Paranasia nubicule etc. The Sub alpine zone mainly consists of Juniperus macropocki, Salix teterasperma and Betula utilis. Shrubs like Rosa macrophylla, Rosa webbiana, Hippophae rhammoid, Tamarix gallaca also can be seen frequently. Herbs inculded Polygonum alpinum, Astragal. Spp. Thymus serphyllum etc. Kariko & Korako and proper Sheila valley situated in this zone. The Alpine zone consists of shrub like Juniperus communis, Salix spp., Betula utlis etc. Alpine herb like Anaphlis triplinervis, Tanacetum dolichoplyllum, Sassurea obvallata, Aquilegia baltistanicia, Pedicularis bicornuta, Carum spp. Cicer arietinum, Bergenia stracheyi, Dactylis glomerata etc. Usually two main elements in the flora namely the alpine & deserts are found here. The alpine species shows the characteristics of some Himalayan, other Euro-Siberian or central Asiatic species. While the desertic ra includes plants growing

on cliffs, sand and along streams or springs. ome species shows Saharo-Sindian and other are typically central Asiatic or eastern 'rano-Turania.

Natural forests are scarce in the area, with only small patches of niperus macropoda and Juniper to excelusa present in the Shelia valley. Additionally, there are scattered instances of Rosa webbiana and Rosa macrophylla vegetation. In Sermik valley, a significant portion of the forest in and around the village has been introduced and cultivated, consisting of trees such as Juglans regia, Prunus armeniaca, Mallus pomila, Momus alba, and various species of Salle and populous. Local residents commonly engage in forestation and reforestation activities, as they rely on plants for fuel and construction purposes.

The primary crops grown in the area include Triticum aestivum (wheat), Hordeum vulgare (barley), Panicetum americanum (jawar), Fagopyrum cymosum (trumba), Solanum tuberosum (potato), and Pisum sativum (pea). The region's climate and soil are highly conducive to the cultivation of fruit trees, such as Prunus annernaca (apricot), Prunus amygdalus (almond), Morus alba (safid tut), Morus nigra (kala tut), Vitis venifera (grapes), Elaeagnus angustifolia (ber), and Juglans regia (akhrot).The region is known for cultivating a wide variety of vegetables, including Docus carota (carrot), Lycopersicon esculantunt (tomato), Annum epa (onion), Cucurbita oleracea (cabbage), Raphnus sativus (radish), Spinocia olearacea (spinach), and tfabiscuss esculantus (lady fingers).

Fig: Ecology of Sermik Vallley

Wildlife

The local fauna in the area is diverse, with various species of animals and birds present. The Sheila valley is home to the Himalayan Brown bear and Marmot, while the entire region is home to common species such as Wolf, Fox, Jackal, and Snow leopard. Additionally, various bird species, including Chakor, Rain Chakor, Dove, Quail, Hoopoe, and Cuckoo, are found in the area.

Fig: Wildlife of Sermik Valley

Geology and Soil

The Karakoram mountain belt is geologically categorized into five zones, and the investigated areas are located within the Ladakh and Deosai zones. The entire area features V and U-shaped valleys in terms of its geomorphology. The predominant rock types consist of igneous and metamorphic rocks. Nonetheless, there are specific areas that exhibit characteristics of sedimentary rocks. The formation of soil in the region occurs primarily due to the weathering of parent rocks such as igneous and metamorphic rocks. The significant mineral particles found in the soil include Quartz, Garnet, Dunite, Tonalite, Epidote, Mica, and other similar elements.

The soil in the area is a mix of transported and residual types. Soil samples collected from various locations in Sermik valley were analyzed at the Agriculture Department of Muzaffarabad. The data obtained revealed that the soil is primarily composed of loamy and sandy loamy particles. The pH level of the soil ranged from 7.6 to 8.9, with organic matter content ranging from 0.11 to 1.116g/100g. Soil saturation levels were found to be between 23 to 30%, while the phosphorus concentration ranged from 13.7 to 1.2ppm. Additionally, potassium levels in the soil were observed to vary between 40 to 240ppm.

S.NO	Localities	Sat%	Soil Texture	PH	Organic Matter	Avl. P (PPM)	Avl. K (PPM)
	Sermik	28	Sandy Loam	8.6	0.11	13.7	40
	Shella	30	Loam	7.8	0.44	17.5	40
	Sosar	25	Sandy Loam	8.9	0.22	17.5	100
	BrookChat	23	Sandy Loam	7.6	1.11	21.2	240

Table: 06 Shows the Geology of Sermik Valley

Tourism and Recreation

Baltistan is renowned worldwide for its breathtaking scenery, towering snow-covered mountains, magnificent glaciers, and stunning lakes, making it a haven for nature enthusiasts, mountaineers, trekkers, and adventurers. Thousands of tourists, both local and foreign, flock to the region each year, and tourism has become a thriving industry, generating significant foreign exchange for the country. With attractions such as Deosai (known as the "Roof of the World"), K2, Siachen glaciers, Satpara Lake, Kachura Lake, Shushar Lake, expansive sand dunes, verdant valleys, babbling streams, and natural springs, there is no shortage of diverse sights to captivate visitors.

The rapid increase in human population along with their increasing number of livestock has posed a serious threat to the integrity of natural resources. However, the impact of tourism cannot be overlooked. While tourism has provided economic opportunities and has boosted the local economy, it has also contributed to the degradation of natural vegetation. The unregulated and unsustainable influx of tourists has put a strain on the natural resources, leading to deforestation, fuelwood collection, and overgrazing in the areas surrounding tourist attractions. The demand for more arable land and the need to cater to the needs of tourists has further intensified the biotic pressure on the natural vegetation. As a result, the palatable species are vanishing and non-palatable species are flourishing, leading to irreversible impacts on the vegetation. Grazing is another significant issue that has immense influence on vegetation. With the growing season being short and the rainfall being low, uncontrolled and improper grazing practices are creating serious problems of soil erosion and desertification.

Significant Medicinal Plants of Commercial Value in the Region

The Sermik valley of Gilgit Baltistan is home to a wide range of medicinal plants that have significant commercial value. These plants have been traditionally used for medicinal purposes by the local communities for centuries. Some of the most significant medicinal plants found in the region include Cuminum cyminum (Safiad zeera) seeds, Curm carvi (Kala zeera) seeds, Elaeagnus angustifolia (Sarsing), Fagopyrum cymosum (Brow) seeds, Ferula asafetida (Hing) gum, Hippophae rhamnoides (Karsouge), Morchella esculania (Bianghoorysna), Peplum haramala (Isman) seeds, Primula macrophylla (Kungmar), Rheum emodi (Traba) roots, Thymus serphylhim (Tomborook), and Viola serpens (Skoreymandoq). These plants have significant value and can be used in the production of medicines and herbal products, making

them an important resource for the region. These plants contain active compounds that have various pharmacological properties and are used in the production of medicines for the treatment of various ailments such as gastrointestinal disorders, respiratory diseases, and neurological disorders. The demand for these medicinal plants is high in local as well as international markets, making them an important source of income for the local communities. However, due to unsustainable harvesting practices, overexploitation, and habitat degradation, many of these medicinal plants are now facing the threat of extinction. Therefore, there is a need for sustainable management practices to ensure the conservation and preservation of these valuable plant species for the future generations.

Ethnical Groups and Languages

Generally two dominant tribes are found having different culture and language.

1. Balties

2. Shins

The Baltis, who speak the Balti language resembling the Tibetan language, are the indigenous people of the area and can be found in Upper Sermik and Shelia valley. The Shins, who speak the Shina language, inhabit the area between proper Sermik and Ella valley. However, the entire Baltistan region is predominantly inhabited by Baltis. According to the renowned historian Ahmad Hassan Dani, in his book "History of Northern Areas," the great ruler Ali Sher Khan Anchun of Baltistan brought a number of prisoners from Brushal, Gilgit, Chilas, and Astore and settled them in Skardu, Sermik, Mehdiabad, Tolti, and Kartaksha. Thus, the descendants of these prisoners with Shina-speaking abilities can still be found in the region, with their own unique cultures and traditions. Apart from these two main groups, several other tribes are also present e.g Syeds ,Wazirs ,Gacha pa , Rajas ,Mullas ,Boots and Baans .

The people of Baltistan celebrate various Islamic festivals with great religious fervor, including Eid-ul-Azha, Eid-ul-Fitter, and Eid-Millad-on-Nabi. In addition to these, there are several traditional festivals that are celebrated in the region. For instance, Nooroze is celebrated on 21st March throughout Baltistan to welcome the arrival of the spring season with cultural enthusiasm. Another festival called Itlayfung is celebrated on 21st December to welcome the onset of winter. The festival of Stoonfewks involves families in the village slaughtering two or more animals and preserving the meat under chilled conditions to consume during the winter season. Similarly, during the festival of Stroopla, when the barley crop is about to ripen, many traditional dishes are prepared from the still-ripening barley grains, which are then distributed among relatives and the poor to express gratitude to God for the bountiful harvest.

Institutions functional in the area

Table 4. List of Government Departments, NGOs and CBOs working in the area

S.NO	Name of Organization	Responsibility
	Government Departments	

1	Forest, Parks and Wildlife Department	The formidable task of overseeing and safeguarding the majestic realms of forests, parks, and wildlife resources falls upon the shoulders of those entrusted with the management, conservation, and protection within a specific jurisdiction. These dedicated individuals bear the weighty responsibility of preserving and nurturing the natural sanctuaries that teem with life and embody the untamed beauty of our planet
2	Public Works Department (PWC)	The Public Works Department typically operates at the regional or local level and is responsible for the construction, maintenance, and management of public infrastructure, such as roads, bridges, buildings, and utilities
3	Fisheries department	Responsible for managing, regulating, and promoting the sustainable use of aquatic resources, including fish and other aquatic organisms, within a particular region
Non-Government Organizations (NGOs)		
1	AKRSP	Responsible for the development and up lift of rural areas. Focuses on promoting sustainable development, poverty reduction, and improving the quality of life for rural communities.
2	World Wide Fund for Nature (WWF)	To conserve nature and biodiversity by protecting and preserving the world's ecosystems and species
Community-based Organizations (CBOs)		
1	Karakoram Area Development Organization (KADO)	To empower communities through education, healthcare, infrastructure, and livelihood projects. They improve access to quality services, develop sustainable livelihood options, and

		foster overall development in the region.
2	Baltistan Wildlife Conservation and Development Organization (BWCDO)	Responsible for wildlife conservation, environmental protection, and sustainable development in the Baltistan region.
3	Mountain and Glacier Protection Organization (MGPO)	MGPO plays a vital role in protecting and preserving mountainous regions and glaciers, addressing climate change impacts, conducting research, and engaging communities to ensure the sustainable management of these unique and valuable natural resources.
4	Skardu Development Organization (SDO)	socio-economic upliftment of the sermik Valley communities through initiatives related to education, health, poverty alleviation, and infrastructure development

Current Management deficiencies in Sermik Valley

The responsibility of managing different aspects of the ecosystem in Sermik Valley lies with various government departments, each with its own set of rules and regulations. However, the effective implementation of these regulations is hindered by inconsistent application due to a lack of well-trained and motivated personnel, as well as limited mobility and communication facilities for staff. Through a series of interviews with the local community we assess the following wetland management and identified gaps for improvement through capacity building. A summary is given in the following table.

Name of Department	**Role in wetlands Mgt/ Conservation**	**Gaps/ Needs**
Forest, Parks and Wildlife Department	○ Main custodian of wetlands and surrounding pastures and Forests Protection and management of the wildlife and forests. ○ Protection and Management of Wildlife and Forest. ○ Regulate exploitation of forest products including timber, medicinal plants and other minor forest producer through enforcement of forest and wildlife act. ○ Measures to protect	○ Limited awareness of the economic and cultural benefits of wetlands among local communities and decision-makers. ○ Poor enforcement of wetland conservation measures and regulations. ○ Lack of coordination and collaboration among relevant stakeholders involved in wetland management. ○ Effective wetland management practices have not been implemented yet,

	○ Wetlands from degradation and restore degraded wetlands through actions such as fencing, controlling grazing, and restoring wetland vegetation. ○ Rehabilitation of degraded forests & wildlife including water fowl. ○ Conduct regular surveys and monitoring of wetlands to assess their health, identify potential threats, and inform conservation and management decisions.	leading to a lack of proper management of these crucial ecosystems. ○ Gaps and weaknesses in the Policy Environment / Legislation ○ Inadequate capacity building initiatives for local staff and communities to engage in wetland management. ○ Lacks familiarity with international treaties and conventions like RAMSAR and MAB, impeding their ability to adhere to and implement the obligations set forth in these global agreements.
Agriculture & Livestock	○ Responsible for promoting and supporting agricultural development by implementing policies, programs, and initiatives to enhance crop production, improve farming practices, and increase agricultural productivity. ○ oversees the management and development of livestock resources ○ Conducts research and development activities in agriculture and livestock sectors. This involves studying new crop varieties, livestock breeds, and innovative farming methods to enhance productivity, resilience, and sustainability. The findings and recommendations from research are shared with farmers to support evidence-based farming practice.	○ Lack of sufficient attention given to environmental pollution and contamination, evidenced by the use of pesticides and chemical fertilizers in high altitude farmlands surrounding freshwater lakes. ○ Lack of knowledge can make it difficult to develop effective management strategies for these ecosystems. ○ The staff's understanding of wetland biodiversity is limited. ○ Limited concern about environmental pollution and contamination. ○ Most of the staff in agriculture and livestock departments have no knowledge of international treaties and conventions, including RAMSAR and MAB .

	○ Proper agricultural practices such as crop rotation, conservation tillage, and reduced use of pesticides can help to maintain soil fertility, reduce erosion, and minimize water pollution. ○ To policy formulation related to agriculture and livestock, providing inputs based on their expertise and experiences. And also enforce regulations related to agriculture, such as quality standards for seeds, fertilizers, and livestock products, ensuring consumer protection and fair trade practices.	○ The department has failed to conduct any research on the status of alpine pastures, despite the critical importance of such research in ensuring. ○ Limited concern about environmental pollution and contamination. ○ Faces challenges in facilitating market linkages for farmers, resulting in difficulties in accessing fair prices and expanding market opportunities. Strengthening collaboration with market actors and implementing market-oriented interventions can help farmers enhance their incomes and improve overall profitability.
Pakistan Tourism Development Corporation (PTDC)	○ Collaborating with stakeholders for Promoting tourism activities in region. ○ Aims to promote tourism in Pakistan by developing and managing tourism infrastructure, promoting tourism activities, and providing tourist information and services ○ Promote wetland tourism and raise awareness about the ecological significance and beauty of wetland areas. ○ Support educational initiatives and interpretive programs that provide visitors with information about wetland ecology, biodiversity, and conservation. This can help enhance visitors' understanding and appreciation of wetlands	○ Weak regulatory frameworks and a lack of enforcement mechanisms result in uncontrolled tourism activities in and around wetlands and natural resources. ○ Lack of actively engaging and including relevant stakeholders in decision-making processes, planning, and implementation of initiatives. ○ Lack the necessary technical expertise and knowledge to manage wetlands and natural resources effectively. ○ The approach is more business oriented than eco-friendly. ○ Insufficient resource ○ Inadequate adaptation and resilience strategies to

	while fostering a sense of responsibility towards their protection. ○ Engaging in collaborative efforts with stakeholders. ○ Operates various hotels and motels in prime locations, providing tourists with comfortable accommodation options.	address the impacts of climate change on wetland ecosystems. ○ Limited public awareness and education about the value and importance of wetlands. ○ Lack of coordination and collaboration with other government agencies, NGOs, and community-based organizations working on wetland conservation and management.
Fisheries Department	○ Regulates fishing activities through the issuance of fishing licenses, the establishment of fishing seasons, and the implementation of gear restrictions. ○ Protection of aquatic ecosystems. ○ Introduction and re stocking of fish in lakes and rivers ○ Management of fish resources ○	○ Field staff inadequately trained in wetland surveying and monitoring. ○ Limited to the management of fish resources exclusively. ○ Lack of sufficient resources to collect and analyze data on fish populations, fishing practices, and aquatic ecosystems. ○ not effectively engage with local communities, fishers, and other stakeholders in the development and implementation of policies and regulations

<u>Current and potential threats to the wetland and surrounding area</u>

There are various current and potential threats to the wetland and its surrounding area, including:

Habitat Loss and Degradation: Wetlands face the risk of habitat loss and degradation due to factors such as urbanization, agriculture expansion, infrastructure development, and land-use changes. These activities lead to the fragmentation and destruction of wetland ecosystems.

Pollution and Contamination: Pollution from agricultural, and urban sources negatively impact wetlands, leading to water pollution, soil contamination, and damage to aquatic ecosystems. Runoff containing chemicals, pesticides, and fertilizers degrade water quality and harm wetland species.

Invasive Species: The introduction of invasive species poses a significant threat to wetland ecosystems. Invasive plants and animals outcompete native species, disrupt natural ecological processes, and alter wetland habitats.

Climate Change Impacts: Climate change poses a significant threat to wetlands. Rising temperatures, changes in precipitation patterns, sea-level rise, and extreme weather events impact wetland hydrology, alter plant and animal communities, and exacerbate habitat loss and degradation.

Overexploitation of Resources: Unsustainable fishing practices, excessive hunting, and the exploitation of wetland resources such as timber, medicinal plants, and other minor forest produce deplete biodiversity, disrupt ecological balances, and negatively impact wetland ecosystems.

Lack of Awareness and Conservation Efforts: Limited public awareness and understanding of wetland values and the importance of conservation hinder conservation efforts. Insufficient resources and investment in wetland protection and management further exacerbate the threats they face.

Addressing these threats requires proactive measures such as strengthening wetland conservation policies, promoting sustainable land-use practices, implementing pollution control measures, conducting invasive species management, and raising awareness about wetland conservation. Collaboration among government agencies, local communities, NGOs, and stakeholders is crucial for effective conservation and sustainable management of wetlands and their surrounding areas.

Management Goals and Objectives

Management Approach and Goals

The long-term management goals of the five-year plan are:

- The preservation and protection of the rich diversity of plant and animal species that rely on wetland ecosystems.
- This goal involves implementing measures to prevent habitat degradation, preserve critical habitats, and promote the recovery of endangered or threatened species.
- To protect the ecological integrity and biodiversity of Sermik Wetlands Complex through all stakeholders participation

Factors influencing the achievement of long-term management goals

Internal Natural factors

Inadequate information regarding wetland ecology, resident and migratory birds, mammals, and their habitat requirements poses a potential challenge to the achievement of long-term management goals. Insufficient knowledge in these areas can hinder effective decision-making, conservation efforts, and the implementation of appropriate management strategies, potentially compromising the desired outcomes in the long run.

Internal human inducted factors

Internal human-induced factors are currently influencing the achievement of long-term management goals for wetlands. Land use practices, such as agricultural expansion and urban development, continue to convert and degrade wetland habitats. Pollution and contamination from human activities are currently disrupting water quality and degrading the ecological health of wetlands. The introduction and spread of invasive species are altering wetland ecosystems and threatening native biodiversity. Overexploitation and unsustainable harvesting practices are depleting wetland resources and disrupting ecological balance. Insufficient awareness, inadequate planning, and limited funding are currently hindering effective wetland management.

External Natural Factors

External natural factors currently play a significant role in influencing the achievement of long-term management goals for wetlands. These factors, originating from the broader natural environment, have ongoing impacts on wetland ecosystems. Hydrological changes, including altered precipitation patterns and fluctuating water levels, currently affect wetland functioning and ecological processes. Natural succession and disturbance events, such as flooding or fire, continue to shape wetland structure and biodiversity. Climate change impacts, such as rising temperatures and sea levels, are currently affecting wetland habitats and species distributions.

Management Structure

The ultimate responsibility for ensuring the successful implementation of the management plan and execution of activities lies with the designated community-based organization (CBO). Wetland management stakeholders encompass a diverse range of entities including governmental bodies, local communities, enterprises, non-governmental organizations (NGOs), and scientific institutions. Effective collaboration and cooperation among these stakeholders are essential for the formulation and execution of comprehensive management strategies. The Northern Areas Forest Department (including Wildlife division) and the Fisheries department will also play integral roles as stakeholders, assisting the CBO in undertaking various plan activities.

The implementation of the management plan will involve the active participation of various stakeholders, including the Northern Areas Forest Department (including Wildlife Division) and the Fisheries Department. These departments will collaborate with the Community-Based Organization (CBO) to carry out the activities outlined in the plan. To ensure effective coordination and support, a Joint Advisory Group will be established within the District Conservation Committee (DCC). The Group will comprise representatives from WWF-P, local communities, relevant line departments, administration officials, and other NGOs working in the area.

The following sections set forth the responsibilities of each group.

CBO (Community Based Organizations)

It will be responsible for:

- Providing feedback and input on wetland management policies and decisions to Government agencies and other stakeholders
- Facilitating conflict resolution between different stakeholder groups over the use of Wetland resources
- Collaborating with government agencies and other stakeholders to develop and implement Livelihood programs that are compatible with wetland conservation objectives
- Monitoring wetland health and reporting any threats to government agencies for timely Intervention
- Carrying out all the activities of the management plan with initial facilitation by P&WC.

Joint Advisory Group

It will be responsible for:

- Identifying emerging issues and challenges related to wetland management and proposing Solutions
- Facilitating collaboration and coordination among different stakeholders involved in wetland management
- Providing training and capacity building support to government agencies and other stakeholders involved in wetland management
- Responsible for offering technical and legal assistance as needed by the department and the CBO during the implementation of the management plan, as well as conducting annual evaluations to assess progress towards meeting management targets.

Gilgit-Baltistan Parks and Wildlife Department

It will be responsible for:

- Demarcating wetland boundaries in collaboration with the Revenue department and in the presence of the CBO and P&WC.
- The department is responsible for monitoring and assessing the ecological health of wetlands in the region. This involves regular monitoring of water quality, vegetation, and wildlife to identify any changes or issues that may arise
- Identifying degraded pastures in conjunction with the CBO
- Facilitating the adoption of a rotational grazing approach (engaging in discussions with grazers, transferring rehabilitated pastures, etc.)
- Collaborating with the CBO in identifying forest sites in need of rehabilitation and supervising sowing of seeds in identified sites
- Assisting the CBO in surveys and monitoring of flora and fauna
- Jointly responsible for maintaining bird sanctuaries and monitoring bird response to management strategies
- Responsible for regulating activities within wetlands, such as hunting, fishing, and grazing, to ensure sustainable use and protection of wetland resources
- Collaboratively pinpointing deteriorated pastures with the Community-Based Organization (CBO)
- The department is responsible for raising awareness about the importance of wetlands and their conservation. This involves educating local communities, businesses, and other stakeholders about the ecological, economic, and social benefits of wetlands, as well as the threats and challenges they face.

NGOs

It will be responsible for:

- Strengthening CBO and line department capacities in management and technical skills
- Raising awareness among communities regarding wetland conservation
- Demarcating wetland boundaries
- Requesting the Joint Advisory Group to provide technical and legal assistance
- Contributing 90% to an endowment fund for supporting plan activities
- Assisting the CBO in securing funds for carrying out plan activities

Operational objectives of the plan

Operational Objective 1: Enhancing Biodiversity Conservation in the Wetland and its immediate Catchment.

Management Target 1.1: Enhance protection measures to safeguard the wetland ecosystem and its biodiversity from further degradation and loss.

Management Target 1.2: Implement sustainable resource management practices to mitigate the negative impacts on biodiversity within the wetland and its catchment area.

Management Target 1.3: Promote the adoption of alternative livelihood options and practices that reduce the consumption of wetland and surrounding natural resources, thus minimizing pressures on biodiversity.

Management Target 1.4: Identify and prioritize the protection and conservation of rare and endangered species within the wetland ecosystem, ensuring their long-term survival and well-being.

Management Target 1.5: Foster community engagement and participation in wetland conservation efforts, encouraging local stewardship and ownership of biodiversity conservation activities.

Operational Objective 2: Rehabilitating areas of reduced biodiversity in the wetland and its immediate catchment.

Management Target 2.1: Implement restoration initiatives to rehabilitate degraded pastures and forests within the immediate and upstream catchments of the wetland, enhancing biodiversity and ecosystem functionality.

Management Target 2.2: Enhance habitat connectivity by establishing ecological corridors and promoting reforestation efforts, facilitating the movement of species and improving biodiversity resilience in the wetland and its surrounding areas.

Management Target 2.3: Implement measures to control and manage invasive species that pose a threat to the biodiversity of the wetland and its catchment, reducing their negative impacts and restoring native species diversity.

Management Target 2.4: Promote sustainable land management practices, such as soil conservation and erosion control, in the wetland and its catchment area, minimizing further degradation and supporting the recovery of biodiversity.

Management Target 2.5: Engage local communities and stakeholders in habitat restoration activities through awareness programs, capacity building, and participatory approaches, fostering a sense of stewardship and community involvement in the rehabilitation of areas with reduced biodiversity.

Operational Objective 3: Strengthening stakeholder participation through mass awareness and capacity building.

Management Target 3.1: Enhance public awareness about the values and benefits of wetlands, fostering a sense of appreciation and understanding among the general public regarding their ecological importance and the need for their conservation.

Management Target 3.2: Build the management and technical capacity of concerned communities and line department staff through training programs, workshops, and knowledge-sharing initiatives, empowering them to actively participate in wetland management and decision-making processes.

Management Target 3.3: Facilitate the establishment of sustainable financing mechanisms and explore funding opportunities to enhance community finances for the implementation of the management plan, ensuring the availability of adequate resources to support ongoing wetland conservation efforts.

Management Target 3.4: Promote inclusive stakeholder engagement and participation in wetland management through the establishment of platforms for dialogue and collaboration, fostering a sense of ownership and shared responsibility among all relevant stakeholders.

Management Target 3.5: Develop and implement capacity-building programs focused on sustainable livelihood options that are aligned with wetland conservation goals, enabling local communities to generate income while minimizing negative impacts on the wetland ecosystem.

Operational Objective 4: Developing Sustainable Eco-tourism opportunities at the wetland site.

Management Target 4.1: Regulate and restrict harmful tourist activities within the wetland, while promoting and expanding eco-friendly tourism practices that minimize negative impacts on the environment and biodiversity.

Management Target 4.2: Ensure that the economic benefits generated from eco-tourism directly contribute to the socio-economic development of local communities, providing opportunities for income generation, employment, and improved livelihoods.

Management Target 4.3: Establish clear guidelines and codes of conduct for eco-tourism operators and visitors, promoting responsible and sustainable tourism practices that prioritize the conservation of the wetland ecosystem and its biodiversity.

Management Target 4.4: Develop and maintain appropriate infrastructure and facilities, such as visitor centers, trails, and interpretation materials, to support eco-tourism activities, ensuring a positive and educational experience for tourists while minimizing ecological disturbances.

Management Target 4.5: Foster collaboration and partnerships among stakeholders, including local communities, tour operators, and government agencies, to collectively promote and support the growth of sustainable eco-tourism, creating a supportive environment for responsible tourism practices and maximizing the benefits for both conservation and local communities.

Management Scenarios

Operational Objective 1: Enhancing Biodiversity Conservation in the Wetland and its immediate Catchment.

Management Target 1.1: Enhance protection measures to safeguard the wetland ecosystem and its biodiversity from further degradation and loss.

Activity 1: Wetland Boundary Demarcation and Information Sign Installation

The boundaries of the lakes and their immediate catchments will be demarcated with the coordination of concerned communities and line departments. The following actions will be required to achieve this:

Collaboration and Planning: Coordinate with the concerned communities, line departments, and stakeholders to plan and execute the wetland boundary demarcation and sign installation activity. Determine suitable locations for the demarcation and placement of information signs, considering visitor access points, ecological sensitivity, and visibility.

Official Demarcation: Engage the Forest Department, Revenue Department, concerned communities, and WWF-P to conduct the official demarcation of the wetland's boundaries. Arrange a joint visit to the wetland site to physically mark and establish the boundary lines using appropriate demarcation materials, such as markers or posts.

Mapping and Documentation: Develop a detailed map that accurately represents the demarcated wetland boundaries, indicating key reference points and landmarks. Document the demarcation process, including photographs and written descriptions, to maintain a record of the boundary establishment.

Information Sign Design and Production: Design informative signs that highlight the importance of the wetland ecosystem, its biodiversity, and relevant regulations. Ensure the signage includes clear and concise messages to engage and educate visitors about the significance of wetland conservation. Collaborate with experts in graphic design and environmental education to create visually appealing and effective information signs.

Sign Installation: Select approximately 10 suitable sites within the wetland area for installing the information signs, considering high visitor traffic, access points, and areas of interest.Prepare the signboards, ensuring they are weather-resistant and durable. Install the information signs securely at designated locations, using appropriate methods such as mounting on posts or structures. Ensure the signs are visible, easily readable, and strategically placed to provide relevant information to visitors.

Monitoring and Maintenance: Regularly monitor the condition of the demarcation markers and information signs to ensure they remain intact and legible. Establish a maintenance schedule to periodically inspect and repair or replace any damaged or faded signs. Encourage feedback from visitors and stakeholders to assess the effectiveness of the signage in conveying key messages and improving awareness.

Evaluation: Evaluate the impact of the wetland boundary demarcation and information signs on visitor behavior, awareness, and compliance with wetland regulations. Use visitor feedback, observations, and data to assess the effectiveness of the activity in enhancing protection measures for the wetland

ecosystem. Modify and improve the demarcation and signage strategy as necessary based on the evaluation results.

Activity 2: Build essential infrastructure

To construct necessary infrastructure to support the effective management and conservation of the wetland ecosystem.

Infrastructure Needs Assessment: Conduct a comprehensive assessment to identify the essential infrastructure requirements for the wetland management plan. Evaluate existing infrastructure and determine gaps and deficiencies in meeting the needs of wetland management.

Design and Planning: Engage architects, engineers, and relevant experts to design infrastructure projects that align with the goals and objectives of the wetland management plan. Develop detailed plans and specifications for each infrastructure project, considering environmental sustainability, accessibility, and compatibility with the wetland ecosystem.

Priority Infrastructure Projects: Prioritize infrastructure projects based on their urgency, significance, and potential impact on wetland management. Examples of priority projects may include visitor centers, walking trails, boardwalks, observation decks, signage boards, waste management facilities, and restroom facilities.

Construction and Implementation: Procure necessary resources, materials, and equipment for the construction of identified infrastructure projects. Adhere to environmental and construction standards to minimize ecological impact during the construction process. Engage qualified contractors or involve local communities in the construction process, fostering community participation and empowerment.

Monitoring and Maintenance: Establish a regular monitoring and maintenance program for the newly constructed infrastructure. Conduct routine inspections to ensure structural integrity, safety, and compliance with relevant regulations. Implement preventive maintenance measures to address any signs of deterioration, damage, or wear. Allocate sufficient resources and personnel for ongoing maintenance and repairs, ensuring the longevity and functionality of the infrastructure.

Management Target 1.2: Implement sustainable resource management practices to mitigate the negative impacts on biodiversity within the wetland and its catchment area.

Activity 1: Wetland Restoration and Biodiversity Conservation Initiative

The Wetland Restoration and Biodiversity Conservation Initiative aims to implement sustainable resource management practices to mitigate the negative impacts on biodiversity within the wetland and its catchment area. Through this activity, we will actively engage in the restoration and conservation of the wetland ecosystem, promoting the sustainable use of resources while safeguarding biodiversity.

Wetland Assessment and Mapping: Conduct a comprehensive assessment of the wetland and its catchment area to identify key biodiversity hotspots, vulnerable species, and areas in need of restoration. Map the existing flora and fauna, including species distribution and habitat conditions.

Restoration Planning and Implementation: Develop a detailed restoration plan that incorporates sustainable resource management practices, considering the specific needs of the wetland ecosystem. Implement measures to restore degraded areas, such as reforestation, habitat creation, and water quality improvement. Engage local communities, environmental organizations, and relevant stakeholders in the restoration efforts, fostering a sense of ownership and responsibility towards the wetland ecosystem.

Sustainable Resource Management: Implement resource management practices that reduce the negative impacts on biodiversity, such as controlled harvesting, regulated fishing, and sustainable agriculture practices in the catchment area. Promote responsible tourism and recreational activities within the wetland, ensuring minimal disturbance to the ecosystem. Raise awareness among local communities and visitors about the importance of sustainable resource management for the long-term conservation of biodiversity.

Monitoring and Evaluation: Establish a monitoring and evaluation framework to assess the effectiveness of the restoration and resource management efforts. Regularly monitor key indicators, such as species populations, water quality, and habitat conditions. Use the collected data to evaluate the success of the initiative, identify potential challenges, and adapt the strategies as needed.

Capacity Building and Collaboration: Conduct training programs and workshops for local communities, stakeholders, and relevant authorities, focusing on sustainable resource management practices and biodiversity conservation. Foster collaboration with research institutions, NGOs, and governmental bodies to leverage their expertise and resources in achieving the goals of the initiative.

Management Target 1.3: Promote the adoption of alternative livelihood options and practices that reduce the consumption of wetland and surrounding natural resources, thus minimizing pressures on biodiversity.

Activity 1: Sustainable Livelihood Promotion for Biodiversity Conservation

The Sustainable Livelihood Promotion for Biodiversity Conservation initiative aims to promote the adoption of alternative livelihood options and practices that reduce the consumption of wetland and surrounding natural resources, thereby minimizing pressures on biodiversity. This activity focuses on empowering local communities with sustainable income-generating opportunities while raising awareness about the importance of biodiversity conservation.

Socioeconomic Assessment and Community Engagement: Conduct a comprehensive socioeconomic assessment to understand the existing livelihood patterns, resource dependencies, and challenges faced by the local communities. Engage with community members, local leaders, and relevant stakeholders to gather insights and ensure their active participation in the initiative.

Identification and Development of Alternative Livelihood Options: Identify and assess potential alternative livelihood options that are compatible with biodiversity conservation and sustainable resource use. Work closely with community members to develop and enhance their skills, knowledge, and capacity in these alternative livelihood options. Explore opportunities in eco-tourism, sustainable agriculture, agroforestry, handicrafts, or other environmentally friendly enterprises that align with the local context and community interests.

Training and Capacity Building: Organize training programs and workshops to provide technical skills, knowledge, and best practices related to the identified alternative livelihood options. Foster entrepreneurship development and business management skills among community members to support the establishment and growth of sustainable livelihood ventures. Collaborate with relevant institutions, organizations, and experts to deliver specialized training modules and mentoring support.

Access to Financial Resources and Market Linkages: Facilitate access to microfinance, grants, or other financial resources to enable community members to start or expand their sustainable livelihood initiatives. Establish partnerships with financial institutions, NGOs, or government agencies to create favorable lending and financial support mechanisms for the promotion of sustainable livelihoods. Forge linkages with markets and value chains, connecting the community-produced goods and services to local, regional, or international markets to ensure sustained income generation.

Monitoring, Evaluation, and Knowledge Sharing: Establish a monitoring and evaluation framework to track the progress and impacts of the alternative livelihood initiatives on reducing resource consumption and biodiversity pressures. Collect data on economic indicators, resource use patterns, and ecological outcomes to assess the effectiveness of the interventions.

Regularly share lessons learned, success stories, and best practices within the community, neighboring regions, and relevant stakeholders to inspire replication and scaling of sustainable livelihood practices.

Management Target 1.4: Identify and prioritize the protection and conservation of rare and endangered species within the wetland ecosystem, ensuring their long-term survival and well-being.

Activity: Rare and Endangered Species Conservation Program

The Rare and Endangered Species Conservation Program aims to identify and prioritize the protection and conservation of rare and endangered species within the wetland ecosystem. This activity focuses on implementing targeted measures to ensure the long-term survival and well-being of these species, mitigating threats, and promoting their habitat conservation.

Species Inventory and Assessment: Conduct a comprehensive inventory and assessment of rare and endangered species present within the wetland ecosystem. Gather data on population size, distribution, habitat requirements, threats, and conservation status of each species. Prioritize species based on their level of endangerment and ecological importance.

Habitat Restoration and Protection: Identify critical habitats and implement measures to restore, enhance, and protect them. Restore degraded habitats to meet the specific needs of the rare and endangered species. Establish protected areas, buffer zones, or wildlife corridors to safeguard their habitats from human encroachment and disturbance.

Threat Mitigation: Identify and address key threats to the rare and endangered species within the wetland ecosystem. Implement measures to reduce habitat loss, fragmentation, pollution, invasive species, poaching, and illegal wildlife trade. Collaborate with local communities, enforcement agencies, and relevant stakeholders to enhance surveillance and enforcement efforts.

Research and Monitoring: Conduct scientific research to improve understanding of the biology, ecology, and behavior of the rare and endangered species. Monitor population dynamics, health, and genetic

diversity of targeted species to assess their long-term viability. Utilize advanced technologies like remote sensing, tracking devices, and genetic analysis to gather accurate data for informed decision-making.

Community Engagement and Education: Engage local communities in conservation efforts by raising awareness about the importance of rare and endangered species and their ecological roles. Develop educational programs, workshops, and awareness campaigns to promote responsible behavior and sustainable practices. Involve local communities in citizen science initiatives, encouraging them to contribute to data collection, monitoring, and conservation activities.

Collaboration and Partnerships: Establish collaborations with research institutions, conservation organizations, government agencies, and local communities to pool resources and expertise. Foster partnerships for funding, technical support, and capacity building to implement conservation actions effectively. Engage in regional and international networks to share knowledge, best practices, and lessons learned in rare and endangered species conservation.

Management Target 1.5: Foster community engagement and participation in wetland conservation efforts, encouraging local stewardship and ownership of biodiversity conservation activities.

Activity: Community-based Wetland Conservation and Stewardship Program

The Community-based Wetland Conservation and Stewardship Program aims to foster community engagement and participation in wetland conservation efforts, encouraging local stewardship and ownership of biodiversity conservation activities. This activity focuses on empowering local communities, promoting their active involvement, and nurturing a sense of responsibility towards the sustainable management of the wetland ecosystem.

Community Awareness and Education: Conduct awareness campaigns and educational programs to highlight the ecological importance of the wetland ecosystem and the significance of biodiversity conservation. Organize workshops, training sessions, and interactive sessions to provide information about wetland conservation practices, ecological processes, and the benefits of preserving biodiversity. Collaborate with local schools, community centers, and cultural institutions to integrate wetland conservation education into formal and informal learning settings.

Participatory Decision-making: Establish platforms for community participation in decision-making processes related to wetland conservation. Organize community meetings, focus groups, and participatory workshops to gather local knowledge, perspectives, and preferences for conservation actions. Involve community members in the development of wetland management plans, policies, and guidelines to ensure their inclusion and ownership.

Community-led Conservation Projects: Facilitate the formation of community-based conservation groups or committees dedicated to wetland conservation. Support these groups in planning and implementing local conservation projects, such as habitat restoration, clean-up campaigns, and invasive species removal. Provide technical assistance, training, and resources to empower community members to actively participate in conservation activities.

Traditional Ecological Knowledge Integration: Recognize and value traditional ecological knowledge held by local communities regarding the wetland ecosystem and its biodiversity. Promote the integration of traditional ecological knowledge with scientific research and conservation practices to enhance

understanding and inform decision-making. Organize knowledge-sharing sessions, where community members can share their insights, stories, and experiences related to the wetland ecosystem.

Sustainable Livelihood Opportunities: Identify and promote sustainable livelihood options that are compatible with wetland conservation goals. Support the development of community-based enterprises, eco-tourism initiatives, and sustainable resource utilization practices that provide economic incentives for wetland conservation. Collaborate with local business networks, tourism associations, and relevant stakeholders to create market linkages and enhance income-generating opportunities for community members.

Recognition and Celebration: Recognize and celebrate the achievements of community members and groups engaged in wetland conservation efforts. Organize events, festivals, and award ceremonies to acknowledge the contributions and commitment of local stewards and their positive impact on biodiversity conservation. Encourage storytelling, art, and cultural activities that reflect the community's connection to the wetland ecosystem and promote a sense of pride and ownership.

Operational Objective 2: Rehabilitating areas of reduced biodiversity in the wetland and its immediate catchment.

Management Target 2.1: Implement restoration initiatives to rehabilitate degraded pastures and forests within the immediate and upstream catchments of the wetland, enhancing biodiversity and ecosystem functionality.

Activity: Ecological Restoration and Biodiversity Enhancement in Wetland Catchments

The Ecological Restoration and Biodiversity Enhancement in Wetland Catchments initiative aims to implement restoration initiatives to rehabilitate degraded pastures and forests within the immediate and upstream catchments of the wetland. This activity focuses on enhancing biodiversity and ecosystem functionality by restoring degraded habitats and promoting the recovery of native vegetation and wildlife populations.

Catchment Assessment and Prioritization: Conduct a comprehensive assessment of the immediate and upstream catchments to identify areas of reduced biodiversity, degraded pastures, and forests in need of restoration. Prioritize restoration sites based on ecological value, connectivity to the wetland, and potential for biodiversity enhancement.

Restoration Planning and Stakeholder Engagement: Develop a detailed restoration plan that outlines specific restoration techniques, timeline, and desired outcomes. Engage with local communities, landowners, and relevant stakeholders to gain their support, input, and active participation in the restoration efforts. Foster collaboration with government agencies, environmental organizations, and research institutions to leverage resources, expertise, and knowledge.

Habitat Restoration and Reforestation: Implement habitat restoration measures, such as reforestation, native species planting, and habitat creation, to restore degraded pastures and forests. Prioritize the use of locally sourced native plant species that are well-suited to the ecosystem and contribute to biodiversity enhancement.

Employ sustainable land management practices, including erosion control measures, water management techniques, and soil conservation methods.

Invasive Species Control: Develop and implement strategies to control and eradicate invasive plant species that threaten the restoration efforts and native biodiversity. Conduct regular monitoring and management of invasive species populations, employing appropriate control methods such as manual removal, biological control, or targeted herbicide application.

Wildlife Habitat Enhancement: Implement measures to enhance wildlife habitat within the restored areas, such as the creation of nesting sites, wildlife corridors, and the installation of artificial shelters. Promote the recovery of native wildlife populations through habitat restoration, ensuring the provision of food sources, water, and suitable breeding environments.

Monitoring and Evaluation: Establish a monitoring and evaluation framework to assess the progress and effectiveness of the restoration initiatives. Monitor key indicators, including vegetation cover, species diversity, population abundance, and ecosystem functionality. Regularly assess the success of the restoration efforts and adapt strategies as necessary based on the collected data and feedback from stakeholders.

Community Education and Outreach: Conduct awareness campaigns and educational programs to engage local communities and stakeholders in the restoration initiatives. Provide information about the importance of wetland catchment restoration for biodiversity conservation, ecosystem services, and climate resilience. Organize workshops, field visits, and capacity-building activities to empower community members with knowledge and skills in ecological restoration and sustainable land management practices.

Management Target 2.2: Enhance habitat connectivity by establishing ecological corridors and promoting reforestation efforts, facilitating the movement of species and improving biodiversity resilience in the wetland and its surrounding areas.

Activity: Ecological Corridor Establishment and Reforestation for Habitat Connectivity

The Ecological Corridor Establishment and Reforestation for Habitat Connectivity initiative aims to enhance habitat connectivity by establishing ecological corridors and promoting reforestation efforts. This activity focuses on facilitating the movement of species and improving biodiversity resilience in the wetland and its surrounding areas through the creation of interconnected habitats.

Corridor Mapping and Planning: Conduct a thorough assessment of the landscape to identify key areas for establishing ecological corridors. Map existing habitats, potential corridor routes, and areas requiring reforestation to ensure connectivity between fragmented ecosystems. Develop a corridor planning strategy, considering ecological factors, land ownership, and stakeholder engagement.

Stakeholder Engagement and Collaboration: Engage with local communities, landowners, and relevant stakeholders to gain their support and participation in the establishment of ecological corridors. Foster collaboration with government agencies, conservation organizations, and research institutions to leverage resources, expertise, and knowledge. Facilitate partnerships with private landowners to secure land access and ensure long-term corridor viability.

Reforestation and Habitat Creation: Implement reforestation efforts within identified corridor areas, focusing on the planting of native tree species that provide suitable habitats and food sources for local wildlife. Employ diverse reforestation techniques, including direct seeding, tree planting, and assisted

natural regeneration, based on the specific site conditions and desired ecological outcomes. Establish diverse forest structures and consider the inclusion of native understory vegetation, water sources, and nesting sites to enhance habitat quality.

Restoration of Riparian Zones: Prioritize the restoration of riparian zones along water bodies within the corridor areas. Implement measures to control erosion, restore natural water flow patterns, and establish native vegetation along stream banks and wetland edges. Promote the natural filtration of water, reducing sedimentation and nutrient runoff into the wetland ecosystem.

Connectivity Enhancement Measures: Implement additional measures to enhance connectivity within the ecological corridors, such as the installation of wildlife-friendly fencing, wildlife crossings, and steppingstone habitats. Create buffer zones along corridor edges to minimize potential impacts from human activities and promote species movement.

Monitoring and Adaptive Management: Establish a monitoring program to assess the effectiveness of the ecological corridors in promoting habitat connectivity and species movement. Monitor vegetation growth, wildlife presence, and population dynamics to evaluate the success of the reforestation and corridor establishment efforts. Continuously adapt management strategies based on the collected data, incorporating feedback from stakeholders and scientific research.

Community Education and Awareness: Conduct community outreach programs and educational campaigns to raise awareness about the importance of ecological corridors and reforestation for biodiversity conservation. Provide information on the role of corridors in facilitating species movement, enhancing genetic diversity, and improving ecosystem resilience. Engage local communities in planting activities, volunteering opportunities, and citizen science initiatives to foster a sense of ownership and stewardship

Management Target 2.3: Implement measures to control and manage invasive species that pose a threat to the biodiversity of the wetland and its catchment, reducing their negative impacts and restoring native species diversity.

Activity: Invasive Species Control and Native Species Restoration Program

The Invasive Species Control and Native Species Restoration Program aims to implement measures to control and manage invasive species that pose a threat to the biodiversity of the wetland and its catchment. This activity focuses on reducing the negative impacts of invasive species and restoring native species diversity through targeted control efforts and restoration initiatives.

Invasive Species Assessment and Monitoring: Conduct a comprehensive assessment to identify and prioritize invasive species that pose a significant threat to the biodiversity of the wetland and its catchment. Monitor and track the distribution, spread, and impacts of invasive species within the ecosystem. Collect data on the ecological characteristics, reproductive strategies, and the extent of their negative impacts on native species.

Development of Invasive Species Management Plan: Develop a management plan that outlines strategies, techniques, and priorities for controlling invasive species. Consider the use of integrated pest management approaches, including biological control, mechanical removal, chemical treatments (if necessary and environmentally safe), and prevention measures. Customize the management plan based on the specific invasive species present and their impact on the wetland ecosystem.

Control and Eradication of Invasive Species: Implement control measures targeting the identified invasive species, focusing on areas where they are most prevalent or have the greatest impact. Use appropriate control methods such as manual removal, trapping, targeted herbicide application, or the introduction of natural enemies for biological control. Conduct regular monitoring and follow-up actions to ensure the effectiveness of control efforts and prevent re-infestation.

Restoration and Enhancement of Native Species: Identify native species that have been negatively impacted by invasive species and prioritize their restoration. Develop a native species restoration plan, focusing on the propagation, planting, and management of native vegetation to enhance biodiversity and ecosystem functionality. Establish nurseries or seed banks for the production and distribution of native plant species for restoration purposes.

Ecological Rehabilitation and Habitat Restoration: Restore habitats affected by invasive species through ecological rehabilitation measures, such as the removal of invasive vegetation and the replanting of native species. Implement habitat restoration techniques that create favorable conditions for the recovery of native flora and fauna, including the establishment of diverse vegetation structures, the creation of suitable nesting sites, and the restoration of water bodies.

Community Involvement and Awareness: Engage local communities, landowners, and stakeholders in invasive species control and restoration efforts. Conduct awareness campaigns and educational programs to educate communities about the impacts of invasive species on biodiversity and the importance of native species conservation. Encourage community participation in invasive species removal activities, restoration projects, and citizen science initiatives.

Long-term Monitoring and Adaptive Management: Establish long-term monitoring programs to assess the success of invasive species control and native species restoration efforts. Continuously monitor the abundance and distribution of invasive species and native species diversity to track changes over time. Use monitoring data to inform adaptive management strategies, making necessary adjustments to control measures and restoration activities based on outcomes and new scientific insights.

Management Target 2.4: Promote sustainable land management practices, such as soil conservation and erosion control, in the wetland and its catchment area, minimizing further degradation and supporting the recovery of biodiversity.

Activity: Sustainable Land Management for Biodiversity Conservation

The Sustainable Land Management for Biodiversity Conservation initiative aims to promote sustainable land management practices, such as soil conservation and erosion control, in the wetland and its catchment area. This activity focuses on minimizing further degradation and supporting the recovery of biodiversity by implementing measures that improve soil health, reduce erosion, and enhance ecosystem resilience.

Soil Health Assessment and Monitoring: Conduct a comprehensive assessment of soil health within the wetland and its catchment, considering factors such as soil erosion rates, nutrient levels, organic matter content, and soil compaction. Implement regular soil monitoring programs to track changes in soil health indicators over time and identify areas that require targeted interventions.

Sustainable Agriculture and Agroforestry Practices: Promote the adoption of sustainable agricultural practices that reduce soil erosion and improve soil health, such as conservation tillage, contour farming, and agroforestry systems. Provide training and technical support to farmers and landowners on sustainable land management techniques, including proper crop rotation, cover cropping, and the use of organic fertilizers. Encourage the implementation of agroforestry practices, which integrate trees or shrubs into agricultural systems, to improve soil stability, provide shade, and enhance biodiversity.

Erosion Control Measures: Implement erosion control measures to minimize soil erosion and sedimentation in the wetland and its catchment. Establish vegetative buffers, such as grass strips or windbreaks, along water bodies and vulnerable areas to trap sediment and stabilize soil. Install erosion control structures, such as terraces, check dams, or sediment retention ponds, in areas prone to erosion to slow down water flow and prevent sediment runoff.

Riparian Zone Restoration: Restore and enhance riparian zones along water bodies in the catchment area, as these areas play a crucial role in stabilizing soils, filtering water, and providing habitat for wildlife. Implement measures to control grazing, manage invasive species, and promote the planting of native vegetation along stream banks to reduce erosion and enhance riparian ecosystem functions.

Education and Capacity Building: Conduct training workshops, field demonstrations, and awareness campaigns to educate farmers, landowners, and local communities about sustainable land management practices and their importance for biodiversity conservation. Collaborate with agricultural extension services, community organizations, and educational institutions to deliver outreach programs and provide ongoing support and resources. Foster knowledge exchange platforms where stakeholders can share experiences, best practices, and success stories related to sustainable land management.

Policy Support and Incentives: Advocate for supportive policies and regulations that promote sustainable land management practices and provide incentives for their adoption. Collaborate with government agencies, policymakers, and relevant stakeholders to integrate sustainable land management principles into land use planning and agricultural policies. Explore options for financial incentives, grants, or certification programs that reward landowners and farmers practicing sustainable land management.

Monitoring and Evaluation: Establish a monitoring and evaluation framework to assess the effectiveness of sustainable land management practices in reducing soil degradation and supporting biodiversity recovery. Monitor key indicators, such as soil erosion rates, soil health parameters, and biodiversity metrics, to track improvements and identify areas for further intervention. Regularly assess the social, economic, and environmental impacts of sustainable land management practices on local communities and stakeholders.

Management Target 2.5: Engage local communities and stakeholders in habitat restoration activities through awareness programs, capacity building, and participatory approaches, fostering a sense of stewardship and community involvement in the rehabilitation of areas with reduced biodiversity.

Activity: Community Engagement for Habitat Restoration and Stewardship

The Community Engagement for Habitat Restoration and Stewardship program aims to engage local communities and stakeholders in habitat restoration activities through awareness programs, capacity building, and participatory approaches. This activity focuses on fostering a sense of stewardship and community involvement in the rehabilitation of areas with reduced biodiversity within the wetland and its catchment.

Community Awareness and Outreach: Conduct awareness programs and community outreach activities to educate local communities about the importance of habitat restoration and the role it plays in preserving biodiversity. Organize workshops, seminars, and public events to raise awareness about the ecological value of the wetland and the benefits of habitat restoration. Use various communication channels, including social media, local newspapers, and community radio, to disseminate information and engage a wider audience.

Capacity Building and Training: Provide training sessions and capacity-building workshops to equip community members with the necessary knowledge and skills for habitat restoration activities. Offer training on native plant propagation, nursery management, seed collection, and site preparation techniques. Train community members in monitoring and data collection methods to assess the success of habitat restoration efforts.

Participatory Restoration Planning: Foster community participation in the planning and decision-making processes of habitat restoration activities. Organize community meetings and focus groups to gather input, ideas, and local knowledge for the design and implementation of restoration projects. Collaborate with community members to develop restoration plans that align with their aspirations, cultural values, and needs.

On-ground Restoration Activities: Engage community members in hands-on habitat restoration activities, such as planting native vegetation, removing invasive species, and creating wildlife-friendly habitats. Organize community-led workdays or volunteer events where individuals can actively participate in the restoration process. Provide necessary tools, equipment, and resources to support community-led restoration efforts.

Demonstration Sites and Learning Centers: Establish demonstration sites or learning centers within the wetland and its catchment area to showcase successful habitat restoration projects. Create accessible areas where community members can observe and learn about different restoration techniques, native plant species, and their benefits for biodiversity. Develop interpretive signage and educational materials to provide information and engage visitors in learning about the restoration efforts.

Community monitoring and Evaluation: Encourage community members to actively participate in monitoring and evaluation activities to assess the progress and success of habitat restoration projects. Develop simple monitoring protocols and engage community members in data collection, including observations of plant growth, wildlife presence, and ecosystem changes. Organize regular community meetings to review monitoring data, discuss project outcomes, and make informed decisions for adaptive management.

Recognition and Celebration: Recognize and celebrate the contributions of community members and stakeholders involved in habitat restoration activities. Organize appreciation events, volunteer recognition ceremonies, or annual gatherings to acknowledge the dedication and efforts of community

participants. Share success stories and achievements through local media, social media platforms, and community newsletters to inspire others and sustain community engagement.

Operational Objective 3: Strengthening stakeholder participation through mass awareness and capacity building.

Management Target 3.1: Enhance public awareness about the values and benefits of wetlands, fostering a sense of appreciation and understanding among the general public regarding their ecological importance and the need for their conservation.

Activity: Wetland Awareness Campaign: Discover, Appreciate, and Conserve

The Wetland Awareness Campaign aims to enhance public awareness about the values and benefits of wetlands, fostering a sense of appreciation and understanding among the general public regarding their ecological importance and the need for their conservation. This activity focuses on designing and implementing a comprehensive awareness campaign that engages and educates the public about wetland ecosystems.

Campaign Planning and Strategy Development: Form a campaign planning committee comprising representatives from relevant organizations, government agencies, NGOs, and community stakeholders. Conduct a thorough assessment of target audiences, their knowledge levels, attitudes, and perceptions towards wetlands. Develop a campaign strategy that outlines objectives, target audiences, key messages, communication channels, and evaluation methods.

Educational Materials Development: Create educational materials such as brochures, posters, infographics, and fact sheets that highlight the values and benefits of wetlands. Ensure that the materials are visually appealing, easy to understand, and tailored to different audience segments, including children, adults, and specific interest groups. Collaborate with local artists, photographers, and graphic designers to create captivating visuals that showcase the beauty and biodiversity of wetland ecosystems.

Multi-channel Communication: Utilize various communication channels to disseminate wetland-related information and messages. Develop a campaign website or dedicated web page that serves as a central hub for information, resources, and interactive features. Leverage social media platforms to share engaging content, success stories, educational videos, and promote public participation in conservation activities. Collaborate with local media outlets to publish articles, press releases, and interviews to reach a broader audience.

Public Events and Activities: Organize public events and activities that allow individuals to discover, experience, and appreciate wetlands firsthand. Conduct guided tours, nature walks, and birdwatching sessions in wetland areas, led by knowledgeable experts or local naturalists. Host workshops, seminars, and public lectures featuring wetland experts, scientists, and conservation practitioners to provide in-depth information and inspire public interest.

Schools and Community Engagement: Develop educational programs and resources targeting schools and community groups to raise awareness about wetland conservation. Collaborate with teachers and educators to integrate wetland-focused curriculum and activities into school programs. Organize interactive workshops, field trips, and nature-based learning experiences for students to engage them directly with wetland environments and foster a sense of stewardship.

Collaboration with Local Stakeholders: Engage and collaborate with local community groups, NGOs, businesses, and other stakeholders to amplify the campaign's reach and impact. Establish partnerships with local environmental organizations, nature clubs, and community associations to leverage their networks and resources. Encourage local businesses and tourism operators to support the campaign by promoting responsible and sustainable practices in wetland areas.

Monitoring and Evaluation: Regularly assess the effectiveness and impact of the awareness campaign through surveys, interviews, and feedback mechanisms. Monitor website and social media analytics to gauge audience engagement and reach. Conduct post-campaign evaluations to measure changes in public knowledge, attitudes, and behaviors towards wetlands.

Management Target 3.2: Build the management and technical capacity of concerned communities and line department staff through training programs, workshops, and knowledge-sharing initiatives, empowering them to actively participate in wetland management and decision-making processes.

Activity: Capacity Building for Wetland Management and Decision-Making

The Capacity Building for Wetland Management and Decision-Making program aims to build the management and technical capacity of concerned communities and line department staff through training programs, workshops, and knowledge-sharing initiatives. This activity focuses on empowering stakeholders to actively participate in wetland management and decision-making processes, ensuring their effective engagement and contribution.

Training Needs Assessment: Conduct a comprehensive assessment of the training needs and gaps of concerned communities and line department staff regarding wetland management and decision-making. Identify key areas requiring capacity building, such as wetland ecology, conservation strategies, policy and governance, data collection and analysis, and stakeholder engagement.

Training Program Development: Develop a comprehensive training program that addresses the identified capacity building needs. Collaborate with experts, academic institutions, and relevant organizations to design training modules and materials tailored to the target audience. Include both theoretical and practical components, allowing participants to apply their knowledge and skills in real-world wetland management scenarios.

Workshops and Training Sessions: Organize workshops, seminars, and training sessions to deliver the capacity building program to concerned communities and line department staff. Facilitate interactive sessions that encourage active participation, discussion, and knowledge-sharing among participants. Provide hands-on training opportunities, field visits, and case studies to enhance practical understanding and application of wetland management concepts.

Knowledge-Sharing Initiatives: Establish knowledge-sharing platforms, such as online forums, webinars, and discussion groups, to facilitate continuous learning and exchange of experiences among stakeholders. Encourage participants to share success stories, challenges, and lessons learned from their wetland management efforts. Foster mentorship programs where experienced professionals can guide and support emerging leaders in wetland management.

Demonstration Sites and Practical Exercises: Identify and establish demonstration sites within the wetland area to serve as practical learning platforms. Conduct field exercises and practical training sessions at these sites, allowing participants to apply their knowledge and skills in actual wetland management scenarios. Demonstrate best practices in wetland monitoring, habitat restoration, water quality assessment, and stakeholder engagement through hands-on activities.

Networking and Collaboration: Facilitate networking and collaboration opportunities among participants, enabling them to connect with other stakeholders and share experiences. Foster partnerships between concerned communities, line department staff, and relevant organizations to enhance collective efforts in wetland management. Encourage the formation of local wetland management committees or working groups that promote ongoing collaboration and cooperation.

Monitoring and Evaluation: Regularly assess the effectiveness and impact of the capacity building activities through participant feedback, pre- and post-training assessments, and follow-up evaluations. Use evaluation results to refine and improve future training programs and initiatives. Monitor the application of acquired knowledge and skills in wetland management practices and decision-making processes.

Management Target 3.3: Facilitate the establishment of sustainable financing mechanisms and explore funding opportunities to enhance community finances for the implementation of the management plan, ensuring the availability of adequate resources to support ongoing wetland conservation efforts.

Activity: Sustainable Financing for Wetland Conservation

The Sustainable Financing for Wetland Conservation activity aims to facilitate the establishment of sustainable financing mechanisms and explore funding opportunities to enhance community finances for the implementation of the wetland management plan. This activity focuses on identifying and mobilizing adequate resources to support ongoing wetland conservation efforts and ensure the long-term sustainability of the management plan.

Financial Needs Assessment: Conduct a comprehensive assessment of the financial needs for implementing the wetland management plan. Identify the key activities, projects, and initiatives requiring financial support. Estimate the costs associated with wetland conservation, restoration, monitoring, and community engagement efforts.

Stakeholder Engagement and Partnerships: Engage relevant stakeholders, including local communities, government agencies, NGOs, private sector entities, and donors, to discuss and explore potential financing mechanisms and funding opportunities. Establish partnerships and collaborations with organizations or institutions specializing in sustainable financing and conservation funding.

Sustainable Financing Mechanisms: Identify and develop sustainable financing mechanisms suitable for the local context and wetland conservation objectives. Explore options such as public-private

partnerships, conservation trust funds, eco-tourism revenue sharing, environmental impact funds, and payments for ecosystem services. Conduct feasibility studies to assess the viability and potential impacts of each financing mechanism.

Community Capacity Building on Financial Management: Provide training and capacity building workshops to local communities and relevant stakeholders on financial management, budgeting, and reporting. Equip community members with the necessary skills to manage and track financial resources allocated for wetland conservation. Foster transparency and accountability in financial management processes.

Fundraising and Resource Mobilization: Organize fundraising campaigns and events to generate financial support for wetland conservation efforts. Engage local businesses, community organizations, and individuals in fundraising initiatives, highlighting the benefits and value of wetland conservation for the local community. Explore crowdfunding platforms and online fundraising tools to reach a wider audience and attract donations.

Monitoring and Evaluation: Establish monitoring and evaluation mechanisms to track the effectiveness and impact of the sustainable financing mechanisms. Regularly review financial records, project budgets, and expense reports to ensure proper utilization of funds. Assess the outcomes and achievements of the wetland conservation efforts supported by the sustainable financing mechanisms.

Management Target 3.4: Promote inclusive stakeholder engagement and participation in wetland management through the establishment of platforms for dialogue and collaboration, fostering a sense of ownership and shared responsibility among all relevant stakeholders.

Activity: Stakeholder Engagement Workshop for Wetland Management

- Identify key stakeholders involved in wetland management, including government agencies, local communities, NGOs, academic institutions, and businesses.
- Conduct a stakeholder analysis to understand their interests, concerns, and potential contributions to wetland management.
- Determine the scope and objectives of the stakeholder engagement workshop, considering the operational objective of promoting inclusive stakeholder engagement and participation.

- Develop an agenda for the workshop that includes interactive sessions, group discussions, and knowledge sharing opportunities.
- Identify facilitators and experts who can provide insights and guidance during the workshop.
- Prepare relevant materials, such as presentations, case studies, and reference documents, to facilitate discussions and learning.
- Conduct the stakeholder engagement workshop in a suitable venue, preferably near the wetland area or a location accessible to all stakeholders.
- Begin the workshop with an introduction to the purpose and objectives, emphasizing the importance of inclusive stakeholder engagement and shared responsibility.
- Facilitate interactive sessions to encourage dialogue and collaboration among stakeholders. These sessions may include: Presentations by experts on wetland conservation, ecosystem services, and sustainable management practices.

- Group discussions on specific challenges and opportunities related to wetland management, allowing stakeholders to share their perspectives and insights.
- Workshops or breakout sessions focused on developing action plans or collaborative projects that address key issues identified during discussions.
- Provide opportunities for networking and informal interactions among stakeholders to build relationships and foster a sense of ownership.
- Document the outcomes of the workshop, including key discussions, action plans, and commitments made by stakeholders.
- Share the workshop's findings and recommendations with all participants and stakeholders who couldn't attend.
- Establish a mechanism for regular follow-up and progress tracking on the action plans and collaborative projects developed during the workshop.
- Evaluate the effectiveness of the stakeholder engagement workshop in promoting inclusive participation and shared responsibility, and identify areas for improvement for future initiatives.

Management Target 3.5: Develop and implement capacity-building programs focused on sustainable livelihood options that are aligned with wetland conservation goals, enabling local communities to generate income while minimizing negative impacts on the wetland ecosystem.

Activity: Sustainable Livelihood Training Program for Wetland Communities

To develop and implement capacity-building programs focused on sustainable livelihood options that are aligned with wetland conservation goals, enabling local communities to generate income while minimizing negative impacts on the wetland ecosystem.

Needs Assessment and Planning:

a. Conduct a needs assessment to identify the existing skills, resources, and economic opportunities within the local wetland communities.

b. Engage with community members, local leaders, and relevant stakeholders to understand their aspirations, challenges, and expectations regarding sustainable livelihood options.

c. Analyze the potential impact of different livelihood activities on the wetland ecosystem and identify sustainable alternatives that can be promoted.

Program Development:

a. Based on the needs assessment, design a comprehensive capacity-building program that encompasses training, skill development, and support for sustainable livelihood options.

b. Identify specific livelihood options that are compatible with wetland conservation goals, such as eco-tourism, sustainable agriculture, handicrafts, or fish farming.

c. Collaborate with local experts, NGOs, and relevant agencies to develop training modules, materials, and resources for the program.

Training and Skill Development:

a. Conduct training sessions and workshops for community members, focusing on the chosen sustainable livelihood options.

b. Provide technical guidance and hands-on training on best practices, techniques, and innovative approaches for sustainable livelihood activities.

c. Offer support in areas such as business planning, marketing, financial management, and access to microfinance or funding opportunities.

d. Incorporate environmental education and awareness sessions to emphasize the importance of wetland conservation and the role of sustainable livelihoods.

Pilot Implementation and Monitoring:

a. Select a pilot group of community members to implement the newly acquired skills and engage in sustainable livelihood activities.

b. Monitor and evaluate the progress of the pilot program, assessing the economic, social, and environmental impacts of the chosen livelihood options.

c. Gather feedback from participants and stakeholders to identify challenges and opportunities for improvement.

Scaling Up and Replication:

a. Based on the lessons learned from the pilot program, refine and expand the capacity-building program to reach a wider audience within the local communities.

b. Collaborate with local authorities, NGOs, and other relevant stakeholders to replicate the program in other wetland communities.

c. Develop partnerships with market actors, tourism agencies, or other potential buyers to create sustainable market linkages for the products or services generated by the communities.

Continuous Support and Evaluation:

a. Establish mechanisms for ongoing support, mentorship, and knowledge exchange to ensure the long-term success of the sustainable livelihood initiatives.

b. Regularly evaluate the effectiveness and sustainability of the capacity-building program, incorporating feedback from participants, community members, and other stakeholders.

c. Adapt and improve the program based on the evaluation results and changing needs or opportunities within the wetland communities.

Operational Objective 4: Developing Sustainable Eco-tourism opportunities at the wetland site.

Management Target 4.1: Regulate and restrict harmful tourist activities within the wetland, while promoting and expanding eco-friendly tourism practices that minimize negative impacts on the environment and biodiversity.

Activity: Eco-friendly Tourism Promotion and Regulation at the Wetland Site

To regulate and restrict harmful tourist activities within the wetland, while promoting and expanding eco-friendly tourism practices that minimize negative impacts on the environment and biodiversity.

Environmental Assessment and Planning:

a. Conduct an environmental assessment of the wetland site to identify its ecological sensitivities, key habitats, and vulnerable species.

b. Engage with experts, conservation organizations, and local communities to understand the potential impacts of tourism activities on the wetland ecosystem.

c. Develop a comprehensive management plan that outlines regulations, guidelines, and strategies for promoting sustainable and eco-friendly tourism practices.

Stakeholder Engagement and Collaboration:

a. Identify and involve relevant stakeholders, such as local communities, tourism operators, government agencies, and environmental organizations.

b. Organize stakeholder meetings, workshops, and consultations to foster dialogue, share knowledge, and gather inputs for developing sustainable tourism practices.

c. Encourage collaboration between stakeholders to establish partnerships, create sustainable tourism networks, and promote responsible tourism initiatives.

Regulatory Framework Development:

a. Develop and implement regulations and guidelines that restrict harmful tourist activities within the wetland site.

b. Define permissible visitor capacities, designated visitor routes, and time restrictions to minimize disturbance to sensitive habitats and wildlife.

c. Establish permits and licensing systems to ensure compliance with eco-friendly tourism practices and monitor the activities of tour operators and visitors.

Eco-friendly Tourism Promotion:

a. Develop and implement marketing campaigns and educational materials to promote the wetland as an eco-friendly tourist destination.

b. Highlight the unique biodiversity, cultural heritage, and sustainable tourism practices through brochures, websites, social media, and visitor information centers.

c. Collaborate with local communities to create authentic and responsible tourism experiences, such as guided nature walks, bird watching tours, or cultural immersion programs.

Visitor Education and Awareness:

a. Develop educational programs and interpretive materials to raise awareness among visitors about the importance of wetland conservation and responsible tourism.

b. Provide information on sustainable behavior, including waste management, wildlife observation etiquette, and the significance of protecting fragile ecosystems.

c. Train tour guides, park staff, and tourism operators on eco-friendly practices and effective communication strategies to educate and engage visitors.

Monitoring and Evaluation:

a. Implement a monitoring and evaluation system to assess the effectiveness of the regulatory framework and the adoption of eco-friendly tourism practices.

b. Collect data on visitor numbers, behavior, and satisfaction levels to inform future management decisions and improve the visitor experience.

c. Regularly review and update the management plan and regulations based on monitoring results and feedback from stakeholders.

Management Target 4.2: Ensure that the economic benefits generated from eco-tourism directly contribute to the socio-economic development of local communities, providing opportunities for income generation, employment, and improved livelihoods.

Activity: Community-Based Eco-tourism Development and Capacity Building

To ensure that the economic benefits generated from eco-tourism directly contribute to the socio-economic development of local communities, providing opportunities for income generation, employment, and improved livelihoods.

Community Needs Assessment:

a. Conduct a comprehensive needs assessment in the local communities surrounding the wetland to identify their socio-economic conditions, aspirations, and existing skills.

b. Engage with community members, local leaders, and relevant stakeholders to understand their perspectives, preferences, and potential involvement in eco-tourism activities.

c. Identify the specific areas where the community can actively participate in the eco-tourism development process.

Capacity Building and Skill Development:

a. Design and implement capacity-building programs tailored to the needs of the local communities.

b. Provide training and skill development opportunities in areas such as hospitality, guiding and interpretation, culinary arts, handicraft production, and sustainable agriculture.

c. Facilitate workshops and mentoring programs to enhance entrepreneurship skills, business planning, marketing, and financial management.

Community-Based Enterprise Development:

a. Support the establishment of community-based enterprises that align with eco-tourism principles and local resources.

b. Assist community members in identifying and developing viable business ideas, such as homestays, community-run tour operations, local product sales, or cultural performances.

c. Provide guidance and technical assistance to initiate and sustain community enterprises, including access to microfinance, market linkages, and certification processes.

Product Development and Marketing:

a. Collaborate with local communities to develop authentic and unique tourism products and experiences that showcase their cultural heritage, traditional knowledge, and natural resources.

b. Support the creation of visitor-friendly infrastructure, such as visitor centers, interpretation trails, and cultural demonstration sites, through community involvement and co-management approaches.

c. Develop marketing strategies to promote community-based eco-tourism initiatives, including online platforms, social media campaigns, and collaborations with tour operators and travel agencies.

Revenue Sharing and Community Investment:

a. Establish mechanisms for revenue sharing from eco-tourism activities to ensure that a portion of the income generated directly benefits the local communities.

b. Facilitate the creation of community funds or cooperatives to collectively invest the generated revenue in community development projects, such as education, healthcare, infrastructure, or environmental conservation.

c. Encourage the participation of local community members in decision-making processes related to fund allocation and project prioritization.

Monitoring and Evaluation:

a. Implement a monitoring and evaluation system to assess the social and economic impacts of community-based eco-tourism initiatives.

b. Regularly collect data on income generation, employment opportunities, skill development, and community well-being indicators.

c. Utilize feedback from community members, tourists, and relevant stakeholders to continually improve and adapt the eco-tourism development strategies and programs.

Management Target 4.3: Establish clear guidelines and codes of conduct for eco-tourism operators and visitors, promoting responsible and sustainable tourism practices that prioritize the conservation of the wetland ecosystem and its biodiversity.

Activity: Responsible Tourism Guidelines and Codes of Conduct for Eco-tourism Operators and Visitors

To establish clear guidelines and codes of conduct for eco-tourism operators and visitors, promoting responsible and sustainable tourism practices that prioritize the conservation of the wetland ecosystem and its biodiversity.

Research and Best Practice Review:

a. Conduct research on existing responsible tourism guidelines and codes of conduct in similar wetland or eco-tourism contexts.

b. Review best practices and case studies from other destinations that successfully promote responsible tourism and conservation.

c. Identify relevant international, national, and local regulations and guidelines related to eco-tourism and environmental protection.

Stakeholder Engagement and Consultation:

a. Engage with eco-tourism operators, local communities, conservation organizations, government agencies, and relevant stakeholders.

b. Organize workshops, focus groups, and consultations to gather input and perspectives on responsible tourism practices and conservation priorities.

c. Facilitate dialogue and collaboration among stakeholders to develop a shared understanding and ownership of the guidelines and codes of conduct.

Development of Guidelines and Codes of Conduct:

A. Based on the research and stakeholder consultations, develop comprehensive guidelines and codes of conduct for eco-tourism operators and visitors.

b. Ensure that the guidelines address key aspects of responsible tourism, including waste management, wildlife protection, sustainable behavior, and cultural sensitivity.

c. Provide clear instructions and recommendations for minimizing negative impacts on the wetland ecosystem and biodiversity, while promoting positive contributions.

Awareness and Education:

a. Develop educational materials, brochures, signage, and online resources that effectively communicate the responsible tourism guidelines and codes of conduct.

b. Conduct training sessions and workshops for eco-tourism operators, guides, and local communities to familiarize them with the guidelines and their implementation.

c. Raise awareness among visitors through information boards, visitor centers, orientation sessions, and interactive materials that emphasize responsible and sustainable behavior.

Enforcement and Monitoring:

a. Establish mechanisms to monitor and enforce adherence to the responsible tourism guidelines and codes of conduct.

b. Collaborate with relevant authorities, conservation agencies, and community members to ensure compliance through regular inspections, site monitoring, and reporting mechanisms.

c. Provide a system for visitors and local community members to provide feedback and report any violations or concerns regarding responsible tourism practices.

Evaluation and Improvement:

a. Regularly evaluate the effectiveness and relevance of the responsible tourism guidelines and codes of conduct.

b. Gather feedback from eco-tourism operators, visitors, local communities, and relevant stakeholders to identify areas for improvement.

c. Update and improve the guidelines and codes of conduct based on monitoring results, emerging issues, and changing circumstances.

Management Target 4.4: Develop and maintain appropriate infrastructure and facilities, such as visitor centers, trails, and interpretation materials, to support eco-tourism activities, ensuring a positive and educational experience for tourists while minimizing ecological disturbances.

Activity: Development of Visitor Infrastructure and Facilities for Sustainable Eco-tourism

Site Assessment and Planning:

a. Conduct a site assessment to identify the specific infrastructure and facility needs based on the wetland's characteristics, visitor flow, and conservation objectives.

b. Assess the existing infrastructure and facilities for their condition, functionality, and alignment with sustainable eco-tourism principles.

c. Develop a comprehensive site plan that includes the design, location, and layout of visitor infrastructure and facilities.

Visitor Center Development:

a. Design and construct a visitor center that serves as an information hub and orientation point for tourists.

b. Include interpretive displays, exhibits, and audiovisual materials that educate visitors about the wetland's biodiversity, ecological significance, and conservation challenges.

c. Ensure the visitor center is designed to be energy-efficient, accessible, and harmonious with the natural surroundings.

Trail and Pathway Development:

a. Identify and designate suitable trails and pathways that allow visitors to explore the wetland while minimizing ecological disturbances.

b. Construct and maintain trails using sustainable construction techniques that minimize erosion, protect sensitive habitats, and ensure visitor safety.

c. Install informative signage along the trails, providing educational content about the wetland's flora, fauna, and conservation efforts.

Interpretation Materials:

a. Develop and distribute interpretive materials, such as brochures, guidebooks, and pamphlets that provide visitors with informative and engaging content.

b. Use creative and interactive methods to communicate key messages about the wetland's ecological importance, conservation challenges, and responsible tourism practices.

c. Utilize visual aids, illustrations, and photographs to enhance visitors' understanding and appreciation of the wetland ecosystem.

Visitor Facilities:

a. Provide appropriate visitor facilities, such as restrooms, picnic areas, and waste management systems, to enhance visitor comfort and convenience.

b. Design and construct facilities that are in harmony with the natural environment and follow sustainable building practices.

c. Implement waste management systems that promote recycling, minimize waste generation, and ensure proper disposal of waste.

Maintenance and Monitoring:

a. Establish a regular maintenance program to ensure the upkeep and functionality of visitor infrastructure and facilities.

b. Conduct periodic inspections and repairs to address any damages, safety hazards, or signs of ecological disturbances.

c. Monitor visitor feedback and engagement to assess the effectiveness of the infrastructure and facilities in providing a positive and educational experience.

Management Target 4.5: Foster collaboration and partnerships among stakeholders, including local communities, tour operators, and government agencies, to collectively promote and support the growth of sustainable eco-tourism, creating a supportive environment for responsible tourism practices and maximizing the benefits for both conservation and local communities.

Activity: Collaboration and Partnership Building for Sustainable Eco-tourism

To foster collaboration and partnerships among stakeholders, including local communities, tour operators, and government agencies, to collectively promote and support the growth of sustainable eco-tourism, creating a supportive environment for responsible tourism practices and maximizing the benefits for both conservation and local communities.

Stakeholder Mapping and Engagement:

a. Identify and map relevant stakeholders, including local communities, tour operators, government agencies, non-governmental organizations (NGOs), and other key actors involved in eco-tourism.

b. Develop a stakeholder engagement plan to foster collaboration, involving regular communication channels, meetings, workshops, and consultations.

c. Establish mechanisms for ongoing dialogue, feedback, and input from stakeholders to ensure their active participation in eco-tourism initiatives.

Partnership Development:

a. Facilitate partnerships and collaborations among stakeholders to promote sustainable eco-tourism.

b. Encourage tour operators, local businesses, and community-based enterprises to work together in offering eco-friendly and culturally immersive tourism experiences.

c. Establish partnerships with government agencies and NGOs to leverage their expertise, resources, and networks in supporting eco-tourism initiatives.

Capacity Building and Training:

a. Conduct capacity-building programs and training sessions for stakeholders involved in eco-tourism, focusing on sustainable tourism practices, community engagement, and conservation awareness.

b. Offer workshops and mentoring programs to enhance business skills, entrepreneurship, marketing, and financial management for local community members and tour operators.

c. Organize educational programs and workshops for government agencies to enhance their understanding of sustainable eco-tourism and promote supportive policies and regulations.

Collaborative Marketing and Promotion:

a. Develop collaborative marketing strategies and campaigns that highlight the unique attractions and responsible tourism practices of the wetland area.

b. Collaborate with local communities, tour operators, and government agencies to create promotional materials, websites, social media campaigns, and destination branding.

c. Participate in tourism fairs, trade shows, and networking events to showcase the wetland area and foster business connections among stakeholders.

Policy Advocacy and Supportive Environment:

a. Advocate for supportive policies and regulations that promote sustainable eco-tourism and the involvement of local communities in decision-making processes.

b. Engage with government agencies and policymakers to influence the development of tourism policies that prioritize conservation, community empowerment, and responsible tourism practices.

c. Provide technical assistance and expertise to support the implementation of eco-tourism policies and regulations at the local, regional, and national levels.

Monitoring and Evaluation:

a. Establish a monitoring and evaluation system to assess the effectiveness and impact of collaborative eco-tourism initiatives.

b. Collect data on visitor satisfaction, economic benefits, conservation outcomes, and community well-being indicators.

c. Utilize monitoring results and stakeholder feedback to continually improve collaborative efforts, address challenges, and identify new opportunities for sustainable eco-tourism.

Table 1: Matrix showing interventions, their priority rating and responsibilities of each implementing partner for the implementation of Sermik Wetlands Complex Management Plan

#	Issues/ Intervention	Priority	Responsibility		Duration		
			Primary	Secondary	Immediate	Mid-Term	Long-Term
1.1	Limited awareness of the economic and cultural benefits of wetlands among local communities and decision-makers.	High	Forest, Agriculture and Environment Department Gilgit-Baltistan	Livestock and Fisheries Department, EPA	✓	-	-
1.2	Poor enforcement of wetland conservation measures and regulations.	High	Forest, Agriculture and Environment Department Gilgit-Baltistan	EPA, Livestock and Fisheries Department	✓	-	-
1.3	Lack of coordination and collaboration among relevant stakeholders involved in wetland management.	Medium	Forest, Agriculture and Environment Department Gilgit-Baltistan	CBOs	✓	-	-
1.4	Effective wetland management practices have not been implemented yet, leading to a lack of proper management of these crucial ecosystems.	High	Forest, Agriculture and Environment Department Gilgit-Baltistan, CBO	EPA	✓	-	-

1.5	Inadequate capacity building initiatives for local staff and communities to engage in wetland management.	High	Gilgit Wildlife and Parks department	Forest and wildlife department	✓	-	-
1.6	Enhancing community-based watch and ward mechanism: Community-based watch and ward mechanism needs to be established in collaboration with Sermik Wetlands Management Committee through deputing additional Community Wildlife Watchers	High	Wildlife and forest department	CBO	-	✓	-
1.7	To ensure adequate legal protection for wetlands and their associated biodiversity in Sermik Valley, it is recommended to incorporate wetland-related rules and legislation into the existing The Gilgit-Baltistan Forest ACT, 2019.	High	Gilgit Wildlife and Parks department	EPA	✓	-	-
1.8	Gaps and weaknesses in the Policy Environment / Legislation	High	Forest and wildlife department	CBO	✓	-	-
1.9	Inadequate capacity building initiatives for local staff and communities to engage in wetland management.	High	Forest and wildlife department	CBO	✓	-	-
1.10	Lacks familiarity with international treaties and conventions like RAMSAR and MAB, impeding their ability to adhere to and implement the obligations set forth in these global agreements	High	Forest and wildlife department	CBO, WWF, UNDP, IUCN	✓		
1.11	Honorary Wildlife Watchers, needs to be properly trained in wildlife identification techniques, survey techniques, data recording, compilation and	High	Gilgit Wildlife and Parks department	WWF	✓	-	-

	reporting, use of GPS, camera, binoculars and spotting scope, first aid, emergency services, wildlife handling and mass capture and effective watch and ward						
1.12	Lack of sufficient attention given to environmental pollution and contamination, evidenced by the use of pesticides and chemical fertilizers in high altitude farmlands surrounding freshwater lakes.	High	Forest and wildlife department	WWF	✓	-	-
1.13	Developing eco-tourism programs that showcase the beauty and ecological importance of wetlands can generate funds for their sustainable management	High	Gilgit Wildlife and Parks department	PTDC	✓	--	
1.14	Donor funded projects should be developed for National and International funding	High	Gilgit Wildlife and Parks department	Government of GB	-	-	✓
1.15	Lack of knowledge can make it difficult to develop effective management strategies for these ecosystems.	High	Gilgit Wildlife and Parks department	EPA	✓		
1.16	The staff's understanding of wetland biodiversity is limited.	Medium	Gilgit Wildlife and Parks department	Forest and wildlife department	✓	-	-
1.17	Limited concern about environmental pollution and contamination	High	Forest and wildlife department	Livestock and fisheries department	✓		
1.18	GIS based studies should be conducted to establish a time series data of the Sermik Wetlands in order to understand the lake morphology, changes and climatic patterns	High	Forest and wildlife department	Government of Gilgit-Baltistan	-	✓	-
1.19	Most of the staff in agriculture and livestock departments have no knowledge of international	High	Agriculture Department	Livestock and fisheries department	-	✓	-

	treaties and conventions, including RAMSAR and MAB .		Gilgit Baltistan	Gilgit Baltistan			
1.20	The department has failed to conduct any research on the status of alpine pastures, despite the critical importance of such research in ensuring.	High	Forest and Wildlife Department	Gilgit Wildlife and Parks department	✓	-	-
1.21	Faces challenges in facilitating market linkages for farmers, resulting in difficulties in accessing fair prices and expanding market opportunities. Strengthening collaboration with market actors and implementing market-oriented interventions can help farmers enhance their incomes and improve overall profitability.	High	Forest and Wildlife Department	Agriculture Department Gilgit Baltistan	✓	-	-
1.22	Use of modern technologies: The use of modern technologies such as GPS collars, camera traps, and drones can help in collecting accurate data on wildlife population sizes, distribution, and behavior	High	Forest and wildlife department	Government of Gilgit-Baltistan	✓	-	-
1.23	Adaptive management: Regular monitoring of wildlife populations can help to identify changes in population size, distribution, or behavior, which may require management interventions	High	Forest and wildlife department	CBO	✓	-	-
1.24	Impact of hunting / poaching on major wildlife species needs to be determined for putting forward an effective strategy in order to reduce illegal activities	Medium	Gilgit Wildlife and Parks department	Forest and wildlife department	-	✓	-
1.25	Data sharing and transparency: Making monitoring data publicly	Medium	Gilgit Wildlife and	Forest and wildlife department	-	✓	-

	available can help to increase transparency, facilitate collaboration, and promote accountability in wildlife management and conservation efforts.		Parks department				
1.26	Limited to the management of fish resources exclusively.	High	Fisheries Department	Livestock department	-	✓	-
1.27	Increasing the frequency of patrols can help to deter illegal activities and detect violations	Medium	Wildlife and Parks department	Forest and wildlife department	-	✓	-
1.28	Implementation of rules and legislations	High	Wildlife and Parks department	EPA	✓	-	-
1.29	"Forest Protection Committees" should be notified within the region to promote and protect unique ecosystem of the region. This may include members principally from the communities, local CBOs and NGOs but one representative should also be included from the government line agencies for verification and field effectiveness.	High	Forest and wildlife department,	Wildlife and Parks department Advisory board	✓	-	-
1.30	Lack of sufficient resources to collect and analyze data on fish populations, fishing practices, and aquatic ecosystems.	High	Livestock and Fisheries Department	CBOs	✓	-	-
1.31	not effectively engage with local communities, fishers, and other stakeholders in the development and implementation of policies and regulations	High	Livestock and Fisheries Department	Wildlife and Parks department	✓	-	-
1.32	Research studies need to be conducted to identify important wildlife corridors in the region, so as to prioritize these regions in terms of their protection and promotion.	High	Wildlife and Parks department	Forest and wildlife department	✓	-	-

1.33	Weak regulatory frameworks and a lack of enforcement mechanisms result in uncontrolled tourism activities in and around wetlands and natural resources.	High	Wildlife and Parks department	EPA , Forest and wildlife department	✓	-	-
1.34	Implementing sustainable grazing practices such as rotational grazing, resting pastures, and managing stocking rates can help to maintain soil health, reduce erosion, and promote plant diversity	High	Wildlife and Parks department	EPA , Forest and wildlife department	✓	-	-
1.35	Implementing water conservation practices such as improving irrigation efficiency, installing rainwater harvesting systems, and promoting dryland farming can help to reduce water consumption and promote sustainable water use	High	Ministry of Water Resources	Agriculture Department	✓	-	-
1.36	Lack of actively engaging and including relevant stakeholders in decision-making processes, planning, and implementation of initiatives.	High	Wildlife and Parks department	EPA	✓	-	-
1.37	Information and awareness boards needs to be installed at significant places close to the lakes in order to create awareness amongst the masses regarding the significance of migratory birds and the Disturbance caused to them during fishing.	High	Fisheries and livestock department	Wildlife and Parks department	-	✓	-
1.38	Lack the necessary technical expertise and knowledge to manage wetlands and natural resources effectively.	High	Wildlife and Parks department	EPA	-	✓	-

1.39	Fish passage Improvement: Implementing measures to improve fish passage, such as installing fish ladders, can allow fish to migrate upstream and downstream more easily, increasing their range and distribution	Medium	Fisheries and livestock department,	Wildlife and Parks department	-	✓	-
1.40	Fishing in Sermik Wildlife Sanctuary should be banned immediately during migratory season and this case needs to be discussed in GB Provincial Wetlands Management Committee	High	Wildlife and Parks department	CBOs	✓	-	-
1.41	Identify migratory routes: Determine the migratory routes of key species and identify areas where they are most vulnerable to disturbance	High	Wildlife and Parks department	CBOs	✓	-	-
1.42	Educate stakeholders: Educate the public, visitors, and stakeholders about the importance of no activity zones during migratory seasons to minimize disturbance to wildlife	Medium	Wildlife and Parks department, PTDC	CBOs	-	✓	-
1.43	Lack the necessary technical expertise and knowledge to manage wetlands and natural resources effectively.	High	Wildlife and Parks department, EPA	CBOs	✓	-	-
1.44	The case of removal of exotics from in and around the Protected Areas needs to be discussed and highlighted in the Gilgit Wetlands Management Committee for policy level decision.	High	Wildlife and Parks department, Fisheries and livestock department,	Forest and wildlife department	-	-	✓
1.45	There is a dire need to establish "Constructed Wetlands" within the region in order to reduce the risk of pollution entering into the lake. These should be constructed in collaboration with local	High	Fisheries and livestock department	Forest and wildlife department	-	✓	-

	communities and at appropriate places in order to benefit the wetlands ecosystem.						
1.46	Drip Irrigation System should be installed for efficient use of water for agriculture crops. This should initially be installed for demonstration purposes in order to assess the efficacy of the system. This should be accompanied by a small research study showing its effectiveness, before it is widely practiced by the communities.	Medium	Agriculture Department	Forest and wildlife department, CBOs	-	-	✓
1.47	Establish community-based organizations (CBOs) or village conservation committees (VCCs). This would enable the communities to take responsibility for the resources and utilize them in a prudent manner.	High	Advisory board	Forest and wildlife department	-	✓	-
1.48	Sign Terms of Partnerships with organized communities for implementation of wetlands management interventions.	High	Forest and wildlife department	Community			✓
1.50	Develop a social maturity index for the organized communities in order to ensure their sustainability and determine their strengths and weaknesses	High	Forest and wildlife department	Community	-	-	✓
1.51	Encouraging community-led initiatives for natural resource management and conservation that provide alternative livelihood opportunities.	High	Government of GB	Forestry, Wildlife, Fisheries and Tourism Department	-	✓	-

Floristic list of Medical and Economical Plants of Village Sermik and its Allied Areas

S.#	Botanical Name	Vernicular name	Altitude	Local	Economic use						
					Med	Fo	Fruit	Veg	Tim	Fu	Food
AMARANTHACEAE											
1	Amaranthus Spinosus L	Morfobortomasy	2500	Sermik	*	-	-	-	-	-	*
2	Amaranthus Viridis L	Boordoomsay	2500	Sermik	*	-	-	-	-	-	*
3	Amaranthus Hybridus L	Tachiforoos	2500	Sermik	*	-	-	*	-	-	*
4	Areva Persica Burm. F Merrill	kazboor	2500	Sermik	*	-	-	-	-	-	*
APIACEAE											
5	TachiforoOS Angelica Glauca Edgew	Ghang	2500	Sermik	*	-	-	-	-	-	*
6	Cortia depressa (Don) Norm	Spungshamdon	3900	Shella	*	-	-	-	-	-	-
7	Foeniculum vulgare Mill	Badiyan	2500	Sermik	*	*	-	-	-	-	*
8	Daucus carota	Walfoo	2500	Sermik	*	*	*	-	-	-	*
9	Carum carvi L	Thalay naqpo	3800	Shella	*	-	-	-	-	-	-
ASERACEAE											
10	Achillea Millefolium L	Samindog	2700	Shella	*	-	-	-	-	-	*
11	Artemisia Scoporia	Boorsay	2500	Sermik	*	-	-	-	-	*	*
12	Coniza Canadenis L	Faema Soa	2700	Sermik	*	-	-	-	-	-	-
13	Chrysanthemum Coronarium	Faraaashiq	2700	Sermik	*	-	-	-	-	-	*
14	Cardus Edelbegi (Ref F)	kongkormoo	2700	shella	*	-	-	-	-	-	*
15	Echinops Echinatus	Bongsair	2700	Sermik	*	-	-	-	-	-	*

16	Prenathes Brunoniana Wallich	Khdaskat	2700	Sermik	*	-	-	-	-	-	-
17	Sasurea Lappa (Deene)	Kuth	3100	shella	*	-	-	-	-	-	*
18.	Solidago Virgu-aurea	Sirchin Mindoq	3100	Shella	*	-	-	-	-	-	-
19.	Sassurea Obvaltat	Gogoole	3500	Shella	*	-	-	-	-	-	-
20	Tanacetum Dolichoplyllu m	Tiallo	3500	Shella	*	-	-	-	-	-	-
21	Tanacetum Gracile	Khoboorsay	2700	sermik	*	-	-	-	-	*	-
22	Taranacum Officinale Weber in wigg	Kaki	2500	Sermik	*	-	-	*	-	-	*
23	Trichqlepsis Stewertii	Shingmindoq	2500	Sermik	*	-	-	-	-	-	-
BORAGINACEA											
24	Myosotis Alpestris	Peezong	3200	Shella	-	-	-	-	-	-	*
BERBERIDACEAE											
25	Berberis Lycium Royle	Skeworboo	2500	Sermik	*	*	-	-	-	-	*
BRASSICACEAE											
26	Brassica Compestris	Shamoolaq	2500	Sermik	*	-	-	-	-	-	*
27	Capsella Bursa-pastoris Medix Pelezen	Koolofmindoq	2500	Sermik	*	-	-	-	-	-	*
28	Lepedium Latifolium Linn	Pasaysoa	2500	Sermik	*	-	-	-	-	-	-
30	Raphnus Sativus	Moolaq	2500	Sermik	*	*	-	*	-	-	-
CAPPARIDIACEAE											
31	Capparis Spinosa	Trowa	2400	Sermik	*	-	-	-	-	-	*
CARYOPHYLLACEAE											
32	Stellaria Alsine	Browghar	2500	Sermik	*	*	-	*	-	-	*

33	Silene Vulgaris (Moench)	Doomindoq	2500	Sermik	*	-	-	-	-	-	*
34	Silene Conoidae L	Bajomindoq	2500	Sermik	*	-	-	-	-	-	*
CHENOPODIACEAE											
35	Beta Vulgaris	Chokundar	2400	sermik	*	*	-	*	-	-	-
36	Chenopodnum Album	Snew	2500	Sermik	*	-	-	-	-	-	*
37	Chenopodium Ambrosoids	Khama	2500	Sermik	*	-	-	-	-	-	-
38	Kochia Scoparia	Faihma	2400	Sermik	*	-	-	-	-	-	-
39	Spinacia Oleracea	Palaaq	2400	Sermik	*	*	-	*	-	-	-
CAMPANULACEAE											
40	Codonopsis Ovata	Laspikatmindq	3100	Shella	*	-	-	-	-	-	*
CARSSULACEAE											
41	Sedum ewersii Ledeb	Reegulnaran	3500	Shella	*	-	-	-	-	-	-
42	Sedum Crasaines Wall	Ree Mondaq	3500	Shella	*	-	-	-	-	-	-
43	Rhodiola Himalensis	Khrochay	3500	Shella	*	-	-	-	-	-	*
CUPULIFERACEAE											
44	Betula utilis D Don	Staqba	3500	Shella	*	-	-	-	-	-	-
CUCURBITACEAE											
45	Cucumis Sativus L	Larra	2500	Sermik	*	*	*	*	-	-	-
46	Curcubita Maxima Duchense	Drayone	2500	Sermik	*	*	-	*	-	-	*
47	Cucurbita Pepo L	One	2500	Sermik	*	*	-	*	-	-	*
48	Luffa Aegypt Mill	Tangoose	2500	Sermik	*	-	-	-	-	-	*
CUSCUTACEAE											
49	Cusculta reflexa Roxb	Ghbool Thag	2500	Sermik	*	-	-	-	-	-	-
DIPSACACEAE											

50	Scabios Speciosa Royle	Zeemamindoq	3100	Shella	-	-	-	-	-	-	-
51	Spinacia Oleracea l	Palaaq	2400	Sermik	*	*	-	*	-	-	-
CAMPANULACEAE											
52	Codonpsis Ovata (Benth)	Laspikatmindq	3100	Shella	*	-	-	-	-	-	*
CARSSULACEAE											
53	Sedum Ewersii Ldeb	Reegulnaran	3500	Shella	*	-	-	-	-	-	-
54	Sedum Crasaines Wall	Ree Mondoq	3500	Shella	*	-	-	-	-	-	-
55	Rhodiola Himalensis (D Don)	Khrochay	3500	Shella	*	-	-	-	-	-	*
CUPULIFERACAE											
56	Betula Utdis D	Staqba	3500	Shella	*	-	-	-	-	*	*
CUCURBITACEAE											
57	Cucumis Sativus L	Larra	2500	Sermik	*	*	*	*	-	-	-
58	Cucurbita Maxima Duchnse	Drayone	2500	Sermik	*	*	-	*	-	-	*
59	Cucurbita Pepo L	One	2500	Sermik	*	*	-	*	-	-	*
60	Luffa Aegyptica Mill	Tangoose	2500	Sermik	*	-	-	-	-	-	*
CUSCUTACEAE											
61	Cuscula Reflexa Roxb	Ghbool Thaq	2500	Sermik	*	-	-	-	-	-	-
DIPSACACEAE											
62	Scabiosa Speciosa Royle	Zeemamindoq	3100	Shella	-	-	-	-	-	-	*
63	Granium Neplense Sweet	Folder	2500	Sermik	*	-	-	-	-	-	*
GNETACEAE											
64	Ephedra Gerardiana Wall	Say	2500	Sermik	*	-	-	-	-	-	*

65	Ephedra Intermedia Skhrenk	Serfosay	2700	Sermik	*	-	-	-	-	*	-
HALVELACEAE											
66	Marchella esculanta	Biangboorisnd	2700	Sermik	*	*	-	-	-	-	-
JUGLANDACEAE											
67	Juglans Regia	Starga	2500	Sermik	*	*	-	-	*	*	-
LAMLACAEA											
69	Elsohzia Densa Bath	Peeno	2500	Sermik	*	-	-	-	-	*	-
70	Mentha Longfoia L	Foling	2500	Sermik	*	-	-	-	-	-	*
71	Mehtha Royalena L	Fowfoling	2500	Sermik	*	-	-	-	-	-	-
72	Menth Piperia L	Podina	2500	Sermik	*	*	-	-	-	-	-
73	Persavskia abrotanoides kal	Sosaling	2500	Sermik	-	-	-	-	-	*	*
74	Thymus serphlium	Tombrook	3100	Sermik	*	*	-	--	-	-	-
LEGUMINACEAE											
75	Cicer arietman l	Sari	3200	Shella	*	*	-	-	-	-	*
76	Meliotus alba medicus		2800	Sermik	*	-	-	-	-	-	-
77	Melilotus indicus		2800	Sermik	*	-	-	-	-	-	*
78	Pisum sativum	Stranma	2700	Sermik	*	*	*	*	-	-	*
LILECEAE											
79	Allium Cepa L	Tchong	2800	Sermik	*	*	-	*	-	-	-
80	Allium Sativum Linn	Zgoqpa	2800	Sermik	*	*	-	-	-	-	-
MORACEAE											
81	Morus Abla L	Osay	2800	Sermik	*	*	*	-	*	*	*
82	Morus Nigra	Berro Osay	2800	Sermik	*	-	-	-	-	*	*
MORINACAEA											
83	Morina Persica L	Kololo	2800	Sermik	*	-	-	-	*	*	*

84	Morina Coulleraiana Royle	Zougehun	2700	Sermik	*	*	-	-	-	-	*
ONAGRACEAE											
85	Epilolium Cylindrium D.DON	Chanmandoq	3600	Shella	*	-	-	-	-	*	*
PAPAVARACEAE											
86	Papavar nudicanle. L	Laila	4000	Shella	*	-	-	-	-	-	-
PLANTAGINACEAE											
87	Plantago Major L	Bohna	2500	Sermik	*	-	-	-	-	-	*
88	Plantago Ovata L	Bohnasioa	2500	Sermik	*	-	-	-	-	-	*
POLYGONACEAE											
89	Polygonum Alpinum L	Mindoqyazim	3200	Shella	*	*	-	-	-	-	-
90	Polygonum neplensis Meissn	Shoosa	2500	Sermik	*	-	-	-	-	-	*
91	Polygonum Vivparum L	Chabair	3200	Shella	*	-	-	-	-	-	-
92	Rumax Dentatus L	Bohna	2500	Sermik	*	-	-	-	-	-	-
93	Rheum Emodi Wall	Tarba	3200	Shella	*	-	-	-	-	-	-
PRIMULACEAE											
94	Primula Macrophylla	Kungmaar	4200	Shella	*	-	-	-	-	-	*
95	Primula denticulata	Pungponar	2700	Sermik	*	-	-	-	-	*	-
PINACEAE											
96	Juniperus Communis L	Chari	3200	Shella	*	-	-	-	-	*	-
97	Juniperus Marcopoda Betrol	Shookpa	3200	Shella	*	-	-	--	-	*	-
98	Juniperus squamta Buch-Ham	Shookpa	3200	Shella	*	-	-	-	-	*	-
PULMBAGINACEAE											

99	Limonium Macrorhabdon L	Shafoora	3000	Sermik	*	-	-	-	-	-	-
POLYPODIACEAE											
100	Adiantum incusum frask	Hoophoop soa	3000	Sermik	*	-	-	-	-	-	-
POACEAE											
101	Avena Sativa Linn	Troyook	2500	Sermik	*	-	-	-	-	-	*
101	Hordium Vulgare Linn	Nass	2500	Sermik	*	*	-	-	-	-	*
102	Panicum Miliaceum l	Sha soa	2500	Sermik	*	-	-	-	-	-	*
103	Zeya Mays L	Makai	2500	Sermik	*	*	-	-	-	-	*
RANUNCULACEAE											
104	Acanitum Voilaceum Var	Booma	3500	Shella	*	*	-	-	-	-	*
105	Aconitum Ovatum Royle	Aposoa	3500	Shella	*	-	-	-	-	-	-
106	Aquilegia baltistanica M N R	Moknoting	3500	Shella	-	-	-	-	-	-	*
107	Aquilegia fragrans	Kafsha mindoq	3500	Shella	*	-	--	-	-	-	-
108	Clematis baltistanica	Treemok Soa	2500	Sermik	*	-	-	-	-	-	-
RUBIACEAE											
109	Galium Asperloids Edgew	Chosoa	2400	Semik	-	-	-	-	-	-	*
110	Galium Elegans L	Numsoa	2400	Sermik	-	-	-	-	-	-	*
ROSACEAE											
111	Fragaria Vesca Linn	Saosay	2400	Sermik	*	-	-	-	-	-	*
112	Melus Pumila Mill	Kooshoo	2400	Sermik	*	*	*	-	-	*	-
113	Prumus Armeniaca Linn	Choolo	2500	Semik	*	*	*	-	-	*	*
114	Prumus amygdalus Beel	Badam	2400	Sermik	*	*	-	-	-	*	-

115	Pyrus Communis L	Noori	2400	Sermik	*	*	*	-	*	*	*
116	Potentilla Serica L	Kosho Mindoq	3100	Shella	*	-	-	-	-	-	-
117	Rosa Webbiana wall	Sia	2900	Shella	*	-	-	-	-	*	*
118	Rosa Macrophylla Lindley	Saybair	2500	Shella	*	-	-	-	-	*	*
SALICACEAE											
119	Salix Alba L	Changma	2500	Sermik	*	-	-	-	*	*	*
120	Salix Tetrasperma Roxb	Broqchang	2500	Kariko	*	-	-	-	*	*	*
130	Populus Nigra L	Ghabiarfa	2500	Sermik	*	-	-	-	*	*	*
SAXIFARIGACEAE											
131	Bergenia Stracheyi Hook F	Braqshafoos	3200	Shella	*	-	-	-	-	-	-
132	Saxifraga Moorcraftian a Wallich	Braqshafoos	3200	Shella	-	-	-	-	-	-	*
SCRAFHULARIACEAE											
133	Verbascum Thapsus L	Reetumbako	3200	Shella	*	-	-	-	-	-	-
134	Veronica undulata Wall	Soorchan	3200	Shella	*	-	-	-	-	-	-
135	Pedicularis punctatae Dene	Frongmindoq	2500	Sermik	*	-	-	-	-	-	*
SOLANACEAE											
136	Capsicum Amium	Snearma	2400	Sermik	*	*	-	-	-	-	-
137	Datura stramonium L	Datura	2400	Sermik	*	-	-	-	-	-	-
138	Solonum Nigram L	Shoklay	2400	Sermik	*	-	-	-	-	-	*
139	Solanum tubersome	Aallo	2400	Sermik	*	*	-	-	-	-	-
140	Hyoscyamus nigar L	Luntang	3200	Shella	*	-	-	-	-	-	-
TAMARICACEAE											

141	Tamarix Gallica Linn	Oongboo	2400	Sermik	*	-	-	-	-	*	-
142	Myircaria elegans Royle	Khotong	2400	Sermik	*	-	-	-	-	*	-
UTRICACEAE											
143	Urtica Diocia L	zoosoot	2400	Sermik	*	-	-	-	-	-	-
VITACEAE											
144	Vitis venifera Linn	Rgoon	2400	Sermik	*	*	*	-	-	*	*
VOILACEAE											
145	Viola serpens Wallich	Skorimindoq	3200	Shella	*	-	-	-	-	-	*
ZYGOPHYLLACEE											
146	Pregnium harmalla Linn	Isman	2400	Sermik	*	-	-	-	-	-	-
147	Tribulus Teristris	Thingsoa	2400	Sermik	*	-	-	-	-	-	-