SOCIAL SCIENCE REVIEW ARCHIVES
https://policyjournalofms.com
ISSNOnline:3006-4708
ISSNPrint: 3006-4694

An Analysis of Natural Resource Distribution and Impact of Resource Depletion on Local Communities in the Broghil National Park.

Alisha Manzoor [1]

[1] Development Studies Department , Comsats university Islamabad, Abbottabad Campus Email: alishamanzoor931@gmail.com

DOI: https://doi.org/10.70670/sra.v3i2.703

Abstract

Broghil National Park was established in 2010. Misuse of natural resources, environmental degradation and natural resource deterioration are the major issues of the park. Sustainability is not maintained between regeneration of the resources and the quantity used. This study aimed to assess the land use and the factors that determine the factors that cause the exploitation of natural resources (peatland, pastures and glaciers) of BNP. For this study, core zone of the BNP is selected. The quantitative data about natural resource distribution was gathered through a survey questionnaire from the heads of the villages of Broghil Valley. In addition to this secondary data was collected through interviews from government officials and BNP management report. From the data analysis it was found that people have no other alternatives other than natural resources of park. Peatlands and pastures are under tremendous pressures due to excessive burning of peat and over grazing of pastures. Due to the remoteness of the area, government authorities are unable of regular monitoring. Based on the results of this study, it is suggested that awareness raising programs should be initiated for sustainable use of natural resources and alternative should be provided to the local communities to reduce the pressure on natural resources. Further it is suggested that restoration of the degraded natural resources of BNP.

Keywords: Natural Resources Distribution , Resources Depletion , Community Vulnerability , Broghil National Park , Socioeconomic Impact

1.1. Introduction

To preserve the natural environment, the government set aside the area for the creation of national parks. The national parks are created for public enjoyment because of their historical or scientific interest. In the national park, kept most of the landscapes and accompanying animals and plants were kept in a natural state. The natural park in Africa mostly tends to focus primarily on animals while the United Kingdom focuses only on lands and the United States and Canada work for the protection of both lands and animals (Augustynet al., 2020). The idea of a park or nature reservoir under state possession developed in the United States in 1870. In 1872, after U.S. President Ulysses S. Grant signed the legislature through which the world first park originated was Yellowstone National Park in Wyoming. The expansion of the national park occurred in the next few decades while the U.S. national park service was started in 1916 for park administration purposes. The national park service administrated more than 400 separated areas accounting for about 85 million acres by the early 21 century. Many countries get inspired by the American example and they started the movement in favor of the establishment of

national parks and Canada was the first country to formed three national parks in 1880(Augustynet al., 2020). Pakistan with its unique geography and climate holds extensive varieties of ecosystems.The government of Pakistan has declared certain specific areas as protected regions in order to safeguard these natural resources. The protected area is where the environment is preserved and protected in its natural conditions, i.e. the flora and fauna. For such a reason the Government of Pakistan classifies into five protected areas, including community control hunting areas, wildlife sanctuaries, game reserves, private game reserves and national parks (Luqman, 2019). The policy on 'modern protected areas' states that a national park is a protected area reserved for the government to protect and conserve its exceptional natural landscapes and wildlife. Previously, Pakistan has 398 protected areas, along with 31 national parks, 92 wildlife sanctuaries, 97 game reserves, 19 wetland reserves and 160 community reserves (Khan, 2020). Recently the Prime Minister Imran Khan announced the establishment of 15 new national parks under the "Protected Areas Initiative" (Khan, 2020) The Broghil National Park (BNP) is located in the Chitral District, comprising the Broghil Valley and small portion of the Yarkhun Valley, and has been proclaimed a National Park under Section 16 of the Khyber Pakhtunkhwa Wildlife Act of 1975 over an area of 1,348 Square kilometers. It is the largest National Park in Khyber Pakhtunkhwa (K.P.) Province (Shah, 2012). In 2010, Broghil was declared as a National park by the government of Khyber Pakhtunkhwa due to the ecological value, landscape characteristics, ecological, biodiversity and socio-economic importance of the peat lands (Khan et al., 2019). It is in the upper northern regions of district Chitral. It is a sanctuary embodied by fragile ecology providing shelter to a variety of birds and rare species of biodiversity along with flora. The majority area of the park is consisting of peat lands which support the natural biodiversity and local populations dwelling alongside the park (Uddin, 2020). There are 12 small settlements in Broghil valley namely Kishamanja, Jungle, Koi, Garam Chashma, Vadinkhot, Arquan, Chikar, Ishkarwarz, Maidan, Chilmarabad, Gharil and Lashkargaz with a total of 1498 persons with 147 households. Of the 12 settlements, the population is concentrated in five settlements and makes more than 70% of the population. The core language of the population is Wakhi. The Wakhi population is pastoralist and formerly lived landless and mobile in search of pastures. Contribution of livestock to household economy is more than 90%. They have a very inadequate dependency on agriculture and other sources of income(Shah, 2012). The valley is predominantly icy and mountainous. Just about one-fourth of the area of Broghil valley is a gently swelling basin dotted with depressions and lakes and the two third of it is completely rugged with steep glaciated mountains. The altitude of basin of this valley ranges from 3300 meters at the first settlement Kishmanja to 4300meters near Qurambar Lake, while the ridges on both sides of the basin further rise 2500meter from the basin. Miankoi peak is the highest peak which is 6.874 kilometers high, located near in the Kishmanjah village. Other high peaks are Chiantar (6224 kilometers) and Garmush (6.245 kilometers) (Shah, 2012). The valley does not consist of any meteorological observatory, nor available in the locality to have resemblance with Broghil valley. Though, the area is arid (dry barren) moderate and usually with snow precipitation from September to April. July and August are two hot months when minimum temperature at night rises above freezing zero. Qurambar Lake and Surkhang Lake recorded the maximum water temperatures at the surface ranged from 6 degree to 15 degree in July 2010 (Shah, 2012). For most of the nights the weather remains windy and wind at daytime is also common. Prostrate vegetation is a sign of the tundra climate conditions and windiness. Sunshine in the Broghil valley is not a rare commodity, the cloudy weather during days for fairly long periods is also common both in summer and winter (Shah, 2012).

Before the introduction of PWP in 2005, the Wildlife Department or any other department of the government had no access and infrastructure extension in Broghil valley which shows the remoteness and isolation of this valley. When recognising the importance of Broghil valley and

taking cognisance of various threats to important biodiversity, through the studies and coordination of the PWP, the K.P. Wildlife Department included the area in the public sector development program of the province. Pending the legal notification of declaring the valley as a national park, which was issued in August 2010, the development proposal was included in the list of the four-year project "Establishment and Development of National Parks in Khyber Pakhtunkhwa 2008-2012" Through this project the KPWD provided the establishment of one Range Officer Wildlife, Two Deputy Rangers Wildlife, Three Wildlife Watchers and Ten Community Wildlife Watchers for natural resources and community management (Shah, 2012). According to the authorities of K.P. National Parks, there are nearly no forests in Broghil valley. Yet, scattered trees growth is found in the lower parts of the valley. Trees are prevented by the arid cold climate and high altitude and most of the park area is above the tree limit. The scattered trees are mostly juniper, willow, poplar, birch, and sea-buckthorn. The mountains and pastures that are above Garamchashma village have no tree growth. Broghil valley is overall alpine tundra, the treeless mountain tract, where vegetation is comprised of mosses and lichens, dwarf shrubs, sedges, and grasses (Shah, 2012). The pastures are self-generating and self-maintaining vegetation used for livestock and wildlife grazing. (Weber et al., 2013) For human survival they provide the basic livelihood in Broghil Valley. People residing there depend on the forests and pastures for fuel, timber, and fodder. The peatlands provide a bulk of fuel and forage. Though the pastures and forests in the Broghil valley is joint custody of whole the community, the settlers have established their possessions of the reserves in the locality of their settlements as traditional users (Shah, 2012). As per K.P. National Parks authority's peat is privately called "cheem" which is an essential wellspring of fuel for cooking and warming in Laskargaz, Garil, Chilmababad, Ishkarwarz, Maidan, Arquan and Chikar towns with a populace of 105 hh. Since there is no firewood accessible around these towns, they use peat fuel all the year around. Wakhis likewise tell that it was some 50-60 years back that the individuals of Broghil valley took in the extraction and utilisation of peat for fuel and this was then presented by a traveler from Pamir. That may be an explanation of augmentation to these settlements past Garamchashma. They use around 200 tons of peat every year. The other five towns Vadinkot, Garamchashma, Koi, Jungle and Kishmankja use peat for cooking and warming in mid-year months when they are in high fields. They winter at lower rises and inadequate regular tree and bush development and furthermore the watered wood parcels serve their interest of kindling in winter. Peat is additionally least accessible in environmental factors of these villages (Shah, 2012).

1.2. Problem Statement

The natural resources of Broghil national park are sensitive to climate change. In the last few years, the peat lands ecosystem and pastures in Broghil National Park have been under tremendous pressure due to exploitation by the local communities living at a higher altitude to meet their household energy needs. The resources of the park are depleting at a very rapid rate and in the future, it will adversely affect the local communities. In the recent decade, BNP has also considered the conservation of biodiversity and cultural resources in a sustainable way but still the park does not have rich experience of managing the issues of and challenges faced by national park. In particular very limited research has been conducted for the conservation of BNP. This study helps to fill this gap by examining management policies of national parks and measures taken for the sustainable development and safety of natural resources.

1.3. Objectives

1. To studythe distribution of natural resources of BNP in district Chitral.
2. To assessthe environmental education of local communities of BNP.

3. To analyze the impact of depleting natural resources on local community of Broghil Valley (Broghil National Park).

2.0 Literature Review

In present times, various issues regarding the reliability of biodiversity have arisen throughout the world. Most notably in developing countries as in Pakistan, there are many issues regarding a quick increase in growth of the population as well as the government and political parties to manage these issues according to available natural resources (Khan & Baig, 2020). Pakistan is deprived not because of a resource gap, but because of its political instability and lack of entrepreneur's innovation (Arif & Shikirullah, 2019). From the past thirty years, almost 40% of the available land in Pakistan's Northern Areas has been changed into space for national parks, wildlife sanctuaries, game reserves, and hunting areas (Ali, 2010).

Most of the national parks in developing countries are in utmost need of investment. Due to many issues arising because of soil wearing down, deforestation, biodiversity reduction and failure of hydrological resources, there is a great need for economic mechanisms to utilize the proper components of natural places and the programs they operate (Khan, 2004).

The developing of the national park program can be traced in a 19th-century American preoccupation with wilderness management and a need to secure the vast 'natural monuments' located in the west. In 1872, this inspiration had led to a description of Yellowstone as a national park and enabled the construction of "pleasuring ground for the benefit and enjoyment of people". From the American national park movement, the importance of nature has been proven, which has a low influence on human and the declaration that management was best when served by the 'withdrawal' of the area from a settlement. It was done on these criteria that national parks in America became identical with national ownership and sources utilise limitations. This technique used by America has a significant role in changes in national parks throughout the world. In 1994 the criteria developed by the IUCN, the term 'national park' remained for those places which utilise the American concerns of nature management and amusement. These places are known as Category II areas (Stockdale & Barker, 2009).

Confined places are also being utilized as the fundamentals for the maintenance of biodiversity, habitats and significant landscapes for a particular class. Moreover, they are even playing a significant part in poverty improvement and maintaining ecosystem services, increasing ecotourism, and providing maintenance settlement for the development of social and economic groups (Karki, 2013).

By utilizing expenses, National parks create useful aspects for the community. Therefore most of the abundant sources are not straightforward due to the reason of a non-excludable settlement, together with consumable and non-rival. That shows that they are only utilized for providing essential resources for the public. On the other hand, it is not accurate to use the term national parks as such, as clean community goods. It is only precise for ecosystem resources and nonuse principles, while the entertaining significance consists of a congestible club or community sources depending on the available policy. In addition to this, the financial assessment of national parks is must to include community resources to keep away from an underestimation of profit when compared with utilized resources (Mayer, 2014).

A more advanced research policy is required to meet the demands of increasing relations of the public and how to utilize these natural resources. The society itself also has a vital role in the preservation and utilization of natural resources. The improvement of these plans depends mainly on how local culture behaves. The success of sustainable projects primarily depends on how well the local communities themselves observe the surroundings and its various procedures, and on how comprehensively local communities are concerned in the utilising the management

policy (Hussain et al., 2017). Natural resources of the country are an essential asset for the country. With the involvement of the community in natural resources organization, Thakadu unspecified three terms: (a) local communities are improved ambassadors to look after natural property; (b) organizations will protect a source only if its profit surpass the expenses of protection, and (c) communities will preserve the originals that have a direct relation to their financial gain(Thakadu, 2005). Community-level natural resource management is defined as the organization of community-based sources by neighboring bodies, governmental, and non-governmental organizations(Hussain et al., 2017). Sometimes, local communities hesitate to challenge a government's property because of losing the profit upon which these local people are dependent(Measham, 2007). If local people preciselyutilize the available resources, the other communities also desire to be in an environment as the sources are unsustainable(Hussain et al., 2017). For the improved management of the natural resources in a local setup, the significant factors include education, collaboration, site, and attitudes of society inhabitants. Hussain et al. (Hussain et al., 2017) declared that if societies remain confined to environment natural area to foot traffic, it allows the sustainable society by limiting collection transportation and dissipation of management society.

The organization of parks frequently leads toward a difference among local inhabitants and park managers. One of the most important aspects of societies in China has been limiting the behavior of local communities, which leads towards bitterness to parks. Most of the parks in China have been made in lands where local people reside, and the parks contain settlements and farms. The resident's concentration in most of the parks and reserves exceeds 60 people kilometer square. Inhabitants mostly depend on forests which are present in the surrounding of their living. They persist in utilizing the forest and its sources(Wang et al., 2012). One of the solutions is to re-locate people to the lands which are present away from the park. The needs to be successful when with younger people and those people who are living away from roads are most vulnerable to acknowledge rearrangement(Xu et al., 2006) Most of the literature has shown that reimbursement is insufficient, and there are minimum opportunities of finding a job in the new area which leads towards extra discouragement(Huang et al., 2008). More economic opportunities will be there when the area is closer to the main road and people usually do not prefer to re-locate. Park zoning using functional scientific approaches and Geographic Information Systems (GIS) to take full advantage of both species safety using habitation suitability indices and social profit using community suitability indices; may aid in such relocation of hard work and guarantee their achievement in maintaining the equilibrium between economic, social and ecological elements of parks (Liu & Li, 2008).

The Broghil National Park peatlands are thought to play a useful ecological role as storage of water points, providing habitat for birds, as a source of food for living animals as well as for wildlife and an essential sink for greenhouse gases at those altitudes(Khan, 2015). Natives in the Peruvian Amazon do not utilize peat itself. However, peatland places supply livelihoods and economic benefit to the local community indirectly, through the plant and animal sources that can originate there (Schulz et al., 2019). Incomplete comprehension and experience means that the use of turf varies. The understanding of peat as an agricultural country may differ from community to community that used to live in peatlands, including tribal immigrants from Java, Madurah, Nusa Tenggara, Bali, and others who have a tradition of agriculture on the highlands (Osaki et al., 2016). The Rueff (Rueff, 2014) acknowledged that too much use of peatlands is the leading cause of failure of habitat for main wildlife species, a reduction in both overly populated region and efficiency of grazing areas, enhanced emission of greenhouse gasses (GHGs), and excessive respiratory troubles within the human community because of utilizing peat as a resource of domestic energy.

Most of the continent is covered by East and Southeast Asia. Compared with the remaining sites in Asia, they have an essential source of renewable and non-renewable resources. The conservation of natural resources has brought many disputes around the world to societies in these regions. "Nations have been often struggling to maintain, or resist control, on war materials, energy supply, land, river basins, sea passages, and other important environmental resources," stresses the World Environment and Development Commission (Wilson and Tisdell, 2003). Driving forces, pressure, state, impact and responses (DPSIR) is a theoretical structure to report on environmental changes in the sustainable environment of complex systems. The DPSIR approach Driving forces are those that allow human action to change the climate. The pressure is defined as a problem in the environment, the state component represents the domain's current status (within the scope of analysis), impact refers to specific damages and answers represent a source of actions to promote environmental conditions. This is a valuable method to analyze socio-economic and environmental concerns simultaneously (Biswas et al., 2012).

National Park biodiversity conservation is done through two main approaches. One approach is the conservation approach aimed at setting aside national parks to exclude human activities except tourism. This approach prohibits direct use of natural park resources for commercial or subsistence purposes (Adams, 2013). This type of approach is often called "protectionism approach" or "fines and fences" approach (Adams, 2013). The restoration strategy seeks to exclude practices that are deemed contrary to National Parks biodiversity conservation goals. The preservation approach was the most prevalent approach until the 1980s, but in some national parks it has now been replaced by the second approach called the community-based conservation approach that enables people (especially those neighboring national parks) to benefit from parks socially or economically (Mansourian et al., 2010). In order to tackle the problems associated with removing human activities from the Park, the community based conservation solution was suggested(Mansourian et al., 2010). The community-based approach to conservation includes programs intended to protect the biodiversity of the park but also to benefit local residents from the park (Galvin et al., 2006). Some initiative requires the signature of agreements for resource use in the Rwenzori Mountains National Park that will give local citizens who are neighboring national parks access to unique resources in the park for their livelihoods(Tumusiime et al., 2011). In other instances, local people receive money for infrastructural development, such as the Integrated Conservation and Development Project in Cameroon's Korup National Park (Muhumuza& Balkwill, 2013). And in other national parks including Benin's Pendjari National Park, local people get a percentage of income from the park's tourism activities (Muhumuza & Balkwill, 2013).

The inability to preserve biodiversity in National Parks was due to limiting access to resources by local citizens around the park. For example, Shackleton et al. (Shackleton et al., 2002)attribute failure to preserve biodiversity in three Ugandan national parks to limit access to park resources. Restricted access caused negative attitudes in local residents to the park's nature, resulting in some people committing criminal activities in the park. Negative attitudes towards protected areas in Western Serengeti, for example, correlated with restrictions on access to pasture and livestock water(Kideghesho et al., 2007). Similarly, a study by Vodouhê et al. (Vodouhê et al., 2010)revealed that 92 percent of people (principally farmers) who were interrogated about their approach to the protection of Pendjaris National Park had expressed a clear negative opinion about park management's decision to ban agricultural activity within the park's borders. In the same study 98 per cent of livestock farmers commented negatively on the decision of workers of the Pendjari National Park to ban livestock farming(Vodouhê et al., 2010). While it was claimed that the local population did not have access to park services, it failed to preserve biodiversity in parks National Parks by continuously patrolling and physically protecting the park (Vodouhê et al., 2010). However, successful conservation through restricted

access was supported by presence of a clearly demarcated border (Bruner et al., 2001). Roe et al. (Roe et al., 2000) suggest that with the presence of a clearly demarcated border, park resources can be clearly segregated and agreed upon by users, although they note that the mobility of animals frustrates this especially under game cropping arrangements.

3.0 Methodology

The purpose of this study is to identify the depleting natural resources in Broghil National Park and its impact on the local communities. This study used a mixed approach. Data was collected using both qualitative and quantitative methods.

3.1 Study Area

This study is conducted in Broghil National Park (BNP). It is situated between latitudes 36o-42" and 36 o-55 "North and longitudes 73o -13" and 73o52" East. The BNP, which has its limits extended south of Broghil valley in a small part of Yarkhun valley, is situated between 36o-40" and 36o-55" North latitudes and 73o-52" 73o-58" east longitudes. It is located about 250km north of Chitral wherefrom the Chitral River originates. The BNP boundaries cover the Broghil valley with about 1250 km2 and an additional area of about 100 km2 of Yarkhun valley. This extra area gives a buffer effect to the central Broghil valley (Shah, 2012). BNP borders in the north and west with the historical Wakhan Corridor of Afghanistan. The east and south borders with Yasin and Ghizer valleys of Gilgit-Baltistan (G.B) and Yarkhun valley is laid to the south-west of Chitral District. It is a sword-shaped valley protruding like a tongue or panhandle to Chitral in the same way as Wakhan strip makes a panhandle or tongue to Afghanistan. Broghil pass is almost in the middle of Broghil valley and the valley runs barely from north-east to southwest (Shah, 2012).

3.2 Sampling technique

The technique of sampling applied on this study was Purposive Sampling, which according to Black (2010) means "Non-probability sampling process and occurs when the researcher judges selected elements for the sample. Researchers also assume that by using a sound evaluation they can obtain a representative sample which saves time and money."The reason for selecting purposive sampling is to target the exact respondents from the population of our choice; in this case it was the heads of villages located in the core zone of Broghil National Park to analyze the patterns of resource utilization.

3.3 Sample Size

Sample is defined as "A small proportion of a population selected for observation and analysis. It is a collection consisting of a part or sub-set of the objects or individuals of population which is selected for the express purpose of representing the population." (Pandey &Pandey, 2015). Sample is the true representative of the universe that inhibits all characteristics of the entire population. A sample size of around 12 respondents from study area was selected which includes heads of 12 villages located in the core zone of Broghil National Park. The reason behind choosing the 12 heads was to include the point of views of all the individuals from the park in order to analyze the patterns on which they are depleting the natural resources and what will be its impact on them in the future. The qualitative data was taken from the researches, journal, reports, relevant departments and two online interviews from:

- Divisional Forest Officer, Wildlife Department Chitral
- Nazim of Broghil Valley

3.4 Data Collection

Data collection explains how information is gathered. There are various data collection methods such as questionnaires, interviews, schedules, observation techniques and rating scales. Depending on the survey design, these methods can be used separately or combined. An essential part of statistical work is perhaps data collection. The researcher develops a questionnaire and interview schedule to collect data for this study.

3.4.1 Questionnaire

The data collection tool used to collect data from the heads (Nambardars) of villages located in the core zone of Broghil National Park was based on a well-designed and pre-tested survey questionnaire. The questionnaire was to support the quantitative as well as the qualitative side of the data collection. The questionnaire was developed from a review of previous research on natural resource depletion and its impact. The first survey reviewed was from the study of (Archer & Griffin, 2005) at University of Technology, Sydney (UTS) to investigate the reasons of depletion of natural resources in national parks and another study reviewed was developed (Shinas, 2017) who analyzes the factors that affect the conditions of natural resources. Both the studies gave me insight on creating my own set of questions. The questionnaire measured the depletion of natural resources while living in the core zone of National Park. The questionnaire contained different questions. Those were divided into different themes to measure the availability and depletion pattern of natural resources. For the purpose of this study the questionnaire was prepared in English for academic purpose but questions were asked in local language of Broghil Valley and Urdu to facilitate the respondents.

3.4.2 Interview schedule

Structured interviews are in essence, orally administered questionnaires in which a list of preset questions is answered, with little to no variance and no space for follow-up questions to answers that require further elaboration. Consequently, they are reasonably fast and simple to administer and can be of particular benefit if clarification of certain questions is needed or if the respondents are likely to have literacy or numeracy issues (Gill et al., 2008). It is considered as an appropriate tool to get the required information. The reasons for choosing the interview schedule as a tool for qualitative data collection were:

1. Interview schedule was used to express the respondents' true meanings of the questions. The researcher should clarify such questions that respondents could not easily and properly comprehend.
2. While answering the researcher could control the environment, question order and non-verbal behavior of the respondents.
3. Through interview schedule, researcher gain more response of the respondent, therefore, interviews are preferred during qualitative part of research.

The online semi-structured interviews were conducted from the Divisional Forest Officer (DFO) and Nazim of Broghil Valley.

3.5 Data Analysis

The data of the study was gathered from the questionnaire and the interviews. To analyze the data from the questionnaires descriptive study was used. Once the sample size was attained the data was put to Microsoft office excels spreadsheet in graphical and tabulation form. It had been presented in a manner that would be understood by research users. The qualitative data from the interviews and reports was analyzed using thematic analysis.

4.0 Results and Discussions

4.1Land Distribution of Broghil National Park

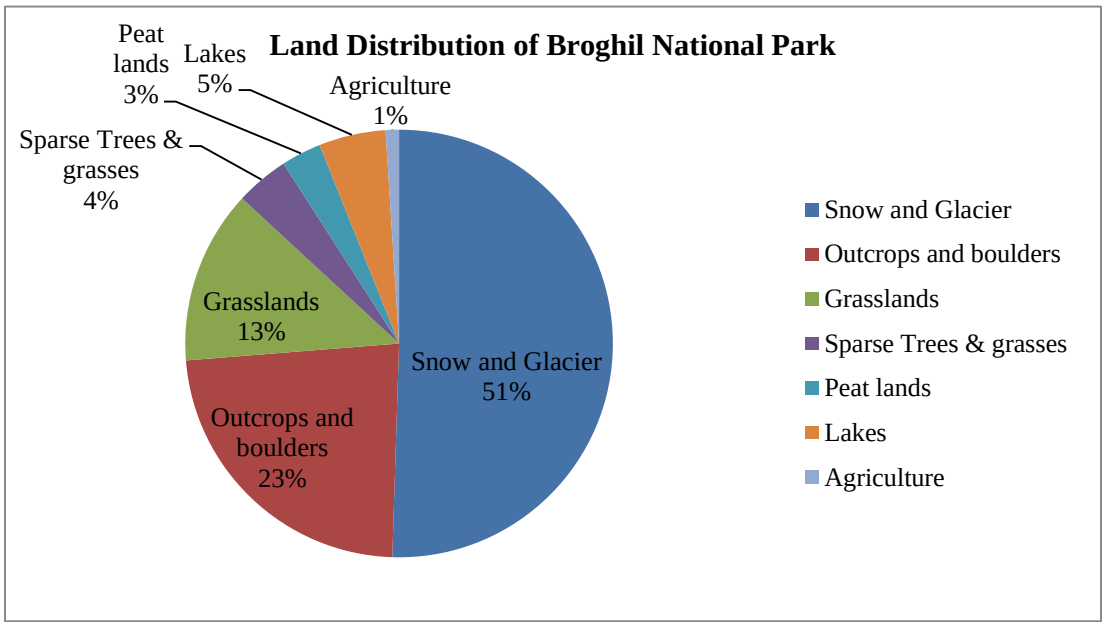

Figure 1: Land Distribution of Broghile National Park

The above pie chart shows the distribution of the land of BNP. Snow and glaciers covered the land the most, at 51%. Outcrops and boulders have the second-highest land coverage, at 23%. Grasslands coverage represents 13% of the total. Lakes coverage of land is 5%, followed closely by sparse trees and grasses at 4%, and then peatlands at 3%. The smallest land coverage of land is agriculture, at 1%. The graph shows that overall land coverage is not widely dispersed among land types; snow and glaciers has a majority share in BNP.

4.2 Depletion of Peatlands and Fuelwood

4.2.1 Source Distribution of Energy to Household in BNP

The results in the below graph indicate that 57% people in the core zone of BNP are using peatlands for energy. The majority of respondents opt for peatlands for household purposes as it is the only energy resource that is available all over the year. Fuelwood comes as the second most used energy source for household purposes. Fuelwood is followed by animal dung, which is preferred by 14%. Agricultural resources and PWP Fuel Efficient Gadget are less used in energy resources. Reading, the least energy resource use by the households represents only two percent. The respondents from the villages at lower elevations use fuelwood, animal dung and agricultural residues as a primary source of energy.

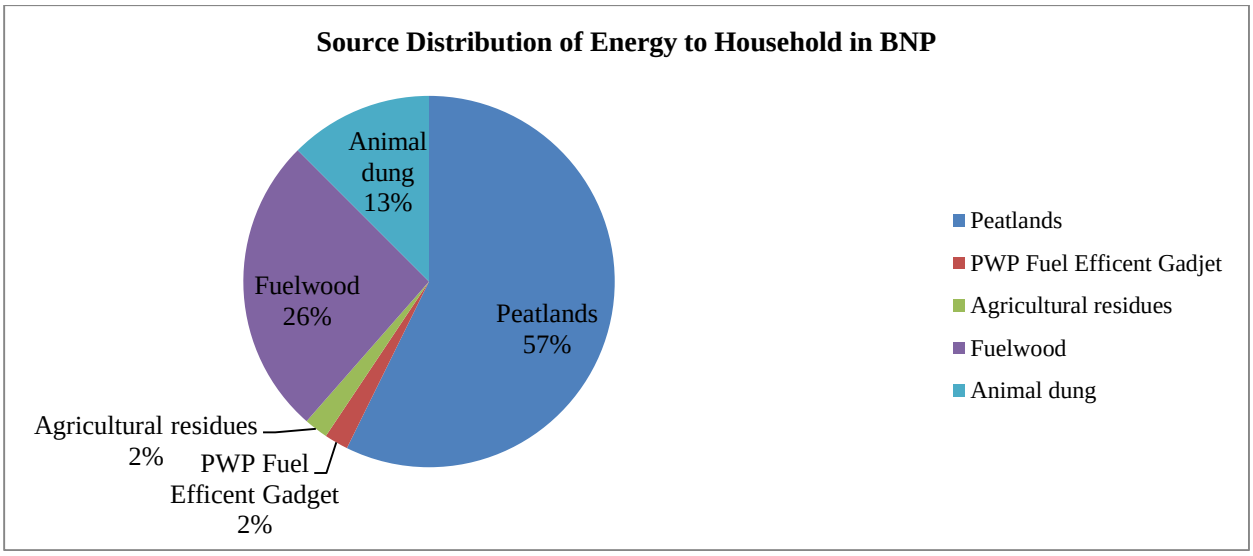

Figure 2: Source Distribution of Energy to Household in BNP

4.2.2 Annual timing of Peat Use in BNP (intensity of use/ supply on a scale of 1 [lowest] to 3 [highest])

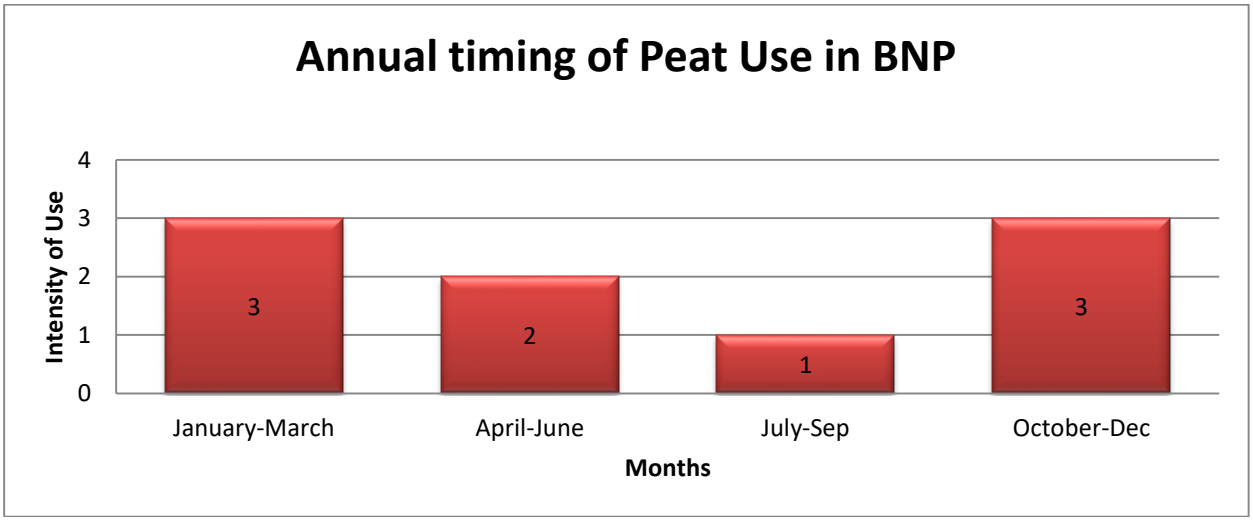

Figure 3: Annual timing of Peat Use in BNP

The graph illustrates that October to March are the critical months as in these months, peat use is high and low from July to September. One of the respondents (R1, community, September, 2020.) mentioned, “In summers the use of peat is limited, as our household energy requirements are met by other sources, such as fuelwood, animal dung and agricultural residues. High in winter, however as heavy snowfall and low temperatures limit local community mobility and increase the demand for energy, which is regularly met by burning peat.”

4.2.3 Annual timing of Fuelwood Use in BNP (intensity of use/ supply on a scale of 1 [lowest] to 3 [highest])

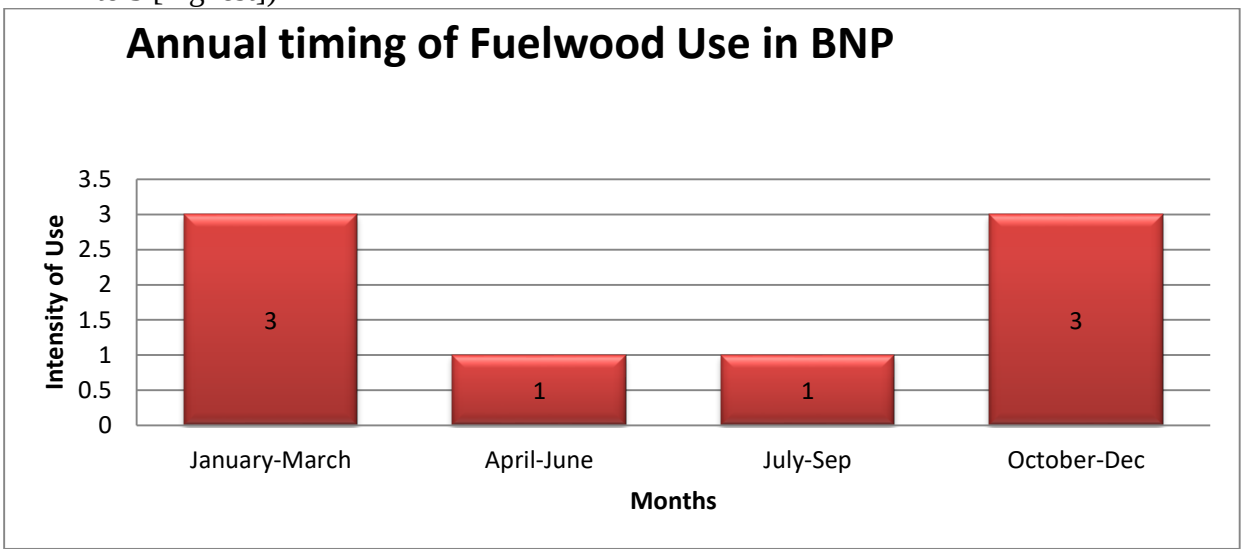

Figure 4: Annual timing of Fuelwood Use in BNP

As visible from the above graph, the use of fuelwood is high from January to March and October to December and low from April to June and July to September. The use of fuelwood is only high in the Kismanjha, Jungle, Garamchasma, Koi and Vadinkhot due to some remains of birch, willow and juniper forests in these villages.

Respondents when asked the questions that if the government puts a permanent ban on peat and fuelwood consumption and provides an alternative to you would you switch? All respondents opted for the first option is given, i.e. will switch if other resources are made affordable. No one opted for the option that read as "will oppose the decision and strike" and "will transgress the law and claim our rights". It is a clear depiction of the development of the social psyche, bearing in mind that Broghil Valley is a rural area with large chunks of peatlands of Pakistan; while the locals are taking ownership and management rights to a BNP with which they associate their social values.

4.3 Depletion of Pastures

4.3.1 Pasturing Livestock Population in Broghil Valley

It is visible from the below graph that goats have the highest number in the grazing of animals. Sheep has the second-highest number in the grazing of animals. Sheep are followed by Yaks, which are 2828 in number. The pasturing livestock population of cows, oxen, horses and donkey is fewer than goat, sheep, and yak populations. A respondent(R2, community, September, 2020.) said that "Livestock meets the major part of food requirements. It the primary source of cash income which is used for the purchase of food commodities and all social and livelihood stuffs in Broghil Valley". As the contribution of livestock to the household economy is almost 90%. With the arrival of autumn, 10-15 percent livestock is marketed before the snowfall. The main markets are Gilgit and Chitral for their livestock. Major portion of livestock is taken by the animal dealers, from Gilgit and Chital, who visit the Broghil valley during August and September when the animals have reasonably good health after summer pasturing.

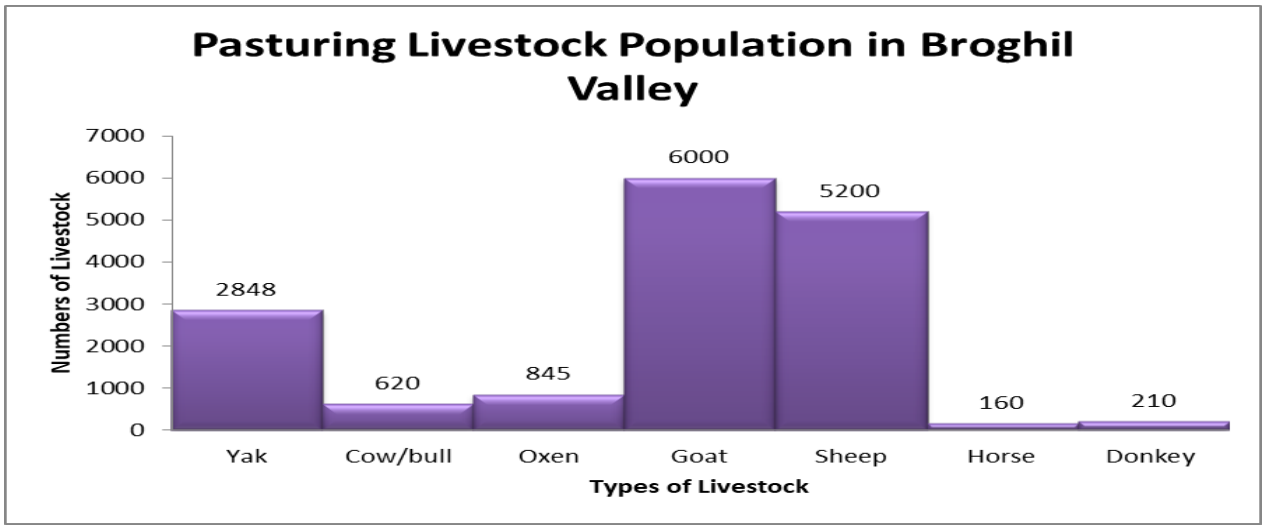

Figure 5: Pasturing Livestock Population in Broghil Valley

4.3.2 Utilization of Major Pastures by Communities of Villages

The below table displays the utilization of major pastures by the local communities of Broghil Valley in BNP. Rabat and Chokzard pastures were declared as communal pastures by the government and every village has given its share. The communities of village Lashkargaz are utilizing the highest numbers of pastures that is four along with the two communal pastures. Other than communal pastures, the residents of villages Kishmanja, Koi, Arquan, Maidan, Ishkarwarz, Vandinkot, Jungle and Chilmarabad are utilizing different single government owned pastures. One of the respondents(R3, community, September, 2020.)said that "some of the villages in Broghil Valley have extracted almost 90% of their share of the communal pastures". The pastures are self-generating and self-maintaining vegetation used for livestock grazing but the villages of Broghil Valley utilizing greater than its regenerating capacity.

#	**Pasture**	**User Village Communities**
1	Vandanil	Kishmanja, Chikar
2	Mian Koh	Koi
3	Ghalyat	Garamchashma
4	Qulquldi	Garamchashma
5	SakhirXerao	Arquan, Maidan
6	Barban Pasture	Chikar
7	Kamk	Ishkarwarz
8	BroghilGhari	Chilmarabad
9	Zoil	Gharil
10	Rokhansil	Gharil
11	Door Mergich	Gharil
12	Irshad	Lashkargaz
13	Showarsher	Lashkargaz
14	Lalehy Rabat	Lashkargaz
15	BaribanMergich	Lashkargaz
16	Rabat	Communal Pasture
17	Chokzard	Communal Pasture

18	Vadinkhot	Vadinkhot
19	Jungle	Jungle

Table4.3.2 : Utilization of Major Pastures by Communities of Villages

4.3.3Annual timing of Pasture Use in BNP (intensity of use/ supply on a scale of 1 [lowest] to 3 [highest])

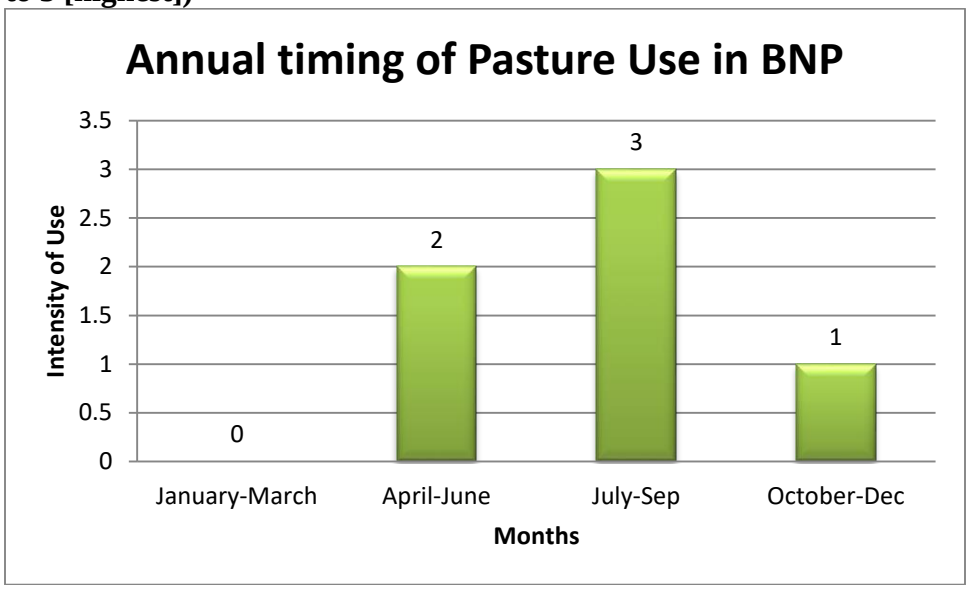

Figure 6: Annual timing of Pasture Use in BNP

The above graph provides an analysis of the annual timing of pasture use in BNP by the local communities. As visible from the graph, July to September is a peak time for using pastures and then steadily declined from October to December as grazing level is low. There is no use of pastures from January to March as they are cover with snow.

Awareness about Impact of Resource Depletion

Below figure shows the data on Awareness about the impact of resource depletion. It is visible from the graph that 9 of the heads (Nambardars) are not aware of the effects of resource depletion. Due to the lack of education and awareness, they are misusing the natural resources of BNP. According to them, the resources are present on their ancestors land and now undertaken by the government on the name of BNP. 2 of the heads are aware of resource depletion as they are trained under resource management awareness campaigns. But the respondents mentioned that it is very expensive to use the alternatives on their own budget. The one head that opted for maybe said that he is aware of resource depletion effects but not ready to utilize the resources based on conservation until the government provides some alternatives or aid.

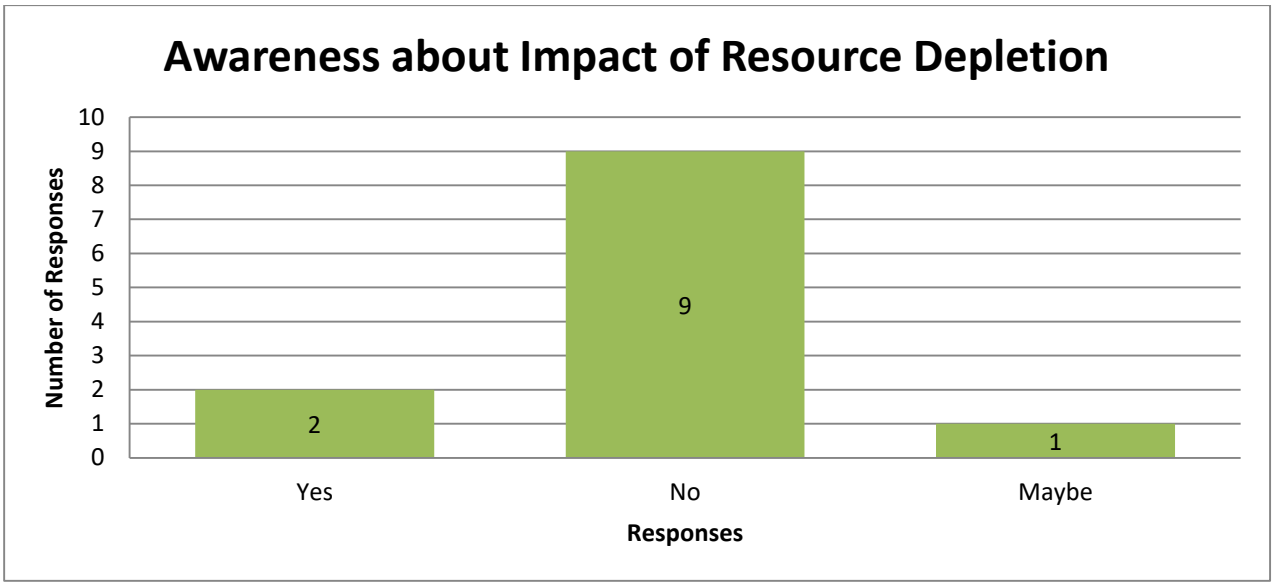

Figure 7: Awareness about Impact of Resource Depletion

4.4 Access to Natural Resources of BNP

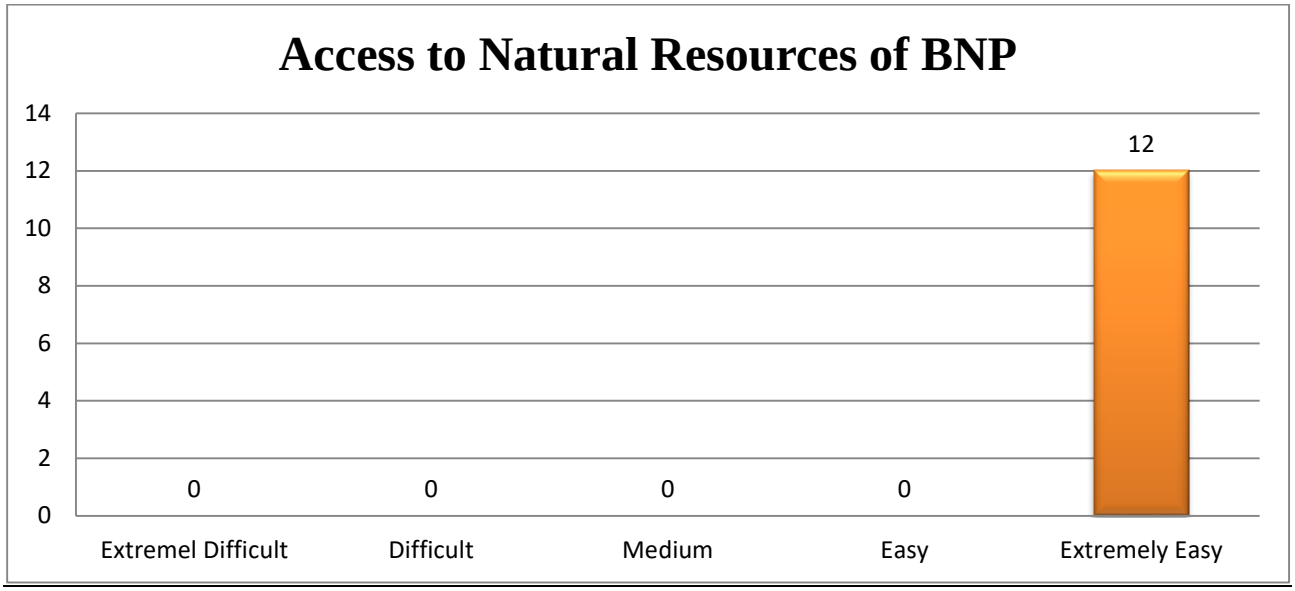

Figure 8 : Access to Natural Resources of BNP

The above figure shows that it is extremely easy to access the natural resources of BNP as there is no law enforcement in the park. One of the respondent mentioned that "they utilize the natural resources of the park until government provide them with the alternatives and employment.

4.5 Training in Natural Resource Management and Administration

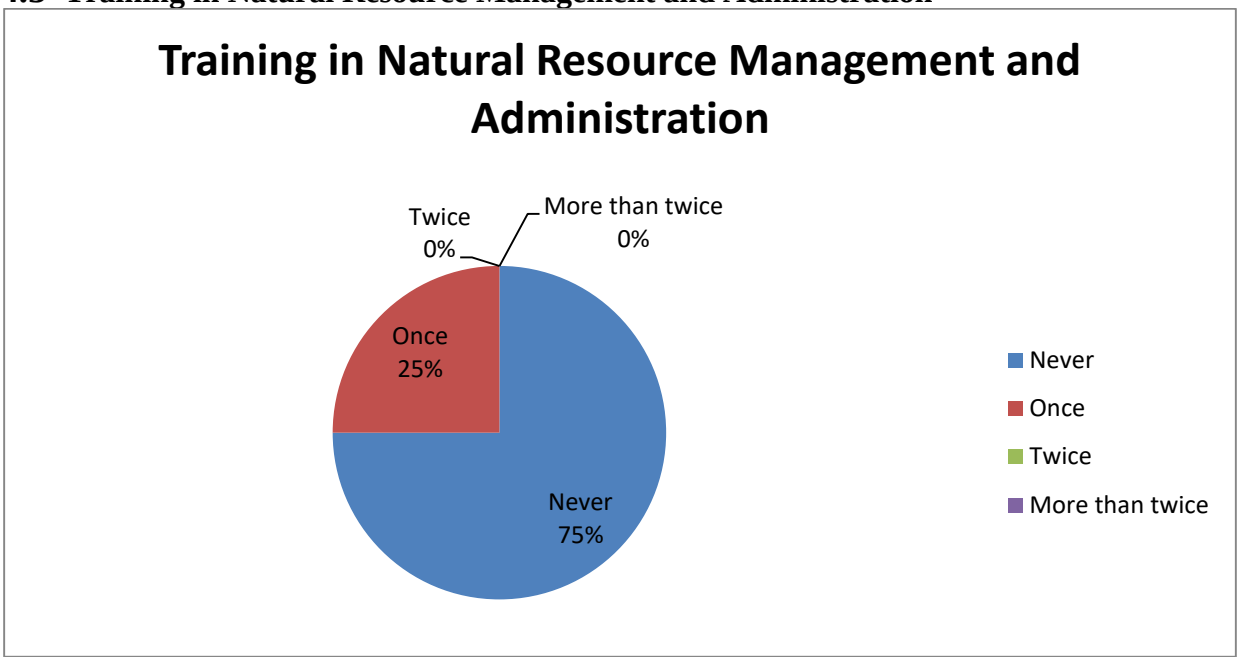

Figure 9: Training in Natural Resource Management and Administration

According to the above graph ¾ of the villages that is 75% have never received any training in natural resource management and administration due to the area's remoteness and poor infrastructure. On the other side, only 25 percent received training, as minimal awareness programs were conducted there.

4.6 Experience of DFO, Wildlife Office Chitral and Nazim of Broghil Valley

Data from the study revealed that resource depletion in BNP has extremely adverse effects on the local communities of Broghil Valley. They explicitly pointed out that one of the major reasons for resource depletion is excessive population growth. As Chairman Amin Jan mentioned, "If the exploitation of resources will not get under control in the next few years, then life will become tough in Broghil Valley. It is impossible to restrict people from misusing natural resources." Further, DFO said that "It diminishes the carrying capacity of pastures on which local communities' livelihoods are dependent. It may result in forced migration to Chitral, Gilgit, or other nearby areas. Unfortunately, the government did not provide any incentives and alternatives while establishing the national park other than communal share in various natural resources. It is highly costly to buy fuelwood alternatives from Chitral as the transportation costs almost half of the alternative." The respondents also mentioned that BNP's ecology will be compromised very severely and the rare bird species will migrate from there.

BNP is home to many large glaciers. The largest glacier in Broghil valley is Chiantar Glacier of 34 km length at the north-eastern end, which lies the Qurambar Lake at elevated position like a water plateau with about 2.7 square kilometers area. The respondents mentioned that generally, glaciers melt from the bottom as they are white and reflect sunlight. The 12 villages of Broghil Valley completely occupy the core zone of the park. DFO said that "Broghil Valley has unpaved road and when it is used for daily transportation, it causes enormous strains on glaciers. Even a single spot is enough for the depletion of a glacier." Chairman of Broghil Valley mentioned that "the people of Broghil Valley do not understand that the excessive burning of peat will result in the glaciers outburst and may lead to disastrous floods." The respondents also highlighted the lack of education as the core cause of resource depletion.

The primary source of livelihood of the local communities living in the core zone is Yak farming and livestock. While discussing the scope of trophy hunting in BNP, the Chairman of Broghil Valley said that "we have different wildlife mammals and are willing to utilize them for trophy hunting."
DFO mentioned that "it is difficult for them to monitor BNP's hunting activities as it almost consumes seven days in traveling. The other major reason is that they are fully occupied with the Markhor hunting, conservation activities and Green Life activities in lower Chitral."

5.0 Conclusion

It is concluded that majority of the land of BNP is covered with glaciers and there is very limited agricultural land. Most of the people use peat as a primary source of fuelwood. Resource conservation in BNP is affected by various factors associated with the park's creation and management, local communities' accommodations in the park's core zone, the area where the park is located and the park's financial resource base. These factors are socio-economic and cultural, involving the management of local communities living in the park's core zone. It indicates that future strategies of conserving natural resources in BNP should focus on the human socio-economic dimension of resource conservation as the scientific study of natural resources in the parks. This study has attempted to contribute to what little is known about the park. The researcher in the investigation found that BNP peatlands are under tremendous pressure as the local communities are extracting it daily without considering the future consequences. But on the other hand, burning peat is the only cost-effective option to fulfill the household's domestic fuel requirements. It was also adversely affecting the ecosystem and resulted in the decline of glaciers covered area. The research trend also highlighted that the livestock population is also causing pressures on the pastures and grasslands. Few of the villages have utilized their 90 percent share from communal pastures and now these villages are using the government owned pastures. The use of pastures gets declined in the winters due to the snowfall. As yak farming and livestock is primary source of income generation so it is very difficult to utilize pasture in a sustainable way until the alternatives provided by government. Another important theme that arouse is lack of awareness. The literacy levels are very low due to the remoteness of the area and extended winters. The study reveals that majority of people are not aware of resource depletion. Due to lack of law enforcement, the local communities can easily access the natural resources of park. The mechanism of educating people about the management of natural resources is very difficult. This issue denies the prerequisite of utilizing the natural resources most efficiently. Nevertheless, people do not tend to take measures about improving their environment as they did not associate themselves to their environment. The findings of the study show that due to excessive peat burning and climatic changes will result in glaciers outburst that may lead to disastrous floods.

5.1 Recommendations

1. The utilization of solar energy and wind energy for household use will reduce the pressure on natural resources.
2. The strict policy implementation and monitoring of the natural resources of the park for sustainable conservation.
3. Initiation of awareness-raising programs in the community concerning the limited sustainable use of natural resources.
4. Restoration/rehabilitation of the degraded natural resources through community mobilization.
5. Building an artificial barrier near the glaciers to restrict the warmer water to reach the ice.

References

Luqman, M. (2019). Socio-Economic Factors Determining Tourism in Sheik Baddin National Park DI Khan Khyber PakhtunKhwa.

Khan, M. A. (2020, July 03). Pakistan's 'Protected Areas Initiative'. IUCN.

Shah, S. I. (2012). Management Plan of Broghil National Park. Wildlife Office Chitral. http://kpnationalparks.com.pk/contact-us/

Uddin, S. (2020). Broghil National Park & Karambar Lake, Pakistan. Ecoclub. Retrieved from https://ecoclub.com/blogs/broghil-national-park-broghil-lake-pakistan

Weber, M., Stimm, B., López, M. F., Gerique, A., Pohle, P., Hildebrandt, P., ... & Aguirre, N. (2013). Conservation, management of natural forests and reforestation of pastures to retain and restore current provisioning services. In Ecosystem Services, Biodiversity and Environmental Change in a Tropical Mountain Ecosystem of South Ecuador (pp. 171-185). Springer, Berlin, Heidelberg.

Khan, H., & Baig, S. U. (2020). Biodiversity conservation in the Hindu Kush-Karakoram-Himalayan mountain region of northern Pakistan: Overview of big mammal protection. Journal of Mountain Science, 17(6), 1360–1373.

Arif, A. M., &Shikirullah, A. S. (2019). Tourism problems in Pakistan: An analysis of earlier investigations. WALIA Journal, 35(1), 122–126.

Ali, N. (2010). Re-imagining the nature of development: Biodiversity conservation and pastoral visions in the Northern Areas, Pakistan.

Khan, H. (2004). Demand for eco-tourism: estimating recreational benefits from the margalla hills national park in northern Pakistan.

Stockdale, A., & Barker, A. (2009). Sustainability and the multifunctional landscape: An assessment of approaches to planning and management in the Cairngorms National Park. Land Use Policy, 26(2), 479–492. landusepol.2008.07.001

Hussain, T., Abbas, J., Li, B., Aman, J., & Ali, S. (2017). Natural Resource Management for the World's Highest Park: Community Attitudes on Sustainability for Central Karakoram National Park, Pakistan. Sustainability, 9(6), 972.

Thakadu, O. T. (2005). Success factors in community based natural resources management in northern Botswana: Lessons from practice. Natural Resources Forum, 29(3), 199–212.

Thapa Karki, S. (2013). Do protected areas and conservation incentives contribute to sustainable livelihoods? A case study of Bardia National Park, Nepal. Journal of Environmental Management, 128, 988–999.

Measham, T. G. (2007). Building Capacity for Environmental Management: Local knowledge and rehabilitation on the Gippsland Red Gum Plains. Australian Geographer, 38(2), 145–159.

Wang, G., Innes, J. L., Wu, S. W., Krzyzanowski, J., Yin, Y., Dai, S., Zhang, X., & Liu, S. (2012). National Park Development in China: Conservation or Commercialization? AMBIO, 41(3), 247–261.

Xu, J., Chen, L., Lu, Y., & Fu, B. (2006). Local people's perceptions as decision support for protected area management in Wolong Biosphere Reserve, China. Journal of Environmental Management, 78(4), 362–372.

Huang, Y., Deng, J., Li, J., & Zhong, Y. (2008). Visitors' Attitudes Towards China's National Forest Park Policy, Roles and Functions, and Appropriate Use. Journal of Sustainable Tourism, 16(1), 63–84. https://doi.org/10.2167/jost720.0

Liu, X., & Li, J. (2008). Scientific solutions for the functional zoning of nature reserves in China. Ecological Modelling, 215(1–3), 237–246.

Samiullah Khan. (2015). Qurumber "Karumber" Lake gives up some of its secret.

Osaki, M., Nursyamsi, D., Noor, M., &Segah, H. (2016). Peatland in Indonesia. In Tropical peatland ecosystems (pp. 49-58). Springer, Tokyo.

Rueff, H. (2014). High-Altitude Rangelands and Their Interfaces in the Hindu Kush Himalayas. Mountain Research and Development, 34(3), 305..

Biswas, S., Swanson, M. E., &Vacik, H. (2012). Natural resources depletion in hill areas of Bangladesh: A review. Journal of Mountain Science, 9(2), 147–156.

Adams, W. M. (2013). Against extinction: the story of conservation. Earthscan

Mansourian, S., Stolton, S., & Dudley, N. (2010). Valuing Protected Areas.

Galvin, K. A., Thornton, P. K., de Pinho, J. R., Sunderland, J., & Boone, R. B. (2006). Integrated Modeling and its Potential for Resolving Conflicts between Conservation and People in the Rangelands of East Africa. Human Ecology, 34(2), 155–183.

Tumusiime, D. M., Vedeld, P., &Gombya-Ssembajjwe, W. (2011). Breaking the law? Illegal livelihoods from a Protected Area in Uganda. Forest Policy and Economics, 13(4), 273–283.

Muhumuza, M., & Balkwill, K. (2013). Factors Affecting the Success of Conserving Biodiversity in National Parks: A Review of Case Studies from Africa. International Journal of Biodiversity, 2013, 1–20.

Shackleton, S., Campbell, B., Wollenberg, E., & Edmunds, D. (2002). Devolution and community-based natural resource management: Creating space for local people to participate and benefit. Natural resource perspectives, 76(1), 1-6.

Kideghesho, J. R., Røskaft, E., &Kaltenborn, B. P. (2007). Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania. Biodiversity and Conservation, 16(7), 2213–2230.

Vodouhê, F. G., Coulibaly, O., Adégbidi, A., &Sinsin, B. (2010). Community perception of biodiversity conservation within protected areas in Benin. Forest Policy and Economics, 12(7), 505–512.

Bruner, A. G., Gullison, R. E., Rice, R. E., & Da Fonseca, G. A. (2001). Effectiveness of parks in protecting tropical biodiversity. Science, 291(5501), 125-128

Roe, Pathak, N., & Gutierrez, D., I. (2000). Evaluating Eden: exploring the myths and realities of community-based wildlife management; series overview (No. 8). IIED.

Pandey, P., & Pandey, M. M. (2015). Research methodology: Tools and techniques. Romania: Bridge Center

Archer, D. J., & Griffin, T. (2005). A study of visitor use and satisfaction in Mungo National Park. Sustainable Tourism CRC.

Gill, Paul, Kate Stewart, Elizabeth Treasure, and Barbara Chadwick. "Methods of data collection in qualitative research: interviews and focus groups." British dental journal 204, no. 6 (2008): 291-295.