

# Assessment of Flora and Biomes of Baghlan province: Afghanistan

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**Abstract:** *Vegetation cover and the number of natural flora on the planet vary from each region to another. Due to photosynthetic and vital role of flora and also air purification and control of Carbon dioxide it is important to study the flora of a region. Therefore, the main objective of this study is the general explanation of the flora of Baghlan, which has a large variety of plant species. The study aims to find out those potential plant species which are existed in three districts of Khenjan, Andarabs and TalaBarfak. Biomes of plant's flora have evolved over a very long time as a result of the interactions of environmental factors such as climate and biological factors. Each vegetable flora biome consists of a combination of the smaller communities that are created by environmental and local conditions. The divisions of the biomes are more or less transverse on the Earth, and the same biomes can be found in similar latitudes, especially in the case of tundra, coniferous forests and deserts. In high mountains, such as the Hindu Kush, the division of biomes is more dependent on altitude, and in nature the formation of biomes is dependent on altitude and geography.*

**Key Words:** *Flora, Andarab District, Tala Barfak District, Doshi District, Biomes, Potential plant species*

## 1. INTRODUCTION:

Plants flora on the Earth is diverse and natural, and these plants flora are photosynthetic. They provide us clean air and control the amount of carbon dioxide in the atmosphere. Natural plants flora biomes have evolved over a very long period of time due to the interactions of environmental factors such as climate and biological factors. In this paper, the main purpose is to assess the forms of Baghlan province flora, the ecosystem of plant communities of Baghlan Province and also to find out the potential Plant species in this province especially in three districts of Khenjan, Andarab valley and Doshi.

## 2. PROBLEM STATEMENT:

Plants ecosystems are the most important natural resources that cover 30% of the Earth's surface. Their role is to maintain temperature equilibrium, oxygenation, and to sequester carbon in their biomass. Baghlan is also one of the provinces with various plant species. There are many forests and other vegetation cover which are unknown and has not been studied yet. Therefore, the research will fill this gap of knowledge.

**3. METHODOLOGY:** The present research is based on existence literature reviews and field observation.

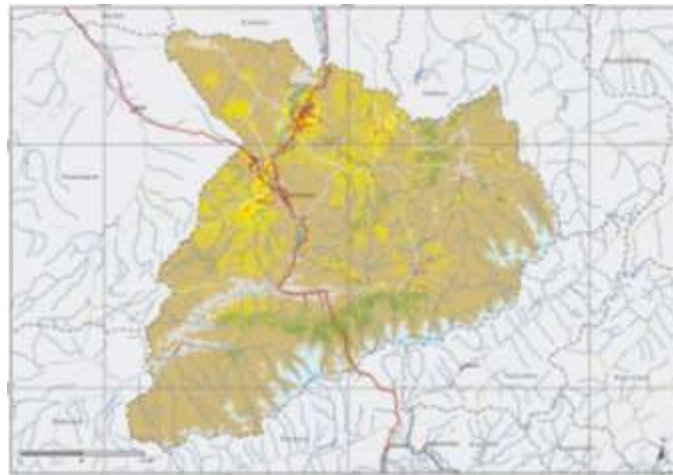
## 4. LITERATURE REVIEW :

### Plants Ecosystems

Plants ecosystems are the most important natural resources that cover 30% of the Earth's surface. Their role is to maintain temperature equilibrium, oxygenation, and to sequester carbon in their biomass, The term of plants ecosystem was first introduced in 1935 by the English ecologist tensely. He introduced the specific ecosystems of plant communities to the whole world. He has applied the term specifically to biological organizations such as the community of plants biomes. According to tensely the ecosystem is a specific unit of ecology that examines the cover of a specific flora. Since historical times, important natural flora of a region such as the tundra, coniferous forests, deciduous forests, shrubs and grasslands have attracted many of ecologists and push them to study the flora in all environmental conditions (2: 70).

## 5. Study area (Baghlan province):

Baghlan is one of the northeastern provinces of Afghanistan, located between a height of 68-69.97 degrees north and a length of 35- 36.57 degrees east, and is 550 m above the sea level. From the east is neighbor with the provinces of Takhar and Panjshir, from the west with the provinces of Balkh, Samangan and Bamyan, from the north with the provinces of Takhar and Kunduz and from the south with Parwan province. Its distance from Kabul 241 km. Its area is 18255.2 km<sup>2</sup> and Pulley- Khumri city is its center (6: 39).



**Figure 1: Land Cover Map of Baghlan Province**

Flora refers to all vegetation cover on the surface of any region, such as trees, shrubs and rangeland species found in natural and artificial habitats (9: 131).

Based on the geographical location of Afghanistan, it should have a desert climate, but the Hindu Kush Mountains have changed the climate in the country and also caused the population to settle there.

Baghlan is one of the provinces located in the northern parts of the Hindu Kush Mountains, with steppe and mountain climates. The southern, south-western and southeastern parts of the province have alpine tundra climate due to the existence of high altitude of the Hindu Kush mountain ranges. As, the temperature in the mountainous highlands are decreasing and the rainfall is rising, thus the temperature in the elevations of these hills are much lower than the lowlands at the base of the mountain and the precipitation is several times higher. Snow falls as small particles on the surface of the slopes and their neighboring areas occurs from those clouds which are at the same height of the slopes. These cause heavy snow falls with mountainous heavy winds in form of storms. Due to such kind of storms dangerous and deadly avalanche occur. With the exception of the mountainous areas, other parts of this province have a steppe climate. In the steppe region, the snowfall in winter season and rainfall is dependent on temperature (7: 56-57).

### **5.1 Forest Flora of Baghlan Province**

The forest is a complex community whose structure is like human society. This community includes trees, shrubs, and even animals. So, the forest comes from the accumulation of a number of trees and plants that affect not only each other, but also on their environment (5: 35 -36).

Researches have shown that the temperature of forested areas is 10 ° C cooler and 10% more humid than the non-forested environment. In addition, the forests absorb harmful gases and radioactive radiation and prevent danger to humans and affect the rate of rainfall and climate change. Although Baghlan province is outside the country's forest provinces, nevertheless the evergreen forests of Junipers species are scattered over vast areas of Khenjan, Khost, Firing, TalaBarfak, Andarab, Nahrin, Berka, Dhaneh Ghorri and Guzargah-e-Noor districts. Among the deciduous forests of this province we can name pistachio, *Pyrus malus* (apple), *Amygdalus reuteri* (mountain almond), *Populus Alba*, *Platanus orientalis*, and *Tamarise dioica* which are distributed in some districts of the province (5: 9-11).

According to the provincial directorate of forests and range lands report of Baghlan Province Agriculture and Irrigation Department, the natural forest cover in 2006 was about 38,300 ha while the Ministry of Agriculture's statistics reports it was about 87,540 ha in 1967 in Baghlan province. This shows a decrease of 56% of forest cover in this province. Some forested areas are converted into agricultural lands, settlements and villages. This land use change pushed wild animals to leave their habitats and look for other suitable and safe locations to stay alive or they were hunted down by people. The main cause of these changes and devastations are war, poverty, and the people's lack of awareness of the importance of natural resources. Even the eradication of pistachio and almond forests for fuel and over exploitation medical plants to sell them to some companies are also other causes of vegetation cover reduction in Baghlan province (1: 109).

### **5.2 Flora of Khenjan District**

Flora refers to all vegetation cover on the surface of any region, such as trees, shrubs and rangeland species found in natural and artificial habitats (9: 131).

Khenjan district is located 72 km far from PulleyKhumri city. Its people are engaged in animal husbandry, gardening and agriculture. Khenjan shares a border with the Salang district of Parwan province in the tunnel that connects Kabul with nine northeastern provinces. The border between the two provinces lies at a latitude of 35 °, 17

min and 35 sec and 35 ° and 19 min north and 69 ° 1 min and 30 sec and 69 °, 3 min eastern longitude. Snowfall on slopes of Hindu Kush Mountains during the winter causes flow of water to the Amu Basin at north and to the Kabul Basin at south of the country. Thus, Khenjan district has a cold and humid climate with temperate summers and cold winters.

The Khenjan Valley extends from north of the Salang tunnel to Khenjan, but the southern Salang Valley extends from south of the tunnel to Jabally Saraj. Accordingly, Khenjan villages are located in the north of Salang and Jabally-Saraj villages are located in the south of Salang, and these two areas in terms of geographical separation represent the same natural flora.

Agricultural lands can be found at the beginning of Khenjan valley. But, the middle and last part of the valley is quite lively and full of grass. The climate and grasslands of the valley make the valley an excellent place for grazing of animals. Livestock production of Khenjan district is very famous in Afghanistan. These products are dry cream, cheese, and dry yogurt.

There is also forest cover of *Morus Alba* (mulberry), *populous Alba*, *Pinus nigras*, *Deodar pine*, *Pistacea uera* (pistachio) and *Pinus gerardiana* (peanut). Especially, Khenjan mulberry is famous in all over Afghanistan. The climate of this district is alpine tundra. Most of the areas in the Khenjan district have mountainous ecosystems (8: 79-80).

### 5.3 Flora of the Andarab Valleys

The Andarab Valley belongs to the province of Baghlan, which is located on height of 69 degrees, 49 minutes and 11 seconds east longitude, and length of 35 degrees, 47 minute and 42 seconds north latitude. It is located in the north of the Hindu-Kush Mountains. The beautiful Andarab Valley can be defined by its delectable natural landscapes of cool and nice weather.

The valleys of this area are landscaped with forests and grasslands. Most of the Andarab valleys such as Sardara, Arezoo, and Parandy have natural forests such as *Deodar pine*, *Pistacea uera* (pistachio) and *Amygdalus reuteri* (almonds). Most of the forests in this area have been destroyed by livestock especially by goat which is a very harmful animal. The first thing the ministry should do is to impose severe restrictions on cutting down natural forests. Second, to prevent people from breeding goats and instead encourage the breeding of sheep.

Apart from the pistachio and almond forests in Andarab, there are *Pyrus malus* (apple), *Prunus avium* (cherry), *Punica granatum* (pomegranate), *populous Alba*, and *Morus Alba* (mulberry) trees. Its apple is very popular in Afghanistan and has a special and pleasant taste. Besides forests, there are shrubs and grasslands which are scattered in all parts of these valleys. But, the grasslands of Andarab are usually used as pastures since ancient times. Furthermore, most of these pasturelands have changed to agricultural rainfed lands where it is not used substantially (3: 80)

### 5.4 Flora of Doshi and TalaBarfak Districts

These two districts are located between 68 °, 1 minute and 54 second's eastern longitude and 35 degrees, 1 minute and 48 second's northern latitude. These two districts are located in a high mountain range, and have mountainous, but some areas have alpine tundra climate. The temperature in these two districts is not so high. The most cultivated crops are *Triticum aestivum* (wheat), *Hordeum vulgare* (barley), *Phaseolus vulgaris* (bean), *Vicia ervilia*, *Brassica napus* (rapeseed), corn (*Zea mays*), *Vicia sativa* (mung bean), and *Oryza sativa* (rice). Additionally, there are *Pistacea uera* (pistachio), *Amygdalus reuteri* (almond), *Deodar pine* and *Pinus wallichiana* forests.

On the other hand, there are wild mountain pomegranate, *Salix wallichiana* and *Tamarise dioica* trees in these areas. These areas also have vast grassland areas which are used as pastures (4: 21-22).

## 6. DISCUSSION:

The diversity of plant flora, which is composed of smaller vegetation biomes and created a diverse vegetation cover, has therefore produced a very long time as a result of the interaction of environmental factors such as climate and biological factors. Each biome is made up of smaller vegetation populations due to local and environmental conditions. Such an increase in the distribution of plants has resulted in a variety of flora on Earth. Flora refers to the life form of a particular plant community or vegetation cover of an area. These flora can be indifferent form of biomes such as tundra, coniferous forests, deciduous forests, grasslands and shrubs.

As the province of Baghlan has a temperate dry climate, the significant point in the diversity of ecosystems is the parallel distribution of ecosystems or latitudes whose biomes divisions are transverse and identical biomes can be found in similar latitudes. . This is especially true in the tundra, northern coniferous forests and desert. In high mountainous regions such as the Hindu Kush Mountains also biomes diversity is a function of height. Baghlan province also is located in the northern Hindu Kush Mountain and has coniferous forests, deciduous forests, shrubs and grasslands. Therefore, it covers a variety of plants flora such as pistachio forests, *Amygdalus reuteri* forests, *Deodar pine* forests, Junipers forests, and grassland.

## 7. CONCLUSION:

Since the number of plants flora on the planet is varied, this article describes the general explanation of the vegetation cover of Baghlan province which its scientific term is plants flora biomes. This paper describes the various plants biomes and environmental groups. Each of these types of ecosystems also has sub-divisions. Dry plants biomes have evolved over a very long period of time due to the interactions of environmental factors such as climate and biological factors. Each biome is made up of a number of smaller communities that are created by specific environmental and local conditions.

A notable point in the distribution of different ecosystems is the vegetation cover, which is parallel to the latitudes of the ecosystems. The formation of divisions of biomes are more or less transversal and plants at the same biomes can be found at similar latitudes. This is especially true of tundra, coniferous forests and deserts. In high altitudes such as Hindu Kush, the segmentation of the biomes is more dependent on height. Therefore, in the nature of biomass formation, vegetation is subordinate to altitude and geographical area, which forms a diverse vegetation cover. Baghlan province also has arid ecosystems that have evolved over time as a result of environmental reactions. These biomes are alpine tundra, Steppe, Desert and Mountains.

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