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# **Field Report for the Northern Trip: Understanding the environment in its natural habitat**



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## Abstract

This report brings together our collective experiences and learning from an incredible multidisciplinary field trip in May 2025 by students of Earth and Environmental Sciences, Bahria University. The main purpose of the field trip was to step out of the classroom and connect with real-world examples across various fields of environmental sciences, geology, Geographic Information Systems, and Remote Sensing, climate patterns, and natural history.

Our visits included multiple important sites in Islamabad and Northern Pakistan. The ecological part of the trip focused on the Himalayan ecosystems, including Margalla Hills, Ayubia National Park, and forests like Bara Gali and Lalazar. The students engaged in practical conservation activities with WWF-Pakistan, such as quadratic sampling for vegetation analysis, soil sampling and wildlife monitoring tools like camera traps, radio collars used for leopard monitoring. We also visited erosion control structures at Namli mehra Waterfall and the old Pipeline Track, where we learnt about the challenges and solutions for watershed management and biodiversity conservation.

The technological and institutional part of the field trip also gave us an exposure to some of the leading research and development organizations. At SUPARCO, we learnt about Pakistan's Space Program, including satellites like PRSS-1 and PakTES-1A used for remote sensing, as well as their upcoming projects, such as the lunar rover for China's Chang'e-8 mission. At the Global Climate Change Impact Studies Centre (GCISC), we learnt how scientists study climate, create models and help in national policy making. We also visited environmental research laboratories at Bahria University and Allama Iqbal Open University, where we explored how different tests and analysis methods are used in environmental and food sciences. Lastly, our visit to the National Museum of National History pushed us to appreciate Pakistan's rich biological and geological collections. Further enriching experience was a visit to the Khewra Salt Mine, illustrating geoheritage and industrial application and an understanding of the socio-economic dimensions of tourism and conservation.

This report highlights how the field trip helped us meet its main learning goals, which gave us a clear understanding of how climate change, environmental sustainability, technology and national policies are all important and connected. The experience also helped us build practical skills and a broader perspective that will be useful in our future careers.

# Chapter 1

## *Visit to Bahria University Islamabad – Environmental & Geological Labs*

Our visit to Bahria University Islamabad was both enlightening and instructive. Upon arrival, we were given a tour of the university campus, during which we interacted with faculty members and students. The faculty from the Earth and Environmental Sciences Department briefed us on the academic programs, ongoing research, and applied projects being conducted at the university. They also highlighted the department's role in supporting national efforts related to environmental sustainability, disaster management, and geospatial analysis. (WWF Pakistan, 2022; IUCN, 2018)

We toured several laboratories, each offering a hands-on glimpse into interdisciplinary environmental science research. (WWF Pakistan, 2022)

### **Key areas included:**

- **Rock Cutting Lab:** Techniques such as spectrometry were demonstrated to analyze soil and air samples for pollutants. (WF Pakistan, 2022)



**Figure 1.2**  
*Visiting different lab*

- **Rock and Mineral Collection Museum:** Here, we explored the classification of rock types, mineral identification, and petrographic microscopy. (IUCN, 2018)
- **Geophysical Lab:** This lab focused on seismic activity mapping, geological hazard mapping, and resource exploration using GIS tools. (IUCN, 2018)
- **Analytical Lab:** We observed testing methods for water and air quality, identification of pathogens in water bodies, and applications of microbiology in environmental monitoring. (WWF Pakistan, 2022)



**Figure 1.3**  
*Visiting the Rock Cutting Lab*

# Chapter 2

## *Margalla Hills*

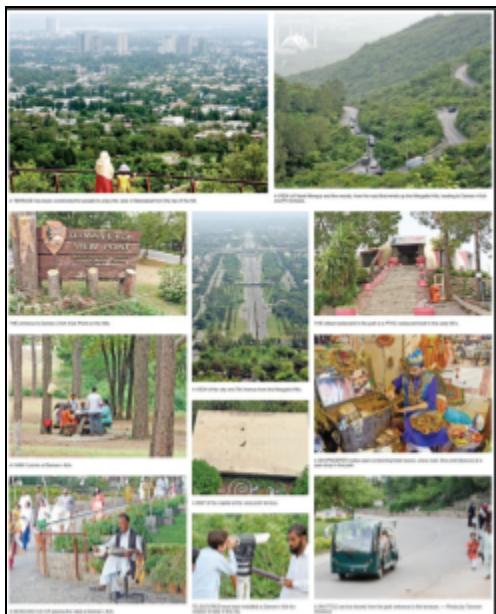
Margalla Hill is a mountain range in Pakistan. Margalla Hill is located in the northern part of Islamabad. Islamabad is the capital city of Pakistan. Margalla Hill is a beautiful picnic point and an adventurous place for tourists and visitors. (Dawn News, 2009)

### GEOGRAPHY

The capital city of Pakistan, located on the north side of Islamabad, the Margalla Hills are part of the Himalayan Foothills. These mountainous hills have elevations ranging from 685 meters to 1605 meters. And spread over a vast area of 1205 hectares, these hills offer a beautiful view surrounded by greenery, making them the ideal place for hiking and for nature lovers alike. (Dawn News, 2009)



**Figure 2.1**  
*Scenic Beauty from the top*



**Figure 2.2**  
*Traditional and cultural representation of the area*

### HISTORY

Margalla is a Mountain range in the northern part of Islamabad. Once there was a civilization which. It is believed to have existed around 40,000 years ago in this area. Many fossils have been discovered, providing evidence that, at one time, a human settlement existed in this area. History says that the civilization, which is believed to have existed. There was a SOAN civilization, the earliest human civilization. Margalla Hills also served as a hunting place for the emperor. (Dawn News, 2009)

## DESIGNATION AS NATIONAL PARK

Islamabad was declared the capital city of Pakistan in 1960. Margalla Hills were designated as a National Park in 1980. This place is home to many birds and animals like the leopard, monkeys. (Wildlife of Pakistan, n.d.)

### Flora and fauna

Margalla Hills are covered with rich forest. There are a lot of shrubs, grasses, and trees. There are several dangerous species like leopards, barking deer, etc. (Wildlife of Pakistan, n.d.; WWF Pakistan, 2022)

### Conservation efforts

It is a home to flora and fauna. Several conservation measures have been undertaken. The institute that manages it is known as the Islamabad Wildlife Management Board. (Wildlife of Pakistan, n.d.; WWF Pakistan, 2022)



**Figure 2.3**  
*Spatial data representation of the area and its features*



### Reforestation program

IWMD undertakes several reforestation programs to increase forestation. About 1,00,000 trees are planted. These trees also help to prevent soil erosion. (Dawn News, 2009)

**Figure 2.4**  
*Animals that are present in the area*

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## Margalla Hill limestone

The strategic committee of Pakistan has formally accepted the term Margalla Hill limestone. The colour of limestone is grey at the fresh surface and pale grey on the weathered surface—limestone with subordinate marl and shale. Marl is grey, while shale is greenish brown. (Dawn News, 2009)



**Figure 2.5**  
Limestone Rock present  
there

# Chapter 3

## *SUPARCO Islamabad*

The Space and Upper Atmosphere Research Commission (SUPARCO) is Pakistan's national space agency, which leads space science research, satellite development, and remote sensing projects.

During our visit, we were welcomed by experts who presented on: (Global Change Impact Studies Centre [GCISC], n.d.; IUCN, 2018).

### 3.1 Satellite Remote Sensing

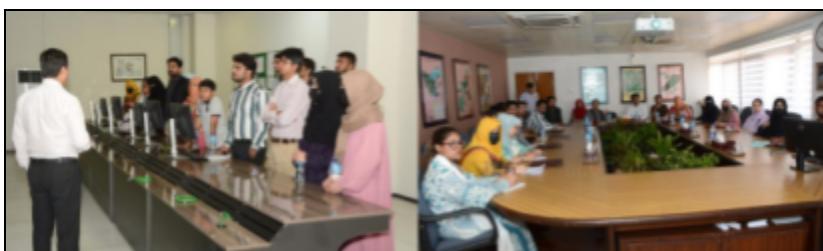
We got to know how these satellites, like PRSS-1 and PakTES-1A, are being used for urban planning, agriculture monitoring, water resource management, and disaster mitigation. These Earth observation satellites provide high-resolution imagery to support national development. (GCISC, n.d.)



**Figure 3.1**  
*Group photo with the first pakistani satellite*

### 3.2 Space Applications

Real-life case studies illustrated the utility of satellite data in flood mapping, crop health assessment, forest cover monitoring, and land use change detection. They talk about how SUPARCO's tools and services are increasingly being integrated with national agencies for decision-making and disaster preparedness. (GCISC, n.d.; IUCN, 2018)



**Figure 3.2**  
*Understanding how things take place*

### 3.3 GIS & Environmental Monitoring

Experts at SUPARCO discussed the integration of GIS with satellite data to track climate change patterns, deforestation,

land degradation, and to assess urban expansion across Pakistan. SUPARCO also plays a vital role in publishing yearly environmental and land cover atlases. (IUCN, 2018; WWF Pakistan, 2022)

## 2.4 Future Missions and Strategic Vision

The experts shed light on how SUPARCO's strategic plan aligns with Pakistan's space vision for 2047. Key missions and initiatives include:

- **PakSat-MM1:** A new communication satellite launched to enhance digital connectivity, satellite internet, and national broadcasting services.
- **Remote Sensing Satellite Series:** Continued development of high-resolution Earth observation satellites for agriculture, forestry, and water resources monitoring.
- **Space Education and Outreach:** SUPARCO is expanding its education programs through student satellite initiatives, space fairs, and university partnerships.
- **Space Science Missions:** The organisation is planning science payload missions for atmospheric studies, weather forecasting, and eventually interplanetary missions.
- **AI Integration:** SUPARCO is actively working to incorporate Artificial Intelligence and Machine Learning in image classification, anomaly detection, and predictive modelling. Their upcoming initiatives also focus on international collaborations with China, Turkey, and other regional partners to strengthen satellite infrastructure and knowledge exchange. (GCISC, n.d.; WWF Pakistan, 2022)



**Figure 3.3**  
First-Ever Pakistan's  
Hyperspectral satellite

## 2.5 Pakistan's Lunar Rover Mission

We also got to know that one of SUPARCO's most significant upcoming milestones is the development of Pakistan's first-ever lunar rover, scheduled to be part of China's Chang'e-8 mission in 2028. This collaboration marks a historic achievement for the country's space exploration efforts.

- 
- The rover, weighing approximately 35 kg, will be deployed to the lunar south pole, a region of growing international scientific interest due to the possibility of discovering water ice.
  - It is being designed, built, and tested entirely in Pakistan by SUPARCO engineers, demonstrating the country's growing self-reliance in advanced space technology.
  - The mission is part of China's International Lunar Research Station (ILRS) initiative, and the rover will be integrated into their Chang'e-8 lander system.
  - The rover will conduct in situ exploration of lunar terrain, including:
    - ❖ Soil and surface composition analysis
    - ❖ Terrain mapping and imaging
    - ❖ Radiation, plasma, and environmental condition measurements

In addition to this, they discussed about SUPARCO nationwide naming contest in 2025 for the rover, offering a reward of Rs 100,000 to the winner, engaging youth and the public in this national space milestone. (GCISC, n.d.)

# Chapter 4

## *Climate Change Ministry*

The Global Climate-Change Impact Studies Centre (GCISC), founded under the ‘ GCISC Act 2013’. The centre was visited on 20 May 2025. It was given the status of a regular national entity. It was formed to perform research and make policies to counter problems such as climate, health, water, energy, food security, etc. The centre introduced us to the aims and some of their recent policies. (Global Change Impact Studies Centre [GCISC], n.d.; IUCN, 2018).

In April 2002, GCISC was initially founded as a research centre under the Ministry of Science & Technology and functioned as a public sector development project for 11 years. This initiative was taken by Dr Ishaq Ahmed (Late), who was the special advisor to the Chief Executive of Pakistan. It was under the Environmental Ministry, which is under the federal ministry. It is only responsible for research, but implementation does not come under its responsibility. (GCISC, n.d.)



**Figure 4.1**  
*Conference deciding climate change policies*

The Global Climate Change Impact Studies Centre's mission is to acknowledge the global environmental changes and their impacts on Pakistan; its main focus is climate change. Their main area of research is: Physical Science Basio, Vulnerability Impacts & Adaptation and Mitigation & Climate Change policies. In the context of Climate change, the centre aims:

- Conduct high-quality research on climate change and its impacts on various sectors, including agriculture, water resources, health, and ecosystems.

- Develop and promote climate change adaptation and mitigation strategies tailored to Pakistan's unique geographical and socio-economic context.
- Serve as a national repository of climate-related data and information, facilitating informed decision-making and policy formulation.
- Foster national and international collaborations to advance climate research and technology transfer.
- Enhance public awareness and capacity building through education, training, and outreach programs. (GCISC, n.d.; IUCN, 2018)

GCISC works on both international and national platforms. (GCISC, n.d.)



**Figure 4.2**  
*Giving of awards*

# Chapter 5

## *National Museum Of Natural History*

If you wish to see Koh-e-Nur, you don't need to visit the UK anymore because there is a replica of Koh-e-Nur on display at the National Museum of Natural History of Pakistan. Not only that, but you can also learn about the species and ecosystem ranging from heights of 28,251 feet to 17,700 feet beneath the Arabian Sea, all under the one roof. The museum was visited on 22 May 2025. This was an educational visit to under the different kinds of biodiversity present in Pakistan. (IUCN, 2018; WWF Pakistan, 2022)

The museum was established in 1976 by the Pakistan Science Foundation, which comes under the Ministry of Science and Technology. Originally, the museum had 10000 species of fossils and preserved specimens from the Indian

Zoological Department that were collected by scientists and officers during the British colonial era. Today, the museum has 600,000 specimens available to researchers and scientists. (WWF Pakistan, 2022)



**Figure 5.2**  
*Some minerals that were showcased there*



**Figure 5.1**  
*Visiting national museum of natural history*

The museum is divided into four sections: botany, earth science, zoology, and public services. The first three sections are engaged in the collection, preservation, identification and research activity. The botany section covers all plants of Pakistan as well as the marine ecosystem. The Zoology section covers all animals, birds, and insects that are found

in any ecosystem of Pakistan. Earth sciences cover all minerals found across Pakistan, and also ancient flora and fauna fossils that are discovered in Pakistan. There are also fossils of dinosaurs and blue whales. (IUCN, 2018; WWF Pakistan, 2022)

Their objectives include:

- To collect, identify and preserve natural history specimens to develop a reference collection of plants, animals, rocks, minerals and fossils found in Pakistan in order to serve as a repository of all type specimens.
- To carry out research on biological and geological resources in light of their economic importance and conservation through industrial linkages and to identify end users for marketable applied research.
- To establish liaison with similar institutions both within and outside Pakistan.
- To provide research facilities and incentives to scientists from within and outside the country to work at the Museum.
- To document and display specimens in the form of attractive exhibits/films/documentaries to educate the masses about the natural wealth of Pakistan.
- To interpret our natural resources and environment in light of the past and plan for future courses of action.



**Figure 5.3**  
*Preserved marine life being showcase*

- To advise the government on all matters related to the environment, wildlife conservation and development. (IUCN, 2018; WWF Pakistan, 2022)

A large whale shark, which landed at Karachi Fish Harbour in 2012, according to the PMNH, is also present there. This whale shark had a length of about 40 feet (12 m) and weighed 16 tons. Its liver weighed about 800 kg (1,800 lb.), the stomach was about 600 kg (1,300 lb.), and the ovary had a weight of 120 kg (260 lb.) and had about 1500 eggs. The shark was seen on February 6, 2012, in the Gora Bari area, in the Pakistani territory of the Arabian Sea, by local

fishermen. This museum has a wide range of biodiversity and ecosystems preserved from all over Pakistan. (Dawn News, 2016; WWF Pakistan, 2022)

# Chapter 6

## *Salt Mine*

Khewra mine is the second-largest salt mine in the world and the largest mine in Pakistan. It is located about 160 km south of Pakistan's capital, Islamabad, in the Jhelum district. Our team visited the mine on 21 May 2025. Khewra mine is the largest source of Pink Himalayan Salt, and recently it has become a major tourist attraction. This mine is known to have an estimated 220 million tons of rock salt deposit. It is the last impact caused by the Himalayan collision. Khewra Salt Mine and tourist mine are operated by the Pakistan Mineral Development Corporation (PMDC). Khewra Mine is one of Pakistan's popular heritage sites, which is packed with tourists throughout the year. The temperature in the main tunnel is always 18 degrees Celsius, all year long. The mine is divided into 17 levels,



**Figure 6.1**  
*The entrance to the salt mine.*



**Figure 6.2**  
*Different monuments made of salt bricks*

with a cumulative length of more than 40 km. However, the tourist area is only 3 km long. There are around 100 ponds built to store water that seeps in from the mountain due to rain or other reasons. This water is then pumped from the ponds and supplied to different industries for the production of different chemicals, such as the production of soaps. (Pearl Tours, n.d.; Shah, 2019; Dawn News, 2016)

The salt mine is believed to have originated about 800 million years ago as a result of evaporation in a sea, followed by geological movement. It remained a hidden treasure until 320 BC when Alexander the Great visited the region

with his army and horses. And fought Raja Porus in the battle of Hydaspes. This is where his Horses were found licking the rocks on the surface of the ground. It was the place where the world was introduced to the salt range, which is known as Khewra Mine. Initially, the locals started mining the surface open-cast mines. In 1872, a renowned British mining engineer built the first tunnel at the ground level to access the salt layer. He was also the one who introduced the room and pillar mining with a 1:1 ratio. This method is still being used. (Pearl Tours, n.d.; Shah, 2019; Dawn News, 2016)



**Figure 6.3**  
*Group Photo inside a salt tunnel*

The Lower passage is a tourist area where different tourist attractions are shown, such as the Cannon that was used in the old times to shoot salt pieces. Shahi mosques and Minar-e-Pakistan were also built by the use of colourful salt bricks from Khewra mine. In that tunnel, a visiting area is also called Chandni Chowk and different small caves are made for the tourists to walk through. There is an area that also consists of an emergency dispensary. One of the significant aspects of the Khewra Mine is its experimental therapy clinic located within the mine. The therapy involves spending time in this salt mine, where it is believed that the air with the salt particles can help alleviate symptoms by reducing inflammation in the Airways. Khewra Mine is home to a clinic that provides unique treatment. It helps solve asthma problems, and people all over the world come for this therapy. The place where asthma patients are kept is very peaceful and soothing. (Shah, 2019; Arab News Pakistan, 2019)



**Figure 6.4**  
*Salt health chambers*

According to records, a total of 419,379 tourists visited the Khewra Mine in the year 2018-2019. In which 488,928 Pakistani visitors, while 2,411 were international. Other than being a tourist attraction, it has economic importance

too. The sword is primarily used for industrial purposes; more than half of the production, which is 200,000 tons, is sold to Imperial Chemical Industries ICI Soda Ash Khewra. A certain amount of salt of the purest quality is sold as Table salt in the country and abroad, especially to India. A small amount is used to produce fancy

goods such as salt lamps, vases and ashtrays. Mostly they are sold near the tourist mine, but also exported in large quantities. Residents feel pride in living near the world's second-largest salt mine. The tourists have brought several benefits to the residents, including restaurant owners, shopkeepers, transporters, and souvenir shop owners who sell souvenirs. (Pearl Tours, n.d.; Dawn News, 2016)



**Figure 6.5**  
*Local People that you salt to make different things*



**Figure 6.6**  
*Some beautiful lamps and decor pieces made up of rock salt*

# Chapter 7

## *Allama Iqbal Open University (AIOU), Islamabad*

Allama Iqbal Open University is a public sector university which is located in Islamabad, offering distance learning. The university has 44 regional campuses throughout Pakistan. The main campus is located in Islamabad, H8 Sector. The university also provides distance education, or distance learning. (University of Peshawar, 2023; IUCN, 2018)

### **Food Radiology Lab**

At Allama Iqbal Open University, we visited the food radiology lab. There was an instrument, which is a ‘viscometer,’ which measures viscosity and can change the temperature. We performed a particle size analysis experiment on a liquid to determine the size of the particles.

1. heta flex: (droplet size measure)
2. Ultra freezer: (used in microbiology laboratories for storing microbes and bacteria)
3. Centrifuge: (used for separation)
4. Corning: (hot plating)
5. Spectrophotometer
6. Rotary evaporator
7. Jhedar: (amount of protein in food)
8. Distillation unit: (use for water distillation)
9. High-pressure homogeniser
10. Soslay:(amount of fats)



**Figure 7.1**  
*Entrance to the Allama Iqbal University*



**Figure 7.2**  
*Library in Allama Iqbal University*

- 
11. Muffle furnace: (mineral content into ash, check mineral content)
  12. Oil bath: (Heat chemical reactions)
  13. Ultrasonic homogeniser: (uses high-frequency sound waves to create mechanical vibrations in liquids)
  14. Speed homogeniser (rpm 10,000)
  15. CO<sub>2</sub> Incubator anaerobic, e.g lactic bacteria
  16. Chemistry analyzer: (blood analysis)
  17. Blood centrifuge (1 ml)
  18. Autoclave (sterilizer things at 120 degrees)
  19. Water bath: (It can be used for substrate melting)
  20. Microscope

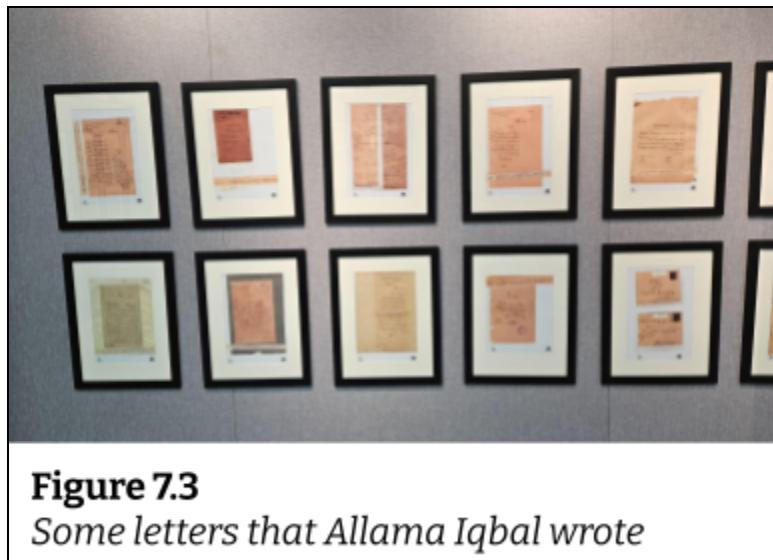
### Visit to the central library

In the central library, there is a huge collection of different sections.

- Arabic collection
- Seerah books collection

### Iqbal Gallery

The library has a variety of book collections and has over 137000 books on different subjects. The central library offers several resources. The university houses a library with the IQBAL COLLECTION specifically focused on Allama Iqbal. (University of Peshawar, 2023; WWF Pakistan, 2022)



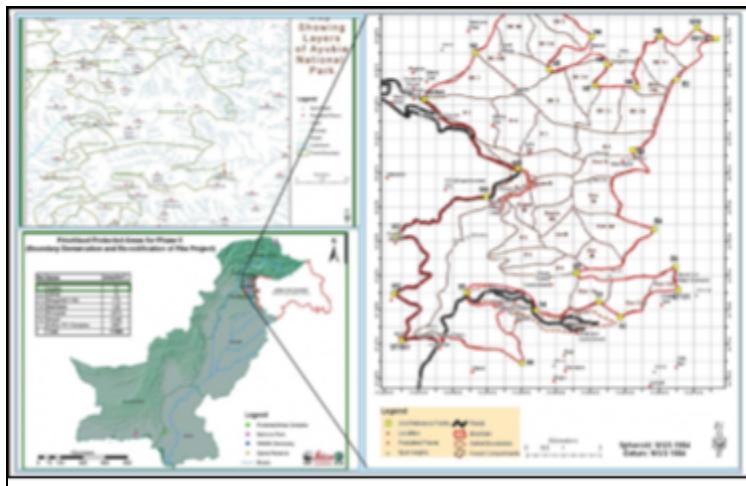
**Figure 7.3**

*Some letters that Allama Iqbal wrote*

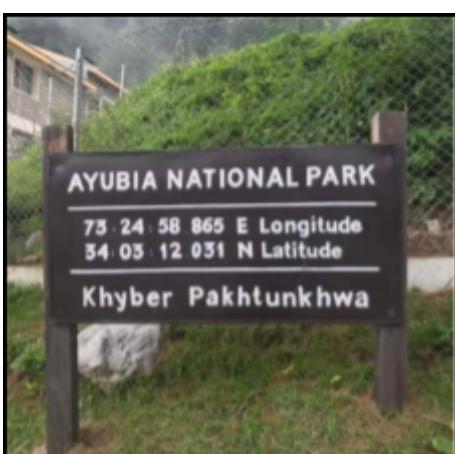
# Chapter 8

## *Ayubia National Park*

Ayubia National Park is a protected land of 3,312 hectares, located in Abbottabad District, Khyber Pakhtunkhwa Province, North Pakistan. It was declared a national park in 1984 under the NWFP Wildlife Act 2015. Ayubia National Park was named after Mohammed Ayub Khan, the second President of Pakistan. The park has an elevation of 8,000 ft above sea level. The area is divided into different smaller recreational sites in Galiyat, which are divided into parts. The first one is in Murree, which includes: Ghor Gali, Sawar Gali, Jika Gali, Bansra Gali, and Khera Gali. Then there is the second part,



**Figure 8.1**  
Map Representing Ayubia National Park



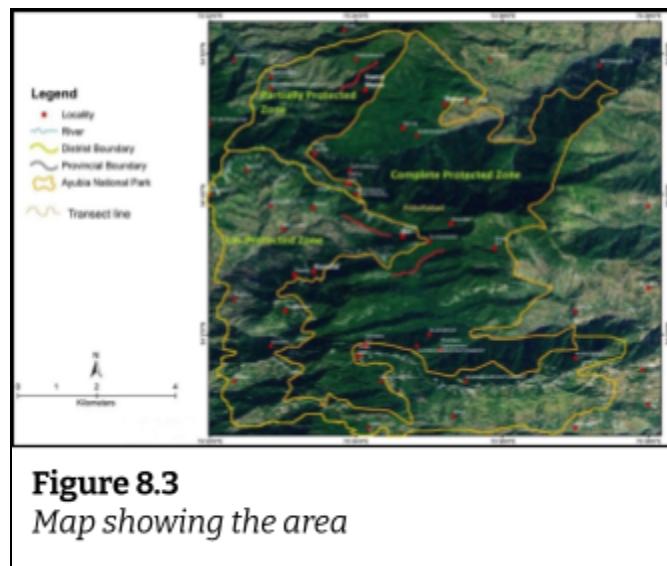
**Figure 8.2**  
Latitude and longitude of the ayubia national park

which comes under KPK that includes Changla Gali, Krza Gali, Dunga Gali, Nathiagali, Bini Gali, Sajan Gali, Tarrada Gali, Bara Gali, Cher Gali and Nanli Gali. All these combine to form Ayubia National Park. National parks play a very important role in preserving the natural ecosystem and biodiversity while offering opportunities for sustainable growth. (Wildlife of Pakistan, n.d.; WWF Pakistan, 2022)

It safeguards the ecosystem and provides a safe space for endangered species. Despite being a protected area, it has faced challenges that include extensive human growth and resource exploitation, which can lead to habitat degradation and

biodiversity loss. The protected areas have both a negative impact on the local community and a positive side effect. It's that they generate employment opportunities and support local businesses. The negative impacts are restrictions on resource use and conflicts with wildlife. The park is home to 757 plant species, 203 bird species, 31 mammal species, 19 reptile species, 3 amphibian species, 23 butterfly species and 650 insect species. All these include the common leopard, red Fox and flying squirrels. (WWF Pakistan, 2022; Wildlife of Pakistan, n.d.)

This area is recognised by WWF, and WWF has been playing a significant role in protecting it. Ayubia National Park has become a part of the Western Himalayan decoration and is one of 200 WWF-designated areas of global significance. They have played a vital role in watershed protection. They have done this by making: a rainwater harvesting system, rainwater collection ponds, water storage tanks, ablution water reuse system. They have also made groundwater recharge through recharge wells and recharge pits, restoration of Ponds through floating treatment wetland, forest rehabilitation for slope stabilization, on-farm water management practices through laser land levelling and lining of water courses and terracing. (WWF Pakistan, 2022; Wildlife of Pakistan, n.d.)



Human activities in climate change are causing a lot of pressure on the ecosystem and biodiversity of Ayubia Park. Due to the climate temperature increase, Ayubia National Park has become a more frequently visited area for vacations or weekend getaways. The development of new high-rise buildings has caused the removal of major plant biodiversity. Deforestation is causing animals to lose their habitat. The increase in buildings and cars has caused a major increase in greenhouse gases. The tourists are not responsible enough to protect these lands, and they openly throw garbage. The increase in the number of people coming has also caused a

significant increase in solid waste. The groundwater and springs are being contaminated by microplastics. The government and people need to recognise these problems and take serious action towards them. (IUCN, 2018; WWF Pakistan, 2022)

It is very important to promote ecotourism to protect and encourage sustainable development. There should be strict guidelines, a model where visitor excesses are being controlled, and infrastructure is minimised so the surrounding habitat remains largely undisturbed. It is also important to promote environmental education and awareness. There should also be a committee that ensures no serious impact is being caused on the wildlife life corridor, breeding area and the fragile ecosystem. They should not just regularly monitor but also make sure that the implementation is being done properly. People should also be very careful while visiting these areas, and they should be respectful towards biodiversity and the ecosystem. Strict punishment should be imposed for anyone who breaks the rules. (WWF Pakistan, 2022; IUCN, 2018)



**Figure 8.4**  
*Scene beauty of the area*

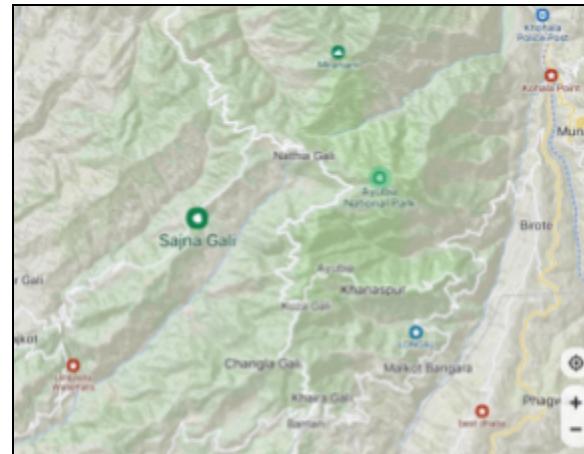
# Chapter 9

## *WWF Activities at Sajan Gali*

The WWF team in Sajan Gali hosted us at a conservation site where we learned about biodiversity protection, ecosystem monitoring, and sustainable resource practices. The key components of the visit were: (WWF Pakistan, 2022; IUCN, 2018)

One of the most hands-on experiences during this visit was our participation in vegetation sampling using the **Quadrat Sampling Technique**. This method is commonly used in ecological studies for plant biodiversity and density within a specific area. Here's how it was carried out:

- A square frame (quadrat) of a fixed size (typically 1x1 meter) was placed randomly within different parts of the forested area.
- Within each quadrat, we recorded the number and type of plant species observed.



**Figure 9.1**  
*Map representation sajan gali*



**Figure 9.2**  
*Activity to get soil sampling*

In addition to vegetation sampling, we also learned about soil sampling techniques. WWF experts demonstrated how soil is collected systematically from different depths and locations to analyze various properties such as texture, moisture, nutrient content, and organic matter.

Understanding soil composition is crucial for assessing habitat quality, determining plant suitability, and identifying signs of land degradation. (WWF Pakistan, 2022; Khan et al., 2020)

### Common Leopard Conservation

We also got to know how WWF is actively working to conserve the population of the common leopard (*Panthera pardus*) in the Ayubia National Park region. Their monitoring efforts include:

- **Camera Trapping:**

Installed in strategic locations to track movement and population size.



- **Radio Collar Tracking:**

Helps determine the home range, feeding habits, and territory mapping of individual leopards.

- **GIS Integration:**

Spatial data is collected and analyzed using GIS to map population distribution and plan mitigation strategies against human-leopard conflicts.

- **Awareness Campaigns:**

Community education and outreach efforts were emphasized to promote coexistence and reduce fear-based retaliation killings. (WWF Pakistan, 2022; IUCN, 2018)

**Figure 9.3**

*Understanding tools that are used to monitor leopard movement*

### Nike Project Partnership

WWF-Pakistan is collaborating with Nike Inc. to implement sustainable water management in key ecological zones of Pakistan under the concept of Integrated Water Resource Management (IWRM). Activities include:

- Replenishment of water resources through reforestation, wetland restoration, and rainwater harvesting.
- Construction of multiple small-scale ponds at strategic locations, particularly in and around Ayubia National Park. These ponds are designed to collect and store rainwater, which is later used by local villagers for agricultural and domestic purposes during drier months.

- These water ponds serve as a practical solution to mitigate water scarcity and improve water access for remote communities, demonstrating a low-cost and high-impact approach to water resource management.
- Local communities have been engaged in the planning, maintenance, and usage of these water bodies, promoting ownership, sustainability, and resilience.
- Data collection and modelling using RS & GIS tools are conducted to monitor the functionality, storage capacity, and seasonal changes in water levels, helping optimize pond locations and forecast needs.

Strategic landscapes for these initiatives include Ayubia National Park, where pilot projects have shown promising results and may serve as models for replication in other parts of the country. with Nike Inc. to implement sustainable water management in key ecological zones of Pakistan under the concept of Integrated Water Resource Management (IWRM).

Activities include:



**Figure 9.3**

*Nike Project: Integrated Water Resource Management (IWRM)*

- Replenishment of water resources through reforestation, wetland restoration, and rainwater harvesting.
- Strategic landscapes include Ayubia National Park, where pilot projects have been initiated.
- Data collection and modelling using RS & GIS to monitor project success and guide expansion. (WWF Pakistan, 2022; Nike, 2021)

### Coca-Cola Foundation Partnership

WWF and the Coca-Cola Foundation have partnered to improve water security in the Indus Basin. The project focuses on:

- Rehabilitating degraded watersheds.
- Promoting community-based water conservation.
- Protecting aquatic ecosystems and maintaining biodiversity. Coca-Cola Foundation, 2022; WWF Pakistan, 2022)
- (Nike, Coca-Cola) They are playing an active role in Pakistan's sustainable future.

# Chapter 10

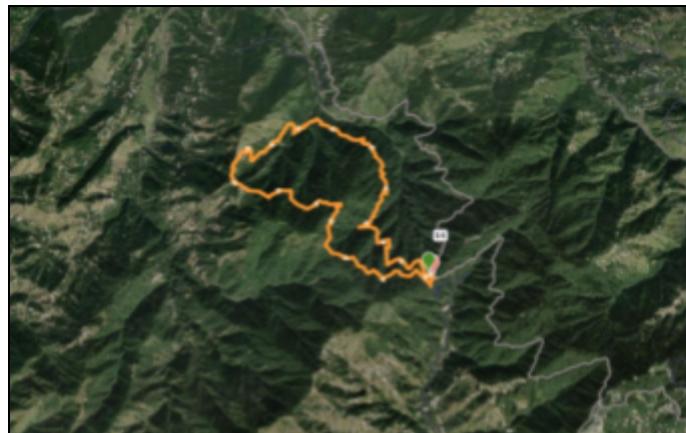
## *Bara Gali Park*

### **Background and Introduction**

Bara Gali is a picturesque forest town in Abbottabad District of Khyber Pakhtunkhwa province, Pakistan. It is situated at an elevation of approximately 7,710 feet on the popular Murree Abbottabad road, between Nathiagali and Abbottabad. It has been renowned for its strategic position, pleasant climate, and natural beauty.

Bara Gali was the summer headquarters of a British administrator during the colonial period. It is now used by the summer campus of the University of Peshawar and an ecotourism and field research destination of popularity.

Bara Gali has developed over the years to be a world-famous ecology and learning centre. The forest cover in the area falls under the bigger Galyat ecosystem, which is well known for being rich in biodiversity, pine-clad slopes, and a cold climate. Not only do these forests hold a critical role in the wellness of the adjacent watersheds, but they also harbour many species of plant and animal life. The call for more forest protection and ecosystem balancing has attracted conservation efforts by organizations like the World Wide Fund for Nature (WWF) to partner with residents and students in the cause of conservation. (University of Peshawar, 2023; WWF Pakistan, 2022; IUCN, 2018)



**Figure 10.1**  
**Bara Gali Track:**  
Sajan Gali lies under the Bara Gali: which is  
one of the main settlements in the Galyat  
Region

### **Location, Ecology, and Forest Composition**

Bara Gali is situated in the wet temperate forest zone of the western Himalayas. Here, coniferous forest is dominant with tree species like Chir Pine (*Pinus*

roxburghii), Blue Pine (*Pinus wallichiana*), and Deodar (*Cedrus deodara*). Oak, subshrubs, and several herbs and grasses make up the understory of other domineering vegetation.

The flora of the locality is vertically positioned according to the plant types and sizes:

1. Box 1 (4 meters): Appropriate for studying ground flora and subshrubs.
2. Box 2 (7 meters): Appropriate for studying ecological and medicinal studies of herbaceous vegetation.
3. Box 3 (10 meters): Appropriate for studying tree canopy-level vegetation and mature trees.

The sampling method enables scientists to quantify forest health, species diversity, and tree density. Official forest census utilizes the grid system, which marks 10 plots per kilometre, used for regular ecological monitoring. (WWF Pakistan, 2022; IUCN, 2018)



**Figure 10.2**  
*Method to calculate Forest rate survival, Population density*

The region is populated, and the surrounding villages depend on the forests for grazing, fuelwood, and medicinal herbs. Climate fluctuation and overuse imperil long-term sustainability, and there is a need for collective conservation (IUCN, 2018; WWF Pakistan, 2022).

### **WWF-Led Forest Conservation Activities**

Under a training field session with WWF at Bara Gali, research scholars and students implemented practical training on the significance of forest preservation and ecological balance. The main goals were to study the structure of the forest, to interpret the layers of vegetation, and to understand how ecological balance can be ensured by practising sustainable strategies.

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Major conservation techniques were:

- **Population Density Measurement:** Counting trees and subshrubs per unit area to show forest health and growth rate.
- **Survival Rate Measurement:** Counting how various plant species survive under varying regimes of the environment. Forest Layer Measurement: Counting herbs, shrubs, and trees with the three-box method (4m, 7m, 10m).
- **Plot-Based Surveys:** Putting in place 10 ecological plots for each 1 kilometre for the purposes of monitoring plant diversity and spatial arrangement. With this experiential approach, the participants were taught the hazards of deforestation, the function of the understory plant vegetation in making the forest long-lasting, and the collaboration between plants and animals for the upkeep of the ecosystem. (WWF Pakistan, 2022; University of Peshawar, 2023)

### Ecosystem Balance and Sustainable Practices

One of the top lessons learned from the Bara Gali conservation experience was how to take care of an ecosystem, how to keep forests healthy, diverse, and life-giving in the long term. The WWF campaign was based on the fact that forest conservation is not tree conservation, but taking care of the entire web of life they support. Sustainable practices learned through the activity are:

- **Selective Cutting:** Pruning mature trees in an environmentally friendly way to avoid injuring the underlying plants.
- **Reforestation:** Restoring native forest plants to recover degraded areas.
- **Herb and Subshrub Conservation:** Recognizing the role of small plants in nutrient cycling and habitat integrity.
- **Community Education:** Getting the community involved to discuss long-term conservation benefits. Following these principles in practice, the Bara Gali forest ecosystem can be kept in balance, which provides biodiversity, avoids soil erosion, and maintains water retention. WWF's strategy, even while promoting research from a scientific perspective, also provides community involvement and awareness, such that the conservation strategy becomes a collective endeavour (WWF Pakistan, 2022; IUCN, 2018; University of Peshawar, 2023).

### Conclusion

Bara Gali's forest is not just in a picturesque setting—it is a pulsating system that helps maintain local environmental balance. With joint efforts from WWF,

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universities, and themselves, this forest can be conserved and upheld as a model for other areas. By being vigilant, recording, and cautious of nature, we actually move towards a greener tomorrow. (WWF Pakistan, 2022; IUCN, 2018)

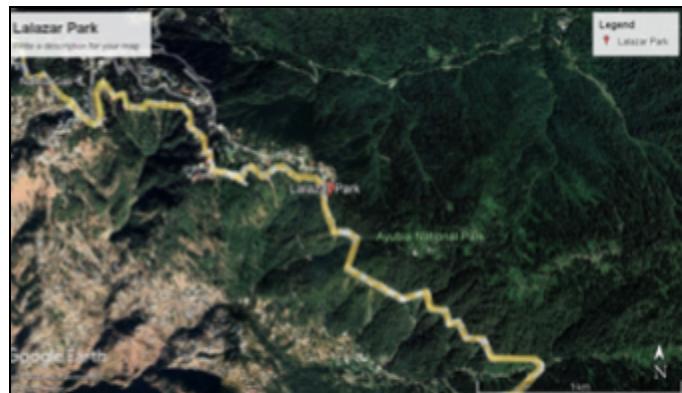
# Chapter 11

## *Lalazar National Park*

### **Historical Context and Introduction**

Lalazar National Forest in the upper Kaghan Valley of Mansehra District of Khyber Pakhtunkhwa, Pakistan, is situated at approximately 10,246 feet above sea level. Lalazar National Forest is a well-preserved forest within the Ayubia National Park and is recognised for its ecological and cultural uniqueness. This land came to be referred to as Lalazar on folkloristic grounds, assumed to be the tragic love story of Sohni and Lala Afghani. It is tradition that says the green pastures of Lalazar are symbolic of Lala's self-sacrifice, and a forest, Sohni da Banr, close by, is in honour of Sohni.

Lalazar not only represents a hotspot of biodiversity but also a world-famous eco-tourism site, with stunning vistas of meadows full of wildflowers, forests of sub-alpine, and snow-covered mountains. Lalazar also serves as a significant ecological corridor of Ayubia National Park and harbours some threatened and endangered flora and fauna. It has been a concern of conservation at government and nongovernment levels for decades. (Fly Pakistan, n.d.; IUCN, 2018; WWF Pakistan, 2022)



**Figure 11.1**  
*Map representing lalazar park path*

### **Flora (Plant Species)**

1. Deodar (*Cedrus deodara*): National tree of Pakistan; tall conifer
2. Blue Pine (*Pinus wallichiana*): Locally known as Biar
3. Chir Pine (*Pinus roxburghii*): Grows at lower altitudes
4. Fir (*Abies pindrow*): Often called Partal (Christmas tree)
5. Berim (local herb): Used for traditional medicine
6. Zaime Hayat: Medicinal plant for the stomach and liver
7. Al Bomber: A green herb for managing diabetes

- 
8. Wildflowers: Daisies, buttercups, bluebells, etc., bloom in summer
  9. Subshrubs & Ferns: Found in understory layers
  10. Oak and Birch trees: In moist zones at lower elevations (IUCN, 2018; WWF Pakistan, 2022).

## Fauna (Animal Species)

1. Snow Leopard (*Panthera uncia*) Rare, high-altitude predator
2. Himalayan Brown Bear (*Ursus arctos isabellinus*)
3. Musk Deer (*Moschus chrysogaster*) Critically endangered
4. Himalayan Ibex (*Capra sibirica*)
5. Indian Leopard (*Panthera pardus fusca*)
6. Red Fox (*Vulpes vulpes*)
7. Yellow-throated Marten

## Birds

1. Monal Pheasant Vibrant bird native to the region
2. Himalayan Snowcock
3. Golden Eagle
4. Koklass Pheasant
5. Eurasian Sparrowhawk

## Reptiles & Amphibians

1. Himalayan Pit Viper
2. Common Toad
3. Rock Agama

## Insects

Butterflies, dragonflies, and various pollinators support the forest's ecosystem, especially around flowering meadows. (IUCN, 2018; WWF Pakistan, 2022)

## BIODIVERSITY

Lalazar is reached by a jeep road four kilometres long near Babusar Pass. The hike is through high-altitude alpine grasslands and dense forest. The forest is a mix of native species of pines, such as Deodara (indigenously Daar), Blue Pine (Biar), and Fir (better known as Partial or "Christmas tree"). Some trees, such as the Auktal Meara, are over 300 years old. The forest is also rich in several medicinal herbs.



**Figure 11.2**  
*An injured leopard that is captured in captivity*

Berim plant is used in medicine, for example, in treating ankle injuries, furniture treatment, and incense in graves. Zaime Hayat and Al Bomber are also consumed to treat stomach, liver, and diabetic diseases, respectively. All the herbs are prepared in the traditional way of crushing, boiling, and consumption in standard dosages.

Wildlife animals offer local birds, small mammals, and traces of larger predators like the snow leopard, whose paw prints are typically seen on the Lalazar trail. Snow leopards are generally not present in the region during extreme winter periods. (WWF Pakistan, 2022; Fly Pakistan, n.d.)

### WWF led Conservation and Community Engagement

Under a contract with the WWF, various ecological sensitisation and conservation activities have been held in and around Lalazar. Some of them are as follows:

Forest Conservation Awareness: Such below-the-surface-level sessions were held in the region around Attabad, Bara Gali, and Namli Mehra waterfall for raising awareness about deforestation and the establishment of ecological balance.

- **Conservation of ancient trees:** Efforts were made to search for and track ancient trees like the Auktal Meera. Conservation of water resources: Freshwater biotopes like Namli Mehra waterfall areas were identified as sensitive habitats to be protected.
- **Monitoring of wildlife:** Leopard and snow leopard footprints were tracked, and season-dependent animal migration was noted.
- **Educational workshops:** Range officers and locals were made aware of sustainable grazing, picking medicinal plants, and ecotourism.



**Figure 11.3**  
*Main entrance to the park*

These projects have promoted local and international tourism environmental responsibility, and also served to preserve the park's ecological resources. (WWF Pakistan, 2022; IUCN, 2018)

### Traditional Practices and Sustainable Future

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The traditional practices are yet to be of value in Lalazar's conservation of biodiversity. For example, the use of Berim was prevalent in households and religious places but decreased due to excessive usage. The invention of artificial concentrates mitigated the pressure on the wild Berim resource, showing how substitutes can help in conservation.

Other community activities include:

Collecting medicinal plants like Al Bomber for traditional medicine. Seasonal migration of animals to a refuge in which snow is falling. Stockpiling fuel and food to insulate against winter unavailability. (IUCN, 2018; WWF Pakistan, 2022)

### **Conclusion**

Lalazar National Forest is a living testament to nature with humans. WWF conservation with the support of local people has played a crucial role in protecting its distinctive fauna, flora, and cultural landscapes. Through an interface between indigenous knowledge and modern conservation science, Lalazar can continue to serve as a refuge for generations to come. (WWF Pakistan, 2022; Fly Pakistan, n.d.)

# Chapter 12

## *Namli Mehra Waterfall*

### **Introduction**

Namli Mehra Waterfall, or Namik Moola, has been a point of focus for environmental monitoring and conservation since 2009. It is a high-altitude natural spring that not only adds ecological charm to the area but also feeds water to Tarbela Dam, one of Pakistan's significant water reservoirs. WWF and associated researchers have been engaged in erosion management, biodiversity monitoring, and ecological education on this site. (WWF Pakistan, 2022; IUCN, 2018)

Erosion Control by Gabion and Check Dams  
Gabion walls and check dams are built in and around Namli Mehra to control soil loss and runoff.

- Gabion Wall: Fabricated with loose stones filled inside wired cages; they work as barriers to retard water flow and hold soil.
- Check Dams: Built by measuring the length, width, and height of the dam using measuring tape. Rocks employed in the construction are also counted to be accurate.

### **A typical measurement:**

Length: 67 ft

Width: 85 ft

Height: 16 ft

Total Volume: 37,520 cubic meters (Ref.: Neelam region)

For tracking erosion:

A 1 ft × 1 ft plot is excavated to harvest and weigh soil monthly.



**Figure 12.1**  
*Namli Mehra Waterfall*

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## Calculated erosion risk:

Area: 420 ft

25% erosion concern

$$420 \times 25 = 10,500 \text{ units of erosion}$$

The volume of sediment is taken after a while. In two years, a maximum of 3 gallons of sediment has been observed in filled plots. (WWF Pakistan, 2022; Khan et al., 2020)

## Tree Age and Forest Health History (Dendrochronology)

The process to measure tree age and growth history is referred to as Dendrochronology:

1. Take a measurement of tree diameter at chest level (hug method).
2. Count visible branches and bark patterns.
3. Drill into the trunk of a tree with a pencil-thick increment borer and pull out a core.
4. Annual rings count:
  - ❖ Wide rings = healthy growth (greater nutrients & water)
  - ❖ Narrow rings = stress years (less water or drought)



**Figure 12.2**  
Map of Namlı Mehra Waterfall

This information assists researchers in interpreting historical climate and forest health patterns. (IUCN, 2018; WWF Pakistan, 2022)

## Step and Area Measurements

Measurements are recorded stepwise to compute area and height relations:

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**1st Step:** 6 ft, 3 ft, 10 ft

**2nd Step:** 5 ft, 2 ft, 9 ft

**3rd Step:** 4 ft, 1 ft, 8 ft

Utilised to compute the overall area (Width × Length):

**Width** = 10 ft

**Length** = 7 ft

**Height of tree** = 6 ft

**Area** = 420 ft<sup>2</sup>

## Biodiversity at Namli Mehra and Nearby Regions

Namli Mehra nurtures a thriving ecosystem with the following documented species:

| Category          | Total Species Count |
|-------------------|---------------------|
| Plant Species     | 757                 |
| Bird Species      | 203                 |
| Mammals           | 31                  |
| Reptiles          | 19                  |
| Amphibians        | 3                   |
| Butterfly Species | 23                  |
| Insect Types      | 650                 |

(IUCN, 2018; WWF Pakistan, 2022)

## Conclusion

Namli Mehra Waterfall is a biodiversity conservation site for the control of soil erosion and ecological learning, in addition to monitoring biodiversity. With applied uses such as dendrology and monitoring erosion, student teams and the WWF have a significant impact on environmental conservation in the area. (WWF Pakistan, 2022; Khan et al., 2020)

# Chapter 13

## Pipeline Track

Pipeline Track is one of the most beautiful and scenic tracks in Ayubia National Park, located in Abbottabad District, Khyber Pakhtunkhwa, Pakistan, with coordinates of  $73^{\circ}24'58.685''$  E and  $34^{\circ}03'12.031''$  N. We visited the place on 25 May 2025 with the WWF team. It is stretched between the Donga Gali and the Donga Valley, and the track is 4 km long. However, the pipeline itself is 36 km long, and the track follows an old pipeline which was initially used to carry water across the slope. The network provided an easy and enjoyable hike through a rich biodiversity and a significant ecosystem. (Traverse Pakistan, n.d.; WWF Pakistan, 2022)

Originally, the pipeline track was laid down by the

British  
during

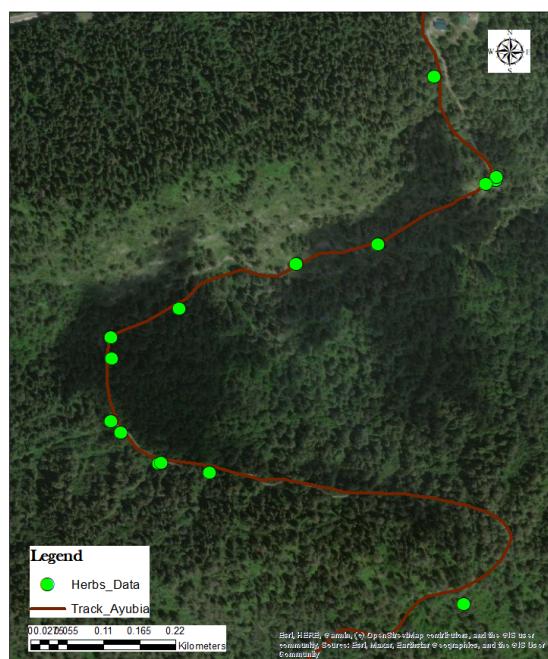
their colonial era in 1930. It was made to supply natural spring water from the Donga Gali to Murree. The track was recently opened to tourists and is under the management of the Ayubia National Park to preserve the region. The pipeline is no longer in use and is not operational. (IUCN, 2018; WWF Pakistan, 2022)

The plant biodiversity of the pipe track plant is astonishing. It consists of many herbal plants that have a lot of medical significance. One of the examples is Sumbul, which is used for treating bone problems and injuries.



**Figure 13.1**  
*Showcasing the pipeline track*

### Plant Biodiversity on the Pipeline Track



Bhang is used for constipation. Ratan Jot is used for joint pains, but also has a lot of importance in skin care. The one with the most significance is the Texas Valley chain, which is being used in the cancer's last stage treatment medicines. Even with this much importance, these plants are still endangered species, and WWF, Ayubia National Park authorities are trying to preserve them as much as possible. Among medicinal plants, there are some fruits too, such as Kanachi, which is a wild berry and wild injera. Among other plants seen are: Wild Rose, Bankukri, White Hulla, Wild Neem, Banakhar (Asqulas), Hulla, Deobara, Koochan, Kenth and Zakheme Hayat. There are different types of Pine trees, such as Al-Bumbar. These plants can be seen on the map in the figure. (WWF Pakistan, 2022; IUCN, 2018)

| OBJECTID | SHAPE | Name               | Latitude  | Longitude | Elevation_R |
|----------|-------|--------------------|-----------|-----------|-------------|
| 1        | Point | Zakhme hayat       | 34.049669 | 73.4062   | 2304        |
| 2        | Point | Wild Rose          | 34.042431 | 73.4066   | 2362        |
| 3        | Point | Wild Neem          | 34.044939 | 73.401789 | 2369        |
| 4        | Point | Wild Hybera        | 34.044239 | 73.40313  | 2368        |
| 5        | Point | White Hulla        | 34.044361 | 73.40244  | 2366        |
| 6        | Point | Texas Valley Chain | 34.0458   | 73.40179  | 2370        |
| 7        | Point | Sumbul             | 34.04825  | 73.40703  | 2369        |
| 8        | Point | Ratan Jot          | 34.04789  | 73.40192  | 2369        |
| 9        | Point | Koochan            | 34.04825  | 73.40704  | 2368        |
| 10       | Point | Kenth              | 34.048289 | 73.40705  | 2369        |
| 11       | Point | Kanachi            | 34.0482   | 73.40691  | 2373        |
| 12       | Point | Hulla              | 34.046489 | 73.40272  | 2370        |
| 13       | Point | Deobara            | 34.0471   | 73.40431  | 2372        |
| 14       | Point | Bhang              | 34.047369 | 73.40543  | 2373        |
| 15       | Point | Bankukri           | 34.044369 | 73.40247  | 2366        |
| 16       | Point | Banakhar           | 34.046089 | 73.40178  | 2370        |

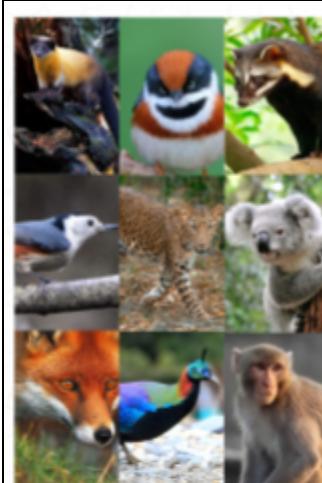
**Figure 13.2**

*Table showing the spatial data of the plants in the area*

the pipeline track. Species recorded to be in the Ayubia National Park include 757 plants, 650 insects, 230 birds, 31 mammals, 19 reptiles and 3 amphibian species. There were recent leopard prints seen, and the tree with the hole where a black bear stays. Some of the wildlife that have been spotted or heard along the pipeline track include Rhesus Macaques, Yellow-Throated Martens, Himalayan Palm Civets, Red Foxes, Koklass Pheasant, Himalayan Monal, White-Cheeked Nuthatch and Black-Throated Tit. Birdlife is particularly abundant, making this trail a hotspot for bird watchers. (WWF Pakistan, 2022; IUCN, 2018)

Pipeline track is an amazing place and a 'must-visit experience' for all the tourists who are coming. However, it must stay the same for the coming generations to experience it too. So everyone needs to preserve and protect it. Every visitor should respect and love nature by not breaking the plants and by not raising his/her voice. Protecting the area is our responsibility, as these plants and animals are our lifeline. (Traverse Pakistan, n.d.; WWF Pakistan, 2022)

Ayubia National Park is home to a diverse range of wildlife, some of which are present on



**Figure 13.3**  
*Animals that are present in the area*

# Chapter 14

## *Babusar Top*

Babusar Top is also known as Babusar Pass. Its elevation is 4,170 m. It is a mountainous pass in the Diamer district of Gilgit-Baltistan. Babusar Top is the highest peak of Naran Valley. It connects KPK to Gilgit. It is also considered the most dangerous mountain elevation. (Fly Pakistan, n.d.; IUCN, 2018)

### **History**

It was known as Babusar Top; the reason behind this name was that the Mughal emperor Babur used the same route. (IUCN, 2018)



**Figure 14.1**  
*Group photo take on the top of babusar top*

### **People of Babusar**

Babusar is not suitable for living due to its high altitude. On the mountains, there are grasslands where Gujjar and other tribes migrate during the summer. On the north side, there are the same mountain systems as the Kaghan mountains. These high-altitude regions, such as Babusar Top and its surroundings, are home to pine, oak, and hardwood forests, as well as various wildlife species. (WWF Pakistan, 2022; IUCN, 2018)



**Figure 14.2**  
*Providing awareness about the problem and their solutions*

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## Mallika parbat

The range bounds the right side of the KUNHAR RIVER and contains a peak called MALIKA PEAK or MALIKA PARBAT. The elevation of this peak is nearly 17000 feet. It can only be witnessed from Babusar top. (Fly Pakistan, n.d.; IUCN, 2018)

## LULUSAR LAKE

A lake is located in the Naran Valley, on the Naran-Babusar Road. The Lulusar Lake is a gorgeous lake and the main source of the Kunhar River. The distance from the lake to Naran is 48 kilometres. (Fly Pakistan, n.d.; WWF Pakistan, 2022)



**Figure 14.3**  
*Beauty of Lusar Lake*

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## Conclusion

The field trip was a valuable and amazing learning experience that helped us connect classroom knowledge with real-world and industry practices. Travel through the Himalayan foothills and visiting different national institutions and agencies gave us a deeper understanding of the challenges and ongoing efforts in conservation, climate change, and technological progress in Pakistan.

We learnt how conserved areas like Ayubia and Margalla Hills play a key role in protecting biodiversity, and how organizations such as WWF use advanced methods to monitor species like the common leopard and restore damaged ecosystems through reforestation and better water management. At Suparco, we explored Pakistan's advancement in Space technology, including the use of remote sensing for environmental monitoring and the upcoming projects. At the same time, we also explored the serious issues facing these ecosystems, such as habitat loss, pollution from tourism and the growing effects of climate change on mountain environments.

The trip shows us how important it is to take an integrated approach to environmental protection. We realized that the future of Pakistan's natural resources depends on continuous research, strong policy enforcement and community involvement. Encouraging responsible tourism, improving conservation laws, and raising public awareness are all essential steps. Overall, this field trip not only enhanced our understanding but also inspired us to play our part as responsible citizens and professionals working towards a sustainable and greener Pakistan.

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## References

Global Change Impact Studies Centre. (n.d.). History. Retrieved from  
<https://gcisc.org.pk/history/>

Global Change Impact Studies Centre. (n.d.). Mission and vision. Retrieved from  
<https://gcisc.org.pk/mission-and-vision/>

Raja, A. (2009, September 6). Environment: A walk in the woods. Dawn. Retrieved from <https://www.dawn.com/news/882656/environment-a-walk-in-the-woods>

Traverse Pakistan. (n.d.). Pipeline track. Retrieved from  
[https://traversepakistan.com/st\\_location/gilgit-baltistan/pipeline-track/](https://traversepakistan.com/st_location/gilgit-baltistan/pipeline-track/)

Pearl Tours. (n.d.). Khewra Salt Mines. Retrieved from  
<https://www.pearltours.com.pk/khewra-salt-mines/>

Shah, A. (2019, September 26). Khewra mines: A salt wonder for tourists. Dawn. Retrieved from  
<https://www.dawn.com/news/1507289/khewra-mines-a-salt-wonder-for-tourists>

Arab News Pakistan. (2019, January 29). Pakistan's Khewra Salt Mines attract thousands of tourists. Retrieved from  
<https://www.arabnews.pk/node/1438136/pakistan>

---

ShowCaves.com. (n.d.). Khewra Salt Mine. Retrieved from  
<https://www.showcaves.com/english/other/mines/Khewra.html>

Dawn News. (2016, June 2). Khewra's hidden treasures. Dawn. Retrieved from  
<https://www.dawn.com/news/1261366>

Southern Illinois University. (2015). *Environmental and social impacts of mining. Electronic Theses and Dissertations*. Retrieved from  
<https://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1240&context=ebi>

International Research Journal of Social Sciences and Humanities. (2022). *Tourism and heritage conservation in Pakistan*. Retrieved from  
<https://irjssh.com/index.php/irjssh/article/view/210/145>

Dawn News. (2024, March 21). WWF Pakistan's conservation efforts expand to new regions. Dawn. Retrieved from <https://www.dawn.com/news/1908899>

Wildlife of Pakistan. (n.d.). Ayubia National Park. Retrieved from  
<https://wildlife.com.pk/conservation/wildlife-parks/ayubia-national-park/>

World Wide Fund for Nature Pakistan. (n.d.). *Saving watershed in Ayubia*. Retrieved from  
[https://www.wwfpak.org/our\\_work\\_/forests/saving\\_watershed\\_in\\_ayubia/](https://www.wwfpak.org/our_work_/forests/saving_watershed_in_ayubia/)

Tripako. (n.d.). Lalazar – A remarkable tourist spot. Retrieved from  
<https://tripako.com/lalazar-a-remarkable-tourist-spot/>

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Wikipedia. (2023). *Lalazar Safari Park*. Retrieved from

[https://en.wikipedia.org/wiki/Lalazar\\_Safari\\_Park](https://en.wikipedia.org/wiki/Lalazar_Safari_Park)

Fly Pakistan. (n.d.). *Lalazar*. Retrieved from

<https://flypakistan.pk/attractions-details.php?attractionname=Lalazar>

World Wide Fund for Nature Pakistan. (2022). *Conservation initiatives*. Retrieved

from <https://www.wwfpak.org/>

University of Peshawar. (2023). *Summer campus – Bara Gali*. Retrieved from

<http://www.uop.edu.pk/>

International Union for Conservation of Nature. (2018). *Forest ecosystems and*

*biodiversity in Pakistan*. Retrieved from <https://www.iucn.org/>