Biodiversity, Ecosystem Restoration and Reforestation to Combat Deforestation and Habitat Loss

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Abstract:

This report critically reviews the legal, institutional, and policy frameworks guiding biodiversity conservation, ecosystem restoration, and afforestation in Khyber Pakhtunkhwa province, Pakistan. It evaluates the effectiveness of these efforts in aligning with international commitments, such as the Paris Agreement and the Convention on Biological Diversity, while identifying obstacles to implementing KP's Climate Change Policy 2022. Utilizing situational and SWOT analyses, the report assesses the performance of KP's Forest and Wildlife Departments in their conservation initiatives. Additionally, it examines global best practices to formulate recommendations for improving the province's environmental management. These recommendations emphasize the need for stronger legislation, enhanced enforcement mechanisms through technology, and increased community involvement. Ultimately, the goal is for KP to achieve its long-term environmental objectives while addressing climate change impacts and protecting its unique ecosystems. The report concludes with a call for more robust legal frameworks, better coordination among provincial departments, and increased international support.

Key words:

Biodiversity, Conservation, Afforestation, Climate Change, Khyber Pakhtunkhwa

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Introduction

Climate change is a significant threat to humanity in the 21st century, profoundly impacting daily life and the environment. In response, countries across the globe have committed to addressing the issue. In addition to many other serious concerns, shifting weather patterns and the increasing frequency of natural disasters pose substantial risks to ecosystems and biodiversity. Furthermore, carbon emissions are identified as a major contributor to these changes (United Nations, n.d.). Forests are vital sources of carbon storage, essential for maintaining environmental balance. More than 1.6 billion people depend on forests for food and fuel, and around 70 million, including many Indigenous communities, live within these ecosystems. Forests supply crucial resources like oxygen, shelter, employment, water, nourishment, and fuel (WWF, n.d.).

Climate change poses significant threats to biodiversity and ecosystems. Afforestation and ecosystem restoration are crucial strategies for mitigating these effects: afforestation sequesters carbon and creates habitats, while restoration enhances ecosystem health and resilience. Together, these efforts support biodiversity, which is vital for maintaining the functionality and resilience of ecosystems in the face of climate change. This interconnected relationship underscores the importance of integrated environmental management for sustainable futures.

Global initiatives have set targets to combat climate change, conserve biodiversity, and expand forest cover. Pakistan actively engages in these global climate frameworks and has made significant progress in strengthening its legal and institutional structures. The country has developed comprehensive policies and action plans that involve provincial participation to effectively achieve these targets.

Khyber Pakhtunkhwa (KP) is a crucial stakeholder in Pakistan's forestry landscape, accounting for over 40% of the country's forest cover (Khurshid, 2024). In line with national policies, the KP government launched the Green Growth Initiative in 2014 to enhance forest coverage and promote sustainable resource management through biodiversity conservation and ecosystem restoration. This initiative seeks to protect the environment while benefiting local communities that depend on these resources.

In response to international and national calls to address climate change and recognizing the high vulnerability of Khyber Pakhtunkhwa (KP), the provincial government developed a Provincial Climate Change Policy in consultation with relevant departments. This policy, first established in September 2017 and updated in July 2022, is designed to be specific and aligned with the National Climate Change Policy of Pakistan (2021). It proposes two key approaches—adaptation and mitigation—targeting the most affected sectors. The policy outlines essential legislation, performance measures, and an institutional framework.

Statement of Problem

Over the past decade, the Khyber Pakhtunkhwa (KP) government has made notable progress in afforestation, ecosystem restoration, and biodiversity conservation. These efforts demonstrate KP's dedication to environmental sustainability and addressing climate change. As the province continues to develop policy guidelines and implement projects in this area, it is crucial to critically assess the legal framework and performance of the relevant departments overseeing these activities. This is especially important in the context of international climate change agreements and Pakistan's national climate policy. The study aims to evaluate how well KP's legal and institutional frameworks, along with its achievements, align with global environmental standards, national policies, and set objectives.

Scope of Study

This study will focus on the performance of the KP government in afforestation, ecosystem restoration, and biodiversity conservation, in light of the targets set and guidelines issued in the KP Climate Change Policy of 2022. It will provide a brief overview of the international and national legal landscape in the fields of biodiversity, ecosystem restoration, and afforestation. The analysis will focus on the KP government's current legal and institutional framework, along with an examination of its performance against the targets set in the policy.

Literature Review

International Legal Framework

Pakistan has signed multiple international conventions and treaties focused on climate change, environmental sustainability, and biodiversity conservation, aligning itself with global climate efforts.

- **Intergovernmental Panel on Climate Change (IPCC)**: Established by the United Nations in 1988, the IPCC assesses and synthesizes the latest scientific research on climate change, its impacts, and potential adaptation and mitigation strategies. One of its key functions is issuing Assessment Reports (AR) that comprise the latest knowledge on climate change, along with the impact of policies and guidelines.
- **United Nations Framework Convention on Climate Change (UNFCCC, 1992)**: Pakistan ratified the UNFCCC in 1994, committing to climate change mitigation, adaptation, and reporting responsibilities under global frameworks. The COP, or Conference of the Parties, is the main decision-making body of the UNFCCC, serving as a platform for countries to negotiate and assess progress in combating climate change.
- **Paris Agreement (2015)**: The Paris Agreement is an international treaty aimed at addressing climate change and its impacts. Adopted in

December 2015 at the COP21 conference in Paris, it brought together nearly all countries to work towards limiting global warming to well below 2 degrees Celsius while pursuing efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels.

- **Convention on Biological Diversity (CBD, 1992)**: This international treaty aims to conserve biological diversity, promote the sustainable use of its components, and ensure fair and equitable sharing of benefits arising from genetic resources. Pakistan ratified the CBD, committing to the conservation and sustainable use of biodiversity. This treaty has influenced national and provincial biodiversity policies, especially in the conservation of wildlife, forests, and ecosystems, linking these efforts with climate change adaptation.
- **United Nations Convention to Combat Desertification (UNCCD, 1994)**: The UNCCD focuses on mitigating desertification and drought and encourages the restoration and maintenance of land productivity.
- **Sustainable Development Goals (SDGs, 2015)**: The SDGs are a set of 17 global goals established by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. These goals aim to address a range of social, economic, and environmental challenges, promoting prosperity while protecting the planet.

    - **SDG 13: Climate Action –** Focused on taking urgent actions to combat climate change.
    - **SDG 15: Life on Land –** Emphasizes the protection, restoration, and sustainable use of terrestrial ecosystems, managing forests, and halting biodiversity loss.

National Legal Framework

Pakistan Environmental Protection Act, 1997: The Pakistan Environmental Protection Act (PEPA), 1997 governs the protection of natural resources and environmental quality across the country. This foundational law influences national and provincial environmental governance by mandating pollution control, resource management, and biodiversity conservation.

National Climate Change Policy (NCCP, 2012; Revised 2022): The NCCP 2012 provided the foundation for national climate strategies, focusing on mitigation and adaptation across sectors like water, agriculture, and forestry. The revised NCCP 2022 aligns with the Paris Agreement and incorporates recommendations from the IPCC AR6. This policy directs provinces, including KP, to implement climate-resilient strategies and enhance their natural carbon sinks.

Nationally Determined Contributions (NDCs): Pakistan's NDCs, issued under the Paris Agreement, outline the country's climate mitigation and adaptation strategies, emphasizing the need for international support. The updated NDC (2021) focuses on reducing emissions by 20% by 2030, with specific goals related to afforestation, clean energy, and biodiversity conservation.

Khyber Pakhtunkhwa Legal Framework

KP Forest Ordinance, 2002 (Amended 2022): The Khyber Pakhtunkhwa Forest Ordinance, 2002, serves as the key legal framework for forest conservation and management. In 2022, the ordinance was amended to strengthen regulations, increase penalties for deforestation, and incorporate modern sustainable forest management practices. The act was aligned with national and provincial climate change policies and also included merged districts in its scope. These amendments support KP's contribution to Pakistan's NDC targets, focusing on afforestation and reforestation as essential climate mitigation strategies.

Khyber Pakhtunkhwa Environmental Protection Act (EPA), 2014: The KP Environmental Protection Act (EPA), 2014 provides the legal framework for environmental management in the province. It includes provisions for pollution control, environmental quality standards, and the promotion of sustainable natural resource use. The law also supports afforestation and biodiversity conservation initiatives that are essential for mitigating climate impacts.

KP Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015: This act provides comprehensive regulations for wildlife protection and biodiversity conservation in KP. The law aligns KP's wildlife policies with the Convention on Biological Diversity (CBD) and supports biodiversity conservation as a critical aspect of climate adaptation. It oversees the establishment of wildlife sanctuaries and protected areas, as well as the preservation of endangered species.

KP Climate Change Policy, 2022: KP's Climate Change Policy of 2022 is a comprehensive plan aimed at building climate resilience in vulnerable sectors such as water, forestry, biodiversity, and agriculture. The policy integrates recommendations from national climate policies and the Paris Agreement, focusing on both mitigation and adaptation. It emphasizes enhancing carbon sinks through large-scale afforestation and promoting biodiversity conservation to reduce the province's vulnerability to climate impacts. The policy outlines a total of 342 strategies, with 195 for adaptation and 147 for mitigation.

KP Action Plan on Climate Change: The KP Action Plan on Climate Change provides specific strategies for implementing mitigation and adaptation measures in line with Pakistan's NDC commitments. It includes action points on afforestation, sustainable forest management, climate-smart agriculture, and disaster risk reduction. The plan strengthens institutional capacity to respond to climate change and ensures alignment with national and international climate policies.

KP Multilateral Environment Agreement: The Khyber Pakhtunkhwa (KP) Multilateral Environmental Agreement (MEA) is a framework that outlines the province's commitment to adhering to various international environmental agreements. This initiative is essential for addressing environmental challenges while promoting sustainable development. The agreement emphasizes integrating international environmental standards into local policies and regulations, ensuring that provincial practices align with global best practices.

Methodology

This study is based on primary and secondary data obtained through personal interviews, access to official reports and data, and consulting online sources. Data obtained will be analyzed using situational and SWOT analysis methods to draw conclusions and prepare recommendations.

Situational Analysis

Afforestation Policy Guidelines and Targets:

- **Afforestation and Reforestation Initiatives**:
    - Expand forest cover by 25% by 2030 through large-scale afforestation and reforestation projects, such as the Ten Billion Tree Tsunami project.
    - Restore 350,000 hectares of degraded forest land across KP to improve carbon sequestration and reduce soil erosion.
    - Urban and peri-urban forestry: Promote tree plantation drives in cities and peri-urban areas to improve air quality and create green spaces (Urban Forestry Policy).
    - Community-based forestry management: Strengthen community participation in afforestation projects, ensuring sustainable forest resource use and protection against illegal logging.
    - **Carbon Sequestration Goals**: Enhance the capacity of forests to act as carbon sinks, contributing to the 20% greenhouse gas emission reduction target outlined in Pakistan's NDCs, conditional on international support.

- **Forest Monitoring and Management**: Strengthen forest monitoring systems using satellite imagery and GIS technology to track deforestation rates and assess the health of afforested areas.

Biodiversity Conservation Policy Guidelines and Targets:

- **Protected Areas and Wildlife Sanctuaries**:
  - Expand the network of protected areas to cover at least 15% of the province's land by 2030. This includes the establishment of new national parks, wildlife sanctuaries, and nature reserves to protect biodiversity hotspots.
  - Implement measures under the KP Wildlife and Biodiversity Act 2015 to safeguard endangered species and critical habitats.
- **Biodiversity Corridors**:
  - Establish and maintain biodiversity corridors to connect fragmented ecosystems, allowing for species migration and adaptation to climate change.
  - Special focus on creating corridors for species endangered by habitat loss due to deforestation and climate change, ensuring genetic diversity and reducing extinction risks.
- **Conservation of Endangered Species**:
  - Strengthen efforts to protect endangered species like the snow leopard, markhor, and other native fauna through habitat restoration, anti-poaching laws, and public awareness campaigns.

Ecosystem Restoration Policy Guidelines and Targets:

- **Restoration of Degraded Ecosystems:**
  - Restore degraded rangelands and wetlands to improve ecosystem services, such as water retention, flood control, and biodiversity support. Specific focus on the restoration of ecosystems vulnerable to climate impacts, such as drylands and mountainous regions.
  - Rehabilitate riverine ecosystems and watershed areas to prevent soil degradation and improve water availability, particularly in areas prone to droughts and flash floods.
- **Sustainable Land Use and Agriculture:**
  - Promote sustainable agriculture and forestry practices to combat land degradation and desertification. Encourage agroforestry and the planting of native tree species alongside crops to enhance soil fertility and water retention.

- **Community-Based Ecosystem Management:**
  - Engage local communities in ecosystem-based adaptation (EBA) approaches, ensuring that local populations benefit from ecosystem restoration projects and take active roles in managing natural resources.
- **Climate-Resilient Infrastructure**:
  - Incorporate ecosystem-based approaches in infrastructure development to reduce environmental impact and protect vulnerable ecosystems. This includes designing climate-resilient roads, dams, and housing projects in line with environmental conservation guidelines.

Performance Against Targets

The KP Government, through its various departments and agencies such as the Forest Department, Wildlife Department, and the Environmental Protection Agency (EPA), has undertaken several significant initiatives to address the challenges of climate change, biodiversity loss, and environmental degradation.

Performance of Forest Department

1. The Green Growth Initiative (GGI) was launched in 2014, under which the flagship, globally recognized Billion Tree Afforestation Project (BTAP) has been successfully implemented, resulting in the raising of 1.208 billion plants.
2. Previously, the Khyber Pakhtunkhwa Forest Department also implemented several projects, including the Kalam Integrated Development Project (KIDP), Siran Forest Development Project, Malakand Social Forestry Project, Kagan Intensive Forest Management Project, Social Forestry Project, and Tarbela Watershed Management Program for the restoration of forest landscapes, strengthening the livelihoods of rural communities, and enhancing the lifespan of strategic reservoirs.
3. The Ten Billion Tree Tsunami Program (10-BTTP) was started in 2019, under which 0.708 billion plants have been raised (2019-2024).
4. To implement the REDD+ Program, the KP Government has achieved the following targets under Reducing Emission from Deforestation:
   a. Prepared Subnational REDD+ Strategy and Action Plan (2022-31).
   b. Developed Benefit Sharing Mechanism for different categories of forests.
   c. Prepared Forest Reference Emission Level for KP.
   d. Conducted Carbon Stock Assessment in all forest areas of KP.
   e. Developed Biomass and Carbon Tables for major tree species.

5. A Letter of Agreement (LoA) has been signed with the Survey of Pakistan for the demarcation of state forests in the province; this activity is ongoing.
6. Demonstrated ecotourism activities under the Sustainable Forest Management Project in the Northern Forest Region-II (2017-21), thus reducing community dependence on forests by providing alternative livelihood options.
7. The Billion Tree Afforestation Support Project (BTASP) was initiated in 2019-27 through the financial and technical support of German Cooperation to provide sustainability to the natural assets developed under the BTAP and 10-BTTP.

Performance of Wildlife Department

Protected Areas and Biospheres

The KP Government has significantly expanded its network of protected areas, including national parks, biosphere reserves, and wildlife sanctuaries. The creation and management of these areas are central to the province's efforts to conserve biodiversity, restore ecosystems, and meet the 15% protected land target by 2030 set in the KP Climate Change Policy.

- **Chitral Gol National Park**:

- Located in the Chitral district, this park is part of the Man and Biosphere (MAB) Reserve model under UNESCO. The park covers an area of approximately 77.5 km² and plays a crucial role in conserving the endangered snow leopard and markhor populations, alongside other local fauna.
- The MAB model, applied here, integrates community-based management approaches, balancing biodiversity conservation with sustainable resource use by local communities.

- **Ayubia National Park (Gallies Biosphere Reserve)**:

- This national park is another successful application of the UNESCO MAB model. It spans over 3,312 hectares in the Gallies Forest Division and is known for its rich biodiversity, including leopards, black bears, and a variety of bird species.

- **New Protected Areas**

KP has designated new wildlife sanctuaries and national parks, such as Nizampur National Park and Shandur-Hundrup National Park, contributing to the expansion of protected lands. By August 2024, approximately 16.75% of KP's total land area was declared protected under various conservation categories.

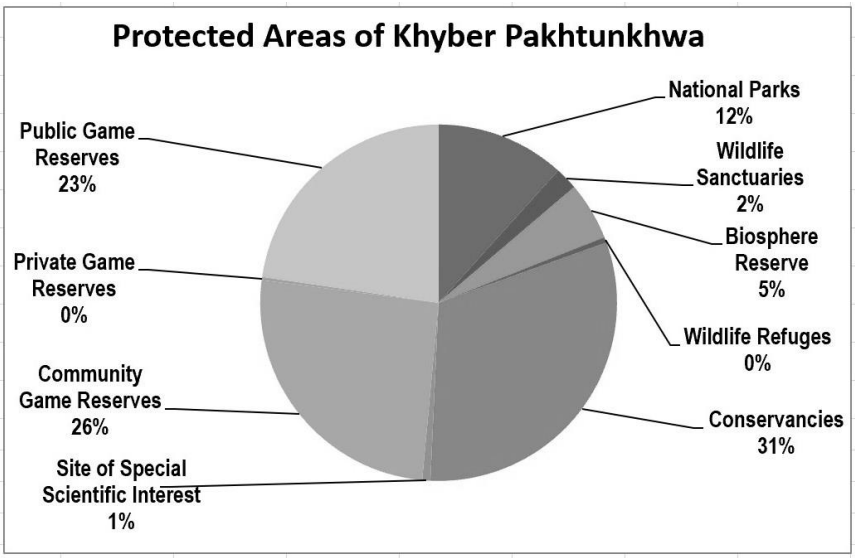

Figure 1: Protected Areas of KP

Zoos and Wildlife Sanctuaries

- **Peshawar Zoo**:
  - Opened in 2018, Peshawar Zoo is a key initiative by the KP government aimed at wildlife education, conservation, and rehabilitation. The zoo has become an important center for raising awareness about the protection of endangered species in the province.
- **Wildlife Sanctuaries**:
  - The KP government has declared several areas as wildlife sanctuaries, such as the Dhodial Pheasantry and Broghil Wildlife Sanctuary. These sanctuaries aim to protect bird species and high-altitude fauna, providing crucial habitats for species under threat from habitat loss and climate change.

National Parks and Wildlife Sanctuaries

The KP Wildlife Department has been instrumental in the creation and management of several national parks and wildlife sanctuaries aimed at conserving critical habitats and endangered species.

- **Nizampur National Park:**
  - A newly declared protected area in the Nowshera district, focusing on the conservation of flora and fauna native to the semi-arid ecosystem.
  - The Park aims to protect the Indian gazelle and other threatened species while restoring the region's ecological balance.

- **Shandur-Hundrup National Park**:
  - This Park, declared in 2021, covers a vast area of the high-altitude Shandur Plateau, famous for its annual Shandur Polo Festival. The park's objectives include biodiversity conservation and the promotion of eco-tourism as a sustainable livelihood option for local communities.
- **Margalla Hills National Park Extension**:
  - KP has been instrumental in the expansion of Margalla Hills National Park, which borders Islamabad, extending protection to additional forested areas within KP.

Urban Forestry Initiatives

- **Peshawar Urban Forestry Program**:
  - In line with the KP Climate Change Policy 2022, the Peshawar Urban Forestry Program was initiated to address urban heat islands, improve air quality, and create green spaces in densely populated areas. The program aims to plant 5 million trees in and around the provincial capital by 2025.
  - The focus is on planting climate-resilient species and developing green belts along major roads, parks, and other public spaces.
- **Urban Greening in Other Cities**:
  - Urban forestry initiatives are being expanded to other major cities like Abbottabad, Mardan, and Swat, with local communities and municipal bodies involved in afforestation activities. The KP government aims to increase urban green cover by 10% by 2030.

Environmental Protection Agency (EPA)

The KP EPA is tasked with enforcing the KP Environmental Protection Act (2014), which regulates activities that impact the environment, including integrated tourism zones and new construction in protected areas.

Performance Against Targets

- Despite progress, illegal logging and land-use conflicts remain challenges in certain areas, and 11,000 acres of forest have been lost (APP, 2024). Furthermore, enforcement in newly merged districts is also a significant hurdle and needs to be strengthened.
- The implementation of biodiversity corridors is behind schedule, limiting species migration and habitat connectivity.
- Wetland and rangeland restoration projects have seen limited progress due to resource constraints and competing land-use demands.

Best Practices Around the World

Uttarakhand is a state in Northern India that successfully implemented a reforestation project supported by the Japan International Cooperation Agency, where local communities were intensively involved with the main objective of sustainable forest management. Below is a comparison of the KP BTAP project with the Uttarakhand project:

Criteria	Uttarakhand Forest Resource Management Project	Khyber Pakhtunkhwa Billion Tree Afforestation Project (KP BTAP)
Objectives	Promote sustainable forest management, enhance biodiversity, improve community livelihoods, rehabilitate degraded areas	Afforestation to combat climate change, restore ecosystems, increase forest cover by planting one billion trees
Methodologies	Community-based forest management, participatory planning, direct seeding, nursery planting	Mix of direct seeding, planting nursery-grown seedlings, community engagement in afforestation
Species Selection	Prioritizes native species for biodiversity and ecosystem resilience	Emphasizes diverse native species for ecosystem restoration and carbon sequestration
Community Involvement	Strong emphasis on empowering local communities through training and direct participation	Actively engages local communities in planting and maintenance, fostering ownership
Funding and Resources	Funded through state and central government sources, with support from international organizations	Primarily funded by the provincial government, with additional international donor support
Monitoring and Evaluation	Participatory monitoring methods involving local communities	Structured monitoring framework using technology for tracking survival rates and biodiversity
Policy and Regulatory Context	Operates within India's comprehensive forest laws, promoting conservation and community rights	Aligned with Pakistan's national climate policies and commitments under international agreements
Legal Framework	Governed by: - Forest (Conservation) Act, 1980 - Wildlife Protection Act,	Supported by: - Khyber Pakhtunkhwa Forest Ordinance, 2002 - Environmental Protection

	1972 - Forest Rights Act, 2006	Act, 2014
Ecological Context	Focuses on hilly terrain with diverse ecosystems, addressing soil erosion and habitat degradation	Targets various ecological zones, emphasizing restoration of degraded lands and biodiversity enhancement
Socioeconomic Impact	Improves livelihoods for forest-dependent communities through sustainable practices and alternative income sources	Aims to provide economic benefits through job creation in tree planting and maintenance
Challenges and Barriers	Faces issues related to land tenure, human-wildlife conflict, and bureaucratic hurdles	Encounters climate variability, ensuring long-term maintenance of planted areas, and land use pressures

Case Study: Markhor Trophy Hunting and Biodiversity in Khyber Pakhtunkhwa (KP), Pakistan

The markhor (*Capra falconeri*) is a wild goat species native to the mountainous regions of Central Asia, particularly Pakistan, where it is recognized as the national animal. Markhor populations have faced significant threats due to habitat loss, poaching, and competition with livestock, leading to its classification as "Near Threatened" by the International Union for Conservation of Nature (IUCN, 2021).

Trophy Hunting as a Conservation Tool

In the late 1990s, the Government of Pakistan, in collaboration with various NGOs and international organizations, initiated a regulated trophy hunting program aimed at conserving the markhor population. This program highlights several key aspects:

1. **Population Management:** The program allows a limited number of markhor to be harvested each year, contributing to population stabilization. Sustainable quotas are set based on scientific assessments.
2. **Economic Incentives:** Fees from trophy hunting licenses can be substantial, generating revenue that is reinvested in conservation efforts and local community development. In KP, fees for a single markhor hunting license can reach up to $60,000 (GOP, 2017).
3. **Community Involvement:** Local communities receive a share of the hunting revenues, providing them with a vested interest in conserving markhor populations and their habitats. Community-based wildlife management models have proven effective in ensuring local engagement.

Success Stories

1. **Population Recovery:** Studies have indicated that the trophy hunting program has contributed to the recovery of markhor populations. For example, the markhor population in the Chitral region increased from about 2,000 in the late 1990s to approximately 4,500 by 2018 (Mishra et al., 2018).
2. **Economic Benefits:** The revenue generated from trophy hunting has funded local initiatives, including education and healthcare services. This has helped improve the quality of life for residents, who see direct benefits from wildlife conservation.
3. **Biodiversity Conservation:** Protecting markhor habitats has also benefited other wildlife species, promoting overall ecosystem health. Conservation efforts in the region have led to the preservation of critical habitats that support diverse flora and fauna.

Despite its successes, the trophy hunting program faces several challenges

1. **Regulation and Enforcement:** Ensuring compliance with hunting regulations is crucial. Illegal hunting and poaching remain significant threats, requiring robust monitoring and enforcement mechanisms.
2. **Balancing Local Needs:** Conflicts can arise between conservation objectives and local land use needs, particularly regarding grazing rights and agricultural land. Addressing these conflicts is essential for sustainable management.
3. **Public Perception:** Trophy hunting can be controversial, with opposition from some conservationists and the public. Raising awareness about its benefits and the importance of sustainable practices is vital for garnering support.

SWOT Analysis of Forest, Wildlife and EPA of KP

Strengths

Forest Department	Wild Life Department	EPA
Legal Frame Work Skilled Staff and Training: GIS monitoring, and forest law enforcement Legal Team. Financial Resources for Reforestation Community based Organizations Research Center	Legal Framework Human Resource Breeding Facility Research Center Logistics and Infrastructure Veterinary Hospitals and Labs	Legal Framework National and Internal support Relevant Knowledge and Expertise

Weakness

Forest Department	Wild Life Department	EPA
Infrastructure Deficiencies: The available infrastructure for forest rangers and officers, particularly in field formations. Lack of Operational Funds: Limited Technological Integration Insufficient • Infrastructure, • Human Resource and • Logistics in newly merged Districts	Deficient in requisite HR Shortage of Operational Budget Non-integration of Technology for monitoring Insufficient • Data repository • Infrastructure, • Human Resource and • Logistics	Technological Gaps Human Resource Shortage Operational Funding Organizational capacity Non-prioritize sector

Opportunities

Forest	Wild Life	EPA
International Donors National and international Policies/Legal Framework Collaborations with NGO, Institutes and Other governments Best practices around the world Job creation Eco Tourism	International Donors National and international Policies/Legal Framework Collaborations with NGO, Institutes and Other governments Best practices around the world Job creation Eco Tourism	International Donors National and international Policies/Legal Framework Collaborations with NGO, Institutes and Other governments Best practices around the world Improved Health Carbon Credits Conservation of

Local communities Social Media Carbon Credits Revenue Generation Non-Timber Forest Products Agro-Farming	Local communities Social Media Revenue Generation Integrated Tourism Zones	natural Resources

Threats

Forest	Wild Life	EPA
Class-Based Social Fabric **Law and Order Issues** Timber Mafia Population Expansion Farming Expanding Housing Societies Integrated Tourism Zones Non-consistent Policies Smuggling Litigation with Communities	**Class-Based Social Fabric** **Law and Order Issues** Timber Mafia Population Expansion Illegal Hunting Road ecology Integrated Tourism Zones Non-consistent Policies Smuggling	Infra structure growth Population growth Urban Sprawl Increased automobiles Fundings

Issues and Challenges

1. Legal

- **Inadequate Legal Mechanisms**: While KP has made considerable progress with laws like the KP Forest Ordinance 2002 (amended in 2022) and the Wildlife Act 2015, the legal framework still lacks provisions for carbon emission trading and climate finance mechanisms, which are essential for aligning with global climate agreements such as the Paris Agreement.
- **Gaps in Enforcement**: The laws enacted are not always effectively enforced due to resource constraints, especially in the merged districts, where the extension of the KP Forest Act 2002 is hindered by law-and-order issues as well as social fabric.
- **Human Resource Deficiency:** Departments like the Environmental Protection Agency (EPA) and Wildlife Department face serious shortages of qualified staff, hindering efficient monitoring of greenhouse gas (GHG) emissions, biodiversity conservation, and environmental assessments.
- **Limited Technological Integration:** The lack of AI-based monitoring systems and computerized forest surveillance reduces the effectiveness of forest protection efforts, leading to issues like illegal logging, wildlife poaching, and forest fires going undetected.

2. Institutional

- **Weak Coordination**: Despite various departments (Forest, Wildlife, EPA) working toward common goals under the KP Climate Change Policy 2022, there is a lack of coordination and integrated action, which affects overall performance in achieving afforestation, biodiversity conservation, and ecosystem restoration.
- **Insufficient Operational Funding**: Departments face budgetary constraints that limit their capacity to enforce environmental laws, conduct field operations, and implement flagship projects like urban forestry and community-managed forestry.
- **Law and Order Challenges**: In regions like the merged districts, implementing forest protection laws is challenging due to security concerns and local resistance from powerful elites within the social fabric.
- **Weak Coordination**: Weak coordination among the tourism department and environmental agencies has resulted in unregulated development that threatens local biodiversity.
- **Unregulated Tourism Expansion**: The overarching legal framework for ITZs (Integrated Tourism Zones) has led to

unregulated tourism expansion, threatening local ecosystems and habitats.

- **Inadequate GHG Monitoring**: The KP government lacks adequate GHG monitoring and has yet to fully develop mechanisms to capitalize on carbon credits or engage in carbon offset projects.
- **Public Awareness Campaigns**: Public awareness campaigns are sporadic and lack focus on portraying offenders of deforestation and wildlife poaching negatively.

Conclusion

The KP government has made significant strides in promoting afforestation, biodiversity conservation, and ecosystem restoration through initiatives like the Billion Tree Tsunami and the KP Climate Change Policy 2022. However, institutional and legal frameworks face significant challenges that inhibit the attainment of projected targets. These include enforcement weaknesses, inadequate funding, technology gaps, and human resource shortages. The government's approach needs a more integrated and coordinated response, especially in emerging fields like carbon management and sustainable tourism.

Recommendations

Objective	Challenges	Recommendations	Projected Targets and Timeline
Strengthen Legal Framework	Insufficient legislation on **carbon finance** and **sustainable tourism**	Introduce **legislation on carbon credits**, **emission trading systems**, and **Integrated Tourism Zones (ITZs)** regulations	Legal framework aligned with **NDCs** and **SDGs** goals Hiring of Consultants 3 Months Coordination with Federal departments 3 Months Coordination with IPCC and Stake Holders 6 Months Legislation and Policy making 4 Months
Improve Enforcement Capacity	**Weak enforcement** of forest and wildlife laws in **merged districts**	Increase **human resource allocation**, ensure strong monitoring through technology, and enhance coordination between departments	Hiring of HR 3 Months Introduction of Technology : Procurement and Capacity Building 6 Months
Enhance Technological Integration	**Lack of AI-based and computer systems** for monitoring	Deploy **drones**, **AI-based forest monitoring**, and **satellite technology** for real-time oversight of forests and biodiversity	Collaborate with International Organizations for funding 6 months Procurement of Equipment and training of Staff 6 months.
Increase Funding for Field Operations	Insufficient funds for **field patrols**, equipment, and afforestation	Establish **special climate funds** and attract **international climate finance.** Introduce Gradual tourism, hunting and entertainment fee by developing niche business in the field.	Hiring of Consultants 3 months Capacity Building 2 months Collaboration with NGOs and Communities. 6 Months Implementation within 1 year

Promote Community-Based Conservation	Lack of **community involvement** in conservation	Expand **community-managed forestry** programs, increase local **engagement through collaborations with stake holders.**	Increase Game Reserves by engagement of local communities by promoting awareness.
Develop Integrated Tourism Zones (ITZs)	**Unchecked tourism** threatening ecosystems	Enforce **ecological regulations through Forest department as the power lies with EPA, Tourism and Forest.**	Preparation of amendment in EPA act 2 week Vetting from Law Department 1 week Approval of Cabinet 1 week Approval from Parliament and Governor 1 month.

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