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GREENING INFRASTRUCTURE IN THE HINDUKUSH-KARAKORAM-HIMALAYA (HKH) LANDSCAPE

Action Plan September 2021

Sustainable Infrastructure Programme
WWF-Pakistan

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GREENING INFRASTRUCTURE IN THE HINDUKUSH-KARAKORAM-HIMALAYA (HKH) LANDSCAPE

Action Plan September 2021

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ABBREVIATIONS

10BTAP	Ten Billion Tree Afforestation Project
AJK	Azad Jammu and Kashmir
BRI	Belt and Road Initiative
BWCDO	Baltistan Wildlife Conservation and Development Organization
CPEC	China Pakistan Economic Corridor
CSR	Corporate Social Responsibility
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
GB	Gilgit-Baltistan
HKH	Hindukush-Karakoram-Himalaya
IUCN	International Union for Conservation of Nature
IWT	Illegal Wildlife Trade
KKH	Karakoram Highway
KNP	Khunjerab National Park
KPK	Khyber Pakhtunkhwa
KVO	Khunjerab Villagers Organization
MW	Megawatt
NGO	Non-governmental Organization
SESA	Strategic Environmental and Social Assessment
SI	Sustainable Infrastructure
SKIDO	Shahi Khyber Imamabad Development Organization
SLF	Snow Leopard Foundation
SLT	Snow Leopard Trust
WWF	World Wide Fund for Nature
WWF-Pakistan	World Wide Fund for Nature-Pakistan

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GREENING INFRASTRUCTURE IN THE HINDUKUSH-KARAKORAM-HIMALAYA (HKH) LANDSCAPE

The Hindukush-Karakoram-Himalaya (HKH) landscape is a mountain region that lies in the northern part of Pakistan and spans seven other countries including Afghanistan, Bangladesh, Bhutan, China, India, Nepal, and Myanmar. It is home to the world's highest peaks, diverse flora and fauna, and vast reserves of natural resources. It is also a source of water for several major river basins and provides ecosystem services such as water, food, and energy that sustain people and livelihoods. However, planned and proposed large-scale infrastructure projects under the China Pakistan Economic Corridor (CPEC), which falls under China's transcontinental multifaceted policy and investment program, the Belt and Road Initiative (BRI), could lead to irreversible destruction of the unique landscape of the HKH region.

CPEC involves at least 51 Memorandums of understanding (MoUs) currently worth over US$60 billion, including projects in the energy sector such as coal, solar, hydro, and wind power projects; associated transmission lines and pipelines; rail and motorway transportation infrastructures; industrial investment; and financial and social cooperation.

In view of the above, WWF-Pakistan recognizes the need to address the adverse environmental consequences of unsustainable infrastructure projects in the HKH region. WWF's vision for greening infrastructure necessitates a new development paradigm that yields a net positive environmental and social impact. This can be achieved by embedding an understanding of the value of nature in development planning and infrastructure decision-making and strengthening governance and legal frameworks.

WWF aims to counter the negative impacts of infrastructure development by:

(i) building alliances towards a strong institutional and policy context through influencing and supporting relevant actors involved in CPEC projects and investments;

(ii) promoting transparent, inclusive, and integrated decision-making, planning, and construction practices that include necessary mitigation measures for sustainable and climate-resilient development and values natural capital and ecosystem services; and

(iii) facilitating planning and implementing best practices for 'greening' infrastructure to minimize environmental risks and enhance resilience and adaptation while providing important social and economic benefits.

As a first step, WWF-Pakistan has developed an Action Plan as a guidance document for policy makers, government departments and agencies, and other stakeholders involved in the planning, design, construction, and operation of large-scale infrastructure projects to integrate and streamline ecologically-friendly practices that are based on community needs and priorities.

The recommendations and next steps for greening infrastructure in the Action Plan have been informed by the key findings from the *Consultative Workshop on Infrastructure Development in Snow Leopard Home Ranges in Pakistan*, held between 16-17 June 2021 and *community consultations in Gilgit-Baltistan (GB)*, held between 19-20 June 2021. The qualitative data has been compiled, assessed, and thematically analysed to propose recommendations for NGOs, government agencies and institutions, local communities, and all relevant stakeholders.

WWF-Pakistan hopes that the vision of greening infrastructure development in the HKH landscape can be integrated into local and district level development plans so that industries, financial institutions, public and private entities, and other relevant stakeholders adopt sustainable infrastructure practices.

PART I

CONSULTATIVE WORKSHOP ON INFRASTRUCTURE DEVELOPMENT IN SNOW LEOPARD HOME RANGES IN PAKISTAN

Key Workshop Findings
16-17 June | Gilgit, Gilgit-Baltistan, Pakistan

INTRODUCTION

Snow leopard (*Panthera uncia*) home ranges are estimated to encompass a habitat of approximately 1,776,000 square kilometres, of which 80,000 square kilometres (4.5%) is situated within Pakistan. This elusive big cat resides in the Hindukush and Karakoram mountains in the north of Pakistan, where its habitat is spread across Khyber Pakhtunkhwa (KPK), Gilgit-Batistan, and Azad Jammu and-Kashmir (AJK). Snow leopard populations in Pakistan, however, face a number of threats including poaching, conflict with communities, and climate change, all of which continue to put the future of their home ranges at great risk.

However, there is now a new and emerging threat that could potentially reverse the gains made in the conservation and protection of snow leopards in Pakistan: large-scale and rapid infrastructure development. With an estimated 250-400 snow leopards remaining in Pakistan, infrastructure development has the potential to negatively transform, fragment, and cause irreversible damage in their home ranges.

Increasing infrastructure investments, largely under CPEC, require planning that integrates ecological sustainability, conservation, and protection of WWF's priority areas and species, such as the snow leopard.

WWF-Pakistan's Sustainable Infrastructure Programme, formally launched in the summer of 2020, was set-up to meet and address the aforementioned need. As a first step, the Sustainable Infrastructure (SI) team focused on mapping and identifying the impacts of proposed and planned BRI related large-scale infrastructure projects on the environment, biodiversity, and local communities, and developed high level recommendations on how to mitigate the identified impacts. This research also aided the SI team in identifying priority regions within Pakistan, and ones that will be most impacted by rapid and ill-planned infrastructure development. The Hindukush-Karakoram-Himalaya landscape of Gilgit-Baltistan was one such ecologically significant area and a priority region for climate action.

To further build on the research conducted by the Sustainable Infrastructure Programme, and to understand the status of snow leopard and infrastructure development research, advocacy, and implementation, a two-day *Consultative Workshop on Infrastructure Development in Snow leopard Home Ranges in Pakistan* was held in Gilgit between 16-17 June 2021.

The workshop was attended by more than 30 representatives, including members from the Government of Pakistan, various experts from the global WWF Network, policymakers, academics, researchers, and local community members (Appendix I).

STRUCTURE OF THE WORKSHOP

The workshop consisted of five moderated technical sessions that allowed panelists to engage with each other and workshop participants. The first session discussed the learnings from the government and NGO sectors and included government officials and representatives from environmental and conservation NGOs sharing their insights regarding snow leopard conservation efforts in Pakistan and infrastructure development in their home range.

The second technical session reflected on the present status of academic research and allowed researchers and academics to share current research initiatives and prospects regarding snow leopard conservation in Pakistan.

The third technical session highlighted the experience of local community members and gave them the opportunity to share their experiences and insights regarding snow leopard activity and conservation efforts in Pakistan. It also involved a discussion on infrastructure development in the GB region.

The remaining two technical sessions involved all attendees to break out into groups and review existing conservation strategies in light of infrastructure development and propose a way forward for ensuring snow leopard habitat protection in Pakistan, respectively.

The following sections summarize the key findings from each technical session of the workshop.

TECHNICAL SESSION I
Learnings From Government and NGO Sectors

Panelists

Ijlal Ahmad, Conservator Forests, Wildlife and Environment, Government of Gilgit-Baltistan

Dr Fazl Baqi Kakakhel, Conservator Wildlife, Khyber Pakhtunkhwa

Shahzad Hassan Shigri, Director, Gilgit-Baltistan Environmental Protection Agency (GB-EPA)

Dr Mumtaz Ali, Deputy Director, Khyber Pakhtunkhwa Environmental Protection Agency (KPK-EPA)

Dr Saeed Abbas Baitham, Consultant, International Union for Conservation of Nature (IUCN)

Muhammad Waseem, Manager Conservation, WWF-Pakistan

Moderator

Dr Imran Saqib Khalid, Director Governance and Policy, WWF-Pakistan

Overview of panel discussion

In this session, panelists reflected on the steps that have been taken and those that are currently underway to address the issues arising from infrastructure development, and discussed future risks and opportunities. They also highlighted the major threats to the snow leopard population in Pakistan, which include habitat destruction from human development, human-wildlife conflict, and illegal wildlife trade (IWT). It was pointed out that approximately 65% of Pakistan's snow leopard habitat is in the Gilgit-Baltistan area, which is now largely threatened by mega infrastructure projects.

Summary of key findings

- With increasing human population and on-going socio-economic development and human encroachment into snow leopard home ranges is inevitable. In order to ensure that the construction and operation of large-scale infrastructure projects does not cause irreversible damage to the environment, all infrastructure projects should undertake environmental impact assessments (EIAs) during the scoping or pre-feasibility stages so that the potential negative environmental impacts of the proposed project can be identified and mitigated at the design and planning stage. As the process currently stands, the EIA is a mere formality and fails to fully account for environmental, social, and economic impacts of infrastructure projects.

- Developers, government bodies, NGOs, and key stakeholders need to advocate for ecologically-friendly infrastructure development that centralizes the importance and need for biodiversity preservation and ecosystem services. Mitigation measures such as wildlife corridors need to be included in the design of infrastructure projects.

- Trophy hunting programmes are an effective conservation tool and have helped in community development and improved community livelihood opportunities. There is a need to systematise the trophy hunting programme so that it can yield maximum financial and social gains for local communities and help to preserve the population of key species such as the Markhor, Ibex, and Blue Sheep.

- A proactive approach is needed to identify existing infrastructure and evaluate future infrastructure needs to assess how infrastructure development can be made more ecologically-friendly. This can enable successful interventions during the upstream planning phase of infrastructure projects. It requires extensive data collection along with baseline studies and assessments on the impact of infrastructure development projects in the HKH landscape.

- There is a need to create a platform or body that encourages coordination in conservation efforts among and within provinces as well as on the federal level. NGOs, academics, and local communities may also be part of this platform or body so that civil society is actively involved in the decision-making process.

- By leveraging innovative technologies, effective mitigation strategies can be implemented to identify and minimize the adverse impacts from infrastructure development. Examples include spatial monitoring and reporting tools (SMART), drone technology, and satellite telemetry.

- Government bodies require additional resources and access to capacity building to improve environmental planning during infrastructure development.

TECHNICAL SESSION II
Reflecting on the Present Status of Academic Research

Panelists

Fathul Bari, University of Chitral

Dr Hussain Ali, Regional Manager, Snow Leopard Foundation

Dr Qamar Abbas, Karakoram International University

Dr Saeed Abbas Baitham, Consultant, International Union for Conservation of Nature (IUCN)

Moderator

Dr Zafar Khan, Karakoram International University

Overview of panel discussion

The second technical session focused on the status of academic research in snow leopard home ranges in Pakistan. The panelists discussed the current population of snow leopard's in Pakistan, and reflected on the ways that conservation efforts can be improved. This helped attendees gain scientific and data-driven knowledge regarding effective ways to protect wildlife species in light of infrastructure development in the HKH landscape.

Summary of key findings

- Awareness sessions and campaigns need to be adopted to enhance civil society knowledge regarding the economic and ecological benefits of conservation efforts such as trophy hunting programmes. The impact of conservation efforts will be most effective when there is mass awareness and buy-in from members of all communities in the HKH landscape.
- In order to protect community domestic livestock, there is a need to regularly arrange livestock vaccination camps and build predator proof corrals. This will help by protecting livestock from diseases and predatory attacks from wildlife, respectively. Alongside these measures, a livestock insurance scheme needs to be implemented to address community concerns regarding loss of livestock from wildlife attacks.
- Government bodies and communities need to address the lack of transparency in the funds collected from trophy hunting programmes. This is because village or community conservation committees or bodies are not democratically elected entities, which allows certain individuals to have a disproportionate influence on how the funds are allocated and utilized.
- Measures need to be put in place to counter the projected increase in poaching and illegal wildlife trade from rising infrastructure development in the HKH landscape.
- There is a need for an integrated database to help collate research and studies on the ecological impacts of infrastructure development. This can take the form of a repository that is open access so that all stakeholders, including community members, can easily access information for utilization in conservation plans, strategies, and policies.
- Since wildlife movements don't adhere to national and political boundaries, it is sometimes difficult for researchers to get their proposals accepted. In order to address this, the government may create an Environmental Cell with the authority to grant permits that allows research to be conducted across geographical areas or national borders.
- There is a need to enhance coordination among the private sector and between the government and the private sector. For example, improve coordination of conservation and environmental NGOs and community based organizations with government custodian departments, such as the Parks and Wildlife Department, Planning Department, and others.

TECHNICAL SESSION III
Empowering Community Action

Panelists

Muhammad Tahir, Shahi Khyber Imamabad Development Organization (SKIDO)

Shahadat Noor, Dubani Local Support Organization

Ghulam Muhammad, Baltistan Wildlife Conservation and Development Organization (BWCDO)

Imtiaz Ali, Khyber village

Haider Badakhshani, Khunjerab Villagers Organization (KVO)

Moderator

Muhammad Zaman, Program Manager, The Aga Khan Rural Support Programme (AKRSP)

Overview of panel discussion

The third technical session discussed the perspective of local communities and focused on community-based conservation efforts. The panelists highlighted the issues faced by local communities during conservation initiatives and discussed solutions and possible limitations. They also deliberated the pioneering work on livestock insurance schemes to mitigate human-wildlife conflict.

Summary of key findings

- One of the main threats to the livelihood of local communities residing in the snow leopard home ranges are predatory attacks by snow leopards on livestock. Since local communities are mainly reliant on farming and livestock rearing for both commercial and subsistence purposes, wildlife attacks on livestock result in financial losses. Without appropriate compensation, community members are likely to retaliate, which may increase human-wildlife conflict. This is why there is a need to review existing livestock insurance schemes.

- The government and NGOs need to revise compensation amounts under livestock insurance schemes so that they are reflective of the market value of livestock, and should also integrate other factors such as livestock care. This can help curb human-wildlife conflict.

- Livestock insurance schemes need to be community managed so that the overall process of registration, claims, and disbursement is accessible and easy for local livestock farmers.

- There is a need to focus on the non-pecuniary aspect of livestock insurance schemes, which focuses on mitigating the threat and the risk of losing livestock. This can include developing predator proof corrals, increasing awareness among local communities (e.g., using social media), and conducting scientific research.

- NGOs need to develop partnerships and collaborate with key stakeholders rather than operating in silos. These stakeholders include the government, conservation and environmental NGOs, academia, policymakers, and local communities. This will help reduce competition and coalesce and strengthen a community of practice working to achieve sustainable infrastructure development. For example, KVO has achieved success by partnering with the government and NGOs such as WWF-Pakistan, the Snow Leopard Foundation (SLF), and the Snow Leopard Trust (SLT).

- There is a need to allocate more resources to conservation funds. This can help to improve conservation efforts and also contribute to the socioeconomic well-being of local communities.

- Future infrastructure development should integrate interventions such as proper waste management, tourism awareness, and law enforcement to ensure the preservation of the environment and ecosystem.

TECHNICAL SESSION IV
Review of Existing Conservation Strategies in Light of Infrastructure Development

Moderator

Ashiq Ahmed Khan, Consultant, EVK2CNR

The conservation of snow leopard populations in Pakistan can be traced back to 1986, when the Pakistan Forest Institute, with the support of the International Snow Leopard Trust, arranged an Internal Conference on Snow Leopards in Islamabad. The outcome suggested that co-management was the only way forward for the protection of the species. The moderator stressed upon the need for coordination and collaboration between the government and civil society to help reduce information gaps and promote collective action for snow leopard conservation.
To review the existing conservation strategies in light of infrastructure development in the HKH region, the participants of the workshop were divided into breakout groups to discuss conservation research, strategy and policy, advocacy.

The breakout groups discussed the following questions:

What is the existing and on-going research on infrastructure development to conserve wildlife populations?

It was discussed that the strategic environmental and social assessments (SESA) of major road networks in GB have been conducted and the EIAs of major energy infrastructure projects have also been carried out. However, participants stressed on

the need for relevant stakeholders such as the government, developers, and others to consult those documents in order to ensure evidence- and data-based policy delivery.

It was further discussed that ample research has been conducted to identify species distribution and movement along the CPEC route. Additionally, SPARCO and GB-EPA have conducted research on the air quality in the region, focusing on Particulate Matter or PM2.5 deposits.

There is also research on land-cover and land-use change in the snow leopard home range, which has already been published. This research has been instrumental in understanding landscape change from infrastructure development projects and identifying future opportunities to ensure sustainable infrastructure delivery in the HKH region.

Similarly, there is also research on snow leopard habitat suitability using habitat suitability modeling and satellite imagery. It was suggested that these findings can be useful to help mitigate the impact of infrastructure projects in the snow leopard home range.

Finally, participants reflected on the need to expand the scope of the research outside of the GB region as most research activities are concentrated within GB, which neglects other ecologically important regions such as northern KPK and AJK.

What are the gaps in the research?

Participants identified gaps in policy and research, highlighting that existing laws need to be revised to address the current challenges to the environment, wildlife, and communities in the HKH region. They stressed on the need for species specific planning and conservation, which can ensure conservation efforts to be more focused towards ecologically, economically and culturally important species.

They also discussed that EIAs need to be more robust and inclusive, which requires improving the contracting process and including local community knowledge (e.g., from community members, watchers). Another major problem is that EIAs are sometimes submitted after infrastructure development on a project has already begun, which not only violates the legal process but also increases environmental risks.

A lack of an integrated waste management plan to counter waste generation and widespread pollution and environmental degradation from infrastructure development was also discussed. The need for research and law enforcement was suggested to overcome this problem.

To study the impacts of infrastructure development on wildlife, habitat, soil quality, and other climate indicators, participants suggested the need for long-term monitoring of the ecosystem in which infrastructure development takes place. The conservation community should, therefore, not limit themselves to EIAs but instead ensure a continuous and transparent process of monitoring and evaluation as part of the infrastructure development lifecycle.

What are the key points to consider when planning and designing infrastructure projects?

First and foremost, the benefits of an infrastructure project should be disclosed to all stakeholders, particularly beneficiaries and local communities.

Moreover, it is also crucial to engage with a diverse group of stakeholders including local governments, policy makers, and local communities during the planning and design phase. This will ensure inclusive, equitable, and participatory planning and decision-making during infrastructure development.

Additionally, planning agencies and consulting bodies should leverage technology during site selection, baseline studies, risk and impact assessments, and other activities to achieve greater accuracy and efficacy during the infrastructure development process.

What steps need to be taken to develop wildlife-friendly infrastructure?

A strategic and consistent advocacy approach was recommended to ensure wildlife-friendly infrastructure development. This requires building infrastructure that protects and promotes wildlife connectivity by considering factors such as habitat loss, habitat degradation, barrier or filters to wildlife movement, wildlife mortality due to wildlife-vehicle collision, avoidance (leading to reduction of habitat and/or barrier to movement), and attraction (leading to roadkill).

To achieve this, participants recognized the importance of stakeholder engagement with government ministries, investors, developers, technical advisors, and local communities to sensitize all actors regarding the importance of wildlife preservation and to share expertise on mitigation strategies such as wildlife crossings for preventing wildlife-vehicle collisions.

Additionally, participants proposed establishing a forum to serve as a platform for multidisciplinary and cross-sectoral stakeholder engagement.

A coalition with partners could help bring complementary skills to fill technical knowledge gaps and advance advocacy efforts to promote wildlife-friendly infrastructure.

Regular community consultations and engagement with civil society organizations was also deemed important to ensure a people-centered approach for equitable, just, and inclusive infrastructure design and planning.

TECHNICAL SESSION V
Way Forward for Ensuring Snow Leopard Habitat Protection in Pakistan

Moderator

Rab Nawaz, Senior Director Programmes, WWF-Pakistan

To decide on a way forward and deliberate on possible policy outcomes for ensuring snow leopard habitat protection in Pakistan, participants were divided into groups to discuss coordination and implementation of conservation efforts, and knowledge sharing and fundraising mechanisms for the same.

The breakout groups discussed the following questions:

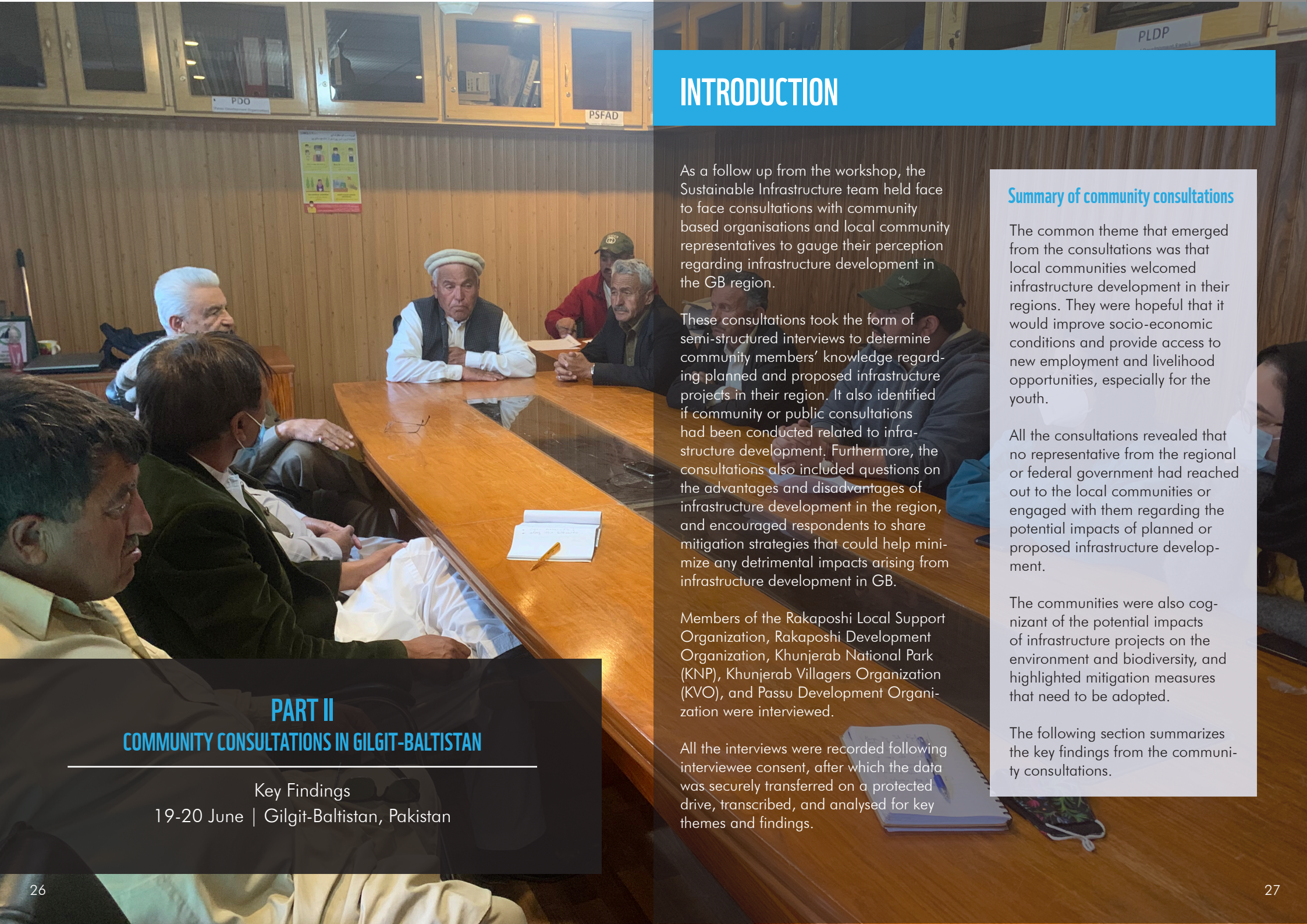
How can conservation efforts be improved?

It was identified that there is a need for a more coordinated conservation effort to promote sustainable and environmentally-friendly infrastructure development. Instead of working in silos, relevant stakeholders, such as the government, NGOs, academia, developers, engineers, investors, and local communities can come together to share technical knowledge, build capacity, and advance advocacy efforts. The creation of a multi-disciplinary and cross-sectoral forum was identified as a viable solution to foster cooperation, collaboration, and partnerships between various stakeholders.

What are the opportunities for improving fundraising mechanisms?

Participants discussed the need for rigorous scientific and evidence based data to attract donor funding for the conservation of the HKH region. They stressed on the need for and importance of framing to highlight that the impact of infrastructure development on natural capital and ecosystems services is profound and widespread, both in terms of intensity and range for both nature and people. They also suggested approaching local corporate donors to seek funding under their Corporate Social Responsibility (CSR) priorities.

Moreover, participants discussed the need for donor mapping to improve the donor engagement process, and encouraged the formation of a knowledge-sharing platform to consolidate and make available information and research that may be needed when drafting funding or grant proposals.



PART II

COMMUNITY CONSULTATIONS IN GILGIT-BALTISTAN

Key Findings
19-20 June | Gilgit-Baltistan, Pakistan

INTRODUCTION

As a follow up from the workshop, the Sustainable Infrastructure team held face to face consultations with community based organisations and local community representatives to gauge their perception regarding infrastructure development in the GB region.

These consultations took the form of semi-structured interviews to determine community members' knowledge regarding planned and proposed infrastructure projects in their region. It also identified if community or public consultations had been conducted related to infrastructure development. Furthermore, the consultations also included questions on the advantages and disadvantages of infrastructure development in the region, and encouraged respondents to share mitigation strategies that could help minimize any detrimental impacts arising from infrastructure development in GB.

Members of the Rakaposhi Local Support Organization, Rakaposhi Development Organization, Khunjerab National Park (KNP), Khunjerab Villagers Organization (KVO), and Passu Development Organization were interviewed.

All the interviews were recorded following interviewee consent, after which the data was securely transferred on a protected drive, transcribed, and analysed for key themes and findings.

Summary of community consultations

The common theme that emerged from the consultations was that local communities welcomed infrastructure development in their regions. They were hopeful that it would improve socio-economic conditions and provide access to new employment and livelihood opportunities, especially for the youth.

All the consultations revealed that no representative from the regional or federal government had reached out to the local communities or engaged with them regarding the potential impacts of planned or proposed infrastructure development.

The communities were also cognizant of the potential impacts of infrastructure projects on the environment and biodiversity, and highlighted mitigation measures that need to be adopted.

The following section summarizes the key findings from the community consultations.

Key findings

Rakaposhi Local Support Organization

The manager of the Rakaposhi Local Support Organization was interviewed on 19 June 2021 in Minapin. He spoke about the advantages and disadvantages of road development in the local area, proposed mitigation measures to counter its negative impacts, and highlighted the steps that NGOs and government bodies need to take to improve infrastructure delivery in the GB region.

He spoke about the recently approved Nagar Highway, and mentioned that it will allow access to previously inaccessible areas and create a shorter route to key human resources such as hospitals and schools. He also pointed out that road development will prove beneficial for improving the local economy by encouraging business activity in small towns and villages.

On the other hand, he highlighted the potential adverse environmental impacts from infrastructure development, particularly air and noise pollution from vehicles. He pointed out that heavy vehicles coming from China and going all the way to Gwadar will result in air pollution, impact glaciers, disturb wildlife migratory patterns, and cause wildlife-vehicle collisions.

He said that till date, no government official or consultant had approached them regarding CPEC plans or other infrastructure development initiatives. This highlights the absence of community involvement in local infrastructure development projects in the HKH landscape.

On mitigation strategies, he stressed on the need to adopt an afforestation program by developing local nurseries and ensuring that local tree species are planted in the GB region. He also underscored the importance of establishing a waste management plan and system.

Moreover, he said that NGOs and government bodies need to champion awareness programs on environmental conservation and wildlife protection. Owing to an increase in tourism following rapid infrastructure development, he highlighted the need to enforce rules and regulations for tourists. Lastly, he mentioned the need for the government and NGOs to conduct skills training sessions to encourage local communities, particularly the youth, to undertake entrepreneurial and business activities.

Rakaposhi Development Organization

A representative from the Rakaposhi Development Organization was interviewed on 19 June 2021 in Askordus Village, Saas Valley, Nagar District. He discussed the benefits and drawbacks of infrastructure development in the region, and highlighted steps that the government and NGOs can take to improve infrastructure delivery. Overall, the representative mentioned that their community had not witnessed any infrastructural development under CPEC in their region.

He pointed out that the perception of infrastructure projects varies by age, with the youth being increasingly in favor of it. He highlighted that infrastructure development will improve access to various resources, such as hospitals and educational institutes, and provide better transportation routes and multiple employment and business opportunities.

However, he said that unsustainable infrastructure development will result in negative impacts on glaciers, agriculture, and human health. Increased carbon release, toxic waste, air pollution, and an inefficient waste management system were identified as the major adverse consequences from infrastructure construction and operation. He pointed out that infrastructure projects, such as road development, will lead to an influx of people and tourists, which will lead to deforestation for fuelwood, waste accumulation, livestock grazing concerns, and wildlife habitat and food chain disruption, all of which will negatively affect the environment.

He concluded that while infrastructure development is advantageous for businesses and livelihoods, it will accelerate climate change and environmental degradation in the HKH region.

He also mentioned that no government official or consultant had approached them regarding infrastructure development initiatives and plans in the region, nor had they been involved in any consultations to date.

Additionally, he highlighted the need for the government and NGOs to advocate for environmentally sustainable and climate-resilient infrastructure development. He said that regardless of development, there is a need to preserve and conserve the landscape, ecosystem, environment, and the climate, and that financial benefit should not be the endgame.

He also mentioned that government bodies such as the EPA should include mitigation measures to counter the negative impacts from infrastrastructure development. In this endeavour, he pointed out that NGOs such as WWF and local communities can play a supporting role.

Khunjerab National Park

A watcher at the Koksil checkpoint at Khunjerab National Park was interviewed on 20 June 2021. He spoke about the impacts of increased vehicular activity from infrastructure development impacting wildlife populations and discussed the resource gaps at the Khunjerab National Park.

He pointed out that over the years, wildlife has become accustomed to noise pollution. However, increased traffic as a result of CPEC may lead to an increase in wildlife-vehicle collisions, particularly in the winter season when wildlife migrate downwards and crosses the road. Additionally, he mentioned that road development is likely to lead to an influx of tourists, which will need an efficient waste management system.

Furthermore, he spoke about the resource gaps at the KNP, mentioning that there is a need for more vehicles to be present at check points. He also said that there is a lack of equipment including warm uniforms *(wardi)* for staff, binoculars, telescopes and first aid kit, and satellite phones, all of which are needed to effectively manage the KNP.

Khunjerab Villagers Organization

The CEO of Khunjerab Villagers Organization was interviewed on 20 June 2021 at a local hotel in Sost Village, Gojal Valley, Upper Hunza District. He pointed out that there is a lack of available or accessible information regarding CPEC development plans, and mentioned that the government had not engaged with them regarding infrastructure development projects. He stressed on the need to mobilise action and interest regarding community awareness on infrastructure development to encourage participatory decision-making.

He spoke about the benefits of infrastructure development, highlighting that it will increase access to markets and encourage business activity in the region. However, he pointed out that unsustainable infrastructure development will negatively impact local flora and fauna. Additionally, he spoke about the need for compensation for land acquired during development, saying that there may be a possibility of resistance from local communities if they believe they will not be fairly compensated.

He also spoke about the need for the government to engage the local community during the infrastructure development process. Furthermore, he pointed out the need for conducting environmental impact assessments and the implementation of mitigation strategies to identify and prevent or reduce adverse environmental impacts. He said that it is critical for EIAs to be accessible to the public.

While discussing mitigation strategies along the existing Karakoram Highway (KKH), he said that wildlife crossings such as fencing, and under- or orverpasses should be constructed for habitat conservation. He also highlighted the need for a waste manage-

ment system. Moreover, he mentioned that all vehicles operating on CPEC routes should be inspected to ensure that they are energy efficient.

Lastly, he said that WWF-Pakistan can play an integral role in creating awareness and building capacity of the local population around issues of sustainability and climate change.

Passu Development Organization

Members of the Passu Development Organization were interviewed in a focus group on 20 June 2021. They highlighted that infrastructure development will be welcomed as long as it provides net benefits to local communities and pays attention to mitigating adverse environmental consequences. They also gave recommendations on how to improve infrastructure delivery in the region. All members present in the focus group confirmed that no government official or consultant had approached them regarding infrastructure development projects in the region. They also said that they had not seen any infrastructure development projects under CPEC in the region.

The members pointed out that the overall sentiment regarding infrastructure development, particularly under CPEC, was not positive in the GB region. The major reason cited was unilateral trade as a result of which GB's organic fruits were not allowed to be exported to China. Due to the lack of a free trade zone, the business community was unhappy.

They also mentioned the four main challenges being faced by the local communities, which included a lack of access to clean drinking water, energy shortages, poor communication infrastructure, and environmental pollution and degradation. Related to the environment, members pointed out that all infrastructure development projects should factor in a multitude of contextual and geographical factors to ensure that they don't disrupt community settlements. While acknowledging the positive impacts from infrastructure projects such as road development, they cautioned that environmental and climate change factors, such as melting glaciers, need to be accounted for.

The members highlighted topline recommendations for both government and NGOs to address the direct and indirect consequences of infrastructure development. Firstly, they said that all forms of pollution, especially from an increased inflow of tourists following infrastructure development, need to be addressed by enforcing rules and regulations. In the context of tourists, the group also stressed that tourists coming from the "down country" (i.e. the rest of Pakistan) need to be sensitised around protecting the environment. Second, infrastructure plans need to be in line with the needs of the local community. For example, they mentioned that Passu can generate 26MW of electricity in extreme winter near Batura glacier at the lower head using the run-of-river concept, which may help address the energy crisis in the region. Lastly, they mentioned the critical need for the government to launch a forum that allows local communities to share their insights and concerns regarding infrastructure development in the GB region.

PART III
Recommendations and Next Steps

1. Improve the EIA process

Revise the process of project development by making EIAs an integral part of the project design, scoping, and pre-feasibility stages so that potential environmental impacts are identified and mitigated during infrastructure design and planning.

Improve the EIA process by making it more robust, inclusive, and transparent and ensure that it integrates local expert knowledge including affected communities, and is publicly accessible. This will help increase stakeholder knowledge and participation in the infrastructure planning and development process.

Improve transparency and increase accountability around the impact mitigation strategies recommended in EIAs and otherwise, so that they are in line with the region's geography, demography, and contextual needs. All mitigation strategies must be ecologically sustainable and aim at contributing towards the net-zero goal. Fencing, wildlife corridors, and afforestation using local tree species are some measures that can be adopted to offset negative impacts from infrastructure development.

2. Invest in data and research

Invest in academic research and baseline studies to inform policy decisions around sustainable infrastructure development. An evidence-based and data-driven approach can contribute towards infrastructure development policy, design and strategy, regional planning, fundraising mechanisms, advocacy efforts, and mitigation strategies. This can help integrate ecosystem services, natural capital, climate risk assessment, and scenario planning in infrastructure design and planning in the HKH landscape. It can also explore possible innovative design solutions for ecosystem-based adaptation to mitigate the risks on ecosystems and ecosystem services from infrastructure development.

Create an integrated open-access knowledge-sharing dashboard or platform where researchers, academics, practitioners, policy-makers, and others can share and access knowledge products that help inform sustainable and environmentally-friendly infrastructure planning, policy, and design.

Conduct continuous monitoring, evaluation, and reporting of infrastructure projects to ensure alignment with environmental and social safeguards and study the long term impacts of infrastructure development.

3. Stakeholder engagement, fundraising and advocacy

Develop stakeholder-capacity to enable holistic and cross-sectoral integration in infrastructure planning and design. This involves recognizing and addressing capacity limitations of key stakeholders, including government and planning departments, policy-makers, researchers, and local communities.

Carry out coordinated stakeholder engagement to ensure equity and participation of all those involved in and affected by an infrastructure development project. This will help ensure that infrastructure development plans and projects are in line with local community and beneficiary needs and priorities.

Establish a government-notified multi-stakeholder board or a stakeholder working group, consisting of key government and non-government stakeholders, to enable a comprehensive and democratic consultation process. This body can help address technical challenges and data and knowledge gaps by allowing cross-sectoral engagement to help develop partnerships, reduce competition, and contribute towards a common conservation goal. It can also help recognize and evaluate the impact of infrastructure projects on beneficiary groups to enable planning and design at a scale that benefits both nature and people.

Explore, identify, and utilize fundraising opportunities by collaborating with existing large programmes such 10BTAP and reaching out to local corporate donors for CSR agendas. Fundraising proposals need to be data- and evidence-driven to highlight the environmental, economic, and social aspects of infrastructure development projects.

Conduct across-the-board advocacy and launch awareness campaigns to inform all stakeholders about the negative environmental impacts of unsustainable infrastructure development in the HKH landscape. Advocacy efforts should adopt inclusive and local language to effectively

engage stakeholders to take action. For this purpose, dialogues should be initiated among developers, government representatives, and local communities, and tools such as social media, mainstream media, webinars, workshops, roundtables, and community listening sessions should be used to engage all actors regarding infrastructure development projects in their regions.

4. Leverage technology

Invest in expanding technology resources and build capacity to leverage technological innovation for various processes during the lifecycle of an infrastructure development project, such as site selection, baseline studies, risk assessments, and impact assessments. This can provide greater data accuracy and analysis capability to improve infrastructure planning and design by enabling upstream strategic planning and project feasibility assessment for optimal, integrated, sustainable, and resilient infrastructure development. Some examples of technology that can be adopted include spatial monitoring and reporting tools (SMART), drone technology, and satellite telemetry.

5. Ensure community welfare

Develop a waste management system to maintain the ecological health and integrity of the HKH landscape. With increasing investments in infrastructure projects, there is likely to be a rise in trading activities and an influx of tourists, both of which may damage the environment from land and water pollution.

Engage in community capacity building and skill development to encourage entrepreneurial and business activities.

Fairly compensate local communities for loss of land or property from infrastructure development in the HKH region.

Address the impacts of human-wildlife conflict arising from infrastructure development by reviewing and integrating existing livestock insurance schemes. These insurance schemes should also be further expanded to include all affected populations in the HKH region. The compensation amounts should be revised in accordance with the market value of livestock and include the cost of caring for livestock. Additionally, predator proof corrals should be built to protect livestock and prevent human-wildlife conflict.

Devise a systemic approach with equitable and transparent resource allocation for trophy hunting programmes to yield maximum financial and social gains for local communities. These programmes are also vital for preserving key wildlife species such as the Markhor, Ibex, and Blue Sheep.

APPENDIX

Participants at the Consultative Workshop on Infrastructure Development in Snow Leopard Home Ranges in Pakistan

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