

National Snow Leopard Ecosystem Protection Priorities (NSLEPs) Nepal



**Government of Nepal
2013**

Executive Summary

Snow leopard (*Panthera uncia*) is a critically endangered species listed under International Union for Conservation of Nature (IUCN) Red Data Book and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix-I. It is also a protected species under the National Parks and Wildlife Conservation Act 1973 in Nepal. The species is largely but patchily distributed throughout the Himalayan Ranges of Central Asia and South Asia. Globally, snow leopards are found only in the 12 countries in the Himalayan region including Nepal.

In Nepal, snow leopards are found in the Kangchenjunga Conservation Area (KCA) in the east to Api-Nampa Conservation Area (ANCA) in the west. Potential snow leopard habitat is estimated around 13,000-km², which is largely located in the Himalayan range from east to west. The area can be broadly classified into three large conservation complexes namely eastern, central and western complexes. The eastern complex extends from KCA in the east to Langtang National Park (LNP) in the west covering Makalu Barun National Park (MBNP), Sagarmatha National Park (SNP) and Gaurishankar Conservation Area (GCA). Similarly, the central complex extends from Manaslu Conservation Area (MCA) in the east to western part of Annapurna Conservation Area (ACA) in the west. The western complex extends from Tscharka pass in the east to ANCA in the west covering Dhorpatan Hunting Reserve (DHR), Shy Phoksundo National Park (SPNP), Rara National Park (RNP) and Khaptad National Park (KNP). Besides protected area system, adjoining national and community forests, rangelands, where prey-base is sufficiently available are the suitable habitats to snow leopards.

The population estimate, based on linear relationships between genetic analysis and scrape encounter rates, which have been cross-verified with predator-prey relationship is 301-400 individuals in Nepal. The population density ranges from 1.5 to 3.2 animals/100 km², with the highest density found in western complex. However, to verify this figure required more systematic and rigorous study in near future. The generated information on snow leopard, its prey base and habitat, which are scanty and outdated such as VHF radio telemetry data backed to 90s, require refined. Available advanced technologies on research methodology such as fecal DNA, camera trap and GPS satellite collar should be internalized to formulate science-based conservation plan of this species.

Snow leopard is an apex animal to the Himalayan Ecosystem. Blue sheep and Himalayan tahr are the major wild prey-base to the species. However, snow leopards often kill the livestock both at individual and groups. Snow leopard is being threatened mainly because of retaliatory killings due to livestock depredation, poaching for illegal trade of its body parts, loss of prey base and habitat loss. Poachers and wildlife criminals kill the animal for skin and bones that have higher demand with higher prices in the international markets. Retaliatory killing of snow leopard is quite common in Nepal. There are evidences that this species is competing with common leopard for shelter and food, as the common leopard is climbing upward especially in SNP, KCA and ACA possibly in the context of climate changing scenarios.

The government of Nepal has strong legal provisions to control wildlife crimes particularly for protected animals such as snow leopard. The provisions include imprisonment of 5 to 15 years or penalty of NPR 50,000 to 100,000 or both. Effective law enforcement is crucial to control poaching and illegal trade of snow leopard.

Community based snow leopard conservation and monitoring is practiced in Nepal involving citizen scientists and local communities. Establishment of community-based snow leopard monitoring system, community-managed livestock insurance scheme, awareness campaigns, corral improvements, improve herding system are some of the examples that have been carried out to date for the conservation of the snow leopards.

Efforts should be made at local, national and regional levels in order to protect this charismatic species. Strengthened community based snow leopard conservation initiatives, establishment of sustainable institutional and financial arrangements, effective implementation of national conservation action plan, and transboundary and regional cooperation are important for the conservation of snow leopards.

Valuing the snow leopard ecosystem and its economic, biodiversity, and spiritual/cultural services, quantified as much as possible

To the community

Nepal is a land-locked and mountainous country with a diverse biology and culture. People living in the Himalayan ranges belong to various ethnic groups. The major ethnic groups are Sherpa, Bhutia, Rai, Limbu, Tamang, Gurung, Magar, Lama, Thakali, and Managi. The livelihoods of these communities largely depend on agro-pastoral. They used to migrate to the lowland in the winter and back to the upland in the summer. In many instances, the local communities of the mountain region used to sell their local products particularly Non-Timber Forest Products (NTFP) and carpets, which are the main sources of income. However, tourism is becoming a growing attraction nowadays for their livelihoods. The major tourism activities local people involved are hotel and restaurant works, porters and nature guides. Among the various ethnic groups, Sherpa is popular for trekking, mountaineering and climbing whereas Thakali are popular for preparing delicious foods.

Snow leopard in Nepal is popularly known as Queen of Mountain. The habitats of snow leopard have also enormous effects to generate income and employment opportunities to local communities. Besides, Himalayan region of Nepal which extended from Mt. Kanchenjunga in the east to Mt. Api-Nampa in the west, is the source of perennial water flowing from north to south and consequently source for hydroelectricity, irrigation and drinking water and eventually overall development of the country. Since those perennial sources are result of conservation efforts of local communities, it is essential to assess and evaluate conservation efforts made by the up-stream communities of snow leopard habitats and payback them for their efforts from the down-stream communities who get benefits from the resources. Environmental Impact Assessment (EIA) and Initial Environment Examination (IEE) may ensure such mechanism of payment for environmental services to local communities. Environmental Services evaluation assessed by ICIMOD in the Himalayan Region might be useful to evaluate snow leopard habitats as well.

To the nation

Nepal shares the important parts of the Himalayan region. The highest peak of the world Mt. Everest (8848m) is located in Nepal along with other seven peaks having elevation more than 8000m including Mt. Kanchenjunga, Mt. Makalu, Mt. Lhotse, Mt. Manaslu, Mt. Cho Oyu, Mt. Annapurna, Mt. Dhaulagiri more than 8000m. The foothills of these mountains are the main habitats of snow leopard and a unique assemblage of rare and endangered species including Tibetan argali (*Ovis ammon hodgsonii*), Tibetan gazelle (*Procapra picticaudata*), wild ass (*Equus kiang*), and blue sheep (*Pseudois nayaur*), lynx (*Lynx lynx isabellinus*), grey wolf (*Canis lupus*), Himalayan black bear (*Selenarctos thibetanus*).

The Himalayan region has a huge contribution to national economy through producing water resources, tourism, NTFPs and aromatic and medicinal plants (MAP). The major river systems of Nepal namely Koshi, Gandaki and Karnali are originated from the Himalayan region and provide perennial water for drinking water, irrigation and hydroelectricity. The landscape beauty, cultural diversity, and natural and cultural heritage sites are the main tourist attractions. Mountaineering, climbing, trekking, and hiking are major tourism activities carried out in the region. The Himalayan range produces high value NTFPs and MAPs which are the sources of medicines for indigenous use and for pharmaceuticals as well.

To the planet

The mountainous regions of Nepal are largely extended and expanded along with Tibetan Plateau. However, the Kanchenjunga region in the east and Api-nampa region in the west is adjoining with India. Therefore, it is crucial to conserve and protect the snow leopard together with neighboring countries in collaboration. Realizing the fact, the Government of Nepal has signed a Memorandum of Understanding (MoU) with the Government of China in 2010. Moreover, annual base resolution has been made between India and Nepal on regular basis. In many instances, Nepal, India and China have been carrying out collaborative efforts in wildlife conservation such as regular national and local level transboundary meeting. It has huge

possibility in snow leopard conservation as well. The snow leopard habitats are also regarded as the third pole of the earth and matter of concern to environmentalists and conservationist worldwide. Besides, recent technological advances and financial support from various countries is being instrumental for the conservation of this globally endangered species.

Disseminating information on the value of the snow leopard ecosystem and generating support for conservation

Past efforts

Various efforts have been made by the government of Nepal to conserve snow leopards and their habitats. The inclusion of snow leopard as the protected species in the National Parks and Wildlife Conservation Act 1973 revealed that Nepal has more than four decade long history of snow leopard conservation efforts at government level. However, the conservation effort made by the local communities in the mountainous region is much larger, as the life of snow leopard and livelihood are correlated. Besides, various efforts have also been made by non-state partners to conserve snow leopard. The common efforts carried out by various organizations are habitat conservation and management, research and monitoring poaching and illegal trade control, human-snow leopard conflict management, and trans-boundary cooperation. Besides, awareness and education to local communities and promotion of tourism in the snow leopard habitats mainly in LNP, SNP and KCA are important efforts.

The Government of Nepal prepared the Snow Leopard Conservation Action Plan for Nepal in 2005, which has been revised in 2012 based on the experience in the field and results of various researches. Moreover, activities of genetic studies and issues of climate change are incorporated in the revised action plan. This action plans aims to maintain a viable population of snow leopards with enrichment of local communities in terms of cultural and ecotourism aspects, and local livelihoods. The plan is currently implementing by the Department of National Parks and Wildlife Conservation (DNPWC) in close partnership with the Department of Forests (DoF) and conservation partners including WWF Nepal and National Trust for Nature Conservation (NTNC). WWF Nepal contributed to snow leopard conservation in the Sacred Himalayan Landscape (SHL) (KCA in the east to LNP in the west) and SPNP while NTNC contributed in ACAP, MCAP and GCAP areas.

The major conservation interventions made by state and non-state partners are:

- Habitat conservation in and around the snow leopard bearing protected areas
- Livelihood improvement activities of local communities through community development and income generating activities to reduce human-snow leopard conflict
- Research and monitoring of snow leopards,
 - Regional level (Eastern Himalaya-wide) analysis of the impacts of climate change on snow leopard habitat
 - Non-invasive genomic analysis of snow leopards;
 - Camera traps survey for snow leopard monitoring
- Promotion of ecotourism based on snow leopard conservation
- Human-snow leopard conflict mitigation through community-managed livestock insurance scheme in KCA, SNP, LNP, ACA, SPNP; and
- Community-based snow leopard conservation and monitoring system in several sites

In addition, the Government of Nepal established two protected areas viz. GCA and ANCA in 2010 considering the prime habitat of snow leopards. GCA and ANCA have an estimated area of 217,900 ha and 190,300 ha respectively. Declaration of these two protected areas is one of the milestones of snow leopard conservation. Similarly, the government endorsed the SHL Strategic Plan (2006-2016) in 2006 and the SHL Interim Implementation Plan (2010-2014) in 2010, which provided opportunities to implement snow leopard conservation initiatives at the landscape level. Establishment of the national level Wildlife Crime Control Bureau (WCCB) under the chairmanship of the Director General of DNPWC and its district cells in selected districts under the chairmanship of protected Area Manager and District Forest Officer has contributed towards controlling poaching and illegal trade of wildlife including the endangered snow

leopards. Moreover, signing of the MoU between China and Nepal in 2010 and a resolution between India and Nepal on annual basis are important steps towards trans-boundary and regional level collaboration for conservation. The Government of Nepal has recently been increased the compensation amount incase snow leopard kill the people in 2013. Similarly, the government decided to compensate NRs. 50000 and 10000, if the snow leopard makes serious and normal injury to human respectively.

Future possibilities

Recent advances in wildlife techniques, such as non-invasive genetic analysis (Janecka *et al.*, 2008; Lovari *et al.*, 2009; Karmacharya *et al.*, 2011; Wegge *et al.*, 2012), camera-trap surveys (Karanth & Nichols, 1998; Jackson *et al.*, 2006), and GPS-satellite telemetry (McCarthy *et al.*, 2005; McCarthy *et al.*, 2008) offer possibilities for better and more rigorous studies on the ecology and behavior of snow leopards. Genetic analysis of fecal DNA shows potential to develop an index of snow leopard abundance and population structure, including information on sex and genetic relationships between different populations. Inclusion and address of climate change issues is equally important to conserve the snow leopard in the following years.

Snow leopards are a wide-ranging species that require landscape level conservation efforts. The large part of snow leopard habitat falls outside the protected area system in Nepal and it is also essential to coordinate and collaborate while protected snow leopard to various conservation partners in one side and local communities on the other. Maintained contiguity and connectivity of the protected areas and habitats is important for landscape level conservation. This will require strengthened coordination between the government agencies, conservation partners and other stakeholders.

Conservation of snow leopards will largely be decided by the active participation of local communities living in and around the snow leopard habitats. Local communities have been experiencing economic crisis due to livestock depredation by snow leopards. Being a charismatic species, there is a high potential to generate income through promoting nature-based ecotourism featuring landscape beauty of snow leopard habitats. This opportunity will not only enhance the livelihoods of local communities but will also raise awareness on snow leopard conservation for long-term sustainability.

Snow Leopard Conservation Action Plan for Nepal envisions three snow leopard conservation complexes viz. western, central and eastern in Nepal for long-term management of the minimum viable populations (MVP) of at least 50 breeding snow leopards. The MVP will be maintained in the western conservation complex (from Darchula district to Tscharka pass, the border of Dolpa and Mustang) and Annapurna-Manaslu conservation complex (from Tscharka pass to Rasuwagadhi in the east-central region of Nepal), which is contiguous habitat of this wide ranging species. However, in the Eastern conservation complex (from Rasuwagadhi to eastern part of KCA) is fragmented, need to be linked by implementing various corridor and connectivity activities. In the eastern and western corners along with Indian and Chinese borders are concurrently shared by snow leopard. It also reveals a need of joint snow leopard conservation efforts by the range countries beyond the border. The joint conservation efforts among the adjoining snow leopard range countries are also equally important for sharing best practices.

Assessing threats, both traditional and new ones from infrastructure development, market demand, tourism, and climate change to:

The snow leopard

The snow leopard faces a number of threats in Nepal. The traditional threats are over-grazing and retaliatory killing as the mountainous communities are largely based on livestock based livelihoods. Besides, poaching and illegal trade of snow leopard organs, development infrastructure and habitat degradation, and climate change are major threats to snow leopard conservation in Nepal. Despite the efforts made by government and non-government partners, these threats remain constant and some of them are eternal nature. Poaching of snow leopards for illegal trade of skins and bones is a widespread threat to snow leopard conservation else where in the world, and Nepal is not exceptional from it. Open

borders with neighbor countries are also threatening to this species. Loss of prey-base in some protected areas such as SNP (Lovari *et al.*, 2009, Ale *et al.*, 2010) and outside the protected areas (Kattel, 1995) is another threat to snow leopard survival. Habitat degradation due to unsustainable grazing, and over collection and exploitation of NTFP and MAPs for commercial trade are additional threats to snow leopard conservation.

The ecosystem (key being Himalaya-Karakorum; mountains of central Asia; Altai-Sayan; Gobi; Eastern Himalaya, Tibetan Plateau)

Impacts of climate change have emerged as unavoidable threats to snow leopards and their habitats. Models based on global climate change trajectories suggest that Nepal will lose about 40% of alpine habitat due to upslope habitat shifts (Forrest *et al.*, 2012). The projected consequences will be the loss, degradation and fragmentation of snow leopard habitats, isolating populations within smaller habitat patches, and compromising their demographics, which include their ecological and even genetic viability. Habitat shifts may cause overlapping of snow leopard habitat with other cats resulting in increased competition.

The human community

Many of the traditional pastoralist systems are currently in the process of substantial change due to external influences related to modern development effects (Miller, 1987) that could significantly influence the alpine predator-prey system. Rapid spreading of village and district roads throughout the country is leading to the loss of snow leopard habitats. Construction of highways and rural roads could also result in habitat fragmentation (Thapa, 2005) and increased wildlife crimes in Mustang and Rasuwagadhi. Unregulated high volume tourism could result in increased stress and other negative impacts on snow leopard habitats and snow leopard populations in SNP and ACA.

Dealing with above threats

Replicating known good practices (mainly for traditional threats)

The government field level offices together with conservation partners including national and international conservation organizations have been implementing both preventive and remedial mitigation measures in order to reduce the threats related to snow leopard conservation. NTNC manages ACA, MCA and GCA and local communities through Kangchenjunga Conservation Area Management Council (KCAMC) manages KCA in order to safeguard the species from various threats. In many instances, these protected areas have also been able to build community stewardship for snow leopard conservation. A community-managed livestock insurance scheme has been successfully piloted in the Ghunsa valley of KCA (Gurung *et al.*, 2011) and has now been introduced in LNP and SPNP. This insurance scheme is largely self-sustaining and is locally managed and administered. Even though the scale and amount is small, the payments of livestock depreciation managed by the local communities are exemplary works. Most importantly, it has recently been demonstrated as a more rational approach in conserving snow leopards compared to other remedial measures (Gurung *et al.*, 2011; Wegge *et al.*, 2012). The results from above mentioned protected areas have been highly promising and may give synergetic effects if we can replicate these best practices to other protected areas of snow leopard bearing. Other innovative solutions such as the construction of predator-proof corrals, conservation awareness campaigns to guard livestock by herders, and veterinary services will be initiated to reduce both depredation and retaliation.

Developing new counter measures (for new threats) including pilots where needed

Climate change scenario projections indicated a northward shift of forests and snow leopard habitat due to global warming and moisture conditions (IPCC, 2007; Rupa *et al.*, 2006). Since forest habitats do not

generally constitute good snow leopard habitats, this shift has resulted in significant loss and fragmentation of snow leopard habitats. It is projected that Nepal will lose about 40% of the current alpine areas (Forrest *et al.*, 2012). Consequently, snow leopards can become isolated in smaller fragments, compromising their demographics and its ecological and genetic variability.

Studies and action research need to be conducted to predict climate change impacts on snow leopard and its habitats. The results further need to be integrated with the information from hardcore research (using GPS satellite collar and fecal DNA research) to develop a climate-integrated conservation plan for Nepal which in turn will identify climate resilient core areas and dispersal linkages, across the Himalayas and within the Trans-Himalayan region. The conservation plan will also consider the role of snow leopards as an apex species in the high Himalayan ecosystems, and as an indicator of the impacts of climate change and other local anthropogenic activities on the ecological integrity on sensitive habitats.

Trans-boundary collaboration

Nepal shares a long border with China that is prime habitat of snow leopard. Similarly, Nepal shares two segments of snow leopard habitats KCA in the east and ANCA in the west. Snow leopards are poached in the border areas for their pelt, which is in high demand in the international markets. Since snow leopard habitats are located in the high mountains, in close proximity to the international market in the Tibet Autonomous Region (TAR) of China and India, the species is always is vulnerable to poaching and trade. Strengthening capacity of enforcement agencies and mobilization of local communities are crucial to control poaching and illegal trade. Likewise, effective trans-border collaboration amongst the governments of Nepal, China and India is urgently required. Regional cooperation is also important for landscape level conservation of snow leopards. It is also very important to mobilize local enforcement authorities to uproot the illegal trans-boundary trade nexus. The MoU signed between the governments of Nepal and China in 2010 will be instrumental in boosting coordination and cooperation to curb illegal trade of wildlife parts and products across the international border.

Organization, empowerment, and support

National institutions for SL conservation: strengths and weakness to be remedied

At the policy level, a National Snow Leopard Conservation Committee (NSLCC) has been formed under the chairmanship of the joint Secretary, Environment Division, Ministry of Forests and Soil Conservation (MFSC). An Advisory Committee under the chairmanship of Director General, Department of National Parks and Wildlife Conservation and a Technical Committee under the chairmanship of Ecologist has been formed. The advisory committee guides at overall level while technical committee is crucial to carry out research and wildlife monitoring including snow leopards.

Local level snow leopard conservation committees have been formed at district level, however they are very seasonal. The KCA and LNP have formed community based anti-poaching operation teams in order to control the snow leopard poaching. Similarly, Snow Leopard Conservation Committees (SLCC) are also formed for snow leopard monitoring and implement livestock insurance scheme. Community based institutions are also formed for community development, income generation, ecotourism promotion, awareness on snow leopards. Local institutions like community forestry user groups need to be incorporate into snow leopard conservation activities which are largely missing in the past. Similarly, it is equally important to incorporate the institutions related to ecotourism activities in the mountainous ecosystem.

Legal framework for protecting SL and habitat; strengths and weakness to be overcome

The government of Nepal has been strong law enforcement provisions to snow leopard hunters and illegal traders of the species. According to the provision, the poacher can sent to the jail from 5 to 15

years and/or can be sanctioned from Rs. 50,000 to Rs. 100,000 or both. Snow leopard bearing protected areas and District Forest Officers are the judiciaries to combat the wildlife crimes in Nepal. Snow leopards are protected under international and national law, including the CITES, which lists the snow leopard as among the most endangered species threatened with extinction, (CITES 2012). It is also a protected species under National Parks and Wildlife Conservation Act of Nepal 1973. Even though the protected areas are serious and committed to take legal action, it is rarely realized such seriousness outside the protected area system, where the government needs to be focus on.

Wildlife law enforcement and combating crime: current practice and areas for improvement

The Snow leopard cases are a very few. It does not mean that there are no snow leopard crimes in Nepal. But most of the crimes often occur in the remote areas where there is no government presence. Therefore, enhance and promoting of law enforcement agencies and motivation to local communities is essential to combat the snow leopard crimes in Nepal.

Legal framework for empowerment of community for co-management of wildlife and habitat; current practice and areas for improvement

Buffer Zone User Committees at MBNP, SNP, SPNP, RNP and KNP are very supportive to law enforcement. KCAMC and other community-based institution at KCA, which is fully managed by community based council system, is also an example of co-wildlife management and very supportive institution to law enforcement agencies. Similarly, local community conservation committees are other examples in ACA, MCA and GCA.. Besides, KCA has formed four snow leopard conservation committees at local level. Similarly, LNP has two snow leopard conservation committees while SPNP and ACA have been formed three and seven snow leopard conservation committees respectively. Local level snow leopard and prey base monitoring, patrolling and insurance scheme have also been managed in KCA.

Support mechanism for building community organizations: current practice and needed strengthening

In order to gain the trust of local communities, to retain their active involvement in snow leopard conservation activities, a local level fund has been created in selected protected areas. Such fund has been instrumental to create and maintain the trust between park authorities and local communities during the human-wildlife incidents. As of beginning of 2013, KCA has created a fund amounting US\$ 16000. It has very effective roles to compensate the wildlife victims. Similarly, LNP and SPNP have created a fund amounting US\$ 10000 and US\$ 3000 respectively. Besides, government and conservation partners have been provided technical support (training for wildlife monitoring technique), equipment: GPS, Spotting scope, binocular, compass and field gears: Sleeping bag, tent, mattresses, kitchen utensils, trekking bag, down jacket, trekking shoes to the frontline staff. These supports are very crucial to motivate the frontline staffs and keep them in snow leopard conservation activities. Even though there is no practice to include local governing bodies for example Village Development Committee (VDC) in snow leopard and other conservation activities directly, but it is highly crucial to consider them for landscape level conservation and generate the conservation fund at local level.

Research and training

Development and implementation of programs for scientific and technical education and training for identification, conservation and sustainable use of ecosystems, their component and support for education and training to meet the specific needs of the habitat of the snow leopard is an important objective of snow leopard conservation action plan (2005-2015). It is highly crucial to train more than 100 citizen scientists and deliver the training to snow leopard conservation committee at local level in the snow leopard bearing protected areas across the Himalayan region. The snow leopard habitats are located in terrain and remote areas and therefore the research and monitoring activities are always time and money consuming. In order to reduce the costs and to get the real time base data, involvement of

local communities through community based institutions are highly crucial. Establishment of permanent sign transects and regular snow leopard monitoring, education to livestock herder is equally important.

Cooperation in the application of results of scientific research

The Government of Nepal together with its non-state partners for NTNC, WWF Nepal, National Academy of Science and Technology and Center for Molecular Dynamics, Nepal have been carried out a number of research works on snow leopard ecology, its behavior and human-snow leopard conflicts. Some of the example researchers are fecal DNA (Karmacharya et al. 2011) for snow leopard abundance and sex, prey base monitoring and snow leopard food habit (Oli et al. 1991, Thapa 2010). Besides, some of the individual scientists have also carried out various aspects of research on snow leopard. However, these researches are fragmented on issues and need to be analyzed for policy and planning transformation.

Time-phased implementation program (i.e. priority activities, their costs, and anticipated outcomes. Activities start when ready and after suitable piloting) – related to understanding and protecting:

SN	Major Area of intervention	Estimated Budget (US\$ 1000)
1	Updating and revising policies	40
2	Managing Habitat & Prey	1400
3	Controlling Poaching of Snow Leopards & Prey	800
4	Engaging Local Communities and Reducing Human-Wildlife Conflict	1400
5	Trans-boundary Management and Enforcement	350
6	Strengthening Capacity of National and Local Institutions	300
7	Researching and Monitoring	800
Total		5090

Note: These costs are only program costs in addition to existing planning and budgeting system

Tracking implementation progress and monitoring results

The progress and monitoring results will be compatible with portfolio activities.

Scientific monitoring of SL, habitat, and threats: current practices and areas for improvement

Being the focal organization for wildlife conservation, DNPWC will lead and coordinate a joint monitoring and evaluation team with the support of partner organizations. Participatory monitoring will be done annually to measure the progress of outlined activities. MIS at DNPWC and its field offices particularly snow leopard protected areas will be strengthened for effective monitoring. In order to measure the effectiveness of conservation efforts and their impacts and sustainability, mid-term and final evaluations will be conducted after implementation of the action plan during a three- and five-year period.

Monitoring implementation progress through key indicators: setting up a robust system

- Periodic monitoring of snow leopard population to all snow leopard bearing protected areas will be institutionalized
- Ecological and non-invasive research will be promoted and continued

- Radio telemetry monitoring and calculation of carrying capacity will be initiated based on the need and capacity of DNPWC
- Prey base population, density and reproductive rate using direct count method will be systematized, with regular monitoring.

Summary of costs and financing possibilities

Capital and operating costs by component, phased over seven years

In order to implement the national snow leopard ecosystem protection priority activities, both internal and external sources need to be assessed and secured. The internal sources are regular government budget, which plan and release through snow leopard bearing protected areas, district forest offices, district development committees and village development committees. In addition to that the buffer zone budget of snow leopard bearing protected areas will be utilized to implement the priority activities. It is expected that out of proposed NSLEP costs, around 25% will be borne from the government revenue. Besides, the contribution of national level non-government organization like national trust for Nature Conservation is equally important.

Similarly, in order to implement the NSLEP priority activities, the contribution of both bilateral and multi-lateral donor agencies including international non-governmental organizations like WWF is essential. Besides, the government of Nepal will give a proper space to other donor agencies based on the mutual discussion. It is expected that around 75% costs of NSLEP will be borne from the external sources particularly donor agencies and international non-government organizations. Besides, new source of funding like payment for environmental services of snow leopard habitats, ecotourism promotion and carbon offsets will be identified. These resources may have extra efforts to implement the in the standard manner.

Major funding Gaps

Around US\$ 5 million is necessary in order to implement the NSLEP of Nepal. Out of total budget estimation, around 25% budget will be borne by the Government of Nepal while remaining part will be borne from donor agencies and conservation partners. Pilot project for Climate Resilience (PPCR) component five will be implemented in the prime habitat of snow leopard particularly SPNP and DHR. In order to reduce the gap and secure the sufficient fund, a conducive environment from government side to non-state partners is essential. However, transparency in budget planning and implementation from non-state partners is equally crucial.