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Review Paper

## Prospect of Financing Protected Areas through Payment for Ecosystem Services in Nepal

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### Abstract

*Protected Areas (PAs) are recognized worldwide for their role in conserving biodiversity and ecosystems. They are also the place to enhance peoples' livelihoods and ensure environmental sustainability goals, as in Biosphere Reserves. As a result there are more than 155,000 different types and sizes of PAs globally. In Nepal, 23.23 % of its territory is covered by some sorts of PAs. But, lack of finance to effectively run these valuable PAs may have threatened the existence of the park. The main aim of this study is to find the prospects of Payment for Ecosystem Services (PES) in securing sustainable finance for the management of protected areas. The study is based on reviewing the existing scientific literature in order to highlight the issues regarding the emerging concept of PES with reference to Nepalese PAs; specifically, the question arises on how these sources can be used to secure sustainable financing of PAs. Findings suggest that there are ample opportunities in Nepalese PAs for PES that can be used as a new financial tool in conservation. However, design of appropriate legal and policy frameworks is highly recommended in participation with concerned stakeholders.*

**Keywords:** Economic valuation, Nepal, park tourism, payment for ecosystem services (PES), protected areas, Shivapuri Nagarjun National Park.

### Introduction

Protected Areas (PAs) are the store house of biodiversity worldwide. They are designed and established to protect the last remaining natural ecosystem for the benefits of human lives. PAs are clearly defined geographical spaces that are recognized, dedicated and managed through the legal and other effective means to achieve the long term conservation of nature with associated ecosystem services and cultural values<sup>1</sup>. They do not preserve only the threatened ecosystems and biodiversity but also the key elements in climate change mitigation strategies and even shelter the threatened human communities and/or sites of cultural and spiritual values<sup>1,2</sup>. Protected areas provide livelihood and income for the people living in and around the protected areas, and support different forms of ecosystem services at the national and global level. Present day protected area management therefore, should not be viewed through the narrow concept of an ecological perspective alone but should be able to address the social and economic dimension leading to sustainability<sup>2</sup>.

Globally, the number and extent of nationally designated protected areas has increased dramatically over the past century. There are over 155,000 protected areas covering a total of about 24 million square kilometers of land and sea. Among nations there is a great deal of variation in protection: only 45% of the 236 countries and territories assessed had more than 10% of

their terrestrial area protected, and only 14% had more than 10% of their marine area protected<sup>3</sup>. In comparison to the international scenario, Nepal has done an exemplary work by establishing protected areas network that includes 10 National Parks, 3 Wildlife Reserves, 1 Hunting Reserve, 6 Conservation Areas and 12 Buffer Zones covering 23.23 % of Nepal's area (figure-1)

Protected areas as natural ecosystems provide various types of ecosystem services which are for "free" as a gift from Nature. This may include the purification of water and air, regulation of rainwater runoff and drought, waste assimilation and detoxification, soil formation and maintenance, control of pests and disease, pollination and seed dispersal, nutrient cycling, maintaining agro-diversity, pharmaceutical research, industrial processes, protection from harmful ultraviolet radiation, carbon sequestration, moderation of extremes temperature, wind and waves<sup>5</sup>. These ecosystem services can be classified into provisioning services (food, fiber, water), regulating services (flood and disease control, climate regulation), supporting services (nutrient cycling, soil formation) and cultural services (tourism/recreational, spiritual, cultural).

However, it is not an easy task to run the already established protected areas due to the complexity involved in its management. The cost involved in the park management has always been the major challenges for the authority. Despite their

benefits, protected areas are seen as the financial burden to national government. Protected area management effectiveness is limited because the park services are undervalued. Economic valuation of the goods and services should be conducted in order to identify true economic contribution, to maximize long term benefits, and to increase investment in nature conservation<sup>6</sup>. Among several options for conservation finance of protected areas, Payment for Ecosystem Services (PES) approach has gain the rapid momentum in recent days.

### Payment for Ecosystem Services (PES)

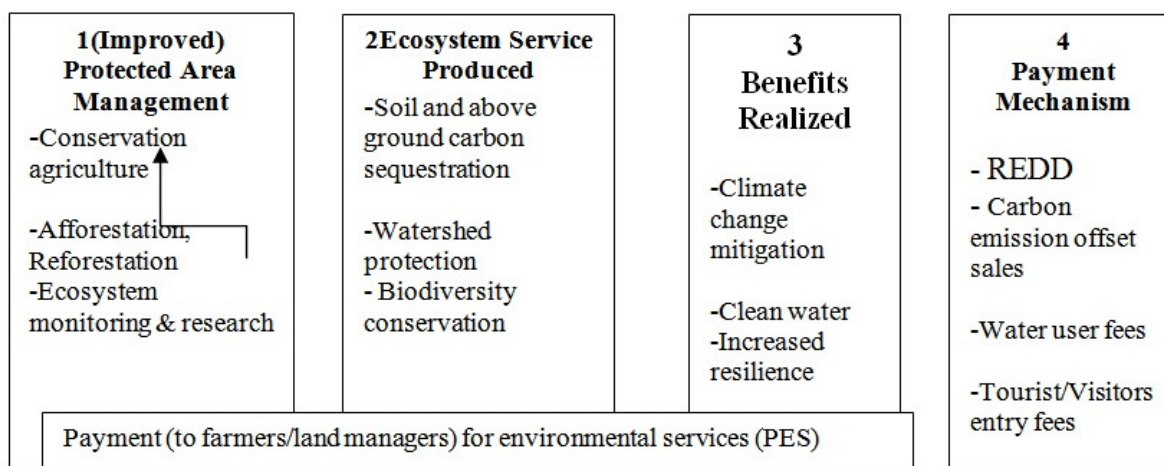
Most of the conservation projects and protected areas around the world face significant economic shortage to launch the conservation activities and to manage the protected areas effectively. They have to rely entirely on (national) government funding. In the case of Nepal, too, many protected areas are fully dependent on regular government budget which often reports the lack of funding to carry out effective conservation activities. This has become the major challenges for most of the protected areas to carry out effective park management activities and therefore limited to normal administrative jobs.

Conventional source of park finance comes from governmental regular budget allocations, multilateral, bilateral and non-government organizations (NGOs), grants and borrowings from banks and other commercial lending organizations. Although, these financial sources are the important source of financing, they are not sustainable and often limited in scope and amount<sup>7</sup>. Protected areas in developing countries receive less than 30% of actual expenditure required for basic conservation<sup>8</sup>. In Nepal, Department of National Parks and Wildlife Conservation (DNPWC) has the sole responsibility of managing protected areas both from financially and technically, except Annapurna Conservation Area (ACA), Manaslu Conservation Area (MCA) and Gauri Shankar Conservation Area (GCA). DNPWC invested US\$ 2.7234 million (NPRs. 240.75 million). Whereas the revenue generated was US\$1.588million (NPRs. 140.38

million) in fiscal year 2009/2010 with an annual budget deficit of US\$ 1.1354million<sup>4</sup>. The expenditure figure goes up if the investment incurred in deploying Nepalese army is added. Every protected area in Nepal that can be categorized as IUCN PA category of II and IV have army presence that is mandated to curb the poaching and control illegal activities inside the park boundary. Study from Bardia National Park (Nepal) revealed that total annual expenditure is NRs27.13 million (US\$ 306,923), revenue generation of NRs. 10.65 million (US\$ 120,464) while the total economic value of the park is more than NRs. 379 million (US\$ 4,288,066)<sup>6</sup>. This proves that Nepalese authority are not able to tap the value of resources offered by the protected areas in one hand and in the other hand it is experiencing the budget deficit to carry out park management activities.

To support the existing financial mechanisms with new and innovative approaches in protected area finance, several mechanisms have been recognized and tested worldwide. Domestic economic instrument such as fiscal policy, markets and charge systems, bonds and deposits<sup>7,9-11</sup>, private sector investment<sup>7,12-14</sup>, and international financial flows such as trust fund, endowment fund, debt for nature swaps etcetera<sup>7</sup> can be used to sustainable financing of protected areas. Nevertheless, every type of funding opportunities has its own merits and demerits and is determined by country's political, economic and societal character.

Payment for ecosystem services (PES) is the market based mechanism in which the beneficiary of such services pays to the providers/conservers of those resources. Hence, the social cost and/or opportunity cost occurred in the conservation of such resources is internalized into the PES framework. PES is never the command and control approach rather it is the voluntary system in which the parties, conservers and users/beneficiaries reach into the agreement. Formal definition of PES lacks in the literature, however, following is the simple criteria to describe the PES principle which is<sup>15</sup>,



**Figure-1**  
 Elements in PES programme design. Source: adapted and modified from FAO<sup>19</sup>

A voluntary transaction where, a well-defined environmental services (ES) (or a land-use likely to secure that service), being 'bought' by a (minimum one) ES buyer, from a (minimum one) ES provider, if and only if the ES provider secures ES provision (conditionality).

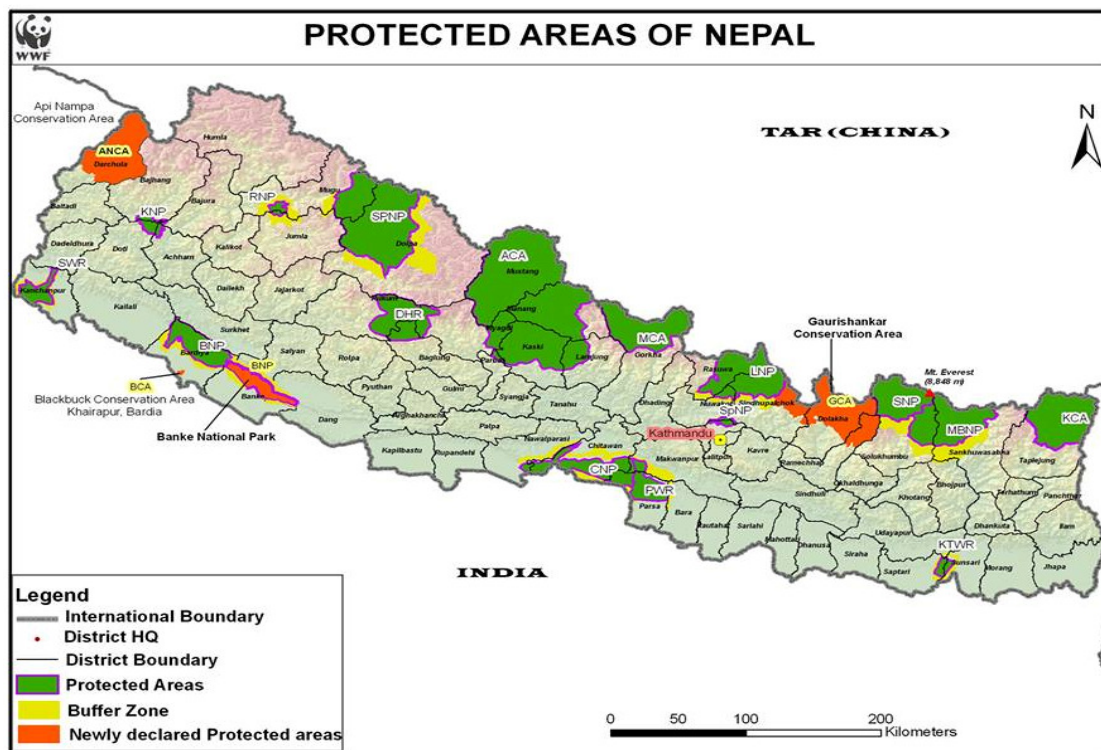
Some proposed the ecosystem based decision support process in a cyclic order that help to capture the benefits of ecosystem services<sup>16</sup>. PES may be implemented at different levels such as<sup>17</sup>. Watershed level: e.g., downstream users of water (urban populations, hydropower companies, water bottling industries) compensating the upstream land owners or managers; national level: e.g., the government-financed PES programmes for forest conservation in China, Costa Rica, and Mexico, global level: e.g., payment through the global initiative for Reducing Emissions from Deforestation and Degradation (REDD) to communities and individuals for forest protection and enhancement.

For the country like Nepal, where majority of people resides in rural areas and livelihood directly links with the natural resources, PES can be effective in protected area management when they contribute to livelihoods and the wellbeing of local communities<sup>17</sup>. Hundreds of PES projects are implemented around the world covering four main environmental services: watershed protection, carbon sequestration, landscape beauty and bio-diversity conservation<sup>18</sup> which have local, regional and

global benefits. Both small scale and large scale PES projects are in implementation. Small schemes tend to be modest in scale, and are very common in nature-based tourism (for eg. eco-tourism/parks tourism) and protection of small watersheds. Large PES schemes tend to be government driven, working at the state and provincial level (e.g. in Australia, Brazil, China and USA), or at national level<sup>18</sup> (e.g. Colombia, Costa Rica, China and Mexico). (Eco)-Tourism opportunities offered by the parks and protected areas is also one of the most important ecosystem services which is non-consumptive in nature. Charging tourist entry fees into the protected areas helps to generate the revenue for financing protected area management as well. Key factors involved in the PES design are illustrated below.

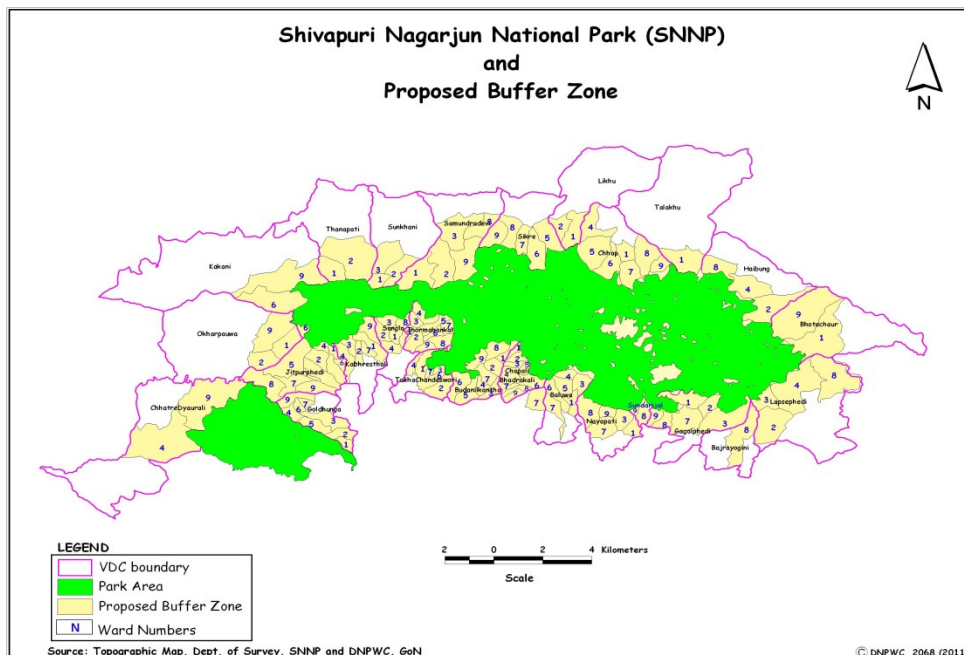
### Material and Methods

This paper is based on secondary literature and desk study. Various existing literatures on diverse field of eco/park tourism, nature conservation, payment for ecosystem services and protected area management were purposely reviewed with particular reference to Nepal. Journals, project reports, conference proceedings, book chapters, government publications, research publications etc were reviewed. Particular emphasis has been given to the Shivapuri Nagarjun National Park, Nepal as a case study which can be developed as a model of financing protected areas through PES (figure-2).



(Source: WWF Nepal)

Figure-2  
 Protected areas of Nepal



Source: <http://snp.gov.np/images/sampled/parcs/landscape/snp%20with%20bz%20area.jpg>

**Figure-3**  
**Shivapuri Nagarjun National Park, Nepal**

## Results and Discussion

An astonishing number and diversity of efforts to implement the ecosystem services framework have emerged worldwide. Though these efforts are small in size, together, they make presence around the world providing different ecosystem services such as forest generated carbon sequestration, water supply, flood control, biodiversity conservation and enhancement of landscape beauty (for recreation/tourism values)<sup>16</sup>. In Nepal too, protected areas have high prospects for PES, but lack appropriate legal and policy frameworks and design to make it work.

**Prospects of PES in Shivapuri Nagarjun National Park, Nepal:** Shivapuri Nagarjun National Park (ShNNP) lies next to the capital city of Kathmandu, Nepal which is just 12 km far from the city centre. This park covers the total area of 159 sq. km in the mid-hills physiographic zone and lies in between 1320 to 2732 metres above sea level. It was established as the ninth National Park (NP) of the country in 2002. Prior to the status of NP, it was a type of protected area (1973) that was established aiming to conserve the area from increasing deforestation and preventing the conversion of forest land into agriculture land. In 1976, it was declared as protected watershed area leading to the creation of wildlife reserve (equivalent to IUCN IV category of PAs) in 1983<sup>20</sup>.

During the early days, the region was focused mainly for the conservation of watershed area and wildlife of mid hills region. ShNNP is the main source of drinking water for Kathmandu city

which supplies about 30 million liters of water/day (MLD) from the Bagmati and Bishnumati rivers, including other small streams that originate from the park<sup>21</sup>. The water supplied from this region is about one-fifth of the total piped water supplied in the city<sup>20</sup>. The main ecosystem services provided by ShNNP can be listed as: firewood, timber, water for irrigating farm land, hydropower and domestic consumption purpose, ground water recharge/supply in Kathmandu valley, water purification, air purification, recreation (birding, wildlife viewing, hiking, picnic spot), leaf litter and grasses for agriculture/livestock, flood control (by reducing runoff), carbon sequestration etc., among others.

The government has not yet measured the value of the ecosystem services provided by the park. Nor, the value of this ecosystem has been brought into the market mechanisms. This has created substantial economic values going undocumented or ill-treated. However, studies have been carried out by several experts on the theme of PES in the park and study on valuation of ecosystem services<sup>20,22</sup>. As the park is the largest source of water supplier to Kathmandu valley residents, there is high prospects to bring the water components (watershed management and conservation offered by the park and local community) into the market mechanisms through PES strategy. Regarding the cost and benefits, the operation cost of the park is borne by park authorities through DNPWC annual regular budget. However, the (opportunity) cost of ecosystem conservation is borne by the local communities in the form of crop and livestock depredation due to wildlife, restrictions in the land use and restrictions in use of various park resources,

whereas the fresh water supplied by the park is enjoyed by the valley residents for free. Similarly, the water generated from the park is used by downstream people for irrigating their farmland and to generate electricity by the Nepal Electricity Authority (NEA), which is also at no direct expenses<sup>20</sup>. This situation facilitates downstream communities to enjoy the ecosystem goods and services for free whereas the local people are bearing the conservation cost, putting their livelihoods in vulnerable to poverty.

PES concept has already been practiced in conservation sector in Nepal. Watershed protection in Kulekhani watershed area and forest conservation (community forestry) in Western Terai shows positive sign that PES can be used as a tool to secure conservation finance. In the case of Kulekhani watershed area, NEA pays to the Makwanpur district development committee, from which 20% of the amount is transferred to the watershed communities, which is used in watershed conservation and various rural development activities<sup>23</sup>. Five different community forestry users group (CFUG) in Western Terai districts of Kanchanpur and Kailali are selling their ecosystem services to the local irrigation users committee and VDC respectively. Irrigation users committee pays to the CFUG for water services (irrigation purpose) and VDC pays for protecting the river bank from erosion and cutting due to flood<sup>6</sup>.

**Valuing Ecosystem Services of ShNNP:** It is clearly evident that ShNNP provides various ecosystem goods and services which have both use and non-use values. As we know from the practicality of valuing several ecosystem services, use benefit is comparatively easy to calculate its economic value as this can be replicated to the market scenario that we have to spend the money to buy similar goods and services. According to the valuation study of ecosystem services in ShNNP, the domestic consumption of water is 33.3 million m<sup>3</sup>/yr of water followed by usage in irrigated farmland 20.8 million m<sup>3</sup>/yr and usages in hydropower production 18.144 million m<sup>3</sup>/yr. This volume of water annually brings the equivalent of net financial values of NRs. 305.69 million or equivalent to US\$ 3.458 million. This study was carried out at the Bagmati watershed level covering the total area of 67 km<sup>2</sup>, which is just 42% of the NP coverage<sup>20</sup>. Therefore, we can conclude that economic value of the park is US\$516/ha/yr. However, total economic valuation of the park resources at the broader level encompassing the whole area may increase (or decrease) from this figure.

In another study, ShNNP is valued as US\$153/ha/year, among this US\$96/ha/year for direct use value and US\$57/ha/year for indirect use value. Water sector alone has the value of US\$ 112/ha/year that includes drinking water and the water purification service provided by the park<sup>22</sup>. The economic value (US\$ 153/ha/year) of ShNNP is close to the average value of US\$ 150/ha/year of ecosystem services provided by the forests in the Mediterranean countries<sup>5</sup>. Since the ShNNP study was conducted in 2008, during the time when the exchange rate of US\$ value was low against NRs, this figure of total economic

value for now is US\$111/ha/year.

Such huge sum of benefits, only from the park water resources, has been used for free and has high prospects in increment of this value if all the ecological benefits are valued. On the other hand, the communities living inside the park has been bearing the conservation cost. At the current scenario, the park authority has the operational expenditure cost (for conservation) of NRs11.0 million (US\$ 124,434)<sup>24</sup>, that is met by the regular government budget. (Opportunity) cost for the local people through restricted land use, crop and livestock depredation and restriction on using the park resources has the totaling amount of NRs. 26,873/household/year (US\$ 304)<sup>20</sup>. Sundarijal Village Development Committee (VDC) is one of the VDC that lies within and outside the park. 6 wards lie within the park boundary and 3 wards lie outside the park. Assuming the same level of conservation cost within and outside the close boundary of the park for 491 household of the VDC, the total cost for the local people is NRs.13,194,643/year (US \$ 149,261). The VDC has the total area of 35 km<sup>2</sup>, therefore the total opportunity (conservation) cost is US\$ 43/ha/year<sup>25</sup>.

If the park can generate sufficient income from its own resources then it can not only rely on its own for the financial needs but also provide its surplus money to the national treasury and invest in community development activities in the buffer zone. It can generate sufficient income if the park resources and its ecosystem services are brought to the market mechanism which can be traded at the prevailing market prices. This approach have win-win situation for both the users (beneficiaries) and providers (conservers).

**Park Finance through Park (Eco) Tourism:** Besides funding from government for running protected areas, tourism is another source of income for parks and protected areas. There is a strong linkage between protected area management and tourism. Nature-based tourism has become increasingly significant not only protecting biodiversity but also generating financial capital from a range of services. However, there are different trends in social, political, demographic and technological sectors that affect park tourism. The major trends can be attributed to war, famine and civil unrest to global (climatic) changes, from fuel prices to park budget relying on tourism revenues (rather than government), from technological advancement to increasing knowledge and education of park visitors and much more<sup>26,27</sup>.

Not all parks and protected areas in Nepal are popular tourist destination. Mountain parks such as ACA, Sagarmatha (Everest) National Park (World Heritage Site and Ramsar Site), Langtang National Park (also Ramsar site) and lowl and Chitwan National Park (CNP) (also World Heritage Site and Ramsar Site within buffer zone) are the most popular park tourism destinations. The trekking tourism and tourist entry fees in these parks has generated significant amount of money that can be invested in park management and community development activities.

Studies carried out in ACA, showed that increase in the tourist entry fee can lead to budget surpluses in an optimistic scenario and minimize budget deficits in the pessimistic scenario. The current entry fee of NRs 2000 (US\$ 23) in the ACA is considerably low and most respondents/visitors stated they would be willing to pay more to the current entry fee<sup>28-30</sup>. Although this fee was sufficient to meet expenditures during times of peace, ACA suffered budget deficits during the peak of the Maoist insurgency. An entry fee of US\$ 50 would minimize budget deficits even in the pessimistic scenario (35,625 visitors in 2005) and leaves considerable surpluses in the optimistic scenario (75,278 visitors in 2002). But now, with the stabilization of peace in the country the total number of visitors already exceeded the optimistic scenario figure and reached more than one hundred thousand. Therefore, even if the other ecosystem services of the park go unvalued into the formal market mechanism, the revision in the park entrance fees provide surplus money to invest more in conservation and development project and to pay for conservation cost to the local people as well. Similar to ACA, there is also more willingness to pay for park entrance fee by international visitors (excluding SAARC visitors) in Chitwan National Park and Langtang National Park than the existing fees<sup>31-34</sup>.

In CNP, Nepal showed that the previously charged park entrance fee of NRs 500 (US\$ 6) was very nominal and the international (excluding SAARC) visitors were willing to pay more than the triple (US \$ 21.94) of the fee (Cook 2011). This study has excluded the national visitors and SAARC visitors which are required to pay the park entrance fee of NRs 20 (US\$ 0.23) and NRs 200 (US\$ 2.27) respectively. In an effort to boost park income through visitors' fees, Nepal government has recently increased the park entrance fees (depend on individual park and ecological region) including charges for various nature based activities within the protected areas, through the notice in Nepal gazette in government managed parks and reserves<sup>35</sup>.

This brings the sufficient fund to the park authority which can be used in conservation and development programme and projects. Buffer Zone (BZ) programme under protected area provides the legal right to the community to receive 30% to 50% of the park income to invest in community development activities with special focus on conservation. Increase in the park income means increase in the fund received by BZ people, which may lead to positive attitude and encourage local participation in the management of protected areas. From the above examples of valuation studies in protected areas we can say that, use of different economic instrument in the management of protected areas can be beneficial in the strategic planning of protected areas and to secure finance.

## Conclusion

It is clearly evident that protected areas not only conserve the biodiversity but at the same time provides various forms of ecosystem services such as provisioning, regulating, cultural

and supporting for the wellbeing of human lives. They are also the growing market for environmental conscious tourist and/or being develop as destinations of eco-tourism. However, they struggle for sufficient funds to carry out the effective park management activities. PES type practices in Kulekhani watershed area and community forest users group in far west Nepal showed the bright prospects of PES in Nepal. If the ecosystem services are brought into the payment mechanism through PES, then protected areas do not only rely on their own income for the management activities but also provide its surplus money to the national treasury and invest in community development activities in the buffer zone to alleviate rural poverty. Ecosystem services are currently being provided by almost every protected areas in Nepal. If the PES mechanism is brought into practice through policy changes, the provisional services will be improved and enhanced. Though, it would be additional cost to current protected area management cost, protected areas can generate sufficient income if the park resources and its ecosystem services are brought to the market mechanism which can be traded at the prevailing market prices. This approach have win-win situation for both the users (beneficiaries) and providers (conservers). Formulation of appropriate legal and policy frameworks is recommended to tap this potential financial source to sustain the protected areas in Nepal.

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