Predator People Conflict: A Central Dilemma in Environmental Management

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Abstract

This paper describes one of the central issues in the management of natural resources, the predator and people conflicts. A case study drawn from Nepal was used to describe who the stakeholders are. Their arguments, interests and objectives on the conservation area were presented. Often local people near the protected areas are treated as co-managers in the new paradigm of conservation strategies, participatory approaches. This approach seems to be good in the management of biodiversity where local people could realise that the protected areas are created for their own benefit so that they are directly involved in the management as one of the stakeholders. The management practices in different parts of the world are different and context specific, which is explained by comparing the case study with Norway. Biodiversity conservation is regarded as a complex policy field using different instruments, e.g., legal and economic for its success. Presently, there is increased interest in the use of economic instruments. In view of this, the possibilities and implications of economic instruments in biodiversity management in relation to power use, responses, conflicts and criteria of efficiency and legitimacy have been described in this paper. Finally, Cost Benefit Approach was discussed in relation to how it could be used to analyse the efficiency of a policy instrument such as legal ban on alternative uses of substantial tracts of land.

Introduction:

Biodiversity has for years now, been an issue of global concern. In the past decades biodiversity conservation and management has experienced increased global public attention. In recent years the follow up of various biodiversity agreements and conventions has led to policy goals, measures and instrument debates on international, national and local arena of decision making (Vedeld 2002a). This has been due to concerns of increasing deforestation and threat to extinction of some plant and animal species, contributing to the potential and actual loss of biodiversity. Due to the substantial increase in the threat on biodiversity, efforts have been made

both at the national and international levels to try and address the problem.

Crops and livestock depredation by wildlife is one of the key issues of predators and people conflict in most parts of the world (Shrestha et al. 1997). The conflicts between predators and people, one of the central dilemmas in environmental management, is common both in affluent countries such as Norway and in many poor countries in the south (Benjaminsen 2002). The current policies, legislation and practices of conservation cannot be sustained if local communities are constantly in conflict with park authorities. In addition to this, it is clear that the growing aspirations of local people for active participation in decision-making processes, is a critical need to build and develop understanding and trust between the two parties for future conservation efforts.

The Environment Protection and Biodiversity Management Act of 1999, which suggests having at least 10 % of land under protected areas by individual countries has led to the use of legal ban on some areas (http://www.ea.gov.au). Different instruments can be used in biodiversity management and conservation, and these include legal, and economic instruments. Economic instruments can be used either to motivate or discourage the targeted actors involvement in certain actions (Bemelmans-Videc et al.1998). Legal instruments on the other hand place exclusion, or partial use of the resources. Through the use of *Cost Benefit Analysis* (hereafter, CBA) technique, the total costs and benefits of establishing protected areas can be revealed, upon which the efficiency with which the resource is utilized can be established. Based on the ratio of the benefits and costs, the economic profitability of the management practice (in this case, legal ban) is established.

This paper will therefore, through the use of descriptive and comparative analysis dwell on biodiversity management, and possible conflicts that exist. Possibilities and implications of increased use of economic instruments in biodiversity management were assessed. Furthermore, CBA approach was viewed on how it could help in analysis of legal ban on efficient resource use.

1. Predator and People Conflict

Conflicts between predator and people are more prominent in areas adjacent to and inside protected areas in Nepal (Shrestha et al. 1997). Economic loss due to wildlife depredation may increase the extent of conflicts between the local people and the government (or management) enforcing the laws to protect wildlife and their habitats. Therefore, it is necessary to make control decisions and management planning together with all the stakeholders due to socio-cultural connection of wildlife problems.

1.1 A Case Study: Livestock Depredation by Wildlife in Makalu-Barun National Park and Conservation Area (MBNPCA)

This study involves wildlife depredation of livestock and crops in one of the mountainous protected areas of Nepal, as reported by Shrestha et al. (1997).

1.1.1 Site Description

MBNPCA was established in 1992 as Nepal's eighth national park and the first to include an adjacent inhabited conservation area as a buffer (www.visitnepal.com). This national park has an area of 2330 km^2 in two Districts in eastern Nepal. Approximately 1500 km^2 area in the north is designated as national park whereas 830 km^2 in the south is conservation area. MBNPCA is designated to incorporate the local people in park and conservation area management. Various community-based organisations (CBOs) were formed and strengthened in order to manage the natural heritage of the area. This part of the country is identified as one of the hot spots in biodiversity richness where more than 3000 species of flowering plants, 82 species of mammals, 440 species of birds, 32 species of reptiles, and 16 species of frogs are reported. People of diverse ethnic origins with subsistence agriculture and livestock farming as their basis of livelihood inhabit in MBNPCA.

1.1.2 Description of the Conflicts

Local people adjacent to natural habitats have negative attitude towards natural

resources conservation due to serious financial losses by wildlife and denial of access to the resources. There is food deficit for two to four months every year, which thus also fuel the problem. Main predators responsible for livestock depredation include leopards, jackals, civet cats, wolves, dogs, and Himalayan black bears. At the same time there is a problem of crop damage by wildlife such as Himalayan black bears.

1.1.2.1 Livestock Depredation

It was reported that almost 71% of the sampled households experienced livestock depredation problem. Generally, small stock was the most vulnerable to wildlife depredation (Table 1). Casualties of large sized livestock (e.g., cattle, Yak-Chaunri) due to wildlife depredation were comparatively lower. The loss was high in the forest area between the high altitude pastures and the villages. Besides crops and livestock, there is a risk of wildlife related human injuries, which is mainly related to black bear. Most of the human injuries from bears were a result of surprise confrontation, and four of such cases were recorded in 1996.

Table 1: Livestock depredation level due to wildlife per reporting households.

	Type of Livestock				
	Yak-Chaunri	Cattle	Goat	Sheep	Pig
Average loss among reporters	3	2	4	5	2
Loss report in % (n= 124)	2.4	12	37	13	13
Total loss	8	23	164	79	41

Source: Adapted from Shrestha et al. (1997).

Stakeholders of the protected area include the government and the local community. Local people are intimately associated with the forest resources to meet their

requirements such as timber, firewood, fodder, leaf litter, vegetables, and medicinal herbs etc. Most of the local people were in favour of the establishment of the MBNPCA, but they had a fear that:

- They would lose the continued access to the forest resources in the future.
- Establishment of MBNPCA would increase the extent of depredation of crop and livestock by wildlife.
- They would lose the opportunity of hunting inside the park

The main objective of the establishment of the protected area from management side was to protect the existing biodiversity in the area. Government of Nepal is striving to improve local living standards through infrastructure, educational and income-generating activities (www.visitnepal.com). Shrestha et al. (1997) suggest that maintaining wildlife population at a sustainable level is beneficial for both the animal species and the local residents.

The park management also had an interest in actively involving local people in protecting the forests and natural resources upon which their lives depend as well as in conserving their own rich cultural heritage. In addition, traditional resource management systems, such as community controlled grazing and forest guardianship would be strengthened, and low-level technologies were introduced where appropriate.

From the objectives and interests put forward by both local people and park management, some have been met and achieved whilst others have not. Park management has realised that without strong and promising benefit, local people will have little incentive to cooperate with the park management for biodiversity conservation. Therefore, they are providing support to the local people in different sectors such as: cultural, religious conservation, natural resource conservation, improved village environment, drinking water supply and irrigation, which were considered helpful to them. Besides, the local people also had interests and hoped that the park management would provide them with:

- Income generating opportunities.
- Access to forest resources without the approval of park authorities.

- Compensation of wildlife depredation.
- Education (conservation education).
- Fodder and firewood from private and community land.

Despite all these, some arguments came up from the establishment of the park. At present, there is no legislation to address the issue of wildlife damage. The local people are responsible for avoiding such damages, as there is no policy on compensation. This is because monetary compensation schemes for wildlife appear to suffer from a considerable number of deficiencies (http://iucn.org).
Compensation:

- Is unable to decrease the level of the problem (because the cause of the problem is not being addressed).
- Reduces the incentive for self-defence by farmers (and therefore could even exacerbate the scale of the problem).
- Cannot address the un-quantifiable social 'opportunity costs' borne by people who are affected by the threat of problem wildlife.
- Is cumbersome, expensive and slow to administer, (because of the need to train assessors, cover large areas, have stringent financial controls etc) and once embarked upon, potentially has no end point.
- Is open to considerable abuse or blatant corruption (e.g. through: bogus claims; inflated claims; deliberate cultivation in places where crops are likely to be damaged).
- Payment to only some victims may cause disputes or social problems.
- Funds are usually never sufficient to cover all compensation claims.
- Where compensation schemes need to be promulgated in law, their ability to keep pace with changing economic circumstances or changes in social policy are hopelessly slowed down.

2. Community Based Conservation and Co-management

Building partnerships among local communities, government agencies and other

stakeholders is emerging as a major conservation strategy. The partnerships may be in the form of benefit-sharing arrangements, which build on community knowledge, develop capacity among all stakeholders and even lead to sharing of responsibility in park management. In MBNPCA, a buffer zone has been created to enable local communities to use the resources (Shrestha et al. 1997). Because the protected area is a popular tourist destination site, some of the revenue raised could be ploughed back into community development projects in the buffer zone. Many similar initiatives, which emphasise the participation of local communities and other stakeholders, are evolving within this region. It is worthwhile noting that this approach is not entirely new. Examination of traditional forms of natural resource management from many parts of the world reveals that communities have long been the custodians, the users, as well as the conservers of their particular resource (http://iucn.org).

Despite these efforts, however, there remains a significant lack of basic understanding about the process of participatory management in the Asian context. The identification of 'legitimate' stakeholders, effective integration of traditional and modern knowledge about natural resource management, and the initiation of negotiation processes with the stakeholders themselves are some of the practical problems of collaborative management. On the one hand there is insufficient information for planners concerning approaches to participatory management, and there is also less information accessible to the most directly affected stakeholders (that is, local communities), which is one of the practical problems of collaborative management.

2.1 Potentiality of Community Based Conservation

Community based conserved areas have significant benefits, including amongst others (http://iucn.org):

- Enhanced ecosystem services and goods, including water,
- Increased wildlife populations and habitat protection,
- Enhanced livelihood security and revenue for communities,
- Increased social respect and self-esteem,

- Protection or revival of social and cultural values, as well as traditional knowledge and management systems,
- Greater political empowerment, village cohesiveness and unity,
- Complementary role to official protected areas.

Community conserved areas (CCAs) need to be given much broader recognition and support throughout the world. This could be through documentation, legal backing, institutional support, and enabling conditions to secure the rights of communities to the resources they depend on and are conserving. In doing so, the tremendous diversity of approaches that communities have evolved, needs to be respected and supported (http://iucn.org).

Considering the interests of the governments and the local community, potentiality of community-based conservation can be enhanced by:

- CCAs need to be better understood and documented, clearly demarcated, and highlighted at all levels including the mass media (but keeping in mind the need for communities to have the capacity to deal with issues such as tourists and researchers descending on them);
- Citizens must have a full right to information including through efficient and locally accessible modes of dissemination;
- Existing community institutions, practices and knowledge systems, should be recognised and built on, and where necessary modified based on lessons being learnt, rather than displaced by, new institutions as part of development and conservation programmes. Efforts involved in organising community institutions should be simple and practical;
- The great diversity of community institutions and approaches should be respected and strengthened (including neglected ones) as well as addressing issues related to their erosion.
- CCAs could derive strength from the large number of people's movements across the country, specially to resist destructive commercial and developmental pressures;
- Political parties, armed forces, donor agencies, media and decision makers need to be sensitised to CCA issues;

3. Comparison of Predator People Conflict between the Case Study and Norway

The main differences and similarities in the predator people conflict between Norway and Nepal are as follows:
Differences: Predators found in these two regions are different due to geographical locations. At the same time, political and cultural differences may have some influences in the kind of predator people conflict. These include:

- In Norway, the wolverine is the most dangerous predator to small stock (Helbæk 2002); whilst in Nepal, the snow leopard and black bear are the most dangerous (Shrestha et al. 1997).
- The animal, which is the major source of conflict in Norway, is the wolf, though this animal does not cause major damages on livestock (Helbæk 2002). People perceive it to be the most dangerous animal in Norway whereas it is not a major source of conflict in Nepal. This could be due to the fact that wolves have just been re-introduced in Norway whereas in Nepal they have always been there and have co-evolved with the people.
- The use of herders in Nepal reduces incidents of predation whilst in Norway livestock roam around on their own therefore is more vulnerable to predation.
- In Norway there is a lot of media coverage of the conflict while in Nepal such conflicts are at times modified, reported late and given very low prominence.
- The conflict in Norway features prominently in political debates at all levels of governance whereas it is not a very hot political issue at higher level in Nepal.
- The conflict in Norway is mainly centred on livestock depredation (Helbæk 2002) whereas it involves both livestock and crop damages in Nepal (Shrestha et al. 1997).
- Denial to the natural resources is one of the major conflicts beside to the predation problem in Nepal where as in Norway the people have access to the resource.
- Compensation on wildlife damages to livestock is not practised in Nepal (Shrestha et al. 1997) but Norway provides compensation for such damages.

- In Norway they practise recreational hunting while in Nepal it is one of the sources of food or income to the local people.
- Local people are not included in decision-making process pertaining to predator and people conflict in Nepal, which is not the case in Norway.

Similarities:

- Some of the livestock predators are similar, e.g., bears, wolves, and lynx. (Shrestha et al. 1997, Helbæk 2002).
- Participation of the local community is the basis of biodiversity conservation in both areas.
- Both countries are signatories in biodiversity conservation conventions to protect the existing important biodiversity in their areas including predators.

4. Possibilities and Implications of Increased Use of Economic Instruments in Biodiversity Management

Economic instruments are one form of policy instruments, which are meant to change people's "attainable combinations" and perceptions of what is economically profitable to do (Vedeld 2002a). Possibilities of their use include; conservation of forest resources; control of pollution; management of national parks and nature reserves just to mention but a few which shall be used as examples. Following is a discourse examining use of specific economic instruments in relation to possible areas of biodiversity management and conservation.

4.1 Conservation of Forest Resources

Forest ecosystems are pockets of considerable wealth in terms of biodiversity. Despite this, these resources have been or are being depleted. The threat to forest biodiversity is attributed to wood fuel needs, other forest products and several other factors (Rodger et al. 2001). Economic instruments could be used in the proper

management and conservation of forest resources. These instruments include; tax on charcoal production, subsidies on energy saving technologies as well as on alternative sources of energy such as electricity and kerosene.

4.2 Control of Pollution

Incidents of pollution are widespread and pose a threat to biodiversity virtually in all types of ecosystems. The most common and vivid examples are those arising as a consequence of; use of agricultural chemicals and fertilisers, industries, burning of fossil fuels and so on. In all the above examples, the threat to biodiversity is very grave and this provides a possible area of intervention where economic instruments could be used. The objective could be to discourage use of heavy polluting operations and inputs by making them very costly, or to encourage the use of less polluting operations and inputs by making them cheaper. An array of instruments that could be used include; taxes, on the heavy polluting inputs (agrochemicals), and technology (machinery); subsidies on technology and inputs which lessen the emission of pollutants or alternatively the pollutants themselves could be taxed directly through an emission charge.

4.3 Management of National Parks and Nature Reserves

These are areas acclaimed with extreme richness in terms of biodiversity. In instances where biodiversity that exist in such areas is threatened or where it is desired to take over such a resources for conservation purposes, economic instruments could be used. One of these economic instruments is out right cash payment to the original owner(s) of the land. The owner(s) of the land on the other hand could retain it, but then receive cash payments in order to conserve the biodiversity, as in the case of some Norwegian forests (Vedeld 2002b). Alternatively, proscriptive economic instruments like heavy fining of trespassers or illegal users could be used with the aim of dissuading any attempts to encroach on the resources under question.

4.4 Implications

All in all it is believed that possibilities for using economic instruments as tools for biodiversity conservation and management are numerous and inexhaustible. The mechanisms of their operation and possible implications based on the foregoing examples are as discussed below.

Generally economic instruments are associated with remunerative power and are expected to stimulate a calculative response whereby the affected stakeholders weigh the costs and benefits of obeying or not obeying (Vedeld 2002a, Bemelmans-Videc et al. 1998). For example, a fine on the illegal use of a national park or nature reserve, such a fine is normally very high relative to the financial status of the would be offenders (Benjaminsen 1997). According to the Republic of Botswana WCNP Act of 1992, any person who kills, hunts or captures any animal within the national park shall be liable to a fine of NOK 15, 000 (P10, 000), or seven years imprisonment. Due to this, the actors are expected to refrain completely from attempting to engage in the undesirable action, because if caught, the cost would be very high. This is a calculative response with individual reflection based on, how much do I gain by not doing the outlawed action or vice versa.

Some economic instruments may however carry traits of coercive power (Bemelmans-Videc et al. 1998). Such instruments may cause a negative moral response from the affected actors (Vedeld 2002a) and this may cause conflicts. Fortunately such incidents seem to be very rare. Related conflicts could also result from perception of unfairness among sections of the actors affected by an economic instrument. For example, according to Vedeld (2002b), when discussions were initiated in Norway, on whether to institute a tax on fertilisers in order to control nitrogen and phosphorous related pollution, pasture farmers who did not fertilise heavily felt were being unfairly treated and voiced their concern. Conflicts of this nature are mainly related to taxes and/or fines. However, since most economic instruments, whether incentive or disincentive, neither prescribe nor prohibit the actions involved, but rather just makes them less or more expensive (Bemelmans-Videc et al 1998), they are less alienating and therefore would rarely cause conflicts. Furthermore, economic instruments are not associated with “value loaded” terms like *lawbreaker*. For example, one is a lawbreaker if they violated a

legal instrument, but a law-abiding citizen if he/she took the action inspite of the fact that they would pay a tax if they did it.

Vedeld (2002a) states that, "it is known that instruments and instrument choice contain political dynamite and usually address two sets of criteria for instrument choice; efficiency and legitimacy". In respect to effectiveness and efficiency, economic instruments may vary. This is supported by, fines on illegal use of national parks and nature reserves, which seem to achieve the purpose although the concept is now being refocused under the new thinking of ecological modernisation. This is whereby the local people participate in the selection of the instruments to use and their enforcement (Vedeld 2002a). This seems to play many roles such as, enhancing effectiveness, cost efficiency, acceptability and legitimacy of the instrument.

5. Assessing legal ban as a policy instrument in biodiversity management: A Cost Benefit Analysis (CBA) approach

CBA can be used to judge the effectiveness of the instrument itself with regard to the management of biodiversity. It reveals all the possible costs and benefits (direct and indirect), and tries to value them. The establishment of the legal bans on the protected areas would be considered profitable and effective (at least on economic basis) if the total benefits out weighs the total costs (i.e. if the Benefit-Cost Ratio is greater than 1). The efficiency with which the actors concerned utilize the resources, will depend on the total value of the benefits relative to cost incurred in protecting the area through legal ban. Accordingly, if the benefits are greater than the costs, then the resources are efficiently utilized.

5.1 Costs and Benefits of establishing a protected area are as follows:

Costs:

There are a number of costs incurred when establishing a protected area where a total ban on the alternative uses of the resource is imposed. These costs can either be

direct or indirect (Opportunity costs). Direct costs include the monetary/financial expenditures incurred in setting up the area, eviction, and policing, monitoring and administrative purposes. If the establishment of the protected area would mean eviction of some people then they will have to be compensated. Indirect costs, on the other hand, are the foregone benefits, resulting from the total ban. These include such alternative uses as; agriculture or pasture land for herded livestock, and collection of firewood, timber, medicinal plants, bush meat, fruits and vegetables (e.g. mushroom) (Curry and Weiss 1993).

Benefits:

The benefits resulting from the establishment of a protected area can be viewed as being the total value of the area. This includes both the use and non-use values of its resources (Curry and Weiss 1993)

Use value: This is the direct benefit of the protected area. It includes such services as the aesthetic value of the resource (i.e. endemism with regard to animal and plant species it contains), the conservation value, tourism and recreation. Another benefit is the option value, which is value put by people in seeing the resource exist in the future. The creation of such a protected area as a national park, would avoid the cost created by the loss of important species or habitat in case the area was not under protection. This means there would be some costs saved since the action (legal ban) mitigates environmental damage.

Non-use value: This is the intrinsic value, sometimes referred to as existence value, where one wants to see a particular resource being protected for the future generations. The motive behind this could be a mixture of altruism and sense of responsibility for the future generations.

5.2 Valuing Costs and Benefits

For a full economic analysis of a project to be carried out, its consequences must be quantified and valued (Curry and Weiss 1993).

Estimating Costs:

The direct costs of establishment of the protected area can be given value by the usual financial accounting methods, where the monetary cost of each component is calculated and summed up. This would include workers' salaries, eviction compensation, and assorted administrative costs (Husfschmidt et al 1983)
Indirect costs (foregone benefits) can be estimated using a variety of techniques, depending on the nature of the cost as follows.
Estimating the value of lost pasture and Agricultural land:
This can be estimated as the foregone income from production by the agriculturists and pastoralists.
Estimating value products such as timber, fuel wood, medicinal plant:
Fuel wood: This could be estimated in the following ways.

- Direct way (market value): By multiplying the market value of each unit (cubic metres of firewood) by the estimated amount of fuel wood
- Indirect way (substitute method): In terms of the resources, it would replace e.g. use of cow dung as fuel.
- Opportunity cost methods: It can as estimated as value of increased time spent by families in collecting firewood.

Timber: The market value for timber can be used to estimate the value of the income foregone by establishing the protected area.
Bush meat, fruits and vegetables: The market value for these products can be used to estimate the income foregone by the community.

***Estimating benefits*:**

Aesthetic value: This could be estimated by such techniques as travel cost, property value technique and contingency valuation methods i.e. willingness to pay for conserving the area or willingness to accept compensation for the loss of amenity (Curry and Weiss, 1993
Tourism and recreation*:* These can be estimated by using the travel cost method. It includes the actual cost of travel such as bus fare or airfare and cost for hotel/lodging. Besides, the travel cost would also include the value of the alternative use of time spent while traveling (Husfschmidt et al. 1983).

Option and existence value: This could be estimated through the use of the contingency valuation methods, which include the willingness to pay for conserving the area and willingness to accept compensation for loss of valuable plant and animal species (Curry and Weiss 1993).

6. Conclusion

Sevetdal (2000) suggests the conflict solving mechanism as negotiations and subsequent contract by the parties (stakeholders) themselves. They can also form various boards and management bodies, or can solve the problem with the help of the land consolidation court or the ordinary court systems. Crops and livestock depredation as well as wildlife-human interactions are the basic causes of predator people conflicts in most parts of the world. Increase in the extent of such damages further increases the conflicts between people and park management, which hinder in achieving the public support in conservation (Shrestha et al. 1997). Participation of local people in conservation with positive attitude (Shrestha et al. 1997, Abakerli 2001, Sevetdal 2000, Helbæk 2002, Valladares-Pauda 2002), environmental education, habitat restoration and promotion of policies (Shrestha et al. 1997, Valladares-Pauda 2002, Abakerli 2001, Sevetdal 2000) are the essential factors for long-term success of biodiversity conservation. Therefore, management plan and decisions should be made together with all the stakeholders. This could be brought about by the fact that local community is often left out when policies on compensation are determined, as well as when determining the compensation itself.

There are many possible areas of use of economic instruments in biodiversity management and conservation. Such instruments are naturally suitable, because they neither prescribe nor prohibit the actions involved and therefore are less alienating and relatively more legitimate among the affected actors. In addition they are reasonably efficient and cost effective. Their potential for use in biodiversity management and conservation is comparatively high.

The use of legal ban as a tool for management of biodiversity has a great impact on

the efficiency with which the concerned stakeholders utilize the resource (under management). Surrogate marketed goods can provide minimal estimates of the benefits from environmental services in deciding whether to protect or replace an environmental good. Moreover, though contingent valuation method is a useful technique for estimating economic values for non-market resources, it must be handled with great care as it could be more subjective rather objective. However, the emerging paradigm of ecological modernization has a great potential in ensuring that the resource is utilized efficiently by ensuring its regulated access and utilization by those concerned.

Abbreviations used:

MBNPCA- Makalu-Barun National Park and Conservation Area
CCAs- Community Conserved Areas
USAID- United Nations Agency for International Development
DNPWC- Department of National Parks and Wildlife Conservation
TMI- The Mountain Institute
CBA- Cost Benefit Analysis
WCNP- Wildlife Conservation and National Parks

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