Volume 19 Issue 31
Originally issued as E5



Global Journal of HUMAN-SOCIAL SCIENCE: E
Economics
Volume 19 Issue 5 Version 1.0 Year 2019
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-460x & Print ISSN: 0975-587X

Trafficking of Wildlife: An Emerging Problem in South Asia

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Keywords: *trafficking; trade route; price; forest.*

GJHSS-E Classification: *FOR Code: 349999*



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Trafficking of Wildlife: An Emerging Problem in South Asia

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I. Introduction

Trafficking of wildlife has emerged as a global problem that shows a rising trend over the years. Poaching and international trafficking of endangered species rank among the largest of crimes representing tens of billions of dollars per year; consequently, it has appeared as one of the threats to the survival of the species and global biodiversity. United Nations sixty-ninth session of the General Assembly (September 2014 – September 2015) also expressed concern about the increasing scale of poaching and illegal trade of wildlife and their products and its adverse economic, social, and environmental impacts. South Asia faces the same misfortune from the deeply-rooted wildlife crime. Weak law enforcement and poor coordination across the administrative/political boundary are helping escape the criminals through the porous borders. Trans-boundary cooperation, coordination, and integrated actions are, therefore, required to make the wildlife crime control efforts producing tangible results. The UN General Assembly has also welcomed the efforts of and cooperation between intergovernmental organizations aimed at preventing and fighting against poaching and trafficking of wildlife.

Wildlife crimes are considered the fourth biggest crimes in the world next to that of arms, drugs, and human trafficking. Similar to the latter, it is also primarily an organized crime that is transnational. The illegal wildlife trade includes the demand of bones for traditional medicines, pets and zoo exhibit, parts and bodies as collectors' trophies, decorations, and luxury items, bush meat and exotic dishes from restaurants, etc. TRAFFIC (2008a) reports that wildlife trade accounts millions of individual plants and animals from several thousand species. South-east Asia's experience suggests that the demand side of this illegal trade is stronger than the supply side.

The political economists overlooked the problems regarding the poaching and illegal wildlife trade for the last several years; however, these issues have recently emerged in the grounds of biodiversity conservation (Eliott, 2011). The present study also stemmed from a similar need particularly in case the of South Asian countries.

Regional Scenario of Wildlife Crimes

Studies show China as the world's largest destination market for illegal ivory and other wild animal parts as well. The recent trend in unlawful ivory trade in China is the consequence of several interlinked factors: the creation of a parallel legal domestic market for ivory in China by CITES decisions, and ineffective control of ivory trade in mainland China through Hong Kong. EIA (2014) highlights the need of Chinese government role to control the trade as well as to regulate the state-owned ivory carving factories and stores. However, the challenge remains on how to control the illegal ivory market when the parallel legal market of ivory also exists. Complete ban of ivory trading in China might be one initiative to be taken.

South Asia and South-east Asia are rich in biodiversity and have porous borders across countries. South Asia possesses almost 12 percent of fauna species and 16 percent of flora species of the world (World Bank, 2009). Moreover, in the case of South-east Asia, countries have well-established trade routes and accessible transport links. These trade routes have caused wildlife trade along with growing wealth in Asia.

South Asia itself does not appear as the foremost global destination market of wildlife crime in terms of both animals and their body parts. However, this being one of the fastest growing regions in the world, the scale of wildlife crimes is expected to grow in coming years. The mode of IWT as discussed in the

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following section shows how South Asia integrates itself with the rest of the world regarding this crime.

In this background, the objectives of this study are two-fold. First, it intends to analyze the nature of this illegal trade. Second, it aims to evaluate and suggest best practices in institution building for the control of wildlife crimes and protect wildlife resources. To fulfill these objectives, the rest of this paper is organized as follows. Section 2 is all about the data/information used for the study and the study method applied. It proceeds with the discussions on the mode of the interrelationship among social, economic, and political factors in Section 3 to understand the intricate relationship among these intertwined factors. Section 4 discusses on study findings and Section 5 presents summary, conclusion, and implications.

II. Data and Methods

a) Data Sources

The study has primarily collected secondary data/information for the review. They are mainly from wildlife enforcement authorities of South Asian countries. Furthermore, the study has reviewed the publications from ASEAN Wildlife Network (ASEAN-WEN), Global Tiger Fund (GTF), GTIC, CBD, Convention on International Trade in Endangered Species (CITES), Latin America Tiger Fund (LATF), Central America Wildlife Enforcement Network (CAWEN), International Police Environmental Society (INTERPOL-ENS) and SAARC Forestry Program.

The study has also conducted in-depth key informant interviews and (focus) group discussions among the stakeholders. The data/information collected has followed the exploratory and qualitative analysis.

b) Methods

The analytical approach in this study follows a triangulation technique to comprehend the political economy of wildlife crimes in the interface of enforcement agenda; socio-political factors; and the demand vs. supply of wildlife, their products, and the derivatives. The enforcement agenda associates the issues regarding the power vacuum and the legal provision against the crimes. The socio-political factors comprise geographic and governance issues in addition to the highlights on the potential areas prone to emerge as illegal wildlife trade spots. Likewise, the study also diagnoses the demand and supply side factors behind the crime. Based on the availability of information/data, the analysis has comprised both national and regional perspectives of the problems.

c) Issues and Indicators

This political, economic analysis is a combination of methods including but not limited to review, study, consultations, and research. A variety of broadly conceived opportunities and alternatives based on studies at national and international levels are also under review. More specifically, the review of works as mentioned earlier is to:

- Understand the phenomenon of wildlife crime, its effects, and its quick emergence in areas with a power vacuum, including those of many transition economies, and the factors behind the wildlife crime
- Describe the conditions that typically lead to its emergence
- Comprehend legal prohibition of wildlife commodities
- Ensure geographic and social distance from the centers of political decision-making, and
- Assess the internal organization, market structure, and welfare effects of wildlife crime.

There are several reasons for wildlife crimes. In more than 60 countries in the world, protein from wild animals including fish fulfill a fifth of the animal protein in rural diets (TRAFFIC, 2017). Wildlife includes three types of resources: animal, plants, and fisheries. Increasing human population in poverty is causing the attack on these forest resources for their survival. Secondly, people use leather, furs, and feathers as clothing and ornaments. Falconry and trophy hunting is mainly for sports. Herbal remedies and traditional medicines rely on wildlife resources. An estimated about 80 percent of the global population do use such resources directly or indirectly (TRAFFIC, 2008). Some animals and plant derivatives are in use for religious purposes; for example, Hindus use rhino horn utensil in worships. Likewise, museums and private individuals do accommodate many wildlife specimens and curios (Ibid).

In some Asian countries – such as China and Vietnam – deep-rooted cultural misconceptions prevail regarding the use of wild animal body parts to have positive effects on the human body, including increasing virility and curing cancer (Pederson, 2013). More specifically, tigers and rhinoceroses are believed to have these medicinal values that are propelling the shadow market of these animal body parts and derivatives in the region.

Traditional Chinese medicines often incorporate ingredients also from animals in addition to plants, the leaf, stem, flower, root, and minerals. In the case of animals, such as seahorses, rhinoceros horns, binturong and tiger bones, and claws are sold by poachers in hidden illegal markets (Weirum, 2007 and New scientist, 2010). Popular Sumatran tiger parts, tiger genitals, and eyes -- culturally believed to improve virility -- are available in open market of some East Asian countries including China (TRAFFIC, 2008b). Due to the demand in Asia (for medicinal and luxury items, especially horns for decoration) and in the Middle East, rhino populations face extinction (CNN, 2011). Despite no scientific basis, a sharp surge in demand for rhino

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horn in Vietnam has attributed to rumors that the horn cures cancer (Watts, 2011 and Telegraph, 2012). In 2012, one kilogram of crushed rhino horn used to sell as much as $60,000 -- more expensive than a kilogram of gold (Randall and Owen 2012). Vietnam is the country that produces bowls for grinding rhino horn in a commercial scale (Smith, 2012).

Ivory is another natural material of several animals that is also under illegal trade to a large extent. It is mainly for creating art objects and jewelry where the ivory carved is with various designs. China is the main destination of the ivory trade. Jeffrey (2012a and 2012b) reported that an upsurge in ivory poaching is flowing to China -- with about 70% of all illegal ivory trade. Poachers seek for the fur -- a natural material – for decoration. Alpine regions of Austria and Bavaria region of Germany traditionally used chamois beard -- a tuft of hair -- as a decoration on trachten-hats worn as a trophy hunting. In the past, it was made exclusively from the chamois' lower neck hair, but its production continues to some extents upon the availability of this hair (Duell, 2012).

This is how socio-economic and cultural elements are fuelling illegal wildlife trade. These factors do work together, so that power, interests, and incentives become structured. WEF (2012) has summarized the idea as follows:

- Poaching swells in the environment with widespread corruption, fragile enforcement mechanism and lack of employment.
- Enormous profits coupled with low-risk in this crime attract criminal groups. Furthermore, the tendency of the crime is fuelled by weak law enforcement, trial, forfeits, and other deterrents.
- Economic growth in consumer societies has caused rising demand for illegal wildlife products, which is exacerbated by the increased accessibility of illegal wildlife products through the internet.
- The lack of collaboration, coordination, and accountability between source and consumer countries is causing the blame being passed back and forth between them.

We discuss these issues more detail in the following sections.

III. Review and Insights

a) Social Factors

Animal poaching is a very open topic among people since the ancient period. As the survival of humankind during the hunting age required killing of animals, it continued to some extent even after people started agricultural activities. In the beginning, it was persistent for fun, meat, and some animal products for human use. In the course of human civilization, there was an increasing realization of the need of protecting wildlife for facilitating the ecosystem and maintaining biodiversity that would, in turn, benefit the environmental protection and eventually human wellbeing.

Once the wildlife got into protection, hunting became a fun and wild animal body parts as something precious for amusement and home decoration. Furthermore, socio-cultural factors and misconceptions provided some undue importance to wild animal body parts. Moreover, the body parts are somewhere considered to have high medicinal and scientific values. These factors are fuelling for the continuation of wildlife poaching as an outcome of these demands. The wealthy consumers in the destination countries use the poor in the source countries to work as poachers. Many illegal hunters commit this crime for economic return; some do it for the 'thrill' or 'fun' involved in it, while others poach themselves for the wildlife products.

Social factors also cross artisan based communities who traditionally practice the art of ivory carving that is present in China and in Nepal too. It is also due to these artisan based skills that make it difficult for governments to be completely assertive in banning the trade.

In addition to the animal hunting, poaching affects the surrounding areas and the other animals too. Food items of human being once entered to wildlife's food chain creates the problems among the latter regarding their food availability and longevity of their lives. Under the circumstances, any of these animals that have been in the world for thousands of years are now becoming endangered and may extinct. There is not an adequate environment to reproduce as well as not enough food to their survival. The animals at the top of the food chain, which rely on the animals lower on that chain but the latter are also disappearing because of hunting, don't have adequate food for survival, therefore, are as well dying from starvation (Girdler et al. 2010). Unlawful animal poaching causes the illegal trade of animal products. Many radical animal poachers, as well as illegitimate buyers, are very powerful and heavily armed themselves. In many cases, people are scared of speaking about their wrongdoing in fear of their own lives.

b) Economic Factors

Several studies have reached to the conclusion that wealth in demand countries is a stronger driver of IWT than poverty in source countries (TRAFFIC 2008a; IFAW 2008; Duffy 2010: 155-187; Duffy and St John 2013). Anti-poaching measures in Chitwan National Park of Nepal has explored that the illegal traders in the country buy it at approximately US$ 8,000 for about one kilogram of rhino horn (Kunwar, 2009). Poacher, mediator, and trader get their return from this amount. In the case of tiger skin, it's trading value in the local illegal market is about US$ 50 for skin from one tiger. However, studies on the overall trading value of animals and their body parts, trophy, etc. are still lacking in Nepal.

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People living in the vicinity of the national parks do have dependencies on the latter for fodder, fishing, herbs, and firewood. Mostly, they do have the license to collect these forest products. Majority of the poachers poach for the monetary cause. There are two types of hunters - (i) the game hunters do it for the sport who are usually licensed, and they pay for the game, (ii) traditional poachers who poach for the food, e.g. bush-meat hunting in Africa and also in South Asian countries.

c) Political Factors

International concern over the wildlife crimes dates at least to the early 1960s when the International Union for the Conservation of Nature (IUCN) called for a treaty to address illegal export trade of endangered species. It took almost ten years to organize the Convention on International Trade in Endangered Species (CITES).

The nature of illegal wildlife trade is sophisticated and complex; however, this sort of crime is of organized nature because it requires an extensive and functional network for hunting the wild animals and pass through all domestic transfers and eventually cross the border. This crime is not only the injustice to endangered wildlife, but it also causes a high level of violence while killing the animals. Although wildlife crime is the fourth biggest in the world next to drugs, arms, and human trafficking, this illegal trade is managed by species-specific smuggling rings, many of which hide behind the cover of the expertise offered by legal operation.

Despite the constant efforts to address the persistent debate over different approaches to wildlife management, the dispute is yet to settle primarily on the issues regarding wildlife trade regulation (Sand, 1997) and CITES has made growing formal commitments to contribute in the sustainable use of wildlife species (CITES, 2007). Significant internal debates persist around the fundamental valuation of trade. The tensions between pro-trade and anti-trade approaches to wildlife management mean that CITES has been likened to a forum where members of opposing camps launch ideological crusades against each other (Stoett, 2002, p. 197). Differences between pro-trade and anti-trade approaches to wildlife management exacerbates in developing countries where poverty alleviation dominates local politics. An ongoing challenge for CITES is achieving outcomes that will ensure the sustainability of wildlife trade while avoiding accusations of cultural domination (Arroyo-Quiroz et al. 2005).

Political interference does have the hindrance to curb wildlife crime as evident in the literature. Kideghesho (2016) reports that Tanzanian politicians have created frustration in the efforts to control IWT in protecting the interests of their constituents who could earn their living through the IWT. According to the survey among staff working in Tanzania's national parks, 75% of respondents described local politicians as the barrier in conservation endeavors. Parliamentary Committee on Land, Environment and Natural Resources in the country has received and presented the evidence of political interference in the war against wildlife crime. The committee found some members of parliament and government officials involved in protecting poachers with whom they had close personal ties (Ibid).

Similar is the case of Nepal, Kunwar (2009) has explicitly mentioned names of the three politicians in Chitwan district during Panchayat regime (1961-1990) who used to have a business of illegal trade of rhino horn. During the period, some of them had close ties with the royal palace; consequently, their IWT got protection in the shadow of the Panchayat regime. Despite this, one of them was arrested by the police along with the rhino horn. These political ties have weakened the enforcement of the protection laws.

The evidence above reveals some affiliations of political groups/parties in promoting IWT; however, democratic changes in the political systems may improve the credibility of the system and has the contribution in the control of IWT. Institutional endeavor comes along with political commitment. An example is the establishment of the South Asia Wildlife Enforcement Network(SAWEN) in South Asia as the reflection of the regional political pledge in the control of wildlife crimes. Democratization in the political system in South Asian countries has caused the increasing realization of the protection of the endangered species, both flora, and fauna. Enforcement of SAWEN Statute is, therefore, a reflection of this realization. In parts of SAWEN region, the number of tigers has doubled within the last five years due to this political will.

IV. Findings

As mentioned earlier, illegal wildlife trade has appeared as the fourth biggest crime next to arms, drugs and human trafficking. Illicit wildlife products are also undergoing with online marketing. Similar to the trading of weapons and drugs, it also lacks awareness about the importance of conservation and impacts of over-exploitation. The poor suppliers and wealthy consumers are contributing to the depletion of the region's fauna and flora resources.

A typical scenario of illegal wildlife trade or its body parts or trophy trade runs like this. A mediator connects the poacher to a local carrier who transfers the wildlife contraband to another mediator for forward delivery and eventually to a trafficking leader. The latter finances the poaching network and uses corrupt connections, if available, in the public and private sector to move the trafficking within the country and across the borders.

The poaching network often involves a complex mix of criminal syndicates, often led by foreign nationals,

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and corrupt government officials. Nepalese experience also suggests that many poaching criminals did use the wildlife and law officials to escape themselves from the crime conducted. Collusion between corrupt officials and criminal network explains the unprecedented scale of poaching and wildlife smuggling in many countries (EIA, 2014). It also compromises enforcement efforts so that only a few of the culprits get prosecution. In the case of Tanzania, trafficking chain of elephant, especially its tusk or ivory, associates series of corruption. The game starts from rangers who provide information regarding duty tracks and the whereabouts of elephant herds to police officers. The latter rent out weapons and pass on ivory to the Tanzanian Revenue Authority (TRA) officers. The role of TRA officials in this regard is to allow shipping containers leave the country's ports (Ibid).The common trend shows that the exporters often form an organized group whereas the importers are mostly individuals.

People in traditional Chinese society were prone to use ivory bracelets linked to handcuff; this inclination was more visible across urban centers. However, this culture has fuelled substantially high demand for ivory in China. A significant landmark in this connection is the ban of ivory import in China announced in January 2018; however, the impact of this regulation is yet to assess. Not only in case of China, but it is also expected to have influence in source and transit countries as well, more importantly in African countries as a source region and Vietnam as well as other South Asian countries as a transit region. Poachers are killing thousands of wild elephants in Africa to satisfy the ivory demand in mainland China so far, and African elephants are expected to be relatively safe after this announcement of the ban of ivory trade in China.

a) Regional Dimensions

USA, Europe, Middle East, Russia, and South-East Asia are the final destinations of illegal wildlife trade (Table 1). The following table shows the source and destination countries along with the end market values of these products (wild animals):

The Convention on International Trade in Endangered Species (CITES) monitors the international trade in species of conservation concern. From 2005 - 2009, CITES recorded an annual average of more than 317,000 live birds, just over 2 million live reptiles, 2.5 million crocodilian skins, 1.5 million lizard skins, 2.1 million snake skins, 73 tonnes of caviar, 1.1 million coral pieces and nearly 20,000 hunting trophies (TRAFFIC online portal). A significant chunk of these trades, no doubt, is illegal. During this period, EU enforcement authorities made over 12,000 seizures of illegal wildlife products in the region (Ibid).

In the legal front, in the early 1990s, TRAFFIC estimated the value of legal wildlife products imported globally around US$ 160 billion. In 2009, the price assessed of global imports was over US$ 323 billion. Furthermore, according to TRAFFIC, the lawful trade of wildlife products into the EU alone was worth an estimated €93 billion in 2005 that swelled-up to nearly €100 billion in 2009.

By the nature of this trade, it is almost impossible to obtain reliable figures for the value of the illegal wildlife trade, but it is considered several billions of US dollars every year. The illegal, unreported and unregulated (IUU) fisheries alone accounts between US$ 10-23 billion per year (MRAG & FERR, 2008); while the value of the illegal international timber trade is about US$ 7 billion per year. Likewise, the prohibited wildlife trade, excluding timber and fisheries counts US$ 7.8-10 billion per year (GFI, 2011).

According to IFAW (2013), the total value of these illegal trades was equivalent to about US$ 19 billion in 2012. However, how much trading occurs in each trading center is still unavailable, and this requires further investigation and research.

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Table 1: IWT across the World and the Trading Values

Source regions/countries	Destination regions/countries	Wildlife (or product)	Price (per unit) in US$
Africa	USA, Europe, Russia	Cheetah	5000-10,000
	Japan, Hong Kong	Elephant	Over 100,000
	Japan, Hong Kong	Ivory	500-1000
	South East Asia	Rhino Horn	5,000 - 10,000
Russia	Middle East	Saker Falcon	10,000 - 50,000
	Hong Kong, Korea, China	Bile/Paws of Brown Beer	500 - 1000
	Hong Kong, Korea, China	Amur Tiger	5,000 - 10,000
	Europe and USA	Snow Leopard	50,000 – 100,000
South-east Asia and Australia	Russia	Boa	500 – 1,000
	Russia	Python	500 – 1,000
	Russia	Parrots	1,000 – 5,000
	Europe	Bird-eater Tarantulas	100 - 500
	USA, Europe	Tiger	5,000 – 10,000
	USA, Europe	Leopard	5,000 – 10,000
	USA	Leopard, Cat	500 – 1,000
	USA	Kangaroo	5,000 – 10,000
South America	Europe, Russia	Butterflies	500 – 1,000
		Old World Monkey	500 – 1,000
		Caiman	500 – 1,000
		Jaguar	5,000 – 10,000
		Piranha	100 - 500

Source: Sputnik News, 2017.

Note: South America includes Colombia, Ecuador, Peru, Venezuela, Trinidad and Tobago, Guyana, Suriname, French Guiana, Brazil, Bolivia, Uruguay, and Argentina. Likewise, South-east Asian countries comprise Brunei, Burma (Myanmar), Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam.

b) People Park Relation

Harvesting wildlife does have many implications. Most importantly, it promotes the harvesting of other natural resources as well. Although rules are not so strict to control fodder, herbs, and vegetable collections, sometimes illegal activities are also associated with these activities. In addition to wild animal poaching, national park and conservation areas are always prone to face timber harvesting, sand mining, opium cultivation, cattle grazing, and fishing in the protected areas. So long as the park authorities get informed about these illegal activities, SAWEN countries do have the system of prompt response to them. However, spot operations are not always possible that make the poachers/violators escape from the park. Spotted deer, wild buffaloes, and wild pigs are poached for meat, rhinos and elephants for ivory/teeth/tusks, beers for bile, tiger and crocodiles for skins, and many other animals for fur. These scenarios are quite similar among the SAWEN countries.

Three types of connections exist between the parks and people (Figure 1): one is legal; another is illegal, and the third one is natural. People in the vicinity of the national park area do often receive the license in fishing, collecting fodders, vegetable, and herbal products to a limited extent. Generally, this is the support to the livelihood of the poor who have a normal tendency to depend on the natural resources. The usual relationship is the behavioral one. The wild animals tend roaming around the jungle irrespective of the park boundaries; therefore, agricultural products adjacent to the buffer zone are always under threat of wildlife attack. Furthermore, human lives are also not free from wildlife attack. For example, people in the Madi region near Chitwan National Park of Nepal do have several complaints against this sort of suffering and loss of human lives. Reciprocally, people also tend killing wild animals roaming in the villages.

The third relation is the focus of this study, i.e., illegal wildlife trade. The poachers are the poor from the vicinity of the wildlife reserve/park areas; the illegal trading goes in different layers until the products get exported. The uses of the products are beyond South Asia, especially in East and South-east Asia.

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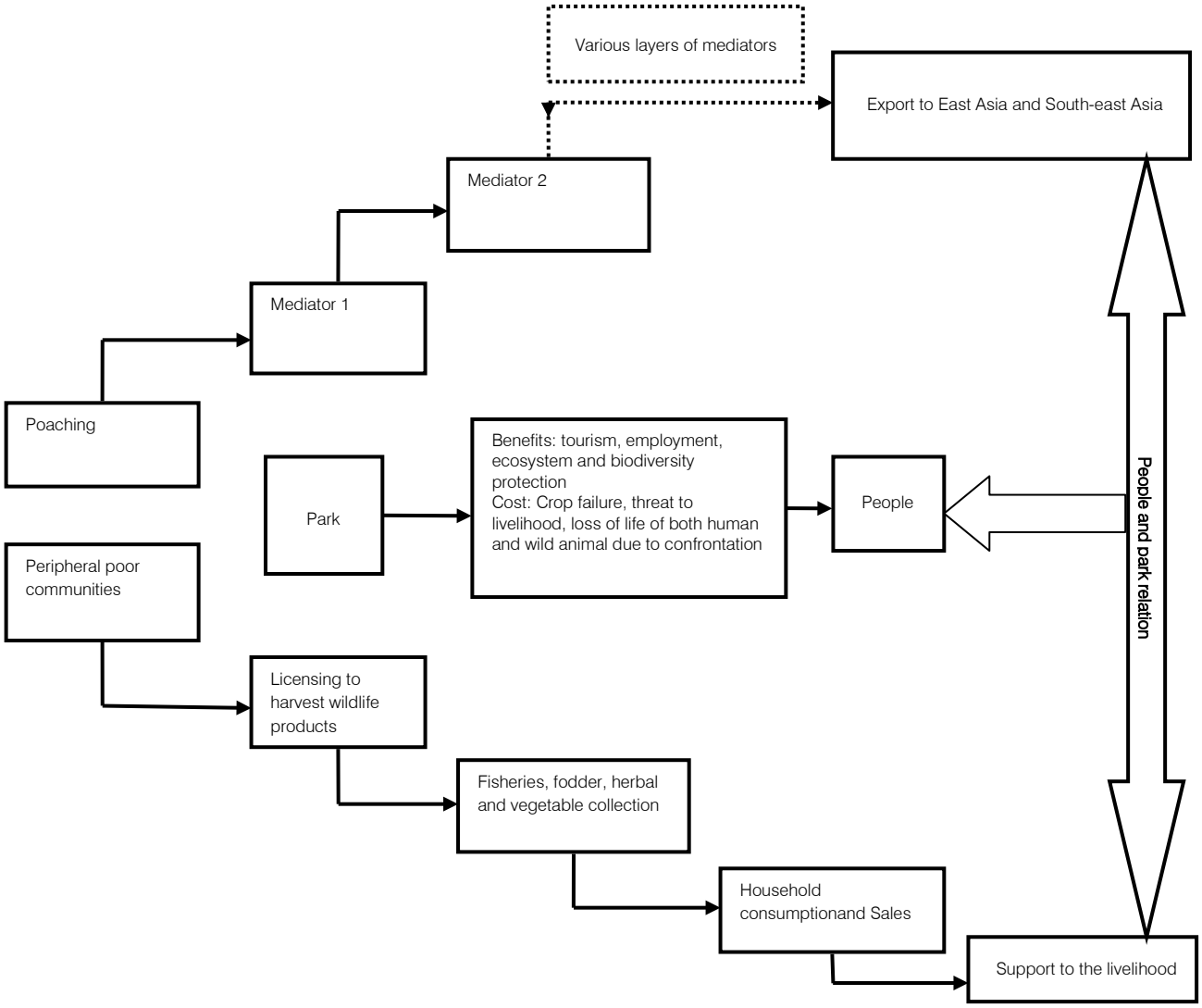


Figure 1: Summarising the People and Park Relations

c) *Modelling Socio-economic, and Legal Components for Anti-poaching*

The poaching model was first developed by Skonhoft and Solstad (1998). Here we follow and modify this model concerning the socio-economic and legal perspectives in anti-poaching.

In most of the cases, poachers are from the local people living in the vicinity of the park areas. They are from poor agricultural households. These poachers are aware of the movement of wild animals and the availability of other wildlife products. The total benefit to these households comprises that from agricultural activities and the poaching activities:

$$B = A(N, X, a) + W(L, X) \quad \text{.....(i)}$$

B= total benefit to the households
A=function representing the returns from the agricultural activities
N= total efforts in agriculture
X= total wildlife stock
a= price of the agricultural products
W= function representing the harvesting benefits
L= Harvesting efforts

Total returns from the efforts in agriculture (G) is assumed to be increasing but at a decreasing rate, therefore,

$$\delta G/\delta N = G_N > 0 \text{ and } G_{NN} < 0.$$

Higher the stock of the wildlife, bigger is the damage of the agricultural products in the vicinity of the park, i.e., nuisance effect. Furthermore, the rate of return from agricultural activities lessens along with the growing number of wildlife:

$$G_X < 0 \text{ and } G_{NX} < 0.$$

The rise in the price of agricultural products shifts the agricultural product curve upward. Likewise, the return from agricultural employment swells up along with the rise in the price of agricultural products:

$$G_a > 0 \text{ and } G_{Na} > 0.$$

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The first part of the equation (i) refers to the traditional agricultural activities whereas the second part is all about illegal wildlife harvesting. Total labor constraint (T) in the local economy is the sum of all efforts in these activities (equation ii).

$$N + L = T \quad \text{..... (ii)}$$

The second part of the equation i is subject to the law enforcement effort. The level of law enforcement (θ) is the function of the level of anti-poaching efforts (E) and the total labor efforts (L) in wildlife harvesting.

$$\theta = \theta (E, L) \quad \text{..... (iii)}$$

where

$$\theta_L > 0,\ \theta_E > 0, \text{ and } \theta_{LE} > 0.$$

Should the poacher be captured, the expected total benefit (B) to the poacher gets reduced due to the fine (Q) imposed. In this situation, the expected benefit at time t will be $(1- \theta) B + \theta (B-Q)$

Under the total labor constraint, the total benefits to the poachers will be

$$(1- \theta) B + \theta (B-Q) = A (N, X, a) + W(L, X) – Q \theta (E, L)$$

To make the enforcement effective, the return from the agricultural activities must exceed the net return from the wildlife harvesting:

$$A_N (N, X; a) \geq W_L(L, X) - Q\theta_L (E, L) \quad \text{.....(iv)}$$

If the poacher makes optimal efforts (L*) in wildlife harvesting, equation (iv) moves towards equality. In this situation, L* is positive. Likewise, if $L^* = 0$, the inequality in equation (iv) holds. When $L^* > 0$, the harvesting effort will be a function of the stock size (X) and the anti-poaching effort (E) along with other parameters:

$$L^* = L^* (X, E; a, b, Q, T)$$

Substituting this into harvesting function f(L,X), the reduced form of illegal harvesting function (h) is determined as follows:

$$h = 0 \text{ when } L^* = 0, \text{ and}$$
$$= f(L^*(X,E; a,b,Q,T), X)$$
$$= h(X, E; a,b, Q, T) \text{ when } L^* > 0. \quad \text{.....} \quad \text{(v)}$$

X_0 is the poaching pressure, i.e. minimum level of wildlife stock considered essential for poaching. At this level $L^* = 0$.

Above X_0 level, $L^* > 0$, $h > 0$, and $h_X > 0$.

The higher stock size will shift the marginal benefit curve of agricultural production G_N curve downward through nuisance effect. In this situation, the marginal net benefit curve of harvesting ($A_L – Q$) will shift upward.

The conclusion of this model is that along with the growth of the wildlife in the conservation areas; the harvesting effort also tends to grow. Therefore, anti-poaching efforts should grow along with the growth of the number of wildlife. The effective monitoring mechanism is, therefore, warranted for devising the anti-poaching activities. This is evident from the experience of Udawala we National Park of Sri Lanka that the conservation staff experience the existing monitoring mechanism as unscientific one because of its rely on visual inspection. The exact census of the wildlife existing in the park areas is still available; poaching activities are; therefore, increasing along with the growth of wildlife. The poaching is also going on, and the scale of poaching has only the rough estimates that have very modest scope for monitoring and research. The case of Chitwan National Park is rather noteworthy in this connection. Due to the graphic monitoring system, the exact numbers of the main wildlife is available with the park authority. Because of this, the park has succeeded in reaching its target of zero poaching of rhinos for the last couple of years.

The supply-side dynamics requires enriched with the research/investigations of the poachers' psychological behavior. McNamara (2016) has also warranted the need for the management interventions to focus and explore the factors behind the changing behavior of hunters for the lasting impact of anti-poaching endeavors.

V. Conclusion and Implications

The Convention on International Trade in Endangered Species (CITES) monitors International trade in species of conservation; from 2005 – 2009, it has recorded an annual average trade of more than 317,000 live birds, just over 2 million live reptiles, 2.5 million crocodilian skins, 1.5 million lizard skins, 2.1 million snake skins, 73 tonnes of caviar, 1.1 million coral pieces and nearly 20,000 hunting trophies. A significant chunk of these trades, no doubt, is illegal. During this period, EU enforcement authorities made over 12,000 seizures of illegal wildlife products in the EU member countries.

According to TRAFFIC estimate, in the early 1990s, global import of wildlife products was around US$ 160 billion. In 2009, this figure crossed US$ 323 billion. Furthermore, according to TRAFFIC, the lawful trade of wildlife products into the EU alone was worth an estimated €93 billion in 2005 that swelled-up to nearly €100 billion in 2009.

By the nature of this trade, it is almost impossible to obtain reliable figures for the value of the illegal wildlife trade, but it is considered several billions of US dollars. Studies reveal that the illegal, unreported and unregulated (IUU) fisheries alone has been estimated between US$ 10-23 billion per year, while the illegal timber trade was worth of US$ 7 billion per year, and the wildlife trade, excluding timber and fisheries, was US$ 7.8-10 billion per year.

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South Asia possesses richness in biodiversity; it contains 12 percent of fauna and 16 percent of flora species of the world. However, the region has lost almost 10 percent of the biodiversity during the last two decades due to several reasons. Most importantly, uncontrolled forest fires, poaching, wildlife trafficking and trade, dependence on forest resources for the livelihood of the poor indigenous communities living in the neighborhood of forest areas are the major factors behind this trend. Likewise, uncontrolled cattle grazing in forest areas, illegal encroachments to forests due to poverty and political reasons, weak monitoring and management system, lack of awareness, and limited availability of conservation financing are also worth mentioning.

Countries in the region do have protection act in each of them with varying dimensions. Some of them have exclusive wildlife protection act, but in case of other environmental law captures the provisions for protection. Wildlife protection has been covered by Environmental Law 2007 in Afghanistan, Wildlife Preservation Order 1973 and 2012 in Bangladesh, Forest and Nature Conservation Act 1995 in Bhutan, Wildlife Protection Act 1972 in India, Environment Protection and Preservation Act (4/93) in Maldives, National Park and Wildlife Conservation Act 1973 in Nepal, Pakistan Wildlife Ordinance 1971, and Fauna and Flora Protection Act 2009 in Sri Lanka. However, concerning SAWEN, policy harmonization including penalties and other prosecutions are still far away; this causes committing crimes in one country with a low level of fines and prosecutions and entering another country where regulations are quite strict, or conversely based on the situations. This infiltration is all possible due to the porous borders across countries in the South Asia region, and it requires transnational co-operation to curb the problem.

South Asian countries still do not have a systematic database of total wildlife resources in the countries of the region. The development of reliable statistics requires the organization of a baseline survey across the nations. This investigation should have the same questionnaire in the regions that have wildlife resources and another to the areas that have marine resources and both set of questionnaires to the countries that have both resources. This survey will be conducive to the quantification of endogenous species and the issues behind their protection. The periodical surveys after that will be instrumental in making impact assessments of several conservation endeavors.

In some countries of South Asia – example includes that of Nepal and Sri Lanka – the role of the settlement of dispute resolution in wildlife conservation has moved to the court from the conservation authority. The idea behind it is the separation of legal and executive powers of preservation. However, there is a problem in this approach as the court authority also does not have technical knowledge of wildlife protection; therefore, the disputes settled may go biased due to ignorance.

The mode of people-park relation also makes a background for the legal framework and enforcement of the conservation law. Community people's dependency on the park and the reciprocal relationship are built based on the need from both ends. Community people living in the vicinity of the park depend on the latter for fodder, firewood, fishes and other water resources. Licensing systems are in place for the same purpose.

Another aspect of people-park relation influences on the enforcement of existing laws against the illegal trade is the promotion of income-generating activities of the community people dependent on forest resources. The conservation policies in many countries accommodate this sort of activities. In the case of Nepal, almost one-fifth of the annual budget of the park goes for the promotion of income-generating activities of the community people on top of the 30 percent on community development. This livelihood promotion helps control illegal poaching and trade of wildlife from neighboring communities. Acknowledgement of the need of park support to the low-income people living in the vicinity of the park is the reflection of the efforts in strengthening enforcement law so that community people can be supportive to the endeavors.

Awareness raising through community development and implementation of income-generating activities deem necessary to sustainable poverty reduction of the community people who are likely to attack natural resources for their livelihood due to the lack of gainful employment. Conservation acts/laws/policies of several countries do have such provisions that require safeguarding in every single amendment. Maintaining this provision eventually contributes not only to the enforcement of protection law with community support but also to impart a message that the ultimate goal of protecting natural resources is for the welfare of the community people. Resource sharing by the state and the community is, therefore, a key in this regard.

Developing successful mode of conservation financing is the pressing need for sustainable protection of wildlife. The major problem in conservation financing is that the monetary investment in conservation and the benefit thereof are not well standardized. Another major difficulty in this regard is that the environmental benefits in the absence of a regulatory framework do have a series of externalities. Detection of these aspects also requires investigation. Although three different types of funding -- private, public, and philanthropic -- are available, an efficient mechanism in making the fund transparent, and channeling them in desired activities in conservation endeavors is important; and this should be through a public sector initiative.

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In the global context, Europe, USA, Middle East, Russia, and South-east Asia (mainly China) are the major markets for the end use of wild animal products. Poaching, and trafficking of wildlife is rampant in South Asia to meet the final demand of the wildlife products mainly from neighboring countries: China, Hong Kong, Vietnam, and other South-East Asian countries. The cultures of the countries in the region have deep-rooted affiliations with the use of wildlife products in their civilization. This culture has continued over centuries; therefore, antique shops are available with wildlife products in the region. However, research on the claims regarding the importance of such products concerning traditional medicines and other uses do not reveal any scientific validation. More specifically, no any proof of the medicinal benefits of the consumption of rhino-horn, beer-bile, tiger meat as well as the use of tiger/lion skins, elephant tusks, etc. is available so far.

Traditional Chinese medicines do use ingredients from wild animals in addition to that from a variety of plant leaves, roots, stems, flowers as well as various minerals. Similar traditions also exist in some other South-east Asian countries; for example, rhino horns are used in Vietnam to prepare traditional medicine to fight against cancer. Rhino-horn grinding bowls are produced and made available in Vietnam.

Regulation of the trade of endangered species in the global context is through the CITES provisions; however, differences in the list of endangered species differs between CITES and the member countries. This difference has created anomalies in the harmonization of endeavors among them. Traffickers use porous borders of South Asian countries and shelter in the region where legal provisions are relatively soft. CITES member countries require coherence in regulatory frameworks to make the efforts result-oriented.

Anti-poaching efforts should grow along with the growth of the wildlife stock. This correspondence necessitates consistent monitoring system developed across countries in the region. The supply of the significant share of wildlife and their products in South-east Asia from South Asia requires control with collaborative efforts among China, SAARC and ASEAN member countries for the sustainable solution of poaching and illegal trade. The wildlife trade is an organized crime, therefore, transnational co-operation, is vital for mutual benefits from all source, transit, and destination countries.

Long term solution of poaching and illegal trade of wildlife in SAWEN region requires addressing from both demand and supply side perspectives. The demand side management is more critical because the end market for wildlife products is from beyond South Asia. However, CITES should articulate these cross-border issues pertinent to demand side of wildlife products. Conservation education from school level of children deemed necessary for raising awareness in the society.

The supply side management requires articulating the problem of poverty and vulnerability of the community living in the neighborhood of the wildlife park and conservation areas. This supply side effort essentially filters to developing the park-people relation for the sustainable protection of forest resources. Furthermore, the public sector does not go for the trading of wild animals; therefore, for making the wildlife conservation efforts financially sustainable in the long run, conservation tax collection from park visitors, licensing/registration/renewal fees from the entrepreneurs deem essential in meeting the operational cost of the wildlife reserves.

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