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COMMUNICATION

SPECIES IN PERIL: ASSESSING THE STATUS OF THE TRADE IN PANGOLINS IN NEPAL

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Species in peril: assessing the status of the trade in pangolins in Nepal

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Abstract: Pangolins are among the most widely traded taxa in the southeastern Asian illegal wildlife trade because of which they are at great risk of extinction. Yet, little is known of their trade status in Nepal. This research was carried out to unfold the status of pangolin trade in Sankhuwasava District of Nepal. We used mixed methods such as semi-structured questionnaire (n=75) and, focus group discussion (n=4) and key Informant Interview, (n=30) to assess the trade status. Seizure data (2009–2017) were gathered from law enforcement agencies to predict major trade routes. The major threat perceived was hunting especially by unemployed local youth and children. The majority of hunters were opportunistic. Sankhuwasava District has become both source and transit for the illegal pangolin trade rather than for local use. The involvement of non-timber forest product traders was high in the illegal trade business, however, there seems a rapid decline in the seizure of pangolin in the last two years, mainly because of the deployment of the Nepal army in the Makalu Barun National Park, which had long served as a major route to China. Thus, we recommend continuation of strong border security. Our study calls for capacity building of enforcement agencies for detailed investigation of seizure data. For sustainable conservation of pangolin and its habitat we recommend sustained conservation awareness programs in addition to alternative livelihood opportunity. Furthermore, formation of community based anti-poaching units followed by motivation, anti-poaching trainings, security assurance, and incentives for worthy conservation outcomes in pangolin-rich communities might aid in conservation.

Keywords: Chinese Pangolin, illegal hunting, Indian Pangolin, *Manis crassicaudata*, *Manis pentadactyla*, opportunistic hunting, NTFP traders, Sankhuwasava District, transboundary.

सालक दक्षिणपूर्वी एसियामा सबैभन्दा बढी अवैध व्यापार हुने वन्यजन्तु हुन, जसको कारण यिनीहरू लोप हुने प्रबल खतरामा छन्। यद्यपि, यिनीहरूको व्यापार बारे नेपालमा निकै कम जानकारी छ। यो अनुसन्धान नेपालको संखुवासभा जिल्लामा सालक व्यापारको अवस्था उजागर गर्न गरिएको हो। हामीले अवैध व्यापार स्थिति आकलन गर्नका लागि मिश्रित विधिहरू प्रयोग गर्‍यो, जस्तै अर्ध संरचित प्रश्नावली (n = ७५) र समूहगत छलफल (n = ४)। व्यापार नाका अनुमान गर्न जफत गरिएका सालक का विवरण हरू कानुनी निकाय बाट प्राप्त गरियो। सालकको लागि प्रमुख खतरा बेरोजगार स्थानीय युवा र बालबालिकाको प्रयोगबाट गरिएको अवैध सिकार रहेको बुझियो। अधिकांश सिकार अवसरवादी रूपमा गरिएको पाइयो। स्थानिय खपत भन्दा पनि, संखुवासभा जिल्ला गैरकानुनी सालक व्यापारको स्रोत र ट्रान्जिट दुवै भएको छ। अवैध व्यापारको कारोबारमा गैरकाठ बने पैदावार व्यापारीहरूको संलग्नता बढी रहेको थियो। मुख्यतया लामो समय देखि चीन को प्रमुख नाकाको रूपमा रहेको राष्ट्रिय निकुञ्जमा नेपाली सेनाको परिचालनका कारण विगत दुई वर्षमा सालक जफतमा द्रुत गिरावट आएको देखिन्छ। तसर्थ हामी सीमा सुरक्षालाई अझ निरन्तरता दिन सिफारिस गर्दछौं। हाम्रो अध्ययनले जफत गरि दायर गरिएको मुद्दाको विस्तृत अनुसन्धानका लागि कानुनी निकायहरूको क्षमता विकासको लागि आह्वान गर्दछ। हामी सालक र यसको बासस्थानको दिगो संरक्षणको लागि, बैकल्पिक जीवनयापनका अवसरको साथसाथै दिगो संरक्षण जागरूकता कार्यक्रमहरूको पनि सिफारिस गर्दछौं। यसबाहेक, समुदायमा आधारित चोरी शिकारी नियन्त्रण तथा युवा परिचालन समूहको गठनका साथसाथै संरक्षण लगाव, सिकार रोक्न प्रशिक्षण, सुरक्षा आश्रवासन, र प्रोत्साहन जस्ता कार्यक्रमले संरक्षण गर्न सहयोग गर्न सक्छन्।

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INTRODUCTION

Illegal wildlife trade is one of the most crucial threats to biodiversity conservation (Nijman & Shepherd 2011; Esmail et al. 2019). Along with increased threats to biodiversity conservation, illegal wildlife trade also impacts the security of the community and their livelihood, living together with wildlife (Riskas et al. 2018). Moreover, it has extended impacts on the governance and economy of the nation (Felbab-Brown 2017).

With dramatic increase, illegal wildlife trade is ranked the fourth most lucrative global crime after drugs, humans, and arms with the transaction approximately between \$7 billion and \$23 billion each year (World Economic Forum 2016). Moreover, the illegal wildlife trade has risen to \$23 billion annually, resulting from increase in environmental crime (Nellemann et al. 2018). Illegal wildlife trade is a large business run by well-coordinated and financially organized groups with international linkages that include a network of traders, smugglers, and supporters (locals, middleman, office staff, politicians, and international contacts) forming an illicit network facilitating poaching (Katuwal et al. 2015; Upadhaya 2017).

Pangolin is an internationally heavily trafficked mammal, as a result both Asian and African pangolins are highly threatened with extinction (Challender et al. 2014; Waterman et al. 2014; Boakye et al. 2015; IUCN SSC Pangolin Specialist Group 2016). In the past few years pangolin trafficking and hunting for local use has peaked up dramatically (Actman 2016; Aisher 2016; Challender et al. 2019; Ullmann et al. 2019). The rate and trend of trafficking of African pangolins to Asia has increased in the last decade (IUCN SSC Pangolin Specialist Group 2016; Challender & Waterman 2017), so that the demand of Asia has been fulfilled by Africa (Challender & Waterman 2017). Pangolin is hunted, poached, and illegally traded mainly due to increase in the demand for meat as a delicacy and for its medicinal importance (Challender et al. 2015; Mohapatra et al. 2015; Sharma et al. 2020).

The demand for pangolin is increasing because of the belief and use of its scales in medicines (Challender et al. 2015; CITES 2016). In some parts of the world, like Pakistan, pangolins are killed due to wrongly-held beliefs, such as, pangolins eat human dead bodies by excavating the graves and harm the local people. These beliefs have encouraged selling of pangolin, resulting in the biggest threat to pangolin population (Akrim et al. 2017). People also consider pangolin as bush meat (Newton et al. 2008; Zhang et al. 2017). In addition to these reasons, poaching

and illegal trade have severely threatened the pangolin population all around the world (Newton et al. 2008; Katuwal et al. 2015; Mohapatra et al. 2015; Challender et al. 2019; Sharma et al. 2020). As trafficking is a major threat to pangolins in the international arena (Challender et al. 2015, 2019) in the national sphere, regions such as eastern Nepal (Thapa et al. 2014; Katuwal et al. 2015) are considered major hotspots in pangolin poaching and trafficking. People around the globe illegally trade to consume the fetuses and various body parts like scales, bones, meat, and claws to increase healing power in different traditional medicines (Katuwal et al. 2013; Thapa et al. 2014; Boakye et al. 2015; Mohapatra et al. 2015; Heinrich et al. 2016). China and Vietnam are the destination countries where most of the illegally traded pangolins from both Asia and Africa reach (Corlett 2007; Challender & Hywood 2012; Heinrich et al. 2016, 2017). Nepal has been a popular trade route for transferring illegally hunted pangolins to the popular and nearest destination, China (Acharya 2015) and traded through different eastern and central borders via the Araniko highway of Nepal (Katuwal et al. 2013).

Pangolins are nocturnal, covered with overlapping scales, and feed on specialized diet comprising of ants & termites. Among eight species of pangolins distributed globally, Nepal supports two, namely Chinese Pangolin *Manis pentadactyla* distributed up to altitude 2,000m and the Indian Pangolin *Manis crassicaudata* distributed below 500m (Baral & Shah 2008; Jnawali et al. 2011; Sharma et al. 2020). Based on the elevation, the landscape of Nepal is more favourable to Chinese Pangolin which is distributed more widely than the Indian Pangolin (Sharma et al. 2020). Besides Nepal, the Chinese Pangolin is also distributed in several Asian nations including Bangladesh, Bhutan, China, Hong Kong SAR, India, Myanmar, Lao PDR, Taiwan, Thailand, and Vietnam (Sharma et al. 2020). Besides poaching and illegal trade, various other anthropogenic activities like deforestation, extensive grazing, forest fire, agriculture accretion, human settlement, and infrastructure expansion, traditional beliefs and road construction are severely responsible for increasing threats to the pangolin population and its habitat (Challender et al. 2015; Katuwal et al. 2017).

The Chinese and Indian pangolins are categorized as Critically Endangered and Endangered, respectively, under the IUCN Red List of Threatened Species (IUCN SSC Pangolin Specialist Group 2016) and are protected under the National Parks and Wildlife Conservation (NPWC) Act 1973 (DNPWC & DoF 2018); however, very little documentation has been done about the illegal

poaching, trade route, hunting, and trading of pangolin in Nepal (Katuwal et al. 2015; Sharma et al. 2020). Though Nepal is a signatory and party to the Convention on International Trade in Endangered Species (CITES) and has provided all legal and institutional instruments to address wildlife trade issues, the illegal pangolin trade has not been investigated in a satisfying manner. Moreover, the traders have a more sophisticated and advanced system for transporting consignments from one place to another. This study aimed to identify the status of pangolin trade by taking account of trade conditions and highlighting the potential routes used for illegal trafficking within the Sankhuwasava District.

STUDY AREA

Forty-three districts, including Sankhuwasava are home to pangolins in Nepal (DNPWC & DoF 2018) which is located in Province-1 of Nepal (27.6142°N & 87.1423°E, 457–8,463 m), however, our study was confined to three major municipalities namely, Khandbari (457–1,500 m), Chainpur (1,200m), and Madi (500–2,900 m). Sankhuwasava District borders with Taplejung and Tehrathum districts in the east, Solukhumbu and Bhojpur districts in the west, Dhankuta district in the south, and Tibet, the autonomous region of China in the north.

Sankhuwasava is extended from sub-tropical to alpine with large wilderness forest and agricultural land that provides a suitable habitat for pangolins. Majority of the local communities are indigenous Limbu, Rai, Yakkha, and Gurung (CBS 2012) who are mainly subsistence farmers and belong to a lower socioeconomic status.

METHODS

The primary data comprised survey response from respondents, key informant’s survey, focus group discussions and seizure data. These were collected between February–April 2018 in Khandbari, Chainpur, and Madi municipalities of Sankhuwasava District (Figure 1). These municipalities were specifically selected for this study as these are the major markets and due to various anecdotal evidences such as seizure reporting on local and national media showing high illegal trade of pangolins in the area. Katuwal et al. (2015) had also used major markets as key indicators in selecting study area. Purposive sampling method suggested by Boakye et al. (2015) was used to identify the potential respondent within the district. These selected respondents were interviewed using a semi-structured questionnaire. As suggested by Newton et al. (2008), a two-person team conducted semi-structured interviews without precise,

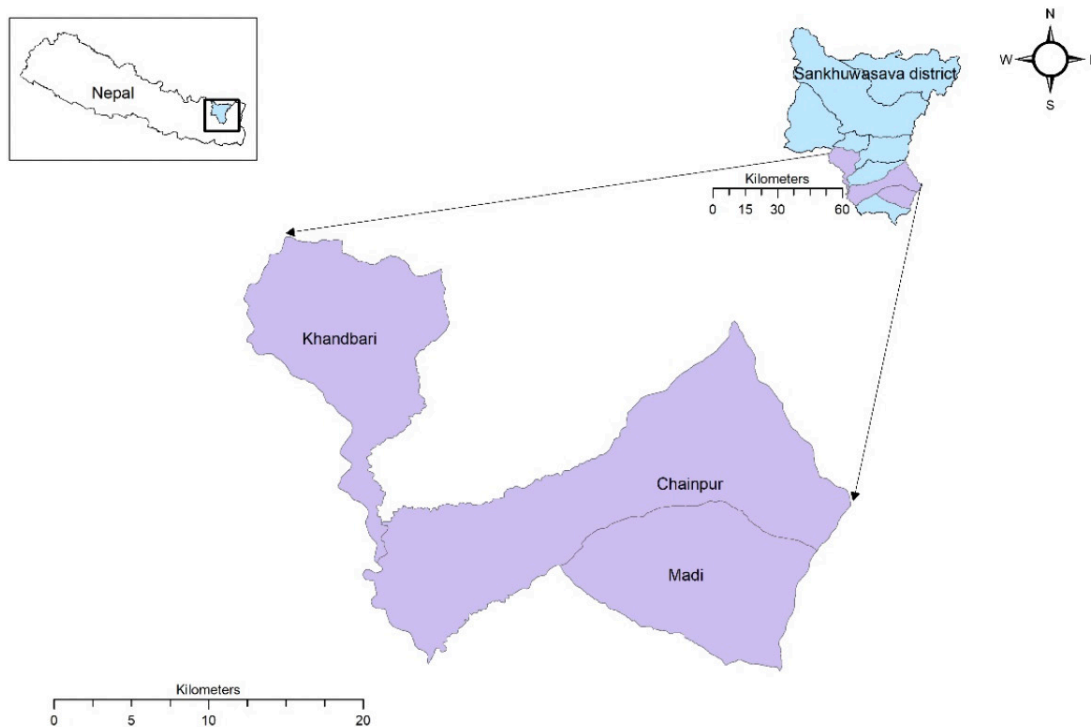


Figure 1. Study area, three different municipalities; Khandbari, Chainpur, and Madi at Sankhuwasava, Nepal.

Table 1. Socio-economic characteristics of respondents.

Respondent characteristics		Percentage
Gender	Male	72
	Female	28
Age	<16 yr. (Child).	9
	16–35 (Youth)	56
	>35	35
Education	Illiterate	11
	School level	66
	College level	23
Occupation	Agriculture	48
	Hotel	12
	Shopkeeper	13
	Forest guard	2
	Travel agent	5
	Driver	4
	Teacher	11
	Private service	5

pre-determined questions so that interesting lines of discussion could be pursued. The team tried to pose open questions wherever possible, to avoid leading the interviewee into a response (Newton et al. 2008). Semi-structured interview was directed toward information of trade and its triggering factors. A process of chain referral was followed where other potential respondents were referred to by the respondent (Newing et al. 2011). Seventy-five respondents, including seven children were interviewed. The surveyor checked the respondent for species identification by providing well illustrated pictures of both the Indian and Chinese pangolins as well as videos showing the behavior of both the species. Interviews were conducted in Nepali languages and were translated to English. Literature about pangolin distribution has only mentioned Chinese Pangolin distribution in Sankhuwasava District (Baral & Shah 2008; Jnawali et al. 2011). But we cannot omit the fact that some trade might be of Indian Pangolin from outside the study area with the district acting as a transit zone. So, both the Indian and Chinese pangolin trade were taken into account.

Trade information was obtained from the seizure report of the district forest office (DFO), district police office (DPO), and Makalu Barun National Park (MBNP) from 2009 to 2017 (Figure 5).

Information from 30 key informants (KI) including DFO staff (n=7), district court office (n=4), police personnel (n=9), the Federation of Community Forestry

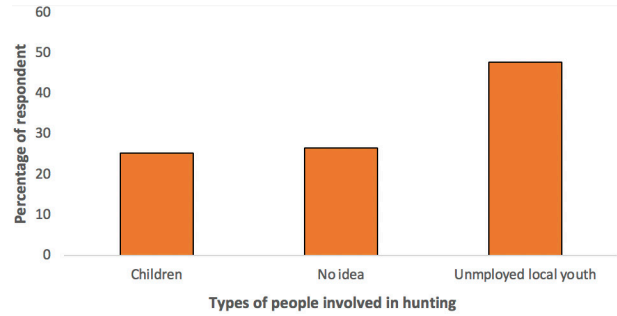


Figure 2. Respondents' (n = 75) response on types of people involved in hunting.

Users Nepal (FECOFUN) staff (n=3) & community forestry user committee members (n=7), and four focus group discussions (FGDs), one in each of the three municipalities and one with law enforcement agencies, were used to identify the major trade routes and market hub for pangolin trade. Various seizure hotspot were supporting evidence for predicting the trade route. FGD and KI were the main source of information in identifying the trade route map which was prepared with the help of GIS.

Purposive sampling was used to identify the respondents who were aware of the pangolin, which they had either seen live or heard about from someone else. Out of total respondents, some 36% (n=27) had seen the pangolin alive, and a few (10.67%; n=8) had seen dead pangolins; while most others (53.33%; n=40) were just familiar with the species through indirect means like photographs, newspaper, television, and radio programs. Solitary and nocturnal nature of the species might be the potential reason for lower number of respondents seeing the species live (Jnawali et al. 2011). Identifying pangolin to species level (whether *Manis pentadactyla* or *M. crassicaudata*) was difficult since most (69.33%; n=52) of the respondents had no idea about the species of pangolin, as in nature both the pangolins are solitary, nocturnal, and burrow-dwelling (Baillie et al. 2014; Challender et al. 2014); however, the remaining 30.67% respondents had claimed the presence of Chinese Pangolin which was validated by showing the photo of both the species of pangolin. A detailed discussion with respondents revealed hunting by humans (88%; n=66) as the major threat to pangolin, and thus, the types of people involved in hunting, their hunting manner, and purpose were explored.

Types of people involved in hunting

Forty-eight percent (n=36) of respondents stated that a majority of the unemployed youths (16–35 years old) are involved in illegal hunting; 25.33% (n=19) of

respondents stated that children (<16 years old) are also involved, while 26.67 % (n=20) were not sure about exact participation of the age group (Figure 2). Similar results were reported by Katuwal et al. (2015), where they claimed that youth, especially the unemployed, were encouraged in illegal hunting by traders. From group discussion, it was revealed that the children were mostly lured to hunting as there is less likelihood of security personnel to suspect children, and also the pay rate for them is low. This was verified by security officials during investigation of seizure data too.

Identifying the manner of hunting can help to predict the intensity at which pangolin is hunted. Out of the total respondents surveyed, the majority (44%; n=33) had no idea about how often and by what method pangolins are being hunted, while some (32%; n=24) of them reported opportunistic hunting of pangolins, some (17.33%; n=13) reported of rare hunting and the rest (6.67%; n=5) reported intentional hunting. We concluded that the existence of community forest, that are strongly guarded by local communities have hindered the hunting of pangolin in forest area. So, people are found to be more engaged in opportunistic hunting. Chin & Pantel (2009) also recorded the same in their study. Similarly, D’Cruze et al. (2018) reported opportunistic hunting in tribal communities in Assam. Harrison et al. (2016) explored impacts of hunting on tropical forests in southeastern Asia and highlighted the importance of opportunistic hunting as it does not require much skill.

When it comes to the purpose of hunting, monetary benefits was the most popular response with 66% (n=50) respondents. Following monetary benefits, uses such as traditional medicine, meat, and very few cultural values were some other reasons (Figure 3). In the local context, the use of pangolin and its parts (like its scales) are believed to have healing power to cure wounds. More importantly, the pangolin is believed to cure arthritis and also consumed to increase immunity. Pangolin scales are taken as anti-poisonous reagent, where the belief exists. Moreover, pangolins are perceived to bring extreme bad luck (commonly called ‘loddar’) and thus, are hunted more often. In addition to these, pangolin claws and scales are used to make rings, bracelets, and other ornaments. All these social and cultural values have collectively added to hunting of the pangolin. However, at present higher monetary values are suppressing these cultural values associated with the species. Similar results were found by Corlett (2007) where he stated that hunters catch pangolins to supply for trade rather than for personal consumption.

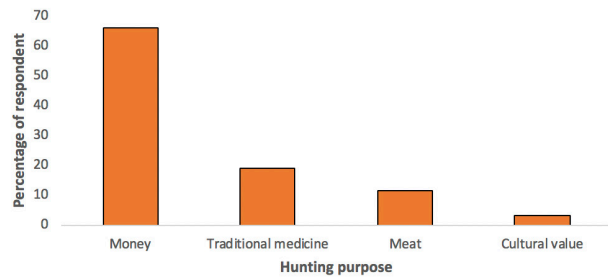


Figure 3. Respondents’ (n=75) response to the purpose of hunting pangolins.

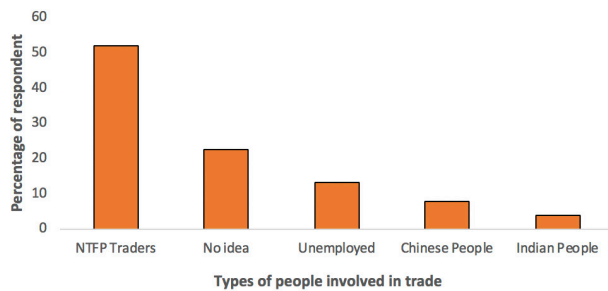


Figure 4. Respondents’ (n=75) response on types of people involved in the trade.

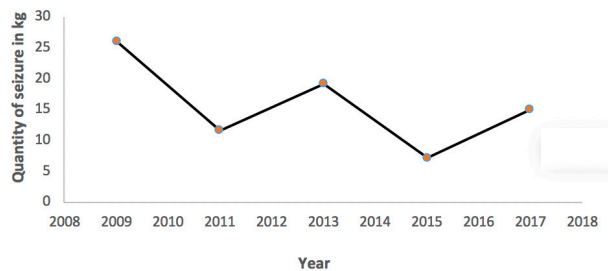


Figure 5. Seizure data showing an overall decreasing pattern of Pangolin trade between 2009 and 2017 (Source: DFO and MBNP seizure report).

Condition of pangolin trade

The status of the pangolin population was assessed where 60% of the respondents had noticed the decrease in pangolin population especially due to high hunting for illegal trade in the past and due to habitat fragmentation. Forty-two respondents (56% of total 75 respondents) identified high profit to be a major reason for trade, followed by low awareness (20%; n=15), poverty (20%; n=15), and poor law enforcement (4%; n=3). Unemployed local youth and children involved in the hunting of pangolins supply its parts to local traders for a small sum of money. It was found during the study, that the price of pangolin rises exponentially at every level of the value chain from local hunters to final traders. The

minimum price of pangolin at local hunter was about Nepali Rupees (NRS) 4,000–5,000 per kg, which increases to NRS 15,000–40,000 per kg in the illegal market. The average price at the Chinese border was higher, ranging from NRS 100,000–150,000 per kg where they were used, especially for preparing bulletproof jackets. Being illegal, prices fluctuate and the difference are site specific. Thus, the actual price may be clear that illegal hunting of pangolin is a serious crime in Nepal. However National Park and Wildlife Conservation Act in Nepal (NPWC Act 1973) has declared both the species of pangolins as protected and any offence regarding them costs a penalty of NRS 100,000–500,000, or imprisonment from 1 to 10 years, or both (1US\$= 118.90NRS as per Nepal Rastriya Bank exchange rate on 12 March 2020)

Types of people involved in trade

The majority of the respondents (52%; n=39) claimed that the trade was a side business for most non-timber forest product (NTFP) traders (Figure 4), especially involved in the trade of *Elaeocarpus ganitrus* (Rudrakshya) and *Elettaria cardamomum* (Elaichi), that are the major NTFPs of Sankhuwasava District. Katuwal et al. (2015), however, claimed the involvement of youth, cow herders, local businessmen, and unemployed locals in pangolin trade through coordinated arrangements. The result of this study also identified that the illegal trade of pangolin goes side by side with trade of these NTFPs and finally reach Indian and Chinese markets. Discussion with KI led us to the conclusion that poor people are often lured by NTFP traders for a small sum of money. So, in this process if any seizure occurs, only poor people working as middleman who do not know about the consequences of smuggling the species get arrested. On the other hand, the real traders are mostly free. Most cases registered in the DPO validate these statements.

Fluctuation in pangolin trade

The fluctuations in pangolin trade was assessed, taking into account both the respondents' opinion and the seizure data obtained from DPO, DFO, and MBNP. The seizure data were tallied with the respondents' opinion which also showed a decreasing trend (80%; n=60) in trade. It contradicts with the result obtained by Katuwal et al. (2015) who advocated towards increase in trade. So, further discussion with KI from DFO and MBNP led to the conclusion that the reason for decrease in seizure could be enforcement of more security forces in every transit point of the district. Deployment of Nepal Army forces at the national park area that serves as the main route of trade to China border for two years

could also have been the major reason for threatening the smugglers using the route. Various missions of the security forces to control the illegal trade and moreover some personal enmity between traders might be the reason for leaking the information and thus, increase the seizure in some years.

Identification of major trade route through Sankhuwasava District

Sankhuwasava has easy access to China through the Kimathanka border of the district. Majority of the pangolin parts are either directly hunted within the district, or the district serves as the trade route to China. Khandbari municipality appears to have been developed as the main hub for pangolin trade.

As informed by the sectoral police office, Chainpur, previously, the majority of delivery entered the district via Chainpur route from Tehrathum. But after strengthening and increasing of the number of police check posts in this route, the major road to enter the district has become off the road of Legwa, Dhankuta District which has lower number of security check posts due to poor condition of the road. Key informants also suggested that Khandbari and Num are major hotspots where the illegal trade is running and once the pangolin parts reach Khandbari they are transported to the China border (Figure 6).

The route shown in the map was predicted in accordance with the result of focal group discussion, KI interview, and local respondent knowledge. More than 80% of respondents agreed to the route demonstrated in the map. Various seizure hotspots were also used as supporting evidence for developing this map. This route showed some modification from the trade route already proposed by Katuwal et al. (2015) which showed Chainpur as the major entry point. This can be explained from Heinrich et al. (2017) who stated that wildlife trafficking occurs through a highly mobile trade network with constantly shifting trade routes as he also identified an average of 27 new unique routes emerging every year globally. It could also be presumed in our study area that though trade might seem to be declining, it might still be rising via shifted route especially through other routes rather than previous check posts.

CONCLUSION

The results suggest that majority of youths (especially unemployed) and children were involved in illegal hunting and trading of pangolin. Unemployed youth and children were lured to these activities by NTFP



Figure 6. Trade route from Bhojpur, Dhankuta, and Tehrathum districts leading to and within Sankhuwasava District.

traders from local areas for small sums of money. The results also suggest that hunting was done mainly for monetary benefits. We found that illegal hunting is the major reason for the decline of pangolin population in the area. Though the trend of seizure appears to be declining, we do not have any knowledge if it is due to decline in pangolin population. But, the result suggested that the poachers might have been discouraged to use specific routes after deployment of Nepal Army, as there are few seizures. Thus we recommend the continuation of strong border security mainly in the trade route (Khandbari to Kimathanka through Num, Hatiya, and Chepuwa) to China. Our findings suggest the significant involvement of youth and children in illegal hunting; to reduce this we recommend strong and sustained awareness programs in the area as most of arrestees do not know about the consequence of the illegal trade. Development of alternative livelihood opportunity may also be useful for poorer people to avoid taking the risk. Furthermore, formation of community-based anti-poaching units in the potential pangolin habitat could be a major intervention to halt the trade. For this, sustained motivation, anti-poaching trainings, security assurance, and mostly incentives for worthy conservation outcomes

are mandatory. Middlemen are being arrested rather than the actual traders. This calls for capacity building of enforcement agencies for detailed investigation of seizure data to reach to the bottom of this illegal trade. Finally, we suggest for a national-level study on looking into illegal hunting and trade of pangolin, as its conservation is in peril.

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