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Research paper

A review analysis of the poaching and illegal trade of tortoises and freshwater turtles (TFTs) in Pakistan

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Abstract

Despite legal protection, illegal trade in turtles and freshwater turtles continues in Pakistan, with many trade species destined for foreign markets. Pakistan's tortoises and hard-shelled turtles are mainly used in the pet trade, while its soft-shelled turtles are used in the meat trade. Given different economic conditions, the economic conditions of different groups of turtles and freshwater turtles will be different and therefore require different interventions. However, a systematic review of the illegal trade in turtles and freshwater turtles that considers the differences between these markets is not currently available. This study uses media seizure data to examine tortoises/hard-shell turtles (in demand in the pet trade) and softshell turtle (meat trade) supply chains. The tortoise/hard-shell turtle network has a larger geographic area and more global trade connections than the soft-shell turtle network. Our current clinical research provides insight into the similarities and differences in illegal activity for different groups of turtles and freshwater turtles, addressing the needs of different markets and demonstrating the need for effective strategies to tackle illegal trade in each group.

Keywords: *Poaching; Review Analysis; Tortoise; Freshwater Turtles; Pakistan.*

1. Introduction

Testudines are one of the most endangered species among all the major vertebrate groups. Illegal trade is a major threat to wildlife worldwide (Wyatt, 2013; Linh et al., 2016; Mendiratta et al., 2017; Stanford et al., 2020; Van et al., 2019; Segura et al., 2020; Fauzi) and others, 2020; Badola et al., 2019 and 2021). Illegal wildlife trade is a major threat to biodiversity, with significant impacts on people, security and public health (Greatorex et al., 2016; Smith et al., 2017). Thousands of animals, including many threatened species, are traded illegally to meet consumer demands for souvenirs, food, clothing, cosmetics, pets, and medicinal plants (Rosen and Smith, 2017). Reptiles, especially testudines' (turtles and tortoises), are the most common prey in the illegal wildlife trade (Bush et al. 2014; Auliya et al. 2016). Recent research shows that healthcare and business expenses are a threat to this group (Stanford et al., 2020; Badola, 2021; Sengottuvel et al., 2023). The increase in demand for TFTs worldwide has brought about the trade of turtles. Turtles and tortoises accounted for 47-4% of all reptiles worldwide between 2007-2017 (World Wildlife Crime Report: Trade in Protected Species, 2020; Segura et al., 2020). People have to keep them as pets for meat (Nijman et al., 2014; Stoner, 2020) (Chaves et al., 2020) (Fauzi et al., 2020) (Platt et al., 2017) (Manjoazy et al., 2017)) (Mendiratta et al., 2017), edible eggs (Charity and Ferreira, 2020), derivatives used in the production of traditional medicine (Khan et al., 2018).

Turtles and tortoises are of great concern because of their life histories (Late maturity, long lifespan, poor reproduction, and extreme longevity) that make them vulnerable to overexploitation and extinction (Congdon et al. 1994; Sung et al. 2013; Lovich et al., 2018). This problem is particularly acute in Asia, where large-scale exploitation of food, traditional medicine and the animal industry has led to wildlife declines, a phenomenon known as the Asian turtle crisis (Cheung & Dudgeon, 2006). There is evidence of illegal domestic and international trade in tortoises and freshwater turtles, and south Asia plays a significant role in this crisis (Cheung and Dudgeon, 2006; Mendiratta et al., 2017). The wetland ecosystem plays an important role in the balance of nature. Damage can be natural or man-made and affected by human activities (Khan et al., 2017; Safi et al., 2020; Safi and Hashmi, 2021).

The turtle illegal trading in Pakistan was first recorded in the 1996, a scientific study conducted by WWF Pakistan's Sindh Wildlife Department and TRAFFIC International reported on the turtle trade in Sindh. Indian softshell turtles are exported to China (Shah, 1996; Noureen et al., 2012: Safi and Khan, 2014: Khan et al., 2015, 2016; IUCN TFTSG), 2000).

Tortoises in Pakistan comprises of two species; Afghan tortoise (*Agrionemys horsfieldii*) and Sindh star tortoise (*Geochelone elegans*). The Russian tortoise (*Testudo horsfieldii / Agrionemys horsfieldii*), commonly known as the Afghan tortoise, Central Asian tortoise, Horsfield tortoise, four-clawed tortoise and Russian steppe tortoise, is a species of the genus *Agrionemys* mostly found in Central Asia (Karl et al. 2021). Terrapins comprising 02 families, 06 genera and 08 species in Pakistan; these include hard shell turtles, pond turtles (*Geoclemys hamiltonii*), crowned river turtle (*Hardella thurjii*), brown turtles (*Pangshura smithii*) and the Indian capped turtle (*Pangshura tectum*) and a second family of turtles consisting of soft shell turtles, viz. *Chitra indica*, *Nilssonia gangeticus*, *Nilssonia hurum* and *Lissemys punctate*

andersonii (Safi and Khan, 2014; Khan et al., 2015 and 2016). The most preferred species in the hard-shelled turtle category is *G. hamiltonii* (Black spotted turtle), its exports have increased in the last few years. While Pakistan is a major exporter of turtles along with Bangladesh and India, its main import markets are China, Thailand, Bangkok and Indonesia (Safi et al., 2021).

Soft shell turtles are collected from all over the Indus river system and exported to China, Hong Kong and some far east Asian countries for food purpose and some medicinal purposes (Khan et al., 2016). Softshell turtles are also hunted for their calipee (the oily, gelatinous substance in the lower shell) and fibrocartilage (the skin on the outside of the shell), although they have also been killed for their use. medicine and soup, the extent and frequency of such trade from Pakistan is still unknown.

Previous studies help understand the illegal trade of tortoises and freshwater turtles in Pakistan. These studies examine the illegal trade of TFTs as a whole or focus on specific species, such as the Indian star tortoises, *Geochelone elegans* and the pond turtle *Geoclemys hamiltonii*. However, there is no in-depth research yet on the illegal use of TFTs in terms of demand or trade. Given different trades, we expect illicit trade to operate differently for different groups of TFTs, and understanding these differences may help improve response.

Social analysis has become an important tool for understanding crime by examining the relationship between actors (defined as individuals, groups, organizations, or places; Clifton and Rastogi, 2016) or the course of events. In recent years, this approach has been applied to illegal wildlife trade to identify key areas for the international trade of rhinos, elephants, and tigers (Patel et al., 2015), the pangolin trade in China (Cheng et al., 2017), wild birds (Indraswari et al., 2020) and ivory (Huang et al., 2020) and identified key offenders in rhino trafficking networks in Indonesia (Haas and Ferreira, 2015).

Here we use this tool to examine and compare illegal imports of TFTs in demand for pets and for meat based products. In this study, an analysis-style analysis of the media marketing flow of TFTs. An overview of recent turtles is given in TTWG (2021).

Fig. 1: The WWF-P Saved 42 Black-Spotted Turtles from Traffickers, Who Abandoned Them. PHOTO: AFP.

2. Discussion

In this study, we conducted an online search using the Google search engine (Google, 2023) for reports of seizures of turtles and freshwater turtles in Pakistan. We used the most advanced research tools, using the following keywords: "Tortoises and freshwater turtles poaching" "Illegal trade of tortoises and freshwater turtles in Pakistan", "turtle poaching", "'seizure tortoise', "turtle poaching", " poach tortoise', and used the same keyword combinations in general Google search and Google News search, searched through all reports, bulletins and news articles and from each seizure report, extracted the following information: date of incident, species involved, product type (live, meat, shells, bones or calipee), product quantity (units/weight) and transportation involved. Document the location of capture, location (e.g., where TFTs), final shipping location prior to detection, and actual location or purpose of shipment (if specified). In cases where the seizure report did not specify the origin, final transit or destination, we searched for other news stories about the same case to gather different information. We only collect cases of capture or poaching in Pakistan or consignments of TFTs caught elsewhere in Pakistan. Finally, for further analysis, we divided each species into two groups: tortoises and hard-shelled turtles/soft-shelled turtles.

The Indian Star/radiating tortoise is in high demand in the international market among the both land tortoises. More than 17,000 Radiated Tortoises were seized in their native range of Madagascar in only two separate raids in 2018 (Stoner, 2018). TFTs are also among the most hunted taxa in the Amazon (Chaves et al., 2020). In 2018, approximately 1.7 million turtles and tortoises were consumed in urban areas of Amazon, South America (Chaves et al., 2020). Podocnemis spp., South American River Turtle *Podocnemis expansa*, Yellow-spotted River Turtle, Big-headed Amazon River Turtle *Peltocephalus dumerilianus*, Red-headed Amazon River Turtle *Podocnemis erythrocephala*, Six-tubercled Amazon River Turtle *Podocnemis sextuberculata* were recorded in illegal trade in Brazil (Charity & Ferreira, 2020). Comparison of legal and illegal wildlife markets is crucial to guide decision-making and strategies to reduce illegal trade (Fukushima et al. 2021).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was established in 1975 to prevent the exploitation of wild species that cannot be sustained through international trade. Species listed in the Convention must be allowed by permit. UNEP-WCMC manages the CITES international trade repository.

The trade of TFTs in Europe involved individuals of the Greek/Common Tortoise, Home's Hinge-back Tortoise, Hermann's Tortoise *Testudo hermanni* (Musing et al., 2018). Pig-nosed turtle has been reported in trade in Papua New Guinea in Oceania (Eisemberg et al., 2015). The TFTs traders use road, train, and air transportation routes for trafficking the specimens within the country or to destination outside. Both regional and international travel routes are exploited to supply the consignments to their targeted locations. The illegal trade in freshwater turtles and tortoises is a multi-million-dollar industry (Stoner, 2018) that thrives on exploiting threatened species. The trading of various TFTs is forbidden as they are protected under national and international laws of range countries and internationally through their enlisting in the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) appendices. CITES is an international agreement between governments that aims to ensure that international trade in specimens does no threaten their survival. More than 200 TFTs species are listed under Appendix I, II, and III of CITES.

In this study, we examined the illegal trade relations between different groups of TFTs with different trades. We found that the tortoise/hard-shell turtle trafficking network (pet trade) is larger, has more global connections, and is more geographical scale than the softshell turtle

network (meat trade). While two-way trade in tortoises/hard-shelled turtles exists between some regions, we see only one-way trade associated with soft-shelled turtles. Additionally, all centralization points differ between the two networks: the tortoise/hard-shell turtle network has more importance in connecting trade, while the soft-shell turtle network has more control over product access. These results suggest that tortoise and tortoise business networks may differ in structure depending on the type of need. Some similarities were also found in terms of concentration into specific geographical areas and relatively low pressure on the market.

This indicates dynamic use of exit points for exporting TFTs, a simpler supply chain from source to destination, potentially necessitating less organization. Currently, domestic and international TFTs trade has been a major concern for the conservation of turtles, which are considered one of the most endangered groups of vertebrates in the world (Turtle Conservation Coalition, 2018). This group includes sea turtles, freshwater turtles, and tortoises (Rhodin et al., 2021). Turtle meat and eggs are consumed for subsistence and as a delicacy in many parts of the world, especially in the Amazon and West African regions (Morcatty et al., 2015; van Vliet et al., 2014; Chaves et al., 2020; Luiselli et al., 2021).

Likewise, in other world markets, especially in western countries, TFTs are highly desired as pets. In the pet market, the particularities associated with body shape, color patterns, geographic origin and rarity influence the desire to purchase animals, driving demand for the species and consequently increasing the price of the specimens sold (Regueira and Bernard, 2012; Shepherd et al., 2010; Balcazar, 2022). Baig (2006) reported on the illegal trade of freshwater turtles, especially soft-shelled turtle, in his study "Environmental Baseline Survey and Monitoring of the Taunsa Dam Emergency Recovery Plan". Trade networks, the commercial value of turtle carcasses, and turtle diseases are described in detail. Bodies of *Chitra indica* and *Nilssonia gangetica* were found among nomads near Taunsa Dam. More than 200 turtles are caught a week in Karachi and Lahore and the dried ones are sold to middlemen (Baig, 2006). Baig (2006) also reported that a truckload of turtles was released near Sust, near China border in GB; At the time of the investigation, the customs inspection office of Pakistan and China was responsible for the trade of goods between the two countries. The reason for this is that these animals are transported incorrectly in containers, causing them to die before reaching their destination. This confirmed the illegal export of turtles from Pakistan to China (Naureen et al., 2012).

Wildlife conservation is neglected in Pakistan and the animals face many threats such as illegal wildlife trade, hunting and illegal fishing (Dawn, 2017, 2018; Express Tribune, 2022). Our content analysis identified illegal hunting as the major reason (considering both the number of posts and the number of individual animals depicted) for wildlife crimes in Pakistan. In Pakistan the number of wildlife crimes represented on Facebook has sharply increased. Similarly, wildlife crimes doubled during the Covid-19 lockdown in 2020 in Bangladesh, and 28 % more animals were killed in 2020 than in the same period previously (Rahman et al., 2021). Wildlife groups have expanded digitally and reached many consumers through social media (Xu et al., 2020). Nevertheless, the increased number of wildlife crime posts on Facebook could have also resulted from trade shifting from physical markets to online social media platforms (Morcatty et al., 2021). Facebook has been used to assess the magnitude of wildlife crime in Sweden to understand illegal hunting through informal Facebook conversations (Essen, 2016) and to study illegal hunting in Russia (Braden, 2014). While the scope of our study is limited, as we sampled a handful of Facebook posts in selected public groups and pages, we found that the general picture was similar to the findings of previous publications from neighboring countries India (Mendis et al., 2022) and Iran (Sardari et al., 2022). In fact, when it comes to wildlife crimes, social media can be a double-edged sword used to monitor both illegal wildlife trade and wildlife crimes (Shan et al., 2022). Wildlife dealers of large cities approach local poachers for illicit harvest of freshwater turtles. Processed body parts of wild caught river turtles are transported from local markets in small towns to national markets in large cities. Illegal trade in freshwater turtles in Khyber Pakhtunkhwa has been initiated by the wildlife traders from Lahore. The consignments collected locally are transported to provincial capital Peshawar and finally to Lahore for export. In Punjab, turtle parts gathered from potential sites are sent to Lahore whereas in Sindh, Karachi is the main hub for export of freshwater turtles and their body parts. China, Hong Kong, Korea and Vietnam are found to be the illicit importers of turtles and their parts from Pakistan. Turtle parts from Pakistan are also exported to Iran due to a long and porous border between the two countries. China being prime consumer; majority of turtle consignments are exported to the country (Nureen et al., 2012).

The local markets of freshwater turtle trade indicate high monetary values with well-established networks. The newly established local markets, however, show comparatively lower prices. The principal consumer of turtles and their body parts is China where turtle meat is preferred for its delicacy and turtle parts are used in Traditional Chinese Medicines (TCM).

Social media is used in business, intelligence, business analysis and forecasting (Fraccastoro et al., 2021). As the digital world of social media expands, it is used to solve protection problems (Van et al., 2019). Participation in many-to-many networks expands wildlife knowledge, as wildlife trade information can easily spread through peer-to-peer networks (Sullivan et al., 2019; Haq et al., 2023).

3. Conclusion

Commercial trade of turtles and freshwater turtles (TFTs) has increased significantly in Pakistan recently. This is particularly concerning for TFTs with limited distribution, delayed sexual maturity, and low reproductive rate. Quite alarmingly, 7 of Pakistan's 10 TFTs species, including ten threatened species, are repeatedly surfacing in such domestic and cross border wildlife trade seizures. The species currently heavily sought after to meet the illegal demand of turtles are Indian Softshell Turtle *Nilssonia gangetica*, Indian Peacock Softshell Turtle *Nilssonia hurum*, Indian Narrow-headed Softshell Turtle *Chitra indica*, Indian Flapshell Turtle *Lissemys punctuata*, Indian Star Tortoise *Geochelone elegans*, Indian Roofed Turtle *Pangshura tecta* and Spotted Pond Turtle *Geoclemys hamiltonii*. Species such as the mud turtle, *L. punctata* found in the natural wetlands and moist agricultural fields are more exposed to exploitation and human interference. Major drivers of illegal trade in TFTs are demand for meat consumption, illegal pet trade, and to be used as an ingredient in traditional medicines within and outside Pakistan. Certain species are butchered at the collection points and packed in iceboxes for sale as processed fish to avoid detection. Calipee from species such as *Nilssonia* is extracted at these centres for transportation, often disguised as fish scales or buffalo horns. Calipee are often extracted from live turtles/freshly butchered animals. Large soft-shell turtles such as *Nilssonia* and *Chitra*, can produce such products.

TFT's illegal business is dynamic. Each year is different in terms of species, sex ratio, product, work and transportation. Turtle poachers and fishermen often receive a nominal price when selling the turtles to local collection points. This also suggests that the population of these species will decline throughout their range, especially outside protected areas.

Examination of the size and sex of some wild species (such as G. hamiltoni) suggests that illegal traders may have created their own live breeding domestically and abroad. Species such as *G hamiltonii, N. gangetica* and *N. hurum* are also listed as endangered species by the IUCN because their numbers are declining due to illegal wildlife trade. It is recommended to improve the overall capacity of law enforce-

ment to stop the trade in sea turtles and their bodies. This should include developing and implementing mechanisms that support institutional cooperation and collaboration to share information, capture wildlife, raise awareness of the situation, rehabilitate communities identified as being involved in the sea turtle trade, and raise awareness of the various TFTs involved in illegal activities. wildlife trade. work and understanding.

Significant differences in the rescue and recovery of various sea turtle species involved in the illegal wildlife trade also exist and need to be addressed. Storing large shipments (containing only "violent" turtle species) while awaiting court hearing, especially during the cold winter months, can result in death. Most turtles die from injuries, infections and internal bleeding. Therefore, relevant departments must plan or carry out the replacement (treatment), isolation and rehabilitation of living turtles. They also need to develop improved procedures for the management and care of animals kept in captivity.

Deaths and serious injuries should be evaluated for specific stressors to establish the basis for future health care; It is important to establish more temporary sea turtle shelters for emergencies, insurance and isolation. We should keep exotic species in captivity or return them to their countries of origin. Similarly, countries should cooperate on the return of sea turtles captured domestically or abroad as provided for by the Wildlife (Protection) Act 1972 and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. We must act quickly to protect the future of the world's turtles and freshwater turtles. Recognizing and documenting threats to these species is critical to promoting conservation and ensuring populations can thrive in the wild.

To help prevent trade in turtles and freshwater turtles, the following is recommended:

- Improve conservation: Identify turtles and freshwater turtles affected by crime and trade and advocate for reforms to protect them through national and international analysis.
- Monitor and analyze business dynamics: Understanding business dynamics, including poaching methods, patterns and processes, through appropriate information, collection and exchange of information on seizures and crimes between organizations and investigators, this includes seizure and It is important for creating strategies to prevent crimes. TFT's job. Databases such as World WISE (UNODC World Wildlife Capture Database) and C4ADS Wildlife Capture Database will help control and identify illegal wildlife and trade.
- Ensure international cooperation and collaboration: Since much of TFT's business is international, organizations and national organizations must cooperate to combat illegal trade and ensure the protection of animals. Actions of the International Alliance Against Wildlife Violence, ROUTES Partnership, Multilateral Environmental Agreements (MEAs) with international trade regulations, IUCN Turtle and Freshwater Turtle Specialist Group (TFTSG), Wildlife Alliance, INTERPOL Wildlife Law Enforcement Group policy. Cooperation across organizations, institutions and borders will help protect international trade.
- Building the capacity of law enforcement: This will help identify animals and ensure the enforcement of fines and penalties specified in national regulations and international animal protection laws. Organizations such as the International Air Transport Association (IATA) provide training to airport officials on combating illegal wildlife trade. The Green Customs Initiative (GCI) organizes training and development tools and educational materials, as well as capacity building programs for Customs and other regulatory bodies. Other similar customs projects include the WCO INAMA project (countries in Asia, South America and Sub-Saharan Africa). CITES provides guidance on the identification of tortoises and tortoises for customs authorities and other law enforcement agencies responsible for enforcing these regulations.
- Use of new tools and technologies: Promote the use of technology and modern technologies (DNA-based identification, tracking and tracing technologies, machine learning, search tools, SMART and other cloud technologies) to identify and monitor TFT brands. Sunday. New methods such as the use of search dogs to combat theft and illegal trade have yielded positive results around the world.
- Monitoring and preventing online wildlife trafficking: Partnerships with the private sector, such as the Alliance to End Online Wildlife Trafficking, are also important in addressing concerns about online wildlife trafficking.

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