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Laundered alive? The transnational trade in wild felids through Bangladesh

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ABSTRACT

Wildlife trade represents a major threat to global biodiversity. Yet preventing species losses from unsustainable trade requires detailed knowledge of patterns and processes of trade to enable targeted interventions. Bangladesh represents a possible lynchpin in global trade for certain groups, yet its role has largely been overlooked until present. We document the trade of twelve live felid species in trade based on interviews with actors involved in this trade, published newspaper reports of seizure incidents, and CITES export and import records for specific shipments of live felids from 2016 to 2021. Of the 12 identified wild felid species in trade, one was classed as Endangered by the IUCN, four were Vulnerable, and three were Near Threatened. South Africa and India, were the main source countries for live felids at 51% and 27% of items respectively, whilst India and Myanmar dominated exports at 20% and 15% respectively. International trade of live felids involved nine land ports, one airport, and one seaport. Our study also suggests that increased live felid import to Bangladesh may be partially for exotic pets. However, it should be noted that major discrepancies in the CITES data preclude the straightforward interpretation of trade patterns, and more work is needed to ensure CITES can effectively monitor and regulate wildlife trade in Bangladesh. We recommend further research to verify the scale and severity of trade, and identify opportunity structures that allow actors to use Bangladesh to launder felids and facilitate global trade, and enable targeted interventions to prevent further illegal trade.

1. Introduction

Wildlife trade includes live animals, plants, processed products from plants and animals, and parts of animals like skins, teeth, body parts, and medicinal ingredients (Nijman, 2010; Traffic, 2008). Along with other forms, the trade of live wildlife may be increasing to fuel a growing demand for pets such as birds and reptiles (Leberatto, 2016; Harrington et al., 2021; Marshall et al., 2020) and supply captive breeding stock (Uddin et al., in review). Globally wildlife trade is valued at between USD 91–258 billion, wildlife trade is a major threat to global biodiversity (Hughes, 2021) and gradual increase of the trade of wildlife makes it more complex to manage.

Groups such as wild felids are threatened by trade (which is largely illegal, but often overlooked) due to domestic and international

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demand for their body parts (Nijman et al., 2019; Davis et al., 2020; Coals et al., 2020), adding to the pressures of habitat loss, human-wildlife conflict, and prey depletion (Murphy and Macdonald, 2010). Since 2008, there has been an increase in legal exports of lion (*Panthera leo*) bones from captive-breeding facilities in South Africa to Asia for medicinal purposes (Williams et al., 2017). Likewise, leopards (*Panthera pardus*), clouded leopards (*Neofelis sp*.), and snow leopards (*Panthera uncia*) are hunted from the wild (despite this largely being illegal), as well as being bred in captivity to fulfill demands locally and internationally (D'Cruze and Macdonald, 2015; Coghlan et al., 2012; Stein et al., 2017). In Southeast Asia, parts and derivatives of big cats, as well as live animals, are sourced in Myanmar, Thailand, Lao PDR, Malaysia, and India and trafficked across national borders into non-government-controlled areas of Myanmar for wholesale and retail to local and international buyers (Oswell, 2010). Historically, Bangladesh has acted as a source country of tiger parts (Saif et al., 2016). Additionally, the demand for other felids, such as fishing cats (*Prionailurus viverrinus*), leopards (*Panthera pardus*), and clouded leopards (*Neofelis nebulosa*) from Bangladesh, is recorded domestically and internationally. Tiger products are also transported from Bangladesh to 13 countries in Asia, Europe, and Australia (Uddin et al. in review). Furthermore, the trade in tiger parts has repercussions for other felids that can act as tiger substitutes; for example, lion bone is frequently used to replace tiger bone (Sills et al., 2019), and despite the promise to ban lion bone trade from South Africa in May 2021 no progress has yet been made (Farmers Weekly 2022). Other than lions, Jaguar paste (*Panthera onca*) often used as a substitute for tiger paste used by Chinese communities in Suriname and mainland China (Lemieux and Bruschi, 2019). Furthermore, infrastructure development in South America is a major driver of felid trade (Morcatty et al., 2020). The impacts of this trade should not be underestimated and CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) trade data from between 2006, and 2012 shows that at least 64.6% of individual carnivores and primates in trade are traded live for commercial and personal purposes and most of them were sourced from wild populations (Harrington, 2015). Without data on wild populations, or accurate data on species in trade, understanding the impacts of this trade is impossible, precluding the development of targeted interventions.

Bangladesh is known to have a role in the illegal transport of tigers and their parts (Uddin et al., 2022), filling the knowledge gap on the role they play in the transport of live felids is needed to enable targeted interventions. To bridge these gaps, we analyzed interviews of actors (individuals involved in tiger poaching, trading and consumption), seizure records and CITES export import records from 2016 to 2021–1). Understand trade patterns of live felid species in Bangladesh, 2). Understand the routes of trade of wild live felids in Bangladesh and 3). Understand the factors underlying, driving or supporting live felids trade to facilitate interventions.

2. Material and methods

2.1. Sampling

To ensure representative sampling across the country, and genuinely understand patterns and drivers Nationwide, interviewees with knowledge of felid trade were selected from towns close to Bangladesh's land, sea and air-ports and communities adjacent to the Bangladesh Sundarbans, hilly areas of Chattogram, Rangamati, Khagrachari, Bandaraban, Cox's Bazar, Habiganj, Moulvi Bazar, Jessore, Dinajpur, Panchogoarch and Cumilla, and Sylhet (Fig. S1). A mixed approach was applied for data collection, including (1) preliminary engagement with subject matter experts to identify potential areas and actors to interview (2) Based on the suggestions from subject matter experts key areas for wildlife trade were selected. Initial respondents were selected from seizure records of Bangladesh Forest Department (BFD), then snowball sampling was used to identify further respondents for interview. (3) records were compiled based on felids seizures and associated arrest records from BFD records and published print and electronic media to establish law enforcement records related to felids in Bangladesh and identified felids species and their trade routes from the records (4) We then collected CITES trade records (legal trade and enforcement records (CITES Trade Database 2022)) noting felid trade to and from Bangladesh (5) Collected "No objection certificates" issued by Department of Livestock Services (DLS) for legally imported/exported felids including a certificate to demonstrate specimens are disease free. This certificate was used to verify which shipments of the CITES database (2022) mentioned came through DLS certification as this is a required part of legal shipments of live animals within Bangladesh.

2.2. Ethical consideration

Permission for the research and ethical permission was granted by BFD and Xishuangbanna Tropical Botanical Garden, University of Chinese Academy of Sciences respectively. The study used questionnaire surveys, interviews followed to ethical guidelines set by the ethics committee of Xishuangbanna Tropical Botanical Garden, Chinese Academy of Science. The first author conducted interviews in Bengali as it is the local language, and interviews followed strict safety protocols based on ethical standards of Xishuangbanna Tropical Botanical Garden, University of Chinese Academy of Sciences to protect both interviewees and field staff. Before starting any interviews, the aim and objectives as well as data protection process and human subject matter protection were briefed to the interviewee and once, they agreed we conducted the interviews. Interviews were conducted following semi-structured questionnaire to provide comparable and standardized data based on a core set of questions, whilst also ensuring that all relevant information was extracted and maintaining a normal information flow (Appendix-I). These questions included determining species, trade routes, and methods and also to add anything they want to add as a part of the responses to explore any outstanding nature of this trafficking process.

2.3. Data collection

We conducted a study across Bangladesh to identify trade routes and destinations for tiger trafficking in which we interviewed 163 interviewees where we found 70 actors found directly involved with felid trafficking (Uddin et al., 2022). Key areas to conduct research were also based on suggestions of the 50 subject matter experts. Once areas had been identified we then collected seizure records of BFD and newspaper and identified potential initial respondents from seizure records. We selected only respondents who were directly involved with trading felids. We used snowball sampling to identify further interviewees who were directly involved with felid trade. If any recommended respondents were found not to be involved with felid trade their interviews were not included in the analysis. Thus, we ensured all the respondents were traders of felids. From these interviews, 12 respondents were directly involved in the illegal trade in live specimens of wild felids and the trafficking of tiger parts.

Before a participant was interviewed, the study aims were explained to the respondents. Permission for interview was then requested from respondents prior to participation in the interview, and personal details of respondents or contacts were not recorded. Respondents were asked about their wildlife trade activities over the past six years using a semi-structured questionnaire (Appendix-I). Participants were asked informally about routes, methods used, and the nature of felids and felids products traded, the dialogue was allowed to flow naturally to ensure the interviewee felt at ease whilst providing the maximum possible relevant information on the various dimensions of trade. Interviews were concluded when all topics had been discussed, and the interviewee's responses were

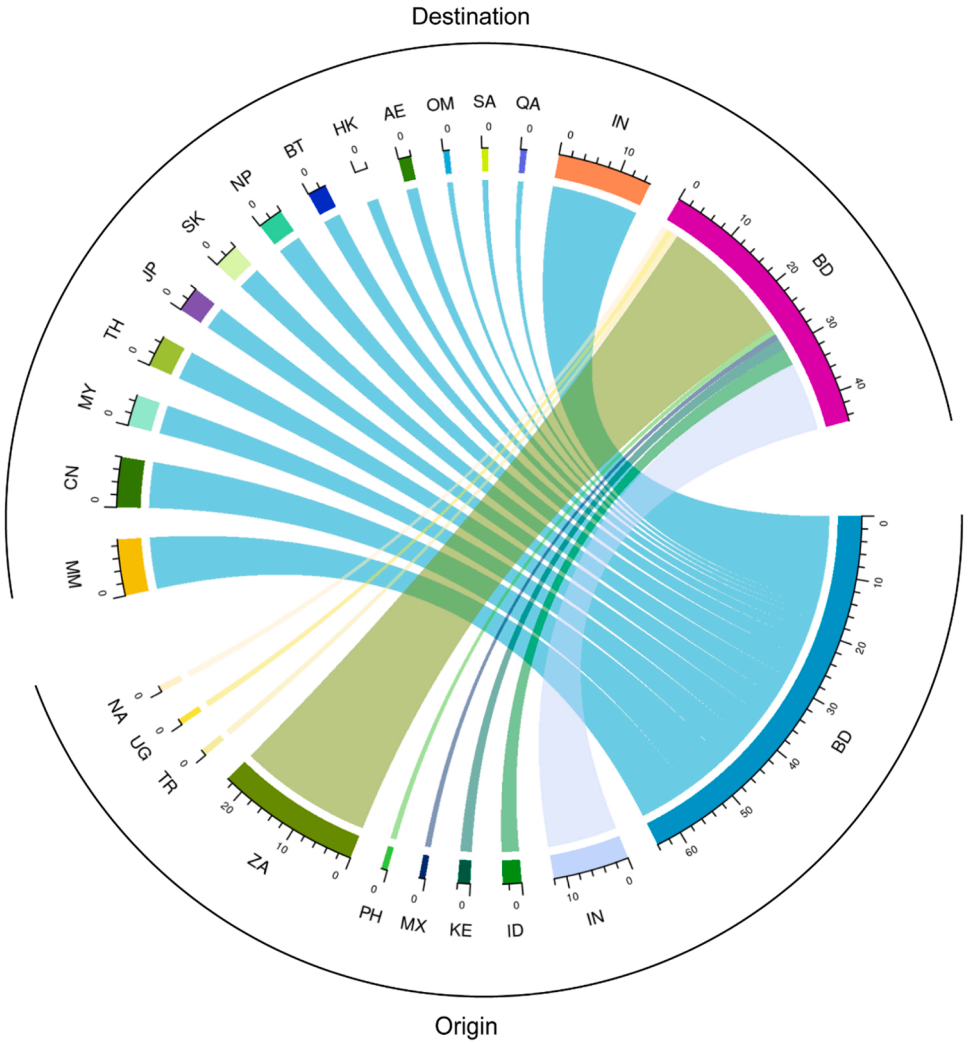

Fig. 1. The directionality of live felid trade based on BFD seizure data, CITES trade data and interviewees responses. A total of 21 countries were in this network, with medium-high confidence for the information provided for South Africa (ZA), Kenya (KE), India (IN), Indonesia (ID), Bangladesh (BD), Myanmar (MM), China (CN), Malaysia (MY), Thailand (TH), Japan (JP), South Korea (SK), Nepal (NP), Bhutan (BT), Hong Kong (HK), UAE (AE) and low confidence for the information provided for Oman (OM), Saudi Arabia (SA) and Qatar (QA), Uganda (UG), Turkey (TR), Mexico (MX) and the Philippines (PH). The network weight show that South Africa and India are the topmost suppliers of live felid in Bangladesh, and India and Myanmar are two topmost importers of live felids from Bangladesh.

transcribed.

We also collected wildlife seizure records from 22 divisions of the Bangladesh Forest Department (BFD) and published print and electronic medias for 2016–2021, which included all official seizure records from each division. We identified 29 seizure records mentioning live felid trade, including lions, cheetahs, fishing cats, golden cats, and leopard cats in BFD official seizure records and print and electronic media.

We then identified 32 export and import records of live felids from CITES trade database (https://trade.cites.org/) mentioning Bangladesh either as importer or exporter. Among those 32 records at least six incidents were verified through No Objection Certificate (NOC) of Department of Livestock Services (DLS) and rest were only found in CITES database. To ensure our analysis described current patterns rather than reflecting historical trends (and thus enable interventions to be developed which are consistent with current challenges), we restricted our analysis from 1st January 2016–31 st December 2021.

Collected seizure records, were analyzed, and destinations and origins for each seizure were identified and mapped.

2.4. Identification of felid species

Most interviewees used species local names, which may, in some cases, made species identification challenging. For example, interviewees sometimes mentioned a small tiger (*Choto Bagh*) for a fishing cat and a big tiger (*Boro Bagh*) for a tiger, and a stripe tiger (*Chokro Bagh*) for a leopard. We showed photographs of each species to interviewees on a mobile phone to verify species identification and asked them to select the species from the images. We also checked the accuracy of the locality data provided, so if interviewees mentioned they saw a tiger trapped by hunters in a place where historically tigers are not present, we asked further questions about the species they mentioned, we asked further supportive questions to determine certainty, for example "are you sure it was jaguar that was seized from Chattogram? or a clouded leopard?" to assess the cause of the mismatch and ensure all collated information was accurate.

Table 1
Live felids trade in Bangladesh information sourced from BFD law enforcement seizure records, Seizure records of print and electronic media, CITES trade database, and interviewee responses.

	Species	Red listing & CITES appendix		Information sources			Items seized
		IUCN status	CITES appendix	Number of seizures - Enforcement records BFD	Number of seizures News reports & social media	Number of Interviewees describing the activity	
1	*Panthera tigris* (Tiger)	EN	I			1	
2	*Acinonyx jubatus* (African cheetah)	VU	I		-	4	
3	*Neofelis nebulosa* (Clouded leopard)	VU	I		-	8	
4	*Panthera leo* (African lion)	VU	I	1	-	4	2 cubs
5	*Panthera pardus* (Leopard)	VU	I	2	1	4	4 cubs 2 adults
6	*Prionailurus viverrinus* (Fishing	VU	II	24	-	9	27 individual
7	*Catopuma temminckii* (Asian	NT	I	-	-	4	
8	*Panthera onca* (Jaguar)	NT	I	1	-	1	2 cubs
9	*Pardofelis marmorata* (Marbled	NT	I	-	-	2	
10	*Felis chaus* (Jungle cat)	LC	II	1	-	0	1 adult
11	*Lynx rufus* (Bobcat)	LC	II	-	-	1	
12	*Prionailurus bengalensis*	LC	II	-	1	8	2 individual

2.5. Data management

We collated 32 CITES records, 29 seizure records and 70 interviewees responses mentioning live felids trade. Interview records were anonymized and managed in Spatial Monitoring And Reporting Tool - Profiles (SMART-Profiles 7.01) and Microsoft Excel. Information reliability of interviewees might vary from respondent to respondent, thus mechanisms were used to verify reliability. To avoid misleading, exaggerated and unreliable information, we restricted further analysis to information that the interviewee was aware of first-hand (not rumor), corroborated by at least one other independent interviewee or enforcement record. Although most of the interviewees were interviewed for the first time for this study and graded 'untested', a subset was graded as 'reliable' based on previous engagements (from former regional projects), cross check of the information at least with one more other sources or interviewees. Interviewees who were found to have provided misleading, irrelevant or false information were considered 'unreliable', and their interview transcript was removed before analysis.

Trade routes were assigned two levels of confidence; medium and high, based on the reliability of the source and corroboration of the information provided by multiple sources. A route was classed as 'Medium' confidence if only described by untested interviewees, but 'High' confidence if independently corroborated by a reliable interviewee (Uddin et al. 2022). Any route description resulting from BFD seizure records and, CITES database was classed as high confidence as they are corroborated by other forms of data. Any routes that were described by more than one interviewee has been classed as medium confidence. In our analysis we only used High Confidence and Medium Confidence routes in the trade route map. The evidence base for each route is provided in the Supplementary material S3**.**

The direction of live felid flows was analysed using circos plots (http://circos.ca/software/download/circos/) using one to many directions. In the circos plot, the weight of connections was counted as the sum of shipments listed in CITES records (export-import for a specific country), seizure records and interviewees (Fig. 1). It provides a clear approach to understand trade routes, volumes and directions. Obviously data is imperfect, as trade is illegal, accessing data is challenging, and even finding interviewees is challenging, and primarily starts with individuals already associated with seizures; thus whilst our data provides an overview, it is not complete. Comparisons between answers to assess consistency between interviewees (especially interviewees identified from former surveys as involved in trade) was used to assess reliability of reviewers (Uddin et al., 2022).

3. Results

3.1. Species in trade

At least 12 wild felid species are in active trade; six were sourced internationally and five from ten forested districts within Bangladesh. Interviewees described exotic felids being imported into Bangladesh through professional import/export businesses and domestically traded felids being sourced through professional poaching gangs operating in the local forested tracts of Bangladesh. Species in trade included one endangered species, four vulnerable species, and three near threatened species (according to the IUCN) (Table 1). Interviewees (n = 12) described live felids being smuggled along with other high-value illegal wildlife trade products, such as tiger skins and parts (n = 8), live birds (n = 9), and pangolins (n = 8).

Fig. 2. Automatic trap set inside the forest, commonly used in Bangladesh Sundarbans to catch live felids (Fishing cat, golden cat, and jungle cat) (Photo from authors own observations).

3.2. Sources of wild felids

Interviewees mentioned the import of Bengal tigers, African lions, and African cheetahs from South Africa (n = 4), Kenya (n = 2), and Uganda (n = 1). Interviewees also mentioned Turkey (n = 1), and Mexico (n = 1) for importing Bobcats and Jaguars into Bangladesh. We were able to corroborate both legal and illegal trade of South African wildlife through eight news reports covering three seizure incidents, six documents from the Department of Livestock Services' website, and CITES export-import data of Bangladesh (CITES trade database 2022). In addition, two interviewees described live Clouded leopards and Leopard cats are imported from India. Three interviews mentioned Indonesia, and one interviewee mentioned the Philippines as sources of live birds and other wildlife linked to felid trade. At least two interviewees described Clouded leopards, Fishing cats, Leopard cats, Marbled cats, and Asian golden cats as being sourced domestically from the ten districts of Bangladesh, including Chattogram, Rangamati, Khagrachari, Bandarban, Sylhet, Moulvibazar, Habiganj, Mymensingh, Tangail and Sherpur (Fig. 4). According to the number of interviews fishing cat (n = 9) is the most highly traded felid species, followed by Clouded leopards (n = 8) and Leopard cats (n = 8).

For domestic collection, at least eight interviewees mentioned using specialized traps to collect live felids from the forests of Bangladesh (especially small felids) (Fig. 2). Small felids and cubs of large felid species (e.g. Bengal tigers) are targeted by domestic trappers because they are valuable and can be transported alive without major efforts to conceal them.

3.3. 5.3 Trade destinations of wild felids

The study identified Bangladesh' role as a source country, consumer country and a transit country for live felids. Interviewees identified South Africa, India, Indonesia and Kenya are the four main countries who export live felids to Bangladesh. The results shows that at least 51% live felids were imported from South Africa followed by 27% from India to Bangladesh. Supply to private animal enclosures of wealthy people in Bangladesh as pets and as a status symbol, in addition to supply to zoos in Bangladesh and re-export to third countries were identified as three main causes of harvest and import of live wild felids in Bangladesh. Interviewees (n = 7) also identified possession of domestic and exotic wild felids as source of pride and attributed increasing demands as a consequence of the social status connotations. Many interviewees (n = 9) mentioned that forgery of CITES permits as one of the main ways used by legal importers to import live felids to Bangladesh. Interviewees identified 15 countries that receive live felids from Bangladesh. This includes four countries in the Middle East, four from South Asia, four from Southeast Asia, and three from East Asia (Fig. 3). At least

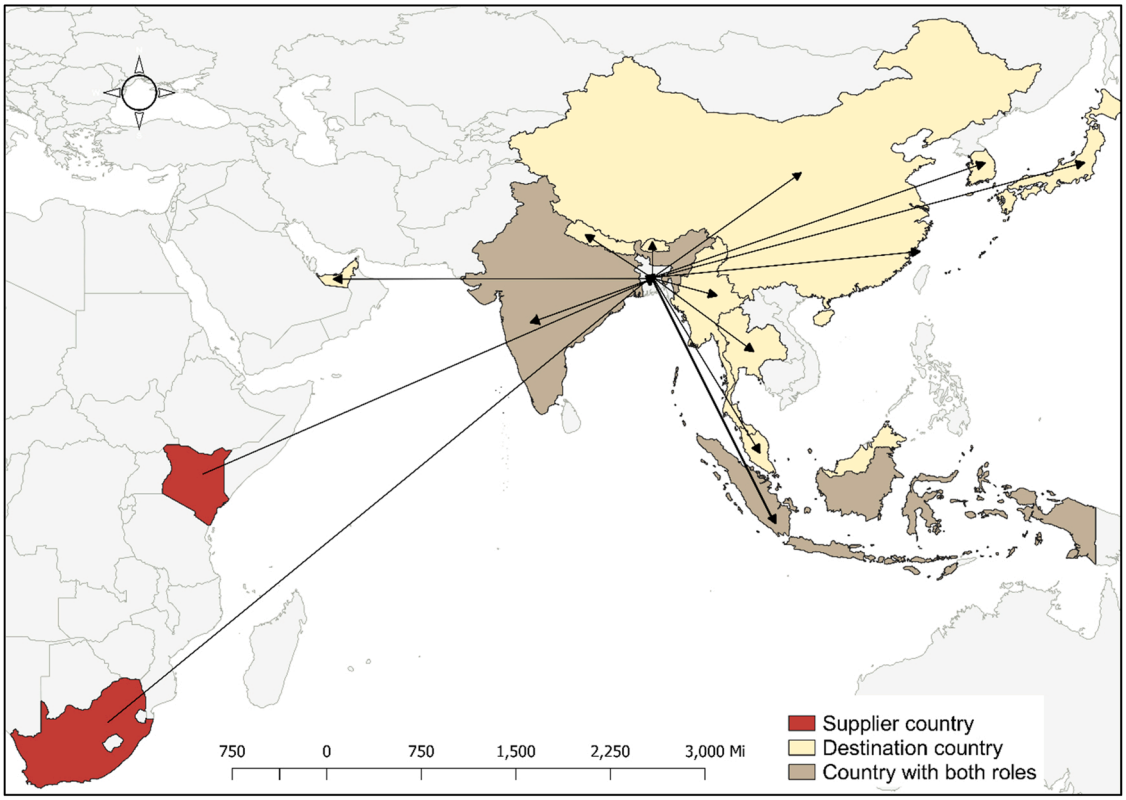

Fig. 3. Trade of live felids linked to Bangladesh. Bangladesh exports live felids to ten countries in Asia and Africa, and imports live felids from two countries of South Africa and Kenya; whilst two countries (India and Indonesia play both roles: bidirectional arrow). Administrative areas follow standards from the source downloads and may not represent the views of authors.

twelve interviewees confirmed that India (n = 12) is the top destination of live felids from Bangladesh, followed by Myanmar (n = 9), China (n = 8), Malaysia (n = 5) and 12 other countries. From interviews we identified nine export routes with high confidence and two with medium confidence, and four import routes (two with high, and two with medium confidence (Supplementary table S3). Interviews also mentioned that government zoos and safari parks in Bangladesh also imported live felids by following CITES permits in

Fig. 4. Domestic source districts of live felids and export hubs identified from BFD seizure records and interviewees records within the study.

different occasions. There are twelve zoos and safari parks both in Government and non-government ownership in Bangladesh which import felids (Supplementary materials 1). Most of the zoo and safari parks formation were conducted before 2013 whereas import of live felids for those zoo and safari parks after 2016 could be one of the big concerns to explore in future.

3.4. Storage and transit facilities of live trade

Interviewees described live felids being stockpiled along with various wildlife products at animal farms in the outskirts of Dhaka city (n = 9) and Kurigram district (n = 4). Animals were then trafficked out of the country via Banglabanda land port in Panchagarh district (n = 3), Sapahar land border of Naogaon district (n = 2), Benapole Land port of Jeshore (n = 6), Hili Land port of Dinajpur (n = 1), Tamabil land port of Sylhet (n = 2), Teknaf land port of Cox's Bazar (n = 6), Akhaura Land port of Barmman baria (n = 2), Chattogram seaport (n = 8), Dhaka airport (n = 3) (Fig. 4).

3.5. Modes of transport

Interviewees described live felids as being imported (n = 9) and exported (n = 2) by air via Dhaka airport (n = 9) and Chattogram airports (n = 1) (Fig. 4). According the interviewees, CITES reports and enforcement records; air and land are the major route types to traffic live felids between Bangladesh and most countries. As India and Myanmar are neighboring countries, trafficking of live felids occur via land ports, though onward trade from these countries is not well documented. Interviewees described that trafficking of live felids through land ports is facilitated by private cars (n = 8), freight trucks (n = 7), and public transport such as publicly and privately owned buses and cars (n = 3) through ground freight. Traffickers use airfreight (n = 4) to import felids from African countries and for export (n = 2) to the Middle East and sea freight to Southeast Asia (n = 8). According to the CITES report airfreight were mainly used to import wildlife from South Africa and Kenya (CITES Database). Interviewees (n = 10) mentioned that traffickers often use sleeping medicine to keep live felids calm and quiet during transportation by road within Bangladesh or between Bangladesh and India, and Bangladesh to Myanmar, to reduce the likelihood they will be identified.

3.6. Patterns of felid trade reported in the CITES database

Between 2011 and 2019, seven species were imported to Bangladesh with CITES permits. Between 2011 and 2019, live felids and trophies of felids were imported to Bangladesh each year. In 2013 and 2015, imports were around 23 and 20 respectively, where in in 2017 imports increased to 121 (Fig. 5) and from 2011 to 2021 a total of 32 shipments of live felids were recorded. Furthermore, there are disparities in the number of animals declared by export and import agencies. Among 31 reports by exporting countries, Bangladesh shows only five imports (shipments) whereas Bangladesh reported one export to Japan, yet Japan did not show the import in the CITES database too. Similarly, our results show 188 felids declared by exporting countries. Against these 188 were declared from export countries Bangladesh reported only four imports were noted; similarly, Bangladesh declared 16 more imports which were not reported by any exporting countries (Supplementary Table 2). The most important and visible and concerning reporting is 2017 where the export country mentioned 121live felids exported to Bangladesh, but Bangladesh's data shows no imports (Fig. 5).

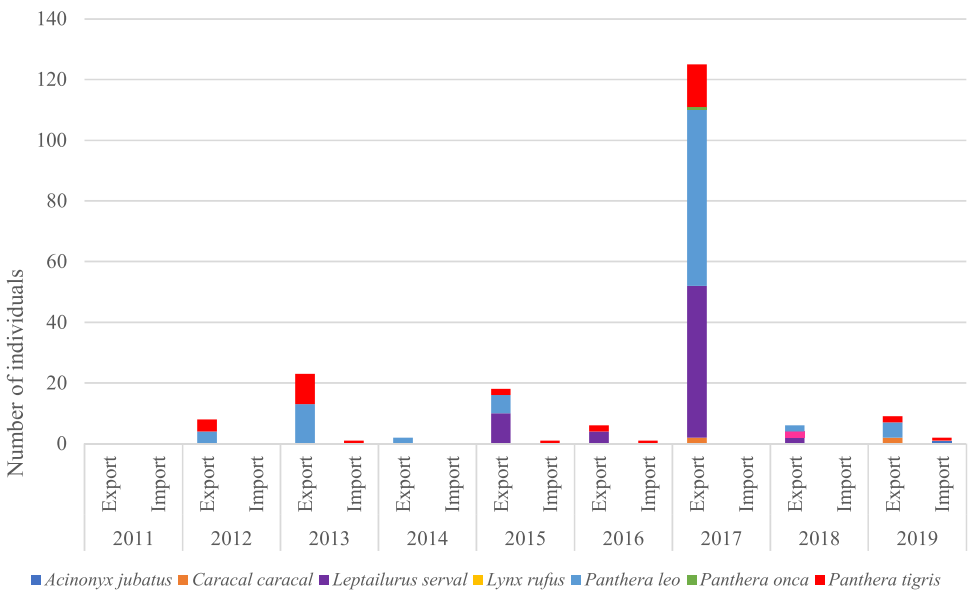

Fig. 5. CITES legal import and export data of felids in Bangladesh from 2011 to 2019. Where we found a sudden surge of felid imports to Bangladesh in 2017.Although we searched for data until 2021, we found that CITES trade were not included for 2020 and 2021 in the database.

4. Discussion

Our data indicates that the illegal trade of felids may also be increasing in many regions and involves at least 15 countries, and the misuse of permits and lax regulations means that understanding the role of Bangladesh in the global trade of felids is critical to prevent it threatening the survival of some of these species.

4.1. Bangladesh as the crossroads of live felid trafficking

Consumption of tiger parts for medicinal purposes is a major cause of tiger trade (Saif et al., 2016; Morcatty et al., 2020; Moorhouse et al., 2021). Among the people who use traditional Chinese medicine (TCM), at least 48% used tiger parts, and at least 71% of them preferred TCM from wild-sourced tiger parts (Gratwicke et al., 2008), and the use of tiger bone may even increase with potential legalization of tiger bone in more TCM products, which may increase demand (Whitfort 2020; Rizzolo, 2021). Also uses of tiger bones for wine, traditional medicine and other multiple uses in China is one of the major pressures on tiger of the regions (Davis et al., 2020; Coals et al., 2020). To fulfill the demands for tiger parts, other big cat species, such as lions, and clouded leopards, are being used as substitutes in Southeast Asia (Panek et al., 2021; Moorhouse et al., 2022). South Africa and Kenya are major supplier countries, whereas, India and Myanmar and China are major export destinations. Among those exported live felids from Bangladesh 13% were to China which might also be for the substitutes of tiger parts. Therefore, identifying key nodes in illegal felid trade networks (Patel et al., 2015) and understanding the vulnerabilities and opportunity structures that facilitate live felid trafficking between Bangladesh and China including South Africa, India, Myanmar and could be a first steps to disrupting and reducing the activity.

India shares its longest border with Bangladesh (Das, 2008), and 11 of the 16 known transit points involved in trafficking tiger parts from Bangladesh are on the border with India, with seven ports involved with other felids (Uddin et al., n.d). Transboundary regions between Bangladesh and India have high linguistic and cultural similarities, facilitating illegal trade between the two countries and allowing easy communication and ability of people from either country to blend into the neighboring country, facilitating transboundary trafficking (Uddin et al. in review). Seizure records, such as fishing cat in 2016, two lion cubs in 2017 and two adult cheetahs in 2018 destined for India from Bangladesh directly support the interviewees' statements about the destination of felids from Bangladesh to India. Furthermore, some interviewees (n = 6) mentioned that lion cubs were coming from African countries and imported to India via Bangladesh. Also, at least eight interviewees mentioned that traffickers smuggle both native and exotic felids to India from Bangladesh. Multi-agency collaboration, strong proactive intelligence management and checking main border points and transport mood identified in this research (and Uddin et al., In review) could stop live felid trafficking from Bangladesh to other countries, especially via enforcement and awareness raising at major routes and transit points. As much demand is external, without such action more localized strategies are unlikely to be effective, as demand-side interventions outside Bangladesh would be needed.

4.2. Misuse of CITES permits

With increasing legal trade (via CITES) there is also a greater opportunity for misuse of CITES permits. Interviewees (n = 5) suggest that legal permit holders misuse the CITES permits to bring more felids to Bangladesh than their permits state, reusing permits or ignoring the numbers listed. For example, several interviewees (n = 6) stated they collect permits from CITES authorities for a certain number of individuals of live felids, but import more than reported or sometimes they reuse legitimate CITES permits for additional imports, this was confirmed by interviews. Furthermore, misuse of CITES permits by falsifying the signature of CITES authorities, uses of expired permits, and altering the dates of permits (Khan, 2021; Personal communication, *Abu Naser Mohsin Hossain 2019*). Also misuse of CITES permits to launder wildlife is also common according to TRAFFIC (Outhwaite, 2020).

Misuse or misreporting of CITES permits is supported by our results, where we found only five shipment declarations (imports) by Bangladesh for a total of 31 shipments (exports) of live felids (Supplementary Table 1). Yet most records lack details, and many have apparent discrepancies; this poses the following questions: 1) where are those felids going? 2) How are these felids transported to Bangladesh; 3) How are permits being issued and on what grounds; 4) How can CITES permit reuse be prevented? 5) Whether all reported export by export countries really shipped to Bangladesh? 6) Who are the buyers of live felids in Bangladesh? Here we show the main routes of felids that transit through Bangladesh are taking, but that mode of travel varies, especially between import and export, and tighter legislation will be necessary to prevent laundering and reuse of permits.

Some interviewees also highlighted the ineffectiveness of CITES; for example, at least four interviewees mentioned that they work with permit holders to collect felids from other countries, and two interviewees mentioned, "We collected orders from local affluent communities and then gave those orders to CITES permit holders who regularly collect wildlife for in-country zoo, safari park, and they bring felids for us to deliver to our customers". Also, some law enforcement agencies people mention note that customs officials are not able to identify species, which may allow traders to conduct wildlife trade activities. For all CITES permit checks of imported animals there should be one wildlife inspector in the airport to check the validity and species identification as well as numbers of imported wildlife to Bangladesh. However, Bangladesh Forest Department issues CITES permits, but has no permanent staff at ports (or airports) to check the imported wildlife, which creates a loophole in the verification of CITES regulated trade of wild felids. This highlights a common perspective, which requires further work to prevent such easy reuse of permits which are known to have ready been used. In addition, the use of hybrids could have been used to enable trade illegally or circumvent need for permits, but at least 15 interviewees were showed pictures of Savannah cats (Hybrid of a domestic cat *Leptailurus serval*) and caraval (Hybrid of a female serval and a male *Caracal caracal*), and hybrid of the cross between *Prionailurus bengalensis* and domestic cats. None of the interviewees were able to identify the hybrid species of the aforementioned species but interviewee (traders) who connected with the Middle East (n = 5)

thought that carval was purebred *Caracal caracal.*

4.3. Increased imports to zoos and safari parks may fuel illegal imports of felids

This paper flags an emerging trend in exotic felids and private menageries by wealthy individuals in Bangladesh. Seven interviewees mentioned that wealthy Bangladeshis keep live felids as pets overseas as a symbol of status, and their affluence. TRAFFIC tiger parts seizure assessment from reports 2000–2018 shows that at least 70% of seizures were wild-sourced (Wong and Krishnasamy, 2019). The export of live felids from Bangladesh to 15 countries suggests that Bangladesh may be a conduit for trade, and seizure and interview data suggests a growing domestic market. At least one interviewee mentioned that Leopards (*Panthera pardus)* would transit to Bangladesh from various countries, before re-export to UAE (n = 1). However, there are also statements that locally affluent communities in Bangladesh order live felids to keep in their private enclosures as a status symbol, and also as pets, which was noted by at least 10 interviewees. Similarly, at least two interviewees mentioned that live felids (especially fishing cats, bob cats, and leopard cubs) are imported by the Middle East as pets.

4.4. Increased live felid trade and non-reporting in CITES trade database

Understanding the dimensions of changing demand is important. Sudden increases of live felids in 2017 are suspicious, and the non-reporting of many imports in the CITES database of Bangladesh underscores the lack of accurate reporting, and increased imports to already established zoos is also suspect. We identified 12 public and government zoos and safari parks in Bangladesh which were established before 2013 (Supplementary Table 2) and increased imports after 2016 specially in 2017 to Bangladesh may not be for those established zoo and safari parks.

Furthermore, with increasing infrastructural investment in the region, with for example the growth and investment of the Belt and Road initiative (a large infrastructural initiative which will enhance road and rail connections domestically and internationally). This increased connectivity within Bangladesh and connecting it to other countries (including major potential import countries such as China) may create the potential for heightened illegal trafficking of wildlife, and steps are urgently needed to prevent these issues being realized (Hughes, 2019; Hughes et al., 2020). These include both demand reduction strategies, and the development of clear border enforcement and monitoring offices to prevent potential trafficking along new transboundary connections.

Although Bangladesh became a CITES signatory in 1981, enforcement clearly remains an issue, with a huge amount of work needed to stem illegal trade. For example, we identified discrepancies of 26 live felid shipments of 32, highlighting that CITES is largely unable to fulfil its remit within Bangladesh. Two committees are responsible for CITES permit authorization and management in Bangladesh such as 1) the scientific committee that is are responsible for permits, and 2) CITES management authority is headed by the chief conservator of forest of BFD. However, understanding the inconsistent patterns of imports and exports is impossible given the clear inaccuracies and discrepancies in reporting, and thus disaggregating changes in reporting from shifts in the market is not possible. Therefore, redressing the processes involved at all stages of permit issuance and verification is needed and exploring the timeliness of reporting both legal and illegal trade data within CITES records.

5. Conclusion

Our results highlight the role of Bangladesh as an importer of live felids as well as a source of live felids for at least 15 countries. International demand for felids is driven by countries in the Middle East, South and Southeast Asia, and sourced mainly from South Africa. Discrepancies in CITES reporting in Bangladesh prevent accurate monitoring of trade, and these discrepancies require further work to redress. Therefore, to prevent permit misuse and laundering of live felids, we recommend that CITES revisit their operations and work to ensure more accurate and representative data with fewer discrepancies, and actively work to prevent permit abuse, closer engagement and capacity building with the CITES authority within Bangladesh is also needed. Transboundary cooperation between Bangladesh and neighboring countries implicated in trade is crucial to halt transnational wildlife trade, and with growing regional connectivity with new roads new border monitoring initiatives are likely to be needed, and a necessary step to prevent illegal and unsustainable trade in threatened felid species, and the possible extinction of these charismatic species.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

provided.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.gecco.2022.e02356.

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