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ANALYSIS OF THE INTERNATIONAL LEGAL TRADE AND DOMESTIC TRAFFICKING OF LONG-TAILED MACAQUE (*Macaca fascicularis*) IN THE PHILIPPINES

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ABSTRACT – The Long-tailed Macaque *Macaca fascicularis* (LTM) is one of the most widely dispersed, adaptable, and exploited primate species in the world. It is extensively utilized in biomedical research and to a lesser extent as wild meat, harvester of crops, and pet. To better understand the trade dynamics of the LTM in the Philippines, we conducted a study by gathering and analyzing data from online trafficking, CITES trade database, private zoos, government wildlife rescue centers, and seizure records. We surveyed 20 Facebook groups in 2022 and documented 41 posts offering to sell 49 LTM individuals. The CITES Trade Database had 719 records for the period 1980–2019. The Philippines exported between 111,258 (exporter-reported) and 147,188 (importer-reported) live LTMs. Decade-to-decade comparison showed that the export of live individuals steadily declined by 35%–56% between succeeding decades. Export of specimens from the Philippines appeared to be increasing for unknown reasons but could not be determined conclusively due to the use of various units of measurement. The Philippine authorities seized a total of 58 live LTMs between 2010 and 2022. Seizure records did not show the true scale of LTM trafficking because illegally-kept LTM pets were usually reported as rescued or voluntarily-surrendered when retrieved from keepers or brought to rescue centers. In May 2022, at least 292 individuals were in 20 government wildlife rescue centers throughout the Philippines. While the LTM is a protected species in the Philippines, poaching for the pet trade is widespread although the true scale remains unclear. The poaching and human-macaque conflict could be a threat to LTM populations in their natural habitats in the Philippines. Developing preventive measures and raising awareness on illegal hunting and illicit trade should be prioritized to ensure the persistence of LTMs in the wild.

Keywords: biomedical research, CITES, social media, wild meat, zoonosis

INTRODUCTION

The Long-tailed Macaque *Macaca fascicularis* (LTM) is one of the most adaptable and geographically dispersed primate species in the world. The species inhabits diverse landscapes, including deciduous forests, evergreen forests, savannahs, mangroves, beaches, and anthropogenically-modified environments from sea level to 2,250 masl (Fooden, 1995; Yanuar et al., 2009; Gumert et al., 2011; Heaney et al., 2016). The species' ecological and behavioral flexibility and adaptability enables it to fill several ecological roles across diverse ecosystems, such as frugivorous seed disperser that promote habitat

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regeneration, prey to large carnivores (i.e. *Malayopython reticulatus*), and zoonotic pathogen vectors (Seidensticker and Suyono, 1980; Corlett and Lucas, 1990; Gumert and Malaivijitnond, 2012; Heaney et al., 2016).

In the Philippines, the LTM is widely distributed throughout the archipelago. Previous studies indicated that the LTM populations across the country range from being stable to locally extirpated (Heaney et al., 2016). In some areas, the declining populations are primarily attributed to overhunting, whereas elsewhere, declines are driven by the human-macaque conflict from diminishing suitable natural habitats for LTMs. Perceived macaque nuisance behaviors, such as crop-raiding, lunging, and foraging in human houses, drive perceptions of macaques as pests by some communities (Gamalo et al., 2019). On the island of Banton, Romblon Province, Municipal authority incentivized trapping of macaques, in contravention of the Republic Act No. 9147 or the Wildlife Resources Conservation and Protection Act of 2001, by offering a PHP 80 (USD 1.44) bounty/ dead or alive individual in 2018, which was increased to PHP 150 (USD 2.70)/individual in 2022 to address the alleged LTM overabundance on the island (Municipality of Banton 2018; 2022). Although the LTM is considered a non-threatened species in the national red list, a permit from the Department of Environment and Natural Resources (DENR) is still require to kill, capture, keep, transport or trade the species (Gonzalez et al., 2018).

In a broader global context, the LTM is the most utilized primate in biomedical research and among the most exploited for entertainment, as pets, and in abuse (Lankau et al., 2014; Hansen et al., 2022b; Badihi et al., 2024). In many parts of Asia, they are hunted for their meat and bones for sustenance and traditional medicine, respectively. To a lesser extent, the species is also utilized to harvest crops (Eudey, 2008; Lee, 2011; Kabir and Ahsan, 2012; Nekaris and Bergin, 2017; Tee et al., 2018). The LTM was classified as Endangered (EN) on the IUCN Red List in 2022 due to a projected decline of more than 50% over the coming three generations (~36 years). The projected decline was hypothesized to be caused from high demand for trade, persecution and culling due to human-LTM conflict, hunting for food and pets, and declining habitats across its range (Hansen et al., 2022a). Based on legal trade date from the Convention of International Trade of Endangered Species of Wild Flora and Fauna (CITES) Trade Database, more than 1.3 million live LTMs, including re-exports, were traded internationally based on the exporter-reported quantity from 1980 to 2019 (40 years). In addition, more than 65,000 specimens including bones, extracts, and body parts (i.e. eyes, feet, skin) from unknown number of individuals were traded internationally during the same period (CITES, 2022). While the CITES trade database comprises legal trade quantities as reported by the respective CITES party, data on the scale of the illegal trade is largely unknown. However, a recent study concluded that based on the capacity limitations for all known breeding centers in Cambodia, the main exporter of LTMs in Asia, the demand for LTMs between 2019 and 2022 could never have been met without wild-caught macaques (Warne et al., 2023).

The COVID-19 pandemic and its global health and economic impacts highlight the severe risk of zoonotic transmission and disease emergence intrinsic in both legal and illegal wildlife trade (Karesh et al.,2005; Can et al., 2019). The ongoing worldwide LTM trade poses implications to a serious global health risk (Sanerib and Uhlemann, 2020). Several events of pathogen transmission attributed to the importation of macaques have already been documented, such as the case of Ebola Reston virus, reaching the U.S. via LTMs from the Philippines in 1989, 1992, and 1996 (Miranda et al., 2002). Wild LTMs are also known to be carriers of the Herpes B virus, which causes high mortality in humans when infected (Engel et al., 2002). Furthermore, research shows that inoculation with SARS-CoV2 in LTMs causes a COVID-19- like disease (Rockx et al., 2020), indicating a possibility of bidirectional virus transfer between humans and LTMs. This study aimed to provide baseline information on LTM trade namely through the domestic online macaque pet trafficking, the reported legal export quantity from the Philippines during 1980–2019 (40

years) through CITES, wildlife seizure records, and captive LTMs in publicly-accessible zoos and government wildlife rescue centers. The consolidated information could be utilized as a basis for the protection and conservation of the species in the wild.

METHODS

Online Domestic Trafficking

We conducted an online trade survey by documenting offers to sell live LTMs in 20 pre-selected Philippine Facebook groups specializing in the trade of non-traditional (i.e. wildlife) pets from January–December 2022. The groups were selected based on previous offers to sell live mammals prior to the start of the survey. We also conducted keyword searches by using common names of the LTM used in the Philippines such as Macaque, Monkey, *Matsing* (Tagalog), and *Unggoy* (Tagalog) in the groups. The Facebook groups were spread across six islands, 10 political regions, and 16 provinces (Fig. 1a). Upon deactivation of one of our selected groups, it was replaced with another group to maintain a sample size of 20 groups at all times. Where possible, we noted the quantity, price, and life stage of the LTMs offered for sale. These were as follows: less than one year old = infant; 1-3 years old = juvenile; 3-4 years old (males only) = subadult; 5 years and older = adult; and not indicated/ no accompanying photo = unknown. Posts that neither included photos nor indicated the available quantity was counted as a minimum of one individual LTM each. Reposted photos or advertisements were excluded in the dataset. The exchange rate of the Philippine Peso (PHP) to the United States Dollar (USD) fluctuated throughout 2022. We used the exchange rate of PHP 55.597 = USD 1 in this report for uniformity (https://www.oanda.com/currency-converter ; 31 December 2022).

International Trade

We retrieved records of international trade of LTMs from the Philippines from the CITES Trade Database (CITES, 2022) for the period 1980–2019 (40 years). We analyzed the quantity, source, and purpose based on the exporter-reported quantity. We obtained export data directly from the Philippines' CITES Management Authority for the period 2020–2021.

Seizure Data

We reviewed a report on wildlife seizure in the Philippines and extracted LTM seizure data for the period 2010–2019 (Sy, 2021) and requested wildlife seizure reports from regional offices of the DENR, Palawan Council for Sustainable Development Staff (PCSDS), Philippine National Police-Maritime Group (PNP-MG), and Bureau of Customs (BOC) for the period 2020–2022. We also collated open-source news articles and social media posts to supplement the official records.

Census of wildlife facilities

To estimate the captive population of LTMs in the country, we compiled a list of private, city-owned, and DENR wildlife facilities and requested information on quantity, date obtained, source, life stage, male versus female ratio, and captive management issues such as capacity and budget constraint.

RESULTS

Facebook wildlife trade groups

We initially pre-selected 20 Facebook wildlife trade groups spread across six islands, nine regions, and 16 provinces with active wildlife trading activities (Fig. 1a). In July 2022, Facebook deactivated at least 116 wildlife trade groups, including 15 groups being surveyed for this study, for violating the platform's commerce policy. The remaining five groups and 15 replacement groups were spread across six islands, nine regions, and 15 provinces (Fig. 1b).

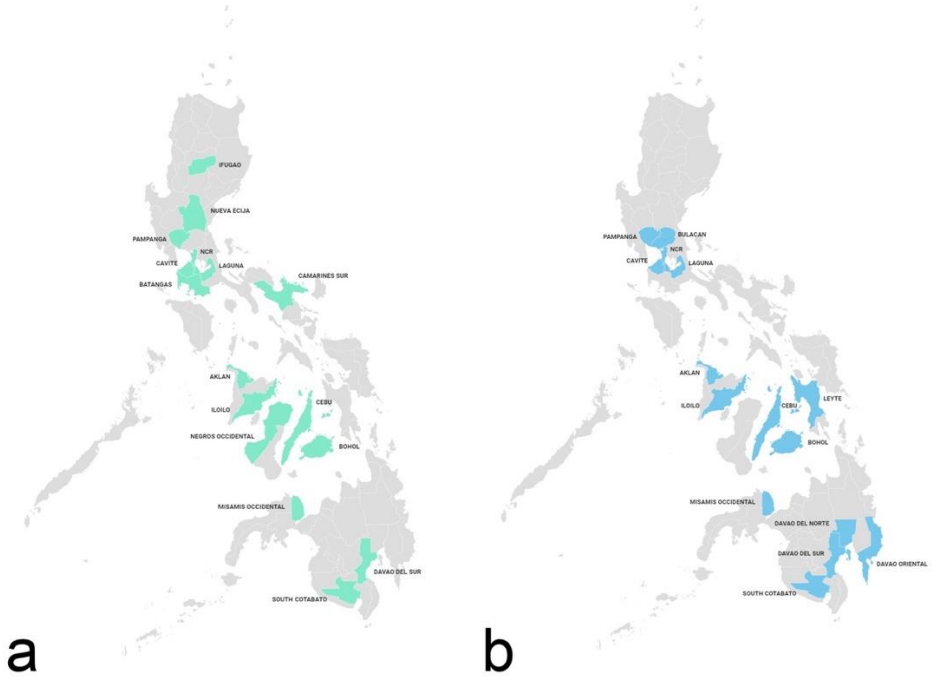

Figure 1. Geographical distribution of initial (a) and final (b) Facebook wildlife trade groups surveyed for this study.

Online Trade and Traders

A total of 41 posts made by 36 unique Facebook accounts offering to sell a total of 49 LTMs were documented during the 12-month online survey (Fig. 2a-b). Most individuals were infants (n=32; 65.3%) followed by unknown life stage (n=9; 18.4%), and juveniles (n=8; 16.3%). No sub-adults or adults were documented during the study period. Only six posts indicated the price, ranging from PHP 3,500–7,500 (USD 62–135) per individual.

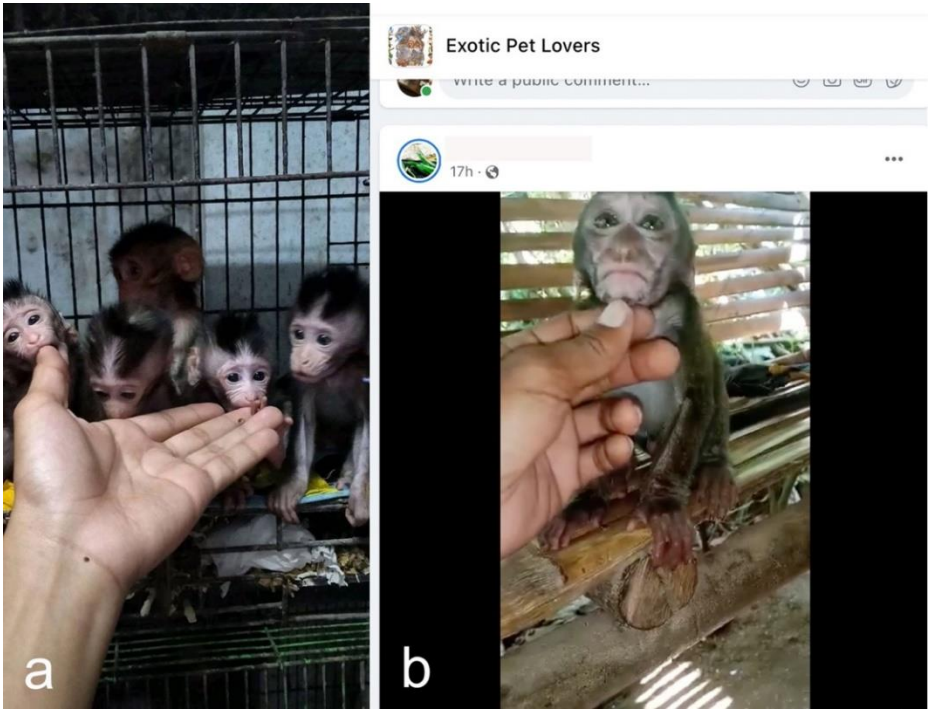

Figure 2. Infant Long-tailed Macaques from Luzon Island offered for sale on Facebook in 2022.

Most of the traders (n=36; 87.8%) offered to sell one LTM each while five traders (12.2%) offered between two and five individuals each. Traders who provided location information were based on Luzon (n=13; 36.1%), Mindanao (n=9; 25.0%), and Leyte (n=1; 2.8%) (Fig. 3). The remaining 13 traders did not indicate locations on their publicly accessible profile or post.

CITES Trade Data

The CITES Trade Database had 719 records of international trade of LTMs from the Philippines during the period 1980–2019 (40 years) (Table 1).

The Philippines exported between 111,258 (exporter-reported) and 147,188 (importer-reported) live LTMs during the period. Based on exporter-reported (Philippines) quantity, the source code of a majority of live LTMs (n=59,452; 53.4%) was not declared, while the purpose code of 49,386 individuals (44.39%) was for commercial (T) (Table 2).

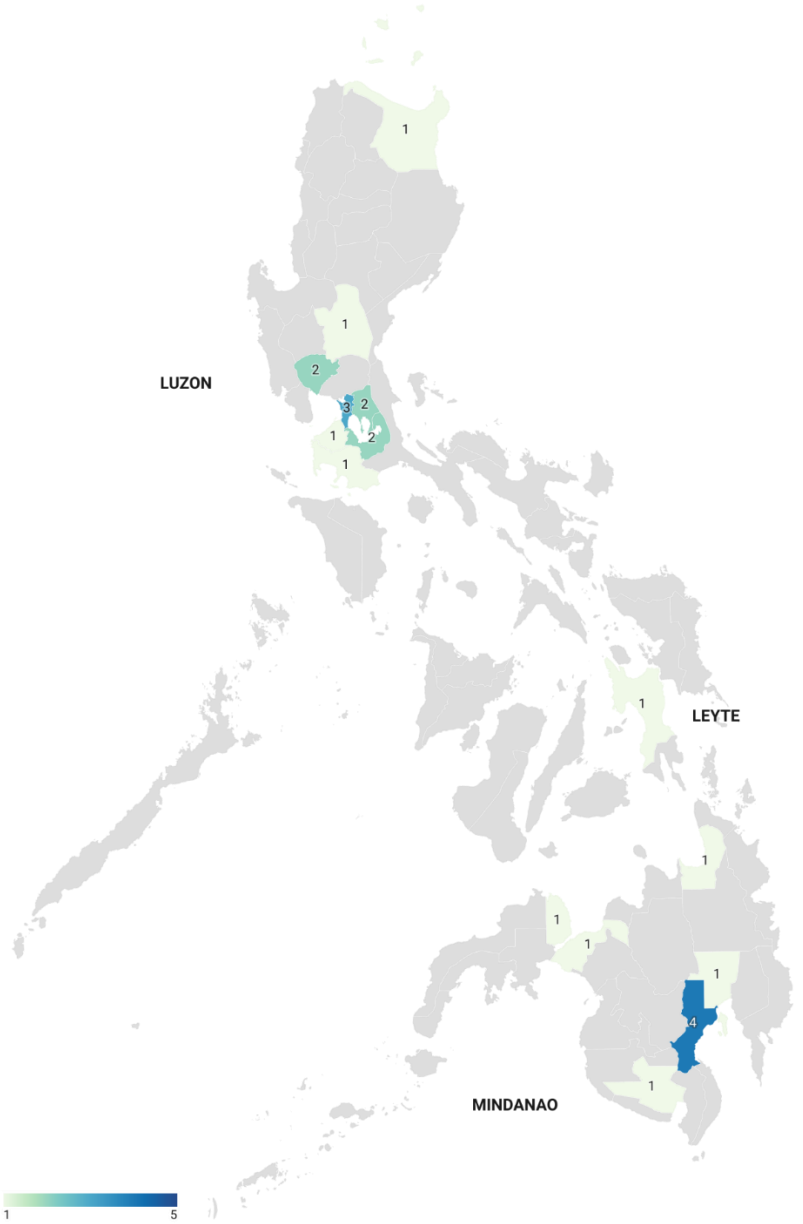

Figure 3. Location of online traders.

Table 1. International Long-tailed macaque trade from the Philippines between 1980 and 2019.

Commodity	1980-1989		1990-1999		2000-2009		2010-2019	
	Exporter-reported (Philippines)	Importer-reported	Exporter-reported (Philippines)	Importer-reported	Exporter-reported (Philippines)	Importer-reported	Exporter-reported (Philippines)	Importer-reported
Bodies	-	-	19	-	-	-	-	-
Bones	-	-	-	19	-	-	-	-
Bones (g)	-	-	-	-	12	-	-	-
Bones (kg)	-	-	-	-	-	1	-	-
Bones (pieces)	-	-	7	766	-	15	-	-
Bones (sets)	-	-	-	-	-	425	-	-
Derivatives (mL)	-	-	-	32	-	-	-	-
Gall (mL)			-	-	-	12	-	-
Live	53,005	88,076	34,570	37,211	16,501	16,296	7,182	5,605
Skeletons	-	-	-	1	-	-	15	15
Skin pieces	-	-	-	-	-	-	-	-
Skins	-	-	-	-	-	4	-	16
Skulls	-	29	-	38	-	26	2	17
Specimens	-	199	7,861	24,357	37,792	30,557	80,135	20,666
Specimens (bags)	-	-	-	33	-	30	-	-
Specimens (bottles)	-	-	957	41	-	-	-	-
Specimens (boxes)	-	-	8	13	146	-	-	-
Specimens (flasks)	70	-	15,956	1,795	33,199	668	-	-
Specimens (g)	-	-	57	-	2,206	2,619	1,080	-
Specimens (kg)	-	4	-	52	17	219	-	323
Specimens (L)	-	-	-	-	-	3	-	2
Specimens (mg)	-	-	-	63	-	-	-	-
Specimens (mL)	1,264	120	1,496	56,804	174,414	156,896	19,164	40,276
Specimens (number of specimens)	-	-	-	-	-	-	-	2,755
Specimens (pairs)	-	-	-	-	10	1,029	-	-
Specimens (sets)	1	11	1	-	59	-	-	-
Specimens (cartons)	-	-	146	-	-	-	-	-
Trophies	-	-	-	10,242	-	15	-	-
Unspecified	-	-	-	-	-	106	-	-

Table 2. Source and purpose of exported live Long-tailed Macaques based on exporter-reported (Philippines) quantity from 1980-2019.

Source			Purpose		
Wild (W)	12,434	11.18%	Personal (P)	24	0.02%
Captive (C)	39,372	35.39%	Medical (M)	28,418	25.54%
Undeclared	59,452	53.44%	Scientific (S)	33,430	30.05%
			Commercial (T)	49,386	44.39%
Total	**111,258**		**Total**	**111,258**	

The combined total of the top three importing countries (United States, Japan, and United Kingdom) accounted for 89.2% or 99,264 live LTMs from the Philippines during the 40-year period (Table 3).

Table 3. Importers and quantity (exporter-reported) of LTMs from the Philippines from 1980-2019.'

Country/Territory	Quantity	Percent
United States	63,121	56.7%
Japan	18,489	16.6%
United Kingdom	17,654	15.9%
France	6,552	5.9%
Taiwan	1,965	1.8%
20 other countries	3,477	3.1%
Total	**111,258**	

Decade-to-decade comparisons showed that the export of live individuals from the Philippines steadily declined by 35%–56% between succeeding decades (Fig. 4). The export of specimens from the Philippines may be increasing, but due to various units of measurement (e.g. ml, g, kg, bags, bottles, cartons) and lack of details, we could not determine the actual quantity of LTM individuals the specimens represent.

Seizure Analysis

A total of 34 LTMs were seized by authorities in a 10-year period in 2010–2019 (Sy, 2021). More recently in 2020–2022, authorities conducted at least 20 LTM seizure operations involving a total of 24 individuals. On 7 February 2021, the PNP confiscated 50 wild-caught LTMs while being transported in makeshift bamboo crates without a local transport permit from the DENR in the Municipality of Siocon, Zamboanga del Norte Province, Mindanao Island. However, the macaques were eventually released back to the owner upon presenting a wildlife collection permit. The wild LTMs were probably intended to serve as parental stock in a macaque breeding facility.

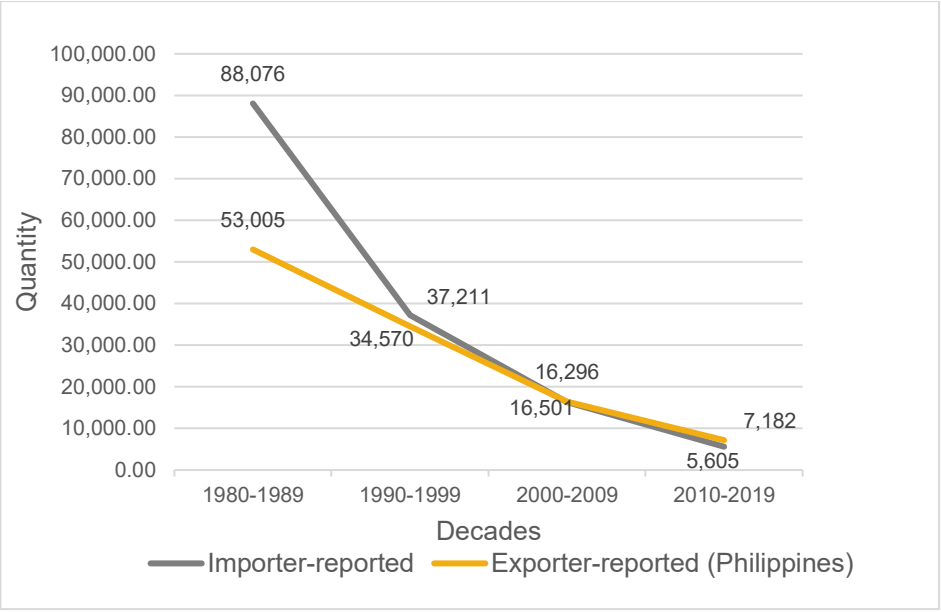

Figure 4. Comparison of importer-reported (gray line) and exporter-reported (orange line) quantity of Philippine-sourced Long-tailed Macaques from 1980 to 2019.

Captive LTMs in wildlife facilities

We surveyed 108 wildlife facilities throughout the Philippines for captive LTMs. A total of 415 individuals were in 33 facilities as of July 2022. We obtained information from 22 out of 77 (28.6%) wildlife facilities, of which 10 had a total of 123 LTMs, managed by private entities, local government units or universities. In contrast, 25 out of 31 (80.6%) DENR-managed rescue centers/temporary wildlife holding facilities provided information and 22 kept a total of 292 individual LTMs. The National Wildlife Rescue and Research Center located in Quezon City, National Capital Region had the most captive LTMs at 107 individuals. The vast majority of captive LTMs were illegally kept pets prior to being seized or turned over to rescue centers when keepers outgrew their interest in keeping them as pets. Some provinces without wildlife rescue centers turn over seized wildlife to accredited private wildlife facilities for temporary custody. It is uncertain how many seized or surrendered Long-tailed Macaques were held in private facilities.

DISCUSSION AND CONCLUSION

The results of our study highlight the ongoing illegal online trade of LTMs in the Philippines. The under-regulation of Facebook groups played a prominent role in facilitating the sale of this and other threatened wild animals. Most traders offered infant and juvenile LTMs at relatively low prices, with trade predominantly in Luzon and Mindanao. Previous studies have identified these two areas as the centers of wildlife trade in the Philippines (Sy, 2018; Sy and Lorenzo, 2020; Sy et al., 2022).

The Long-tailed Macaques offered for sale on Facebook are likely poached from the wild and traded illegally, based on their observed life stages. Hunters may deliberately target nursing female LTMs for meat and then sell the orphaned infants afterward (Fig. 5). The majority of LTMs available online were infants, which strongly indicates that they were wild-caught, since the average weaning age is between 10 and 14 months (Prescott, 2012). The very low selling price further suggests that these individuals were not bred in captivity, as such low prices would not cover the costs of raising and breeding them. The Long-tailed Macaques listed online may primarily be available for domestic pet trade only.

Figure 5. The image depicts an infant LTM holding onto the body of its recently killed mother. Subsequently, a group of men offered to purchase the infant for PHP1,000 (USD 18) in July 2025.

Wild meat is a common food source for indigenous groups, who hunt this species for various reasons, including sustenance, cultural traditions, and potential financial gain. In rural areas, where food scarcity can be significant, hunting becomes an essential means of survival (Scheppers et al., 2012; Tanalgo, 2017; Tiempo et al., 2023). In southern Luzon, hunters preferred to hunt from August to October. After a successful hunt, it is customary for hunters to share their catch, consuming half to celebrate while selling the remainder to clients (Scheppers et al., 2012). Additionally, within these communities, it is believed that consuming wild meat grants individuals the strength and abilities of the animal. Long-tailed Macaques are also used in traditional medicine; their dried tails and placentas, when infused in coconut oil, are thought to aid in childbirth (Tanalgo and Baleva, 2015; Tanalgo, 2017).

Data from CITES during a 40-year period indicates a declining trend in the export of live LTMs from the Philippines. However, specimens have been increasing in trade volume, but the use of various units of measurement made it impossible to provide a reliable estimate of Individuals they represent. The Philippines reported exporting 350 live Long-tailed Macaques in 2020 based on issued permits. Although there was no corresponding importer-reported quantity in the CITES Trade Database, we were able to confirm this transaction to the USA by examining documents at the Wildlife Traffic Monitoring Unit stationed at the Ninoy Aquino International Airport (NAIA) in the National Capital Region (NCR). Unpublished data provided by the Philippine CITES Management Authority indicated the export of 705 live Long-tailed Macaques in 2021 (BMB in lit. to EYS, 16 May 2022). The downward trend of live Long-tailed Macaque export from the Philippines is likely to continue since there is only one commercial LTM breeding farm left in the country as of 2022. On the other hand, it is possible that the trade of LTM derivatives is increasing, but the true figures are obscured by inconsistent use of units of measurement as reported to the CITES Secretariat.

Law enforcement seizures revealed ongoing poaching and trafficking of LTMs. Although illegal trade of live Long-tailed Macaques is a common occurrence throughout the Philippines, official seizure records did not reflect the actual level of trafficking (Sy, 2021). Authorities usually report seizures of illegally-kept LTMs as "rescue" or "voluntarily surrendered" possibly to avoid the tedious filing of criminal or administrative cases against perpetrators.

Many Long-tailed Macaque populations are severely threatened from various threats and compounded by trafficking and other anthropogenic activities. Illegal and unsustainable harvesting are occurring, and human-macaque conflicts further exacerbate negative perceptions of the species. Pragmatic solutions such as raising awareness and preventive measures to avoid the escalation of conflicts between local communities and LTMs should be conducted by relevant authorities (i.e. local government, wildlife authority) to ensure the survival of the LTMs in the wild.

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STATEMENT OF AUTHORSHIP

EYS conceptualized the study, curated and analyzed the datasets, and collated seizure records. AGBM conducted the online survey and census of wildlife facilities, and analyzed the online trade dataset. Both authors contributed equality to the writing of the paper.

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