

CONTRIBUTED PAPER

Perceptions of the COVID-19 pandemic's impact on communities and wildlife trade: Preliminary qualitative analysis from hunters in Vietnam, Cambodia, and Laos

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Abstract

The COVID-19 pandemic has accelerated efforts to engage critically with forest-adjacent, rural, communities who rely on wildlife. We interviewed 109 hunters of wildlife across Vietnam, Cambodia, and Laos regarding the effect the COVID-19 pandemic has had on them, as well as within their communities. We found that “negative economic impacts” was a prevalent theme due to loss of employment, rising prices, and restrictions on trade resulting from city-wide lockdowns, factory closures, and border closures. In Vietnam, hunting was stated to have increased as young men returned to their villages; however, in Vietnam and Cambodia trade in wildlife was believed to have decreased due to the inability of middlemen traders to travel easily. Our results from Laos illustrated general economic cost, but otherwise no impact of COVID-19 on hunting and trade in wildlife. Here, we show the complex impacts of a pandemic, with contextually specific conservation positives (such as decreased trade), and conservation negatives (such as increased hunting to supplement loss of employment). We illustrate the importance of establishing sustainable, non-wildlife-dependent livelihoods within rural communities, to mitigate hunting and the potential for disease transmission, and the value in engaging with hunters to understand locally and spatially specific trends in global conservation challenges.

KEYWORDS

COVID-19, hunting, illegal wildlife trade, qualitative analysis, Southeast Asia

1 | INTRODUCTION

In March 2020, the spread of the SARS-CoV-2 virus (hereafter COVID-19) was declared a global pandemic by the World Health Organization (Cucinotta et al., 2020).

The COVID-19 pandemic has accelerated efforts to engage critically with a OneHealth approach that reduces the risk of other zoonotic, emerging infectious diseases by placing human health and ecosystem resilience at the forefront of conservation policy and interventions

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(e.g., Decaro et al., 2020; Watsa and Wildlife Disease Surveillance Focus Group, 2020). As part of this approach, regulation of human intrusion into natural spaces, such as reductions in hunting, are critical to wildlife and human health (e.g., Wolfe et al., 2005). However, the COVID-19 pandemic appears to have resulted in an increase of hunting globally, as rural communities were forced into forest resource utilization and subsistence as a result of unemployment and city-wide lockdowns (Bates et al., 2021; Gibbons et al., 2021; Koju et al., 2021; Lappan et al., 2020; Roe et al., 2020).

Although the animal origins of the virus are still unknown, early reports indicated that pangolins (*Manidae* spp.)—a highly traded and consumed taxon (e.g., Nijman & Shepherd, 2021)—may have been the intermediate host of SARS-CoV-2 that facilitated virus transmission to humans (Liu et al., 2020). Following this revelation, as well as initial reports that the virus was connected to a wildlife market in Wuhan, China, and other countries implemented sweeping wildlife consumption bans (Huang et al., 2021). While evidence exists that wildlife consumption bans alone are not sufficient (Booth et al., 2021), they appear to be having success in decreasing consumption in some countries (e.g., Gibbons et al., 2021). As an alternative to consumption bans, One-Health approaches emphasize wildlife management measures that take into account rural and disenfranchised communities through more thoughtful, community-based approaches that have long-term viability (Berrian et al., 2018). Understanding and engaging with communities who are at the forefront of emerging infectious diseases and global health is critical for effective conservation management strategies. This includes engaging with hunters of wildlife in global biodiversity and emerging infectious disease hotspots such as Southeast Asia (e.g., Coker et al., 2011; Duffy et al., 2016). While many non-governmental organizations (NGOs) in Southeast Asia work within protected areas and around forest-adjacent communities, there are to our knowledge very few studies to date that present evidence on the motivations, values, and beliefs of hunters themselves. This lack of evidence and the need to better understand the drivers of rapid biodiversity decline, particularly in the Southeast Asian region, encouraged us to conduct this study.

We interviewed 109 confirmed hunters from Vietnam, Cambodia, and Laos, with one of the aims being to understand the impact of COVID-19 on hunting and trading wildlife. This is part of a broader study to improve understanding of hunting in the region, from the perspective of hunters. The legal landscape of hunting is complex in all three countries. In Cambodia, the

hunting of endangered and rare wildlife is fully prohibited, and all wildlife are protected within protected areas (including “special public areas”); however, hunting of unprotected species for subsistence and according to indigenous custom is allowed, even within protected areas. (Royal Government of Cambodia, 2002; Royal Government of Cambodia, 2007; Royal Government of Cambodia, 2008). To do so requires permission from local Forestry Administration authorities (Royal Government of Cambodia, 2002; Royal Government of Cambodia, 2007; Royal Government of Cambodia, 2008), but both authorities and local officials are rarely aware that this provision exists; consequently, hunting around and within protected areas is frequently illegal because no permission has been received (T. Lim, pers. obs.). In Laos, hunting of rare species is prohibited, but hunting for subsistence is allowed (National Assembly, 2007); however, it is commonly believed by Lao nationals (including enforcement and government officials) that all forms of hunting are prohibited (Singh, 2008, 2010). In Vietnam, hunting is prohibited in “strictly protected” areas (Law No. 20/2008/QH12 on Biodiversity), and all animals on Appendix II of CITES, as well as those identified as endangered and rare, are illegal to hunt (Criminal Code No.100/2015/QH13). In recognition of this complexity across our three study countries, we will use the term “hunting” rather than “poaching” throughout the article. Most of our data was collected within 20 km of protected areas, which are theoretically protected from all forms of hunting according to all three countries' laws. Yet, since it can be unclear which areas are considered “strictly protected” in each country, it is possible that some of the hunting activities we noted in our sample were fully legal according to the local legislations.

Theoretically, we can expect that the effects of the pandemic will be to reduce, increase, and/or have no effect on hunting. It is possible that all three effects could occur within even a small geographic area, dependent on specific factors such as the economic resilience of a village, relationship with enforcement bodies, localized limitations on movement (such as those implemented during the COVID-19 pandemic), etc. This complex landscape of both positive and negative effects has been identified on a global scale (Bates et al., 2021). Here, we investigate the effect of the COVID-19 pandemic on hunting (and wildlife trade) at a fine scale, within three forest-adjacent communities in Vietnam, Cambodia, and Laos—three countries that lie within a global biodiversity hotspot, and hotspot for emerging infectious disease. Based on these results, we suggest potential areas where conservation interventions might be successful in

aligning with OneHealth goals of conserving the health and viability of wildlife and humankind.

2 | METHODS

2.1 | Study sites and timeframe

In Vietnam, we interviewed hunters adjacent to Pu Mat National Park, Pu Huong Nature Reserve and Pu Hoat Nature Reserve in the Western Nghe An Biosphere Reserve, Nghe An Province (Figure 2). In Cambodia, we interviewed hunters adjacent to the Central Cardamom Mountains National Park, in Kampong Speu and Koh Kong Provinces (Figure 1). In Laos, hunters were interviewed around Nam Et-Phou Louey National Protected Area, in Houaphan Province (Figure 2). Sites were chosen according to where the research team in each country had previously conducted research and built connections and trust (e.g., Davis et al., 2019; Viollaz et al., 2022), as well as the communities' proximity to protected areas. All study villages were within 20 km of a protected area in Laos: in Cambodia, all villages were within protected

area boundaries; and in Vietnam, all villages were within 10 km of a protected area.

In Cambodia, Laos, and Vietnam, the majority of the populations live in rural areas where limited livelihood opportunities create incentives for rural–urban migration. Internal migrants constitute significant proportions of the populations. Remittances are typically sent by the migrant to support the daily living cost of family members left behind who often rely on subsistence agriculture, as well as non-timber forest products (NTFP) (UNESCO, 2018). In Cambodia and Vietnam, rural–urban migrants tend to be better educated than family members staying behind and are drawn to urban employment opportunities in the garment, construction, tourist, transportation, and service industries (UNESCO, 2018). In Laos, the majority of internal migrants are women from Northern provinces seeking work in the garment sector (UNESCO, 2018).

We interviewed 18 hunters in Cambodia, from 12 villages across five districts. We interviewed 50 hunters in Vietnam from 26 villages, in one district. In Laos, we interviewed 41 hunters from 24 villages, in four districts. In Vietnam, hunters were interviewed between June and November 2020. In Cambodia,

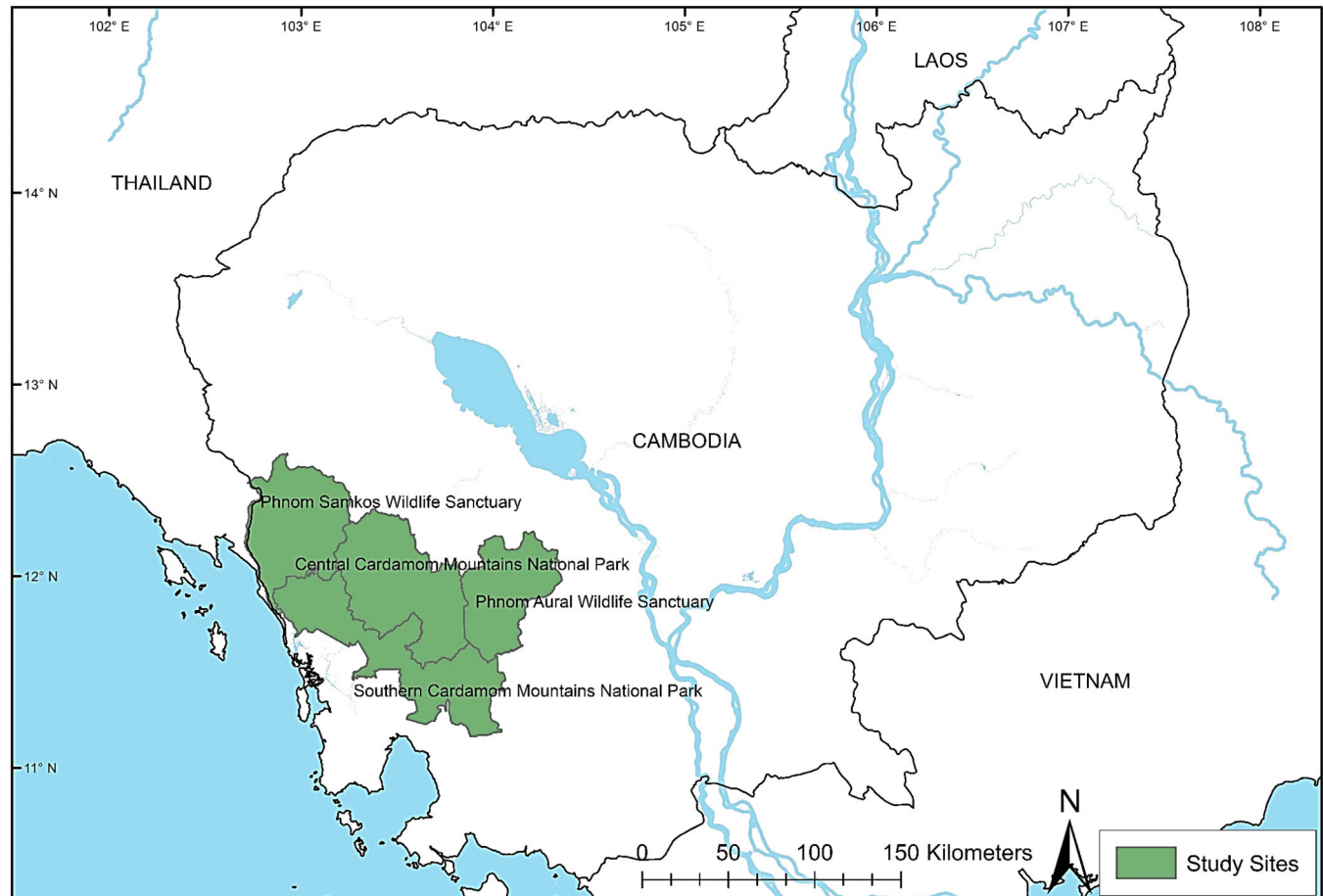


FIGURE 1 Map of the study sites in Cambodia. Study villages are not indicated to protect the identities of the respondents.

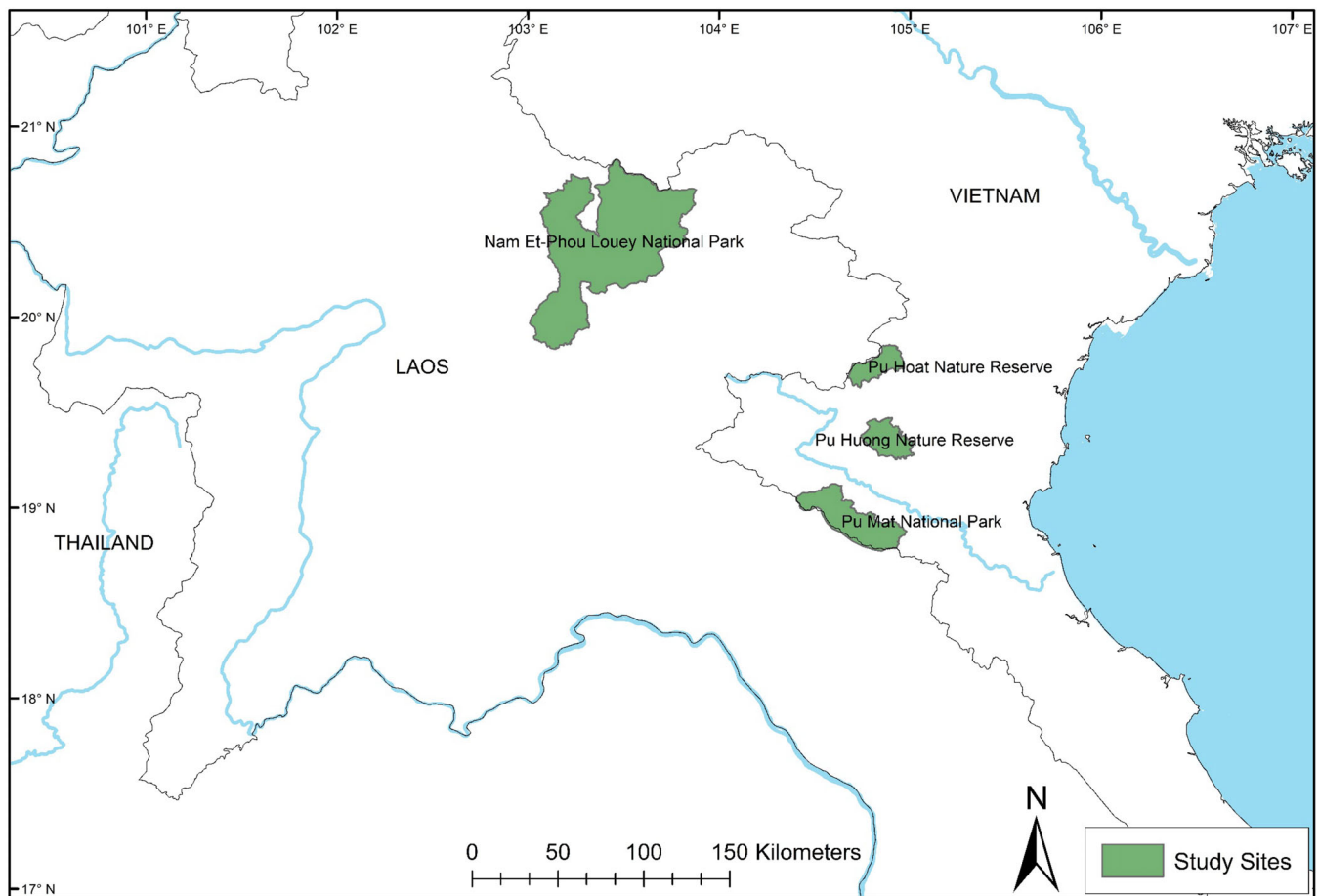


FIGURE 2 Map of the study sites, for Vietnam and Laos. Study villages are not indicated to protect the identities of the respondents.

hunters were interviewed between September 2020 and February 2021. In Laos, hunters were interviewed between March and July 2021.

2.2 | Sampling

Hunters were chosen according to snowball sampling. Initial contact was made with the local village chiefs in each area, and the chiefs referred hunters, who then referred other hunters they knew of in the village.

2.3 | Survey instrument

In a semi-structured interview, we asked the hunters an initial open-ended question: “*The recent outbreak of COVID-19 virus affected many aspects of life. Did it have any impact on hunting in this area?*” If hunters were not sure how to answer, we would ask them the following prompt questions: “*Were there any changes in hunting or trade in wildlife in general or any specific species? What changed and why?*”. Due to the open-ended conversational nature of this

question, it was assumed that respondents would not perceive this question to be particularly sensitive since many forms of hunting are legal in all three countries; respondents could choose how much and which information to provide.

The initial question was asked as part of a longer, semi-structured interview designed to investigate hunting and trade of large fauna in forest-adjacent communities in all three countries (Davis et al., *in prep.*). At the end of the interview, interviewers and note-takers were asked to record their perceptions of the interview, specifically: physical context (e.g. whether the respondent was alone, where the interview took place, whether alcoholic drinks were involved), respondent manner, and potential respondent secretiveness, which could contribute to overall sensitivity bias.

The survey instrument was administered by interviewers in each study site. The interviewers were highly trained (i.e., had participated in at least two trainings in interview technique and protocol) and in Vietnam and Cambodia, had practical field experience conducting hundreds of interviews. All interviewers could fluently speak the dominant language of each country they were conducting interviews in, and in some cases could also

speak other languages spoken in the villages where interviews were performed, such as Hmong and Tai.

2.4 | Analysis

Interview data were written in the national language of the country or in local languages (such as Hmong) by the interviewers, and translated to English by members of the research team with fluency in both languages per study site. Since these researchers were embedded in the data collection process, they could provide further clarification on connotation and meaning for responses, where necessary (described in further detail below). Analysis occurred after all interviews were completed. Handwritten notes were scanned, typed, and translated, with files saved into a shared, invitation-only, encrypted online folder. The data from Cambodia and Laos was coded by the lead author. The data from Vietnam was coded by co-author Marielle Castaneda, and reviewed by the lead author after the Cambodia and Laos thematic reports (discussed in more detail below) were created and codes had been established. This enabled the lead author to compare these identified codes with the codes in Vietnam and where appropriate, adjust the codes to better align with those created for Cambodia and Laos, so as to limit inter-coder unreliability.

In the first round of coding, the lead author and co-author Marielle Castaneda read through each individual response, and directly color-coded according to an identified theme within the response; for example, responses referring to “rising prices” were be coded as “economic” and after the first round of coding, grouped into a “common idea” (i.e., a theme [e.g. Cresswell, 2013; Elliott, 2018]) of “economic hardship”. At this time, questions and comments were also compiled by the lead author and co-author Marielle Castaneda, to be asked and presented to the entire research team (discussed below). Following this initial round of coding, the coding team would create a thematic document, which would begin as a collation of the codes into broad themes according to the frequency of the response, including relevant quotes. This would entail a second round of review, with consultation between written interpretation of the broad themes, available literature, and the specific, identified codes. Sometimes, this would result in adjustment of the codes to refine responses into more specific themes. This process followed the definition of thematic analysis given by Braun and Clarke (2006), as an active process by the analyzer to reflect “reality” as well as an investigation into the societal constructs, physical factors, geographic factors, national factors, and other factors that support this reality. Importantly, this is an initial study

and represents an investigation into a bounded and potentially unique event.

Following this second round of review, individual discussions were conducted with the author team, and where appropriate, experts involved in the project in an advisory capacity. These discussions involved questions about specific word connotation, physical context of the communities which may have influenced the responses, specific societal and physical context of specific responses (where appropriate), knowledge about government activities, anecdotal observations pertaining to the themes, and reflective insights from members of the author team, according to their lived experiences.

Beyond the two specific rounds of data coding, and group discussions following these second rounds, the lead author continually consulted and reflected on the data as part of an iterative process, particularly when refining the thematic reports in preparation for this article. Following this country-specific analysis process, the lead author compared thematic reports among countries, and then repeated the second stage of coding, whereby the thematic report and codes were consulted in tandem and iteratively, with adjustments made where appropriate. Through this iterative process, thematic saturation was reached, both for within-country themes, and for the between-country themes.

The potential secretiveness of the respondents was recorded for the full interviews conducted, by the interviewer and note-taker in conference. Sensitivity was expected since the respondents could potentially discuss illegal activities during the full interview conversations (e.g. Blair et al., 2020). The level of sensitivity to questions, and by extension potential deceit within the full interview, was determined by noting when respondents kept silent for certain questions, or changed the topic, or looked uncomfortable, or looked away (or some combination of all of the above). Sensitivity was generally recorded as an aggregate for the full interview, but was sometimes connected to specific questions. Sensitivity was determined exclusively by the interviewers, although the coders did confer with the interviewers in circumstances where more clarification on potential respondent secretiveness was needed. Figure 2 was created in R version 4.1.1 (R Core Team, 2022), using the *tidyverse* system of packages (Wickham et al., 2019), including *ggplot2* and *dplyr*. The code to create the figure can be found in Data S1.

2.5 | Ethics and ethical approval

Respondents were informed that the interviews were anonymous and that they could decline to answer or end the interview at any time. The research assistants stated

the scope of the interview, and the rights of the respondents. The interview did not proceed unless the respondent gave verbal consent. Because hunting can be illegal depending on where it occurs, and what is being hunted, we took significant precautions to ensure the safety of the respondents. This involved gaining specific approval from a village authority, generally the village leader. If the village leader was concerned that our interviews might be harmful for the villagers, s/he would deny permission to interview in that community. To further ensure trust between researchers and respondents, we approached village leaders with whom we had built relationships over the course of previous iterations of fieldwork.

The research team is composed of four women and three men. Of the women, we are American of European descent, American of Philippine descent, Cambodian of Khmer descent, and Italian of Eastern European descent. Of the men, we are Irish of Irish descent, Cambodian of Khmer descent, and Vietnamese of Kinh descent. Four members of the author team are employed by conservation organizations. One author is a student and independent researcher, one is a researcher at a scientific institution in Europe, and one is a professor at a university in Vietnam. We are frequent collaborators who share the position that illegal and/or unsustainable hunting is incontrovertibly damaging to biodiversity, ecosystem health, and human health in Southeast Asia. We also share the position that Southeast Asian communities must be key participants in the process of reducing hunting practices. Available knowledge will be shared with local communities, and any conservation action perpetrated to reduce hunting will both place importance on the livelihood and rights of forest-adjacent communities, and will be co-created with the communities. Research assistants employed in all three countries were nationals of the respective country in which the interview took place, spoke the majority language and in some cases specific ethnically-linked language(s), and in many cases, shared their heritage with the communities.

For the purposes of risk mitigation, all physical data are kept securely in locked cabinets on site in each country. All virtual data are kept securely online, accessible only through invitation and individual passwords. While blanket permission was granted for conducting the work by government entities in Cambodia and Laos, government officials were not permitted to join the interviews, nor did we share specifics about which villages interviews were conducted in. We obtained ethical approval for the study from Miami University of Ohio Institutional Review Board, #02106e.

We followed all local COVID requirements for social distancing, gathering in groups, mask-wearing, and travel.

The risk to respondents (and researchers) was low during the interview time periods. Generally, all three countries were successful at isolating any cases of COVID-19 quickly, prior to Omicron. As a result, all three countries were largely “open”, particularly in the rural areas where we conducted interviews. As noted by our participants, rural areas hardly noticed any effect of restrictions for much of the early years of the pandemic. In addition, most interviews took place outside, which will also have minimized the risk of possible transmission.

3 | RESULTS

All hunters interviewed were male. In Vietnam, hunters ($n = 50$) were from the Tai, Hmong, and Tay Poong ethnic minority groups. In Cambodia, hunters ($n = 18$) were predominantly Khmer, although one individual was Khmer-Chinese, and one was Khmer-Thai.¹ In Laos, hunters ($n = 41$) were Khmu, Hmong, and Lao.

3.1 | Study context: National COVID-19 trends

During data collection, Vietnam saw the biggest spike in cases (Figure 3), and continual cases throughout that period. Hanoi and the surrounding provinces were especially affected by strict governmental measures to contain the virus, which included the disbarment of Chinese nationals (many of whom operate or are employed at factories in Vietnam) (e.g. Hoang, 2019), strict limitation of travel into the country, and limits on social gatherings (e.g., Nguyen et al., 2021). Due to the combined force of these measures, many factories operating in Vietnam closed, and other economic opportunities were also limited.

Similar measures were implemented in Cambodia and Laos (Flower & Marks, 2021; Tatum, 2021). These policies will have also impacted economic opportunities in both countries due to these countries' reliance on international (and particularly inter-regional) trade (e.g. Green, 2021; Tran & Suhardiman, 2020). These impacts (in the context of hunting and wildlife trade) are discussed at greater length below for each country.

3.2 | Broad thematic categories between countries

Four broad themes were found in the data: economic impact within communities, change to community hunting patterns, impact on illegal wildlife trade, and

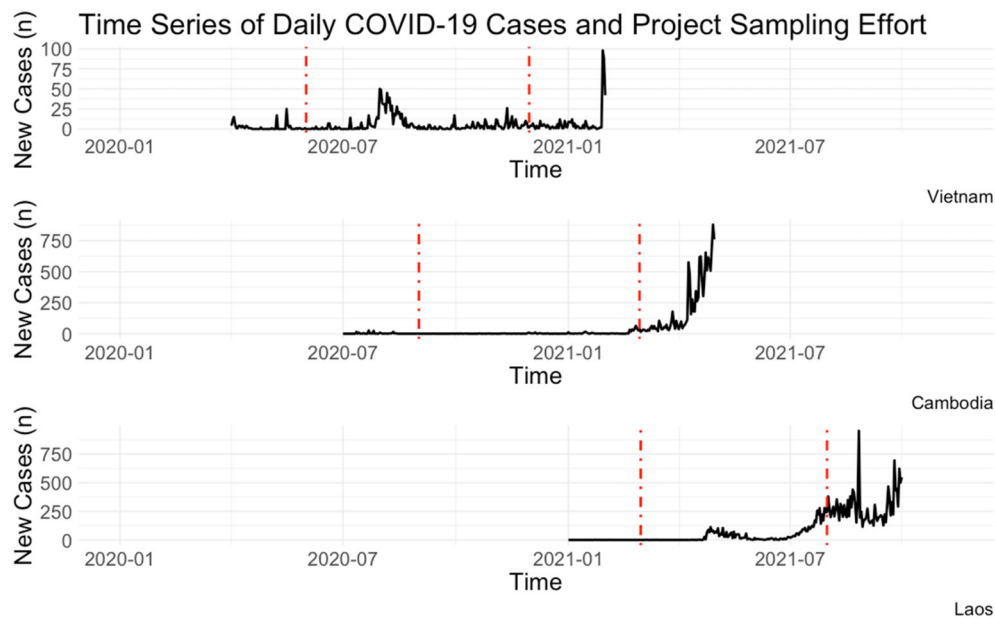


FIGURE 3 Daily COVID-19 cases in all three countries, with red dashed lines indicating the start and end dates of the sampling effort in each country. In Vietnam, a spike occurred shortly after sampling began. In Cambodia, cases began to marginally rise as sampling finished, and in Laos a small spike occurred midway through, followed by a larger spike at the end of the sampling effort. The relatively low number of cases in each country prior to data collection is indicative of the strict restriction put in place to prevent the spread of COVID-19 in those countries. Figure created using data accessed from the WHO COVID-19 Dashboard (WHO COVID-19, 2021).

TABLE 1 Table of themes identified, moving (left to right) from the identified broad theme, sub themes, a connected theme (if applicable), and the country/ies that the theme(s) were found in.

Broad theme	Sub theme	Connected theme	Country
Economic impact within communities	Loss of jobs due to pandemic restrictions	Increased forest entry	Vietnam
			Cambodia
	Increased prices	Laos	
Change to hunting patterns	Increased hunting activity		Vietnam
Impact on illegal wildlife trade	Decreased illegal wildlife product trade		Vietnam
	Wildlife traders no longer coming to communities		Cambodia
Generalized COVID-19 impact	No impact		Cambodia
			Laos

Note: “Sub themes” are defined as being a detailed, directed theme, connected to each specific country. “Connected theme” here is defined as a sub theme directly connected by the respondents to another sub theme, in contrast to parallel sub themes that were not directly connected to one another by the respondents, such as “loss of jobs” and “increased prices”. Hence, the connected theme of “increased forest entry” is defined as such because it was explicitly connected by respondents to the sub theme of “Loss of jobs due to pandemic restrictions”.

generalized COVID-19 impact (Table 1). From these, we identified six specific themes, and one connected theme. Individuals from all three countries reported economic impact. However, respondents in Cambodia and Laos also asserted that there was no general impact of COVID-19. In Vietnam, change to hunting patterns and the impact of COVID-19 on illegal wildlife trade were both identified broad themes.

3.3 | Data context: sensitivity bias

In Cambodia, three individuals (17%, $n = 18$) did not appear to answer truthfully about their own actions during the complete interview, while two other individuals in Cambodia answered openly about their own actions, but refused to talk about the actions of others out of fear of incriminating those individuals without their explicit

permission. In Vietnam, seven respondents appeared to be secretive when discussing hunting practices (14%, $n = 50$). In Laos, four respondents (10%, $n = 41$) were deemed to be secretive during the full interview. Within some of these interviews, the research team noted particular questions where sensitivity to responding was noted. However, the questions noted were specific to the hunting of large carnivores, rather than the question this study is focused on (the impact of COVID-19 within hunter communities and on wildlife hunting and trade).

3.4 | Vietnam

Responses regarding the impact of COVID-19 on wildlife hunting and trade varied among the respondents in Vietnam. Nearly half of the respondents (42%, $n = 21$) noted an increase in hunting activity, 24% ($n = 12$) stated that they were unaware of any impacts on hunting, while 18% ($n = 9$) perceived no impact on hunting. Many of those who believed that the pandemic did not have an impact on hunting, however, did mention an impact on local wildlife trade. Specifically, 64% ($n = 34$) of the respondents said that COVID-19 had led to a decrease in frequency or increased difficulty in illegal wildlife trading. For example, a 42-year-old Tai farmer said, “The government bans so they [hunters] don’t go to the forest” as his response to our question “*The recent outbreak of COVID-19 virus affected many aspects of life. Did it have any impact on hunting in this area?*” while a 50-year-old Tai farmer suggested that trading decreased because general traffic decreased, and therefore individuals were more likely to have their vehicles checked. The assertion that enforcement officials were checking more often, and that this both had impacted trade in wildlife and was a result of the pandemic, was mentioned by multiple individuals in the sample.

Other notable impacts of COVID-19 included increased visits to the local forest, lost jobs and work opportunities, and an overall strain on quality of life. Nearly half of the respondents (40%, $n = 20$) stated that villagers began going into the forest more frequently during the pandemic, specifically during the sanctioned quarantine lockdown. Going to the forest more did not necessarily constitute hunting specifically—two respondents noted that people going into the forest more were intending not to hunt, but to gather other forest products. As a result of the overall governmental measures to control the spread of COVID-19, a cascade of local economic consequences ensued. Companies and factories were forced to close or shutdown, leaving many unemployed. Consequently, many respondents attributed the increased

behavior of going into the forest to the villagers losing their jobs and being out of work. In fact, 13 of the 17 respondents who stated that people had lost their jobs due to the pandemic also said that people had started going into the nearby forest (i.e., protected area) more.

“People who lost their jobs can go to the forest for food or hunting [illegal]. They will go back to work only if the quarantine is ended.”

- 55-year-old Tai farmer

Because of the pandemic, people who work far from home now just stay at home and tend to go to the forest more.

- 67-year-old Tai farmer

[COVID-19] does not have any effect on hunting because nowadays there are not many people hunting, but it does affect going to the forest more (for taking some forest products like bamboo shoots, honey, herbs). Has an impact on trading wild animals because the forest rangers are stricter.

- 60-year-old Tai farmer and head villager

However, one individual stated that COVID-19 did not have an impact on local hunting behavior:

[COVID-19] does not affect much on people's life because lack of them going to the forest (only few hunters left). Trading is not as convenient as before because of the transportation [barriers] during COVID-19.

- 52-year-old Tai farmer

Thirty-percent ($n = 15$) of respondents stated that they did not know or did not care whether the pandemic had any effect on local hunting simply because they themselves were no longer hunting, therefore they were unaware of the current local hunting activities. Some respondents reported going to the forest more to hunt for food or for money, while others reported going to gather forest products (however, it was unspecified whether these products were for personal use or for financial gain). Although there was some variability in the responses regarding impacts on hunting, a notable consensus about the impacts on the ease of trading wildlife emerged. A majority of respondents (64%, $n = 32$) reported diminished or decreased trading of local wildlife. Respondents listed restricted travel and escalated enforcement by forest rangers as the two primary reasons for the increased difficulty—therefore

decreased frequency—in illegal wildlife trading activity.

Trading is less because of the travel restriction and the forest rangers are stricter.

- 55-year-old Tai farmer

[COVID-19] has impacts on wild animals trading because of travel restriction, they check people more often.

- 54-year-old Tay Poong agriculturist and former hunter

Interestingly, one respondent mentioned an impact on local restaurants:

Trading is also decrease (the local restaurants do not have much wild animal meat like they used to).

- 63-year-old Tai farmer

Prices for wildlife products were stated to have been impacted by COVID-19. One respondent mentioned that the prices of wildlife goods may have dropped, which contradicted other respondents (such as the individual quoted below) who stated that wildlife goods had become more valuable.

[COVID-19] has a huge impact on people's life: everything is more expensive, wild animals are expensive too. More people go to the forest to hunt.

- 62-year-old Tai farmer

Impacts on the local wildlife populations were not mentioned by any respondents, even when prompted. Instead, wildlife were discussed in relation to their marketability:

Yes, people lost their job; go to forest for food. There were not any changes about any species, every animal can be sold.

- 63-year-old Tai farmer

The final major theme that emerged from the responses reflects a consequence of COVID-19 that encompassed society at large—economic impacts. Thirty-six percent of the respondents ($n = 18$) mentioned themselves or others losing their jobs because of the pandemic. Although they were only asked about impacts on hunting and wildlife trade, several respondents explained that these other pandemic-related effects were detrimental to their community's economic viability and general well-being.

Their life is more tough because people cannot go to work have to come back to the village.

- 50-year-old Tai farmer

3.5 | Cambodia

Responses were mixed regarding the impact of COVID-19 in Cambodia. Three respondents (17%) stated economic impacts, with general goods becoming more expensive (“prices have risen”) and unemployment rising. Another theme also stated by three respondents (17%) was that traders were no longer coming to the communities to purchase wild animals and their products, as well as non-timber forest products. One individual described a scenario relating to pangolin (note that “before COVID-19” in the quote refers to the time directly prior to March 2020, as discussed in the broader conversation around COVID-19 impacts):

Before COVID-19, 1 kg of pangolin was 500 USD. But nowadays it has been decreasing to only 100,000 KHR [~25 USD]. Because of covid the price of the wildmeat has decreased. King cobra used to get 1 kg for 200 USD, but now no one comes to buy. One district has one dealer come to buy, but buy or sell he needs to do secretly because authority will arrest. Then, the dealer continues to sell to Vietnam because Vietnam has the ship to take all kind of wildlife to China. Now, if there [is a] dealer, they [hunters] will not tell you [referring to interviewers].

- 85-year-old Khmer retired teacher

Another individual said:

No traders came to buy non-timber forest products, recently because those people need to cross border from Thailand to buy.

- 59-year-old Khmer-Thai farmer/logger

The inference of the comment being that the lockdowns in Thailand and Cambodia had made land travel more difficult between the two countries. Another respondent in this theme described a scenario where he actively created a barrier to traders and outside poachers coming into the village, due to his fears of being arrested by a wildlife law enforcement NGO working in the area:

As I know, it affected such as it reduced the number of hunters because there has [been] no buyer, this because [COVID19] impact on the people finance. There have [been] no people com[ing] for order [wild] animals. Last month there were people [hunter] came and asked to stay at my house for trapping wildlife but I was afraid of [arrest by forest authority] [so I ignored them], they

are from Kandal province [approximately 2–3 h drive away]. They wanted to catch diverse wildlife; they take all what were caught. They will not use the normal snare trap but they would use electric shock equipment. [Also], as I heard that Pangolin contaminated Covid 19, it was effect on the price of it.

- 54-year-old Khmer sub-village chief and soldier

Other responses within the broader sample were more variable, and could not be easily classified into the broader themes. One respondent (6%) said that he was initially afraid of pangolin consumption in particular, but changed his mind according to peer influence:

At first, I was afraid as I heard that it [COVID-19] is transmitted by a pangolin, so that I dare not to eat it. But according to the result from others hunters who have eaten it, they have not any problems. Then, I bought it and ate but I'm still normal.

- 65-year-old Khmer village chief

Another respondent (6%) described:

I just heard and knew from the news. It has no effect, we live a normal life, but need to protect ourself by ourselves. For those who go to the forest to collect non-timber forest products, such as Krokor fruit or Rong resin [a type of natural sealant], they still normally do because it'll not be impact by the disease, we do it in only in our community. No one came here to buy wildlife.

- 42-year-old Khmer teacher

One respondent (6%) said that he was indeed scared of COVID-19 and specifically of eating wild meat. He said “What they [other people] didn't see with their eyes, they don't believe, [but] some reports said that it was transmitted from pangolin.” Finally, a third of respondents (33%, $n = 6$) cited no impact of COVID-19. Three respondents (17%) were unsure of impacts, but two of those respondents did speculate that there had been no change since people still went into the forest and still ate wildlife meat.

3.6 | Laos

For Laos, the biggest impacts respondents identified (49%, $n = 20$) were economic, specifically: (1) increase in prices of general goods; and (2) barriers to transportation, such as within-country and international travel bans. Of the 41 respondents, seven (17%) stated that transportation had become difficult and prices had increased. Another 32% ($n = 13$) agreed that prices increased, and

that life had become more economically challenging. One respondent (57-year-old Hmong farmer) said that not only had prices increased, but his family had also lost income with his son having to return from working in the city. Other reasons given ranged from an increase in the price of goods from Vietnam, as well as a general decline in income with no tourism. One individual (30-year-old Khmu farmer) said that while product prices had increased, he also believed that there had been no effect on hunting because outbreaks were localized to cities rather than rural areas—i.e., rural areas unaffected by COVID-19 did not have restrictions on local movement.

A fifth of respondents (22%, $n = 9$) said that they had seen no effect from COVID-19. In particular, some respondents stated that in their experience, hunters were continuing to hunt and sell wildlife, although it is possible that this was only occurring locally. For example, at one cluster of restaurants on the highway near the study site, only one of five restaurants was not selling wildlife meat at the time of the survey (B. Crudge, pers. obs., 26 Feb 2021***). Although 17% ($n = 7$) of the respondents speculated that hunters were unable to find any buyers due to the border closures, one respondent said that hunters would be able to find buyers if they “know the police”. The third strongest theme (17%, $n = 7$) was belief that due to the international border closures, access to middlemen would have stopped for hunters, thus decreasing impetus to supply wildlife. The final theme (7%, $n = 3$) was personal impacts health and security, i.e., concerns over the safety of family members and themselves, coupled with observations about product price increases. Finally, one individual fell outside of any theme (2%, 35-year-old Hmong farmer) by agreeing that hunting had become more challenging, but instead he blamed the challenges on increased regulations against hunting.

4 | DISCUSSION

We found evidence of the pandemic reducing trade (Vietnam and Cambodia), increasing hunting (Vietnam), and having no other effect (Cambodia and Laos). In Vietnam, localized hunting was believed to have increased, but the ability to trade wildlife products more widely was believed to have decreased. We can infer that hunting became more important for subsistence following loss of jobs and economic opportunity, but less valuable for increasing one's economic stability via lucrative rural-to-urban and/or international trade avenues. In Cambodia, a reduction in wildlife trade was described, but so was an absence of any impact of the COVID-19 pandemic. Hunting likely persisted at a “normal” level

within the communities we conducted interviews in, but the opportunities for (potentially) more lucrative rural-to-urban and/or international trade were reduced. Within the communities we interviewed, it appears that Cambodia's strict border measures prohibited the "middlemen" traders who would ordinarily visit and purchase wildlife.

Reduced opportunities for further income generation compounds existing issues of poverty, which we observed in Vietnam. While the hunting and consumption of wildlife should be reduced, conservation interventions—particularly enforcement—can become unethical in contexts where additional food and/or income opportunities are scarce (Ingram et al., 2021). Additionally, these results illustrate the direct consequence of loss of urban economic opportunity on local wildlife. The factories of Vietnam have negative environmental effects (Hostovsky et al., 2010), but within the complicated conservation issue of hunting and wildlife trade they are an important factor in decreasing hunting pressure. We can speculate that a lack of similar responses in Cambodia and Laos reflect a lack of such alternative employment for men; Cambodian factories have tended to be female-dominated (e.g. Brickell et al., 2022), and Laos lags behind both countries in industrialization (Nakata, 2021). However, we also note that while increased employment and economic stability are expected to improve some conservation challenges such as direct hunting, increased economic stability and by extension available income can facilitate the use of wildlife, as seen in Vietnam (e.g. Olmedo et al., 2022) and in China (Zhang & Yin, 2014).

Vietnam instituted a new directive in response to COVID-19, with provisions for shutting down wildlife markets and generally tackling pervasive wildlife consumption within the country (Sardana and Fischer, 2021). This law made it into international media, and was important within Vietnam for directly articulating and codifying into law the link between wildlife consumption and emerging infectious diseases. Possibly, this could have resulted in increased awareness of such links, but this did not manifest in our sample. By contrast, Laos did not institute any such laws, and the country as a whole stayed largely separate and isolated from the impacts felt by more globalized countries, including Vietnam (e.g. Flower & Marks, 2021). This "life as normal" reality within Laos may have barred prolonged reflection on the links between wildlife consumption and COVID-19. Despite these different national responses and by extension an expectation that respondents in Vietnam would be more expressive about COVID-19 and wildlife consumption, direct concerns over contracting COVID-19 from wild meat consumption were not expressed in our samples in Vietnam or Laos. At a national level Cambodia was somewhere in the "middle"

of both Vietnam and Laos, with no directive implemented to target wildlife consumption, but with clear economic impacts of the virus (e.g. Grundy-Warr & Lin, 2020). Yet despite our small sample, two respondents in Cambodia expressed direct concerns with consuming wildlife, explicitly linking this consumption with fears over COVID-19. The respondents we interviewed in Cambodia may have been more aware of the wildlife consumption and emerging infectious disease link due to the active presence of a local NGO within the area. Our results may be representative of the NGO's localized efforts to increase understanding of this link, which illustrates the importance of local networks and locally-based organizations in spreading information, particularly within rural communities (e.g. de Lange et al., 2019).

Our results from Cambodia also show that the restrictions of COVID-19 may have had a positive impact for wildlife in creating barriers to international trade and transportation; however, wild meat consumption and hunting was reported to continue as normal within the communities. While we did not find a theme of increased hunting connected to the economic impacts of COVID-19 in Cambodia, other research in the country has pointed to such a link (Gish et al., 2021). It's possible that our sample size of 18 was too small to capture this effect. It is also possible that we did not capture the effect of the pandemic on local economic stability. Our sampling occurred between September 2020 to February 2021, just before mass layoffs (as opposed to temporary unemployment) occurred at the garment factories that many women (and by extension, many households) across Cambodia rely on (Brickell et al., 2022).

Transportation barriers were mentioned by respondents in every country, although the strength and direction of this perceived impact varied. This variance may have been due to specific, localized factors. For example, respondents in Laos cited transportation barriers most frequently, possibly because Laos is a transit country for many goods, and heavily depends on inter-regional trade in goods from neighboring countries such as Thailand and Vietnam (e.g., Walker, 1999). However, a fifth of the respondents in Laos noted no economic impact, which may be a reflection of rural isolation that buffered global economic impacts, and/or some form of self-sufficiency in the villages of those respondents (i.e., little reliance on external resources). Across the border in Vietnam, transportation barriers were cited by a majority of the sample as an impact of COVID-19, but not in relation (necessarily) to the economy. These barriers were cited in relation to wildlife trade, with perceived increased enforcement causing greater challenges in easily transporting wildlife out from the forest. It is possible that the perceived greater enforcement of trafficking wildlife products out

was a reflection of less traffic, and thereby, greater opportunity for enforcement officials to search the vehicles that were passing through. This may have also caused traders to become hesitant to attempt to illegally trade wildlife, which could explain the additional noted difficulty in finding wildlife buyers and sellers. It is also possible that the perceived increases in enforcement were unrelated to COVID-19, despite the beliefs of the respondents. These barriers to the international illegal wildlife trade (IWT), as well as within-country rural–urban IWT, may have the benefit of providing a (temporary) decrease in the accessibility of wildlife products within urban spaces. However, this is not a long-term solution to the challenge of urban wildlife consumption. Reducing demand is the most viable, long-term intervention to halt the flow of wildlife from protected areas (e.g. Verissimo & Glikman, 2020).

Across all three countries, few respondents expressed hesitation over their personal actions of hunting and consuming wildlife, or being in communities where such practices occur. Within interviews, respondents would justify their practices according to their economic situation. In Vietnam, the difficulty in maintaining income and the ability to afford daily necessities, such as food, was discussed within the interviews. Economic difficulties can result in increased hunting for subsistence purposes (e.g., Duffy et al., 2016). Our results show that the COVID-19 pandemic initiated increased hunting by individuals affected in Vietnam. While we did not find the same result in Laos and Cambodia, we did note that hunting and wild meat consumption were continuing. Taken as a whole, our results demonstrate the fundamental OneHealth concept that conservation, poverty, and human health are inextricably linked (e.g., Amuasi et al., 2020). Economic hardship within rural communities such as those in Vietnam can exacerbate the global issues of loss of biodiversity and the emergence of infectious diseases.

Our results illustrate the importance of engaging directly with illegal hunters themselves, to best understand locally-specific complexities, challenges, and opportunities (e.g., Duffy et al., 2016). Our results also show the challenges of conducting conservation when people's livelihoods and well-being are directly involved. While discouraging hunting and the consumption of wildlife is necessary to limit the emergence of future infectious diseases, a global pandemic places significant economic strain on rural communities and can increase some communities' need to rely on subsistence hunting. Strict enforcement and penalization of hunting could be counter-productive through exacerbating poverty and in turn, lessen the ability of rural communities to withstand disease (Booth et al., 2021). Instead, conservation organizations should be

aware of the role that subsistence hunting has in the livelihoods of rural and/or impoverished communities, and facilitate well-researched, participatory, and evaluated shifts to more sustainable and healthy practices that benefit the community, and the world (e.g., Booth et al., 2021).

4.1 | Limitations

In all three countries, some hunting practices are illegal. As such, there may have been hesitation in our samples over truthfully discussing the extent of hunting practices. The level of sensitivity bias was similar across all three countries, with 10–17% of respondents potentially giving deceitful responses for particularly sensitive questions within the entire interview. In addition, the sample in Cambodia was much smaller than intended due to general reluctance to be interviewed about hunting. We suspect this is due to the concerted enforcement efforts of NGOs working in the area. While hunting and wildlife trade are certainly still going on in the area where we conducted interviews, it is a more secretive practice due to fear of repercussions. We cannot specifically identify whether respondents were deceitful when discussing the impact of COVID-19 on hunting practices in the area; however, interview notes indicated deceit around those questions in the interview that asked specifically about hunting large carnivores (which are illegal to hunt in all three countries), as well as the hunting actions of respondents' peers, rather than the impact of COVID-19 on hunting practices in the community.

We also recognize that with our results we cannot identify the relationship between the impacts of COVID-19 with actual hunting pressure (i.e., wildlife offtake). To answer that question, a larger quantitative study would need to be conducted that explores economic covariates (such as unemployment, inflation, and barriers to international trade), along with relative animal take before and after the COVID-19 pandemic.

5 | CONCLUSION

Our results are only a brief snapshot of the impact of COVID-19 on forest-dependent individuals and communities. More research is necessary, ideally rural and urban studies of consumption and economic viability, paired with targeted questions assessing the individual and community-level impact of the sweeping “wildlife ban” policies instituted across China and Southeast Asia (e.g., Roe et al., 2020). While a substantial number of

individuals noted few impacts to their communities, the economic impact of the pandemic was felt across all three countries. Building resilience to pandemics necessitates achieving human development goals, especially basic economic security (Booth et al., 2021). Decentralizing economic opportunities away from urban centers is one strategy that could engender rural resilience and facilitate efforts to reduce localized reliance on hunting for subsistence and income.

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DATA AVAILABILITY STATEMENT

Due to the sensitive nature of this data, it will not be posted publicly. It can be shared on reasonable request, with geographic identifiers removed.

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ENDNOTE

¹ “Thai” differs slightly in the context of our respondents from Cambodia and Vietnam, and is therefore marked by the slight difference in spelling. Thai refers to individuals living within and near the modern Southeast Asian country of Thailand, who come from the “Tai” ethnic group. The Tai ethnic group in Vietnam shares cultural similarities with the “Thai”, but they migrated from the area now known as Thailand several hundred years ago (e.g., Keyes, 1995).

REFERENCES

- Amuasi, J. H., Lucas, T., Horton, R., & Winkler, A. S. (2020). Reconnecting for our future: *The Lancet* One Health commission. *The Lancet*, 395(10235), 1469–1471.
- Bates, A. E., Primack, R. B., Biggar, B. S., Bird, T. J., Clinton, M. E., Command, R. J., Richards, C., Shellard, M., Geraldi, N. R., Vergara, V., & Acevedo-Charry, O. (2021). Global COVID-19 lockdown highlights humans as both threats and custodians of the environment. *Biological Conservation*, 263, 109175.
- Berrian, A. M., Smith, M. H., van Rooyen, J., Martínez-López, B., Plank, M. N., Smith, W. A., & Conrad, P. A. (2018). A community-based one health education program for disease risk mitigation at the human-animal interface. *One Health*, 5, 9–20. <https://doi.org/10.1016/j.onehlt.2017.11.002>
- Blair, G., Coppock, A., & Moor, M. (2020). When to worry about sensitivity bias: A social reference theory and evidence from 30 years of list experiments. *American Political Science Review*, 114(4), 1297–1315.
- Booth, H., Arias, M., Brittain, S., Challender, D. W. S., Khanyari, M., Kuiper, T., Li, Y., Olmedo, A., Oyanedel, R., Pienkowski, T., & Milner-Gulland, E. J. (2021). “Saving lives, protecting livelihoods, and safeguarding nature”: Risk-based wildlife trade policy for sustainable development outcomes post-COVID-19. *Frontiers in Ecology and Evolution*, 9, 639216. <https://doi.org/10.3389/fevo.2021.639216>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>
- Brickell, K., Chhom, T., Lawreniuk, S., & So, H. (2022). Global precarity chains and the economic impact on Cambodia's garment workers. In *Covid-19 in Southeast Asia: Insights for a post-pandemic World* (Vol. 8, p. 97).
- Coker, R. J., Hunter, B. M., Rudge, J. W., Liverani, M., & Hanvoravongchai, P. (2011). Emerging infectious diseases in Southeast Asia: Regional challenges to control. *The Lancet*, 377, 599–609. [https://doi.org/10.1016/S0140-6736\(10\)62004-1](https://doi.org/10.1016/S0140-6736(10)62004-1)
- Cresswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. SAGE.
- Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Bio Medica: Atenei Parmensis*, 91(1), 157.
- Davis, E. O., Crudge, B., Lim, T., O'Connor, D., Roth, V., Hunt, M., & Glikman, J. A. (2019). Understanding the prevalence of bear part consumption in Cambodia: A comparison of specialised questioning techniques. *PLoS One*, 14(2), e0211544.
- Decaro, N., Martella, V., Saif, L. J., & Buonavoglia, C. (2020). COVID-19 from veterinary medicine and one health perspectives: What animal coronaviruses have taught us. *Research in Veterinary Science*, 131, 21–23. <https://doi.org/10.1016/j.rvsc.2020.04.009>
- Duffy, R., St John, F. A., Büscher, B., & Brockington, D. (2016). Toward a new understanding of the links between poverty and illegal wildlife hunting. *Conservation Biology*, 30(1), 14–22.
- Elliott, V. (2018). Thinking about the coding process in qualitative data analysis. *The Qualitative Report*, 23(11), 2850–2861.

- Flower, B., & Marks, M. (2021). Did Laos really control the transmission of SARS-CoV-2 in 2020? *The Lancet Regional Health-Western Pacific*, 13.
- Gibbons, D. W., Sandbrook, C., Sutherland, W. J., Akter, R., Bradbury, R., Broad, S., Clements, A., Crick, H. Q. P., Elliott, J., Gyeltshen, N., Heath, M., Hughes, J., Jenkins, R. K. B., Jones, A. H., Lama, R. L., Macfarlane, N. B. W., Maunder, M., Prasad, R., Romero-Muñoz, A., ... Ockendon, N. (2021). The relative importance of COVID-19 pandemic impacts on biodiversity conservation globally. *Conservation Biology*, 36, e13781. <https://doi.org/10.1111/cobi.13781>
- Gish, E., Leroux, N., & Marx, N. (2021). Snaring epidemic threatens an endangered banteng *Bos javanicus* population of global conservation significance in Southwest Cambodia. *Cambodian Journal of Natural History*, 2021, 40–52.
- Green, W. N. (2021). Placing Cambodia's agrarian transition in an emerging Chinese food regime. *The Journal of Peasant Studies*, 49(6), 1249–1272.
- Grundy-Warr, C., & Lin, S. (2020). COVID-19 geopolitics: Silence and erasure in Cambodia and Myanmar in times of pandemic. *Eurasian Geography and Economics*, 61(4–5), 493–510.
- Hoang, P. (2019). Domestic protests and foreign policy: An examination of anti-China protests in Vietnam and Vietnamese policy towards China regarding the South China Sea. *Journal of Asian Security and International Affairs*, 6(1), 1–29.
- Hostovsky, C., MacLaren, V., & McGrath, G. (2010). The role of public involvement in environmental impact assessment in Vietnam: Towards a more culturally sensitive approach. *Journal of Environmental Planning and Management*, 53(3), 405–425.
- Huang, Q., Wang, F., Yang, H., Valitutto, M., & Songer, M. (2021). Will the COVID-19 outbreak be a turning point for China's wildlife protection: New developments and challenges of wildlife conservation in China. *Biological Conservation*, 254, 108937.
- Ingram, D. J., Coad, L., Milner-Gulland, E. J., Parry, L., Wilkie, D., Bakarr, M. I., Benitez-López, A., Bennett, E. L., Bodmer, R., Cowlshaw, G., & El Bizri, H. R. (2021). Wild meat is still on the menu: Progress in wild meat research, policy, and practice from 2002 to 2020. *Annual Review of Environment and Resources*, 46, 221–254.
- Keyes, C. F. (1995). Who are the Tai? Reflections on the invention of identities. In *Ethnic identity: Creation, conflict, and accommodation* (pp. 136–160).
- Koju, N. P., Kandel, R. C., Acharya, H. B., Dhakal, B. K., & Bhuju, D. R. (2021). COVID-19 lockdown frees wildlife to roam but increases poaching threats in Nepal. *Ecology and Evolution*, 11, 9198–9205. <https://doi.org/10.1002/ece3.7778>
- Lappan, S., Malaivijitnond, S., Radhakrishna, S., Riley, E. P., & Ruppert, N. (2020). The human–primate interface in the new Normal: Challenges and opportunities for primatologists in the COVID-19 era and beyond. *American Journal of Primatology*, 82, e23176. <https://doi.org/10.1002/ajp.23176>
- Liu, P., Jiang, J.-Z., Wan, X.-F., Hua, Y., Li, L., Zhou, J., Wang, X., Hou, F., Chen, J., Zou, J., & Chen, J. (2020). Are pangolins the intermediate host of the 2019 novel coronavirus (SARS-CoV-2)? *PLoS Pathogens*, 16, e1008421. <https://doi.org/10.1371/journal.ppat.1008421>
- Nakata, T. (2021). After dispossession: Shifting livelihoods and lives since the advent of a rubber plantation in southern Laos. *Journal of Southeast Asian Studies*, 52(3), 492–514.
- National Assembly. (2007). Wildlife and Aquatic Law. https://data.laos.opendevlopmekong.net/laws_record/wildlife-and-aquatic-law-2007#:~:text=The%20Wildlife%20and%20Aquatic%20law,anthropogenic%20pressure%20on%20decreasing%20species
- Nguyen, T. V., Dai Tran, Q., Phan, L. T., Vu, L. N., Truong, D. T. T., Truong, H. C., Le, T. N., Vien, L. D. K., Nguyen, T. V., Luong, Q. C., & Pham, Q. D. (2021). In the interest of public safety: Rapid response to the COVID-19 epidemic in Vietnam. *BMJ Global Health*, 6(1), e004100.
- Nijman, V., & Shepherd, C. R. (2021). Underestimating the illegal wildlife trade: A ton or a tonne of pangolins? *Biological Conservation*, 253, 108887. <https://doi.org/10.1016/j.biocon.2020.108887>
- R Core Team. (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing <https://www.R-project.org/>
- Roe, D., Dickman, A., Kock, R., Milner-Gulland, E. J., Rihoy, E., & Sas-Rolfes, M. (2020). Beyond banning wildlife trade: COVID-19, conservation and development. *World Development*, 136, 105121. <https://doi.org/10.1016/j.worlddev.2020.105121>
- Royal Government of Cambodia. (2002). *Law on forestry*. Ministry of Agriculture, Forestry and Fisheries, Royal Government of Cambodia. https://data.opendevlopmekong.net/laws_record/law-on-forestry
- Royal Government of Cambodia. (2007). Prakas No. 145 (RGC) on establishment and management of community forest areas in Siem Reap province. <https://forestlegality.org/sites/default/files/2019-08/Prakas%20No.%20145%20%28RGC%29%20on%20establishment%20and%20management%20of%20community%20forest%20areas%20in%20Siem%20Reap%20province.%20%28May%202007%29.pdf>
- Royal Government of Cambodia. (2008). Protected Area Law 2008. [https://portal.mrcmekong.org/assets/v1/documents/Cambodian-Law/-Protected-Areas-Law-\(2008\).pdf](https://portal.mrcmekong.org/assets/v1/documents/Cambodian-Law/-Protected-Areas-Law-(2008).pdf)
- Singh, S. (2008). Contesting moralities: The politics of wildlife trade in Laos. *Journal of Political Ecology*, 15, 1–20.
- Singh, S. (2010). Appetites and aspirations: Consuming wildlife in Laos. *The Australian Journal of Anthropology*, 21(3), 315–331. <https://doi.org/10.1111/j.1757-6547.2010.00099>
- Tatum, M. (2021). Cambodia ends controversial COVID-19 restrictions. *The Lancet*, 397(10289), 2035.
- Tran, T. A., & Suhardiman, D. (2020). Laos' hydropower development and cross-border power trade in the lower Mekong Basin: A discourse analysis. *Asia Pacific Viewpoint*, 61(2), 219–235.
- UNESCO. (2018). Policy briefs on internal migration in Southeast Asia. <https://bangkok.unesco.org/content/policy-briefs-internal-migration-southeast-asia>. August 19, 2022
- Verissimo, D., & Glikman, J. A. (2020). Influencing consumer demand is vital for tackling the illegal wildlife trade. *People and Nature*, 2(4), 872–876.
- Viollaz, J., Rizzolo, J. B., Long, B., Trung, C. T., Kempinski, J., Rawson, B. M., Reynald, D., Quang, H. X., Hien, N. N., Dung, C. T., & Huyen, H. T. (2022). Potential for informal guardianship in community-based wildlife crime prevention: Insights from Vietnam. *Nature Conservation*, 48, 123–147.

- Walker, A. (1999). The legend of the golden boat: Regulation, trade and traders in the borderlands of Laos, Thailand, China and Burma. University of Hawaii Press.
- Watsa, M., & Wildlife Disease Surveillance Focus Group. (2020). Rigorous wildlife disease surveillance. *Science*, 369, 145–147. <https://doi.org/10.1126/science.abc0017>
- Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., Grolemund, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller, E., Bache, S. M., Müller, K., Ooms, J., Robinson, D., Seidel, D. P., Spinu, V., ... Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software*, 4(43), 1686.
- Wolfe, N. D., Daszak, P., Kilpatrick, A. M., & Burke, D. S. (2005). Bushmeat hunting, deforestation, and prediction of zoonotic disease emergence. *Emerging Infectious Diseases*, 11, 6–1827.
- Zhang, L., & Yin, F. (2014). Wildlife consumption and conservation awareness in China: A long way to go. *Biodiversity and Conservation*, 23(9), 2371–2381.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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