



Systematic Review Understanding the Illegal Wildlife Trade in Vietnam: A Systematic Literature Review

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Abstract: As one of the earliest countries in the Southeast Asia region, Vietnam joined the CITES in 1994. However, they have faced several challenges and practical barriers to preventing and combating illegal wildlife trade (IWT) after 35 years. This first study systematically reviews 29 English journal articles between 1994 and 2020 to examine and assess the main trends and patterns of the IWT's concerns in Vietnam. Findings show (1) slow progress of empirical studies, (2) unbalanced authorship between Vietnamese and non-Vietnamese conducting their projects, (3) weighting of wildlife demand consumptions in Vietnamese communities rather than investigating supply networks with high-profile traffickers, (4) lacking research in green and conservation criminology to assess the inside of the IWT, and (5) need to focus on potential harms of zoonotic transmission between a wild animal and human beings. The article also provides current limitations before proposing further research to fill these future gaps.

Keywords: illegal wildlife trade; wildlife trafficking; CITES; Vietnam; conservation; green criminology



Citation: Luong, Hai Thanh. 2022. Understanding the Illegal Wildlife Trade in Vietnam: A Systematic Literature Review. *Laws* 11: 64. https://doi.org/10.3390/laws 11040064

Academic Editors: Aldo Muro, Jr. and Grigorios L. Kyriakopoulos

Received: 15 July 2022 Accepted: 19 August 2022 Published: 22 August 2022

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1. Introduction

Vietnam is a high biodiversity country in Asia and the Pacific region with diverse system records, with approximately 7000 marine invertebrates and about 10,500 species of land animals (Nguyen 2008). However, Vietnam has long been considered a hotspot market for wildlife consumption in the region pre and post joining the United National Convention International Trade for Endangered Species of Wild Fauna and Flora (CITES) in 1994. Currently, Vietnam is a key transit point on the route of transporting illegal wildlife trade (IWT)¹ to other countries in Asia, especially China (Lemaitre and Herve-Fournereau 2020; Luong 2021; Nguyen et al. 2019). Since the first public hearing in 2016 of the Wildlife Justice Commission (WJC) to investigate the wildlife trafficking hub of *Nhi Khe* commune, a suburb of Hanoi, at the Peace Palace in the Hague (Covert 2016), Vietnam is continuing to be the location of several IWT's activities as a major regional transportation area for wildlife trade as of this article's writing (Luong 2021).

Vietnam's exploitation, trade, and consumption of endangered wildlife are still difficult to control. In particular, the disappearing of viable biodiversity such as tiger populations due to illegal poaching for commercial aims and traditional medicine treatments (Dinerstein et al. 2007; Linkie et al. 2015) but also one of the highest markets of rhino horn demand imported from South African territories (Duffy 2014). After the last Vietnamese one-horned rhinoceros (*Javanski rhinoceros*) was killed in 2010, its horns were amputated; however, the situation of smuggling and illegal rhino horn has not yet decreased or been prohibited clearly. At the time, there was not much research to address the cause and effect of the IWT, though most conservationists, animal welfare activists, and green criminologists recognized and called for further specific actions to ensure animal rights (Halsey 2004; Lynch and Stretesky 2003; White 2008; Wyatt 2013).

¹ Illegal wildlife trade (IWT) and/or wildlife trafficking (WT) and are used interchangeably in this paper to mean the poaching or other taking of protected or managed species and the illegal trade in wildlife and their related parts and products.

As one of the first pioneers to coin the 'green criminology', in the early 1990s, under the lens of radical criminology, Lynch (1990, pp. 3–4) considered that 'this is not an entirely new perspective or orientation within criminology ... [and need] to examine of the successes and failures of governments and corporation to protect humans and animals from environmental hazards.' However, over decades, both Lynch and Stretesky (2014, p. 176) recognized that 'criminology has ignored the changing nature of the world around us, and has become less and less relevant to the problems found in the contemporary world.' Perhaps, the ignorance of criminologists may be one of the explanations for the fact that green crime often fails to prompt the required response by governments, the enforcement community, and the public. In reality, the enormity of green crimes and their associated issues have deeply concerned a variety of academic disciplines, including green chemistry, biology, medical science, epidemiology, environmental toxicology, and economics, that have examined these practices and made remarkable contributions to our knowledge of the last years of the 20th century and the early years of the 21st century (Halsey 1997, 2004; South 1998; White 2008). In the latest systematic review to look for the updated publications of criminology and criminal justice in terms of WT/IWT, McFann and Pires (2020, p. 129) informed that 'no study to date has empirically examined publication trends in wildlife crime research nor how criminologists and criminal justice researchers have contributed to the field.' Based on systematic review and meta-analyses, these concerns need to review the whole of the IWT/WT's impacts on the environment and harm. However, except for two wildlife crime reviews of non-Vietnamese scholarship, Kurland et al. (2017) and Mbzibain and Mohamed (2020), no one focuses on Vietnam's context, which is still considered the hotspot location. As one of the new Vietnamese generations in green criminology, I also recognized that lacking reviews of the trend and pattern of IWTs is likely to lead to an unclear picture of IWT in Vietnam since joining the CITES in 1994 (Luong 2021). Systematic literature review (SLR) is a method for making sense of large volumes of information and various database disciplines to interpret those resources for explaining 'what works' and 'what does not work' and connecting the gap between research knowledge and practice (Petticrew and Roberts 2005). Therefore, the current study uses SLR to assess the overall volume of IWT's research and examine each step of WT's process in Vietnam. Based on reviewing empirical studies in Vietnam from 1994 to 2020, the article also identifies limitations and gaps. For these purposes, the article focuses on addressing three main research questions (RQs).

- RQ1: What are the trends, patterns, and research methods regarding IWT in Vietnam?
- RQ2: What species-targeted victimizing and geography-based research relates to IWT in Vietnam?
- RQ3: What has the activities in IWT's process been focused on research?

2. Method

2.1. Data Collection

To gain the maximum of informative, productive, and objective findings from the previous database, Pittway (2008, p. 217) suggested that each SLR should ensure at least eight key principles, including (1) transparency; (2) clarity; (3) integration; (4) focus; (5) equality; (6) accessibility; (7) coverage; and (8) synthesis. By doing this, SLR brings a comprehensive, transparent search conducted over multiple databases and gray literature that can be replicated and reproduced by other researchers based on setting up clear research questions and planning a specific search strategy. The search terms, search strategies such as database names, platforms, dates of search, and limits must be included in the review's process by clarifying relevant timeframes to collect information (Newman and Gough 2020; Xiao and Watson 2019). Therefore, following these principles, SLR should follow a clearly defined protocol or plan where the criteria are clearly stated before the review is conducted (Gough et al. 2012). In this study, to ensure transparent and complete reporting, I used PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which is an evidence-based minimum set of materials and publications purposed to support researchers to inform a comprehensive approach to systematic reviews and meta-analyses in various fields (Moher et al. 2009).

Like recent systematic review studies in green criminology with a mixture of the different online databases (Kurland et al. 2017; Lavadinovic et al. 2021; Mbzibain and Mohamed 2020; McFann and Pires 2020; Thomson et al. 2019), this study used Scopus to collect data which is a citation index. Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books, and conference proceedings. Scopus's system with the Boolean operators (AND, OR) was searched. The study accessed Scopus and used four main criteria groups for searching to identify publications in the field. The first relates to 'wildlife trafficking', 'wildlife smuggling', 'animal trafficking', or 'illegal wildlife trade', while the second is to locate 'Vietnam' or 'Viet Nam'. The third is the timeframe between 1994 (when Vietnam signed the CITES) and 2020;² meanwhile, last is the scope of species, with ten commonly identified as the target of IWT in Vietnam. The query result consisted of 231 documents based on the Scopus database. It includes record per year by source, document by author, document by affiliation, document by country/territory, document bay type, document by subject area, and document by funding sponsor. In addition, the author is conducting a project on environment-related crimes in the Mekong region with the pilot of Vietnam's focus, funded by the Global Initiative against Transnational Organized Crime (GI TOC). Accordingly, 31 out of 700 records in my EndNote system were added to the first identification. This led to 262 publications before entering the second stage—screening (Figure 1).

PRISMA 2021 diagram presenting the collection of IWT in Vietnam from Scopus database



Figure 1. The process of data collection and analysis.

² There are some updated records in 2021 relating to this topic without publising in the Press with volume and issue number and thus, I prefer to look for publications indexed and recorded in the Scopus system to the end of 2020. However, some of 2021's specific articles (Nožina 2021; Dang and Nielsen 2021) were first published online in 2020 but indexed in 2021. I use these to compare my findings in the Discussion section.

The following inclusion criteria were employed to identify eligibilities at this stage, including:

- 1. The study must be a systematic review and/or a meta-analysis relating to WT/IWT.
- 2. The study must be referred to Vietnam (or Viet Nam).
- 3. The study must include one or more of the ten common species being threatened by IWT in Vietnam (tiger, rhino, pangolin, snake, bird, bear, turtle, macaque, gibbon, and otter).
- 4. The study must be published from 1994 to 2020 in English and peer-reviewed journal articles;³ others were excluded.

2.2. Data Analysis

A total of 124 studies passed the initial screening and were obtained, and the abstracts read. There were three main reasons to exclude 138 documents at this stage: document type, subject areas, and languages. First, there were 59 sources excluded, including book (n = 2), book chapters (n = 17), reviews (n = 11), conference paper (n = 7), reports (n = 11), letters (n = 6), editorial (n = 1), and note (n = 2). This does not mean gray literatureunpublished works and reports by research institutions or government agencies—cannot be as significant as those of peer-reviewed journal articles in systematic methods and meta-analysis, particularly in the field of criminology (Wilson 2001, 2009). Instead, some of these sources, such as book chapters, conference proceedings, and reports, have remained compared with the current finding in the Discussion section. Second, the focus is on WT/IWT and thus several subjects/fields that are not close relations and/or disconnected with the current target were also excluded (n = 75). They include veterinary (n = 23); biochemistry, genetics and molecular biology (n = 19); immunology and microbiology (n = 13); engineering (n = 3); business, management, and accounting (n = 4); pharmacology, toxicology, and pharmaceutics (n = 5); economics, econometrics, and finance (n = 3); energy (n = 1); computer science (n = 1); chemical engineering (n = 1); chemistry (n = 1); and neuroscience (n = 1). Lastly, one German and three Portuguese articles were also excluded due to language.

The third stage involved re-screens and combined the four above specific eligibility conditions to only collect the included records, focusing on their related contents. While only 29 full-text publications were selected for analysis, 95 papers were excluded at the eligibility stage for different reasons. Therefore, at the final stage, only 29 last records were selected to be converted into Microsoft Excel for Mac 2021 for analysis, including 24 (out of 231) Scopus extractions and 5 (out of 31) additional records.

Before data analysis, there were two main points applied to the process. Firstly, the raw data were cleaned in Microsoft Excel 2021 for Mac. Different forms of the same author's name (most Vietnamese pronunciation and its related order between first name, middle name, and last name) were corrected for consistency, for example, 'T, Nguyen' and 'Nguyen, T'; 'Dang, V.H Nam', 'Dang, Vu Hoai Nam', and 'Hoai Nam Dang Vu'; 'V. Dao, Truong' and 'Truong, Van Dao'; and 'Nguyen, V.S' and 'Van Song, Nguyen'. Similarly, different keywords (single/plural or synonyms) and Vietnam's proper nouns used for the same concept were identified and standardized, such as 'Vietnam' and 'Viet Nam'; 'Hanoi' and 'Ha Noi'; 'wild animals' and 'wildlife animal'; 'wildlife trafficking' and 'illegal wildlife trade'. Secondly, all 29 final articles were converted and added into the NVivo 12 for coding after cleaning. All initial codes and their specific sub-codes are based on the thematical analysis guidelines of Braun and Clarke (2006) to address the research question's contexts (RQ).

³ During scanning, checking, and confirming these peer-reviewed journals, there were two records of the *Conservation Letters* classified into the Letter's category rather than belonging to the article's category and thus, excluded at the first stage of PRISMA. However, the author doubled these publications in Scopus, Web of Science, and others to add to the final step.

3. Discussions of Findings

Based on the SLR mechanism and procedure, this section provides the specific outcomes with detailed assessments to address three RQs. Each sub-heading part covers its relevant database and findings for each RQ.

3.1. Researching on Illegal Wildlife Trade in Vietnam

The first research question found the overall volume and the growth pattern of publications in Vietnam relating to IWT.

3.1.1. Overall Volume

Figure 2 shows a slow publication rate in the WT/IWT in the first two decades (1994– 2014): only nine records, accounting for over 30% out of 29 publications. In particular, the publishing rate of the first fifteen years (1994–2008) was not a considerable contribution with only three articles. Accordingly, except for the only TRAFFIC research released in 1998 (Li and Li 1998), no study has been published in any peer-review journals to reflect on the post-CITES joining of Vietnam in the first five years (1994–1998). Once again for the next decade (1998–2008), there was unavailable research and publishing by Vietnamese and non-Vietnamese scholars on the trends and patterns of WT/IWT in Vietnam until 2008 with two publications (Newton et al. 2008; Nguyen 2008). On one hand, utilizing data collection between 2002 and 2007, the study confirmed these concerns are existing domestic consumption and expanding as 'a cross-bridge of wildlife trade from Indochina [*Cambodia*, *Laos*, *and Vietnam*] to China, Korea, and Japan at this time' (Nguyen 2008, p. 146, p. added to explain). On the other hand, using pangolin as specific evidence of the wildlife market, the concurrent research also unveiled that 'over the past two decades, Vietnam has become an important link in the international wildlife trade' (Newton et al. 2008, p. 41). Paradoxically, several pieces of evidence show the complex scenarios of wildlife supplyand-demand consumption in Vietnam at that time (Drury 2009, 2011; Hansen et al. 2012). However, we waited for at least the next five years to understand the nature of WT/IWT in Vietnam from the criminology approach of Ngoc and Wyatt (2013). In contrast, there was a twofold increase in the last five years compared to 21 years ago. Accordingly, the rest of the 20 articles published between 2016 and 2020 contributed to nearly 70% of total records.



Figure 2. The volume of publication by year.

3.1.2. Source of Publications

Overall, 23 different journals covered 29 publications from 1994–2020. Apart from four journals that covered more than two records, almost all articles were only published one time in one journal. In particular, *Biological Conservation* (Davis et al. 2019; Rostro-Garcia et al. 2016; Xing et al. 2019) and *Global Ecology and Conservation* (Davis et al. 2020; Gomez and Shepherd 2018; Shepherd et al. 2020) were recorded as the most common journals with three times. *PLoS ONE* (Hansen et al. 2012; Williams et al. 2017) and *Conservation Letters* (Drury 2009; Olmedo et al. 2018) presented two articles each. There are 16 diverse publications with relevant publishers in the rest of the records, respectively relating to IW/IWT in Vietnam (Drury 2011; Greenfield and Verissimo 2019; Kline et al. 2020; Le et al. 2018; Lemaitre and Herve-Fournereau 2020; Martin et al. 2013; Newton et al. 2008; Ngoc and Wyatt 2013; Nguyen and Roberts 2020; Nguyen 2008; Nguyen et al. 2019; Olmedo et al. 2018; Omifolaji et al. 2020; Sharma et al. 2020; Smith 2018; Willcox 2020; Li and Li 1998).

3.1.3. Author and Affiliation

From 1994 until 2020, for 25 years, only two Vietnamese scholars groups researched and published their publications in terms of WT/IWT while working in Vietnam. Those articles were led by Nguyen Van Song—Head of the Economics Department, Faculty of Economic and Rural Development, and his groups in the Vietnam National University of Agriculture and their colleagues in the Hanoi University of Business and Technology and the Vinh University (Nguyen 2008; Nguyen et al. 2019). The current data collection shows the unbalanced rate of the author with their affiliations among Vietnamese and non-Vietnamese scholars in publications. The other was conducted by Dang Vu Hoai Nam—the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Social Marketing Initiatives, Hanoi, Vietnam (Dang and Neilsen 2018).

Almost all records of international researchers, either first author or corresponding author, were predominated by domestic scholars throughout the period. It is over twofold difference between the two sides, 21 and 8, respectively. However, six out of the eight Vietnamese scholars in the play of first authors perhaps implemented their research when conducting the doctoral theses with their dual affiliations, both their Vietnam address and international institution-based addresses. Newton et al. (2008) called for further attention from the scientific community about Vietnam's IWT. Accordingly, five years later, Cao Ngoc Anh began to pursue his Doctor of Philosophy in this field and co-authored with his supervisor(s) to publish the articles (Ngoc and Wyatt 2013). Between 2013 and 2018, at least four records demonstrate this partnership's model focus on the IWT topic in Vietnam (Dang and Neilsen 2018; Dang et al. 2020; Le et al. 2018; Truong et al. 2016). Dang Vu Hoai Nam is considered the top-ranking Vietnamese researcher with at least three publications, either first/corresponding author or co-author.

Interestingly, many international scholars focusing on WT/IWT in Vietnam have contributed several publications in recent years. The current data show that at least 23 articles with non-Vietnamese scholars distributed, either first/corresponding author or co-author, accounted for 80% out of 25 publications between 2010 and 2020. To begin with, Rebecca Catherine Drury, as one of the first non-Vietnamese generations, examined Vietnamese wildmeat consumption in her Doctor of Philosophy (2005–2009) before publishing it in the Conservation and Society and the Conservation Letters (Drury 2009, 2011). In the first five years of the 2010s, there were only four articles, apart from Drury's studies (Hansen et al. 2012; MacMillan and Nguyen 2014; Martin et al. 2013; Ngoc and Wyatt 2013); meanwhile, the rest of publications of non-Vietnamese have increased remarkably in the last five years. Accordingly, they include two articles in 2016 (Rostro-Garcia et al. 2016; Truong et al. 2016), one in 2017 (Williams et al. 2017), and five in 2018 (Dang and Neilsen 2018; Gomez and Shepherd 2018; Le et al. 2018; Olmedo et al. 2018; Smith 2018), two in 2019 (Davis et al. 2019; Xing et al. 2019), and nine in 2020 (Dang et al. 2020; Davis et al. 2020; Kline et al. 2020; Lemaitre and Herve-Fournereau 2020; Nguyen and Roberts 2020; Omifolaji et al. 2020; Sharma et al. 2020; Shepherd et al. 2020; Willcox 2020).

3.1.4. Citation of Publications

In Figure 3, the citation of publications reflects different rates among journals over 35 years. Depending on the timeline, while the highest source is 70 times (Newton et al. 2008), the lowest rate is one time (Kline et al. 2020; Nguyen and Roberts 2020). Some publications have a similar time rate, such as 3 times (Le et al. 2018; Sharma et al. 2020; Smith 2018), 4 times (Dang et al. 2020; Shepherd et al. 2020), and 34 times (Olmedo et al. 2018; Rostro-Garcia et al. 2016). Ironically, only a Vietnamese group scholar (Nguyen et al. 2019) on the *AgBioForum*—the Journal of Agrobiotechnology Management and Economics, analyzed the IWT in Vietnam with its causes and solutions has not yet been cited in any peer-reviewed articles after five years.





To begin the first publication of Li and Li (1998), after five years, Vietnam joined the CITES; it unveiled the warned alarms of live wildlife trade across the Guangxi border between China and Vietnam. As the first peer-reviewed paper, it ranked the third citation among 27 records (53 times) until the present. However, from China's side, Chinese researchers conducted fieldwork in several places in Guangxi rather than Vietnam. A leading Vietnam National University of Agriculture expert published the first Vietnam study to provide data on the logistics, scope, and economics of IWT in Vietnam (Nguyen 2008). Based on the Scopus database, it is ranked the fourth most cited (36 times). At that time, Newton et al. (2008) released their findings based on local hunters' knowledge (Cuc Phuong National Park, Ke Go Nature Reserve and Khe Net State Forest Enterprise; and Song Thanh Nature Reserve) to conserve the elusive pangolin in Vietnam before threatening poachers and traffickers. To date, while the article of Drury (2011)⁴ accounts for 62 citations as the second-ranking, Newton et al. (2008)'s study is the highest citation (70 times) among all 27 records after over 35 years.

Pre-and-Post 2013's milestone, interestingly, as the first green criminology approach, the Ngoc and Wyatt (2013) study explored Vietnam's IWT impacts on biodiversity loss and species extinction. It not only records a fourth top-ranking citation (43 times) but also is considered a unique publication in the field of criminology to analyze Vietnam's IWT concerns.

⁴ The first publication on the *Conservation Letters* (2009) has not been indexed in the Scopus database without the citation's count, although it was cited by 44 times on the *CrossRef* (https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/j.1755-263X.2009.00078.x (accessed on 1 July 2022)).

3.1.5. Methods Used in Research

Among 29 publications in this SLR study, various research methods are applied to explore the nature of wildlife conservation in Vietnam. All studies were conducted from primary data based on qualitative approaches and/or mixed methods research (MMR) to explore various views of WT/IWT in Vietnam. There were six studies to utilize secondary data from previous projects and/or open-access databases to examine Vietnam as an external factor, either destination or transit hub (Gomez and Shepherd 2018; Hansen et al. 2012; Lemaitre and Herve-Fournereau 2020; Omifolaji et al. 2020; Shepherd et al. 2020; Williams et al. 2017). The rest of the papers also used gray literature, including local authorities' information, annual reports, and non-government statistics. They published documents to warn about the emerging threats to small carnivores (Willcox 2020) and the declining populations of the Indochinese leopard (Rostro-Garcia et al. 2016), as well as to detail the nature and extent of WT/IWT in Vietnam (Ngoc and Wyatt 2013).

Firstly, in the qualitative group with seven records, almost all authors (n = 4) designed and delivered their interview techniques or focus group discussions as a unique approach to collect the primary data rather than combined with different ways by the rest of the researchers (n = 3). For the former, Vietnamese scholars (as the first/correspondent author) predominantly implemented their three projects through semi-structured interviews (SSI). Depending on each project's scale, objective, and goal, a range of interviewees were recruited and invited to join their studies. In particular, looking for utilitarian and hedonic values in rhino demand's consumption and its related reference groups influences in Vietnam, Dang and Neilsen (2018) and Dang et al. (2020) invited 30 respondents (in Hanoi and Ho Chi Minh City) and 50 participants (Hanoi only), respectively, to be interviewed. Interestingly, for those SSI samples, the second group was extended from the first group's snowballing techniques by the first author in Hanoi's context, between 2015–2016 and 2019.

On the other hand, covering 20 hotspot provinces and cities with specific locations in Vietnam with borders with Cambodia, Laos, and China, such as Can Tho, Ha Tinh, Nghe An, Quang Nam, Lang Son, Lao Cai, and Quang Ninh; with two biggest airports namely Tan Son Nhat and Noi Bai; with two busiest seaports including Hai Phong and Vung Tau; and with two largest domestic wildmeat markets in Hanoi and Ho Chi Minh City, Nguyen et al. (2019) contacted and interviewed at least 171 interviewees, as the most considerable size of SSI's methods at that time. Accordingly, the interviewee's demographical background also varied under the authors' standard eligibility criteria. An external study by Kline et al. (2020) inspired an ethic of care among the Sustainable Tourism class at Appalachian State University to understand the demand reduction of pangolin trafficking in Vietnam and China. Accordingly, they recruited 25 students with different backgrounds (hospitality and tourism management, marketing, commercial recreation management, and public relation) to divide into groups to expose their thoughts via a take-home exam with several open-ended questions on the test. While two articles looked at Vietnam as an external factor contributing to the decline of rhino (Martin et al. 2013) or threatening the tropical butterfly (Xing et al. 2019), the rest of the paper (MacMillan and Nguyen 2014) investigated factors influencing wildlife poaching in Vietnam, respectively. For the latter, the authors selected a mixture of qualitative approaches. Those publications used various qualitative methods to collect data sources, including combining interviews and fieldwork/focus-groups and gathering museum specimen records plus field observations.

Secondly, most publications designed and delivered survey questionnaires to collect data in the quantitative group with four records. Depending on each approach, the range of participants involved in their project varies between 608 males (Truong et al. 2016), 800 households (Sharma et al. 2020), 1120 participants (Davis et al. 2019), and 1344 individuals (Davis et al. 2020). Looking for illicit consumption of rhino horn in Vietnam, Truong et al. (2016) analyzed a 608-male survey to not only make sense of health customer's choices (such as body detoxification and hangover treatment) but also to show their habits to possess curative properties and a professional network among users' peers in society. Three recent surveys gathered households and participants with a larger sample. One is

outside Vietnam, which was conducted by Sharma et al. (2020) with 800 homes in the protected area (PA) and non-PA in Nepal to investigate the trend and patterns of Chinese pangolin trading/poaching (some of them are indirectly influenced by the high prices in Vietnam's market). Others are inside Vietnam, and researchers surveyed 1120 participants and 1344 individuals in Hanoi and Ho Chi Minh City to explore the demand for bear bile. Notably, the latter found that bear product is still used widely in these two most prominent locations of Vietnam despite their use being banned since 2006 (Davis et al. 2019, 2020).

Finally, for the MMR group with nine records, it was considered the most dominant option for the scholar to look for IWT and its related concerns when conducting their empirical studies in Vietnam. All those authors combined qualitative and quantitative data and developed a mixture of participant observation/SSIs and surveys/previous databases (Drury 2009, 2011; Le et al. 2018; Nguyen and Roberts 2020; Nguyen 2008; Olmedo et al. 2018; Smith 2018; Li and Li 1998). Only one project combined standard ecological methods (line-transects and field sightings, records of tracks and signs, camera traps) and interviews with local hunters (Newton et al. 2008). Li and Li (1998) conducted fieldwork and surveys to collect and analyze their empirical studies relating to wildlife trafficking at 42 local free markets and 28 restaurants in four cities (the capital Kunming, Gejiu, Kaiyuan and Wenshan) and six counties (Funding, Mekong, Jinping, Maguan, Mengzi, Pinbian) in Yunnan Province. Yet, they also interviewed 188 wildlife brokers, restaurant patrons, tourist guides, taxi drivers, and local wildlife officers. They drew the picture of a specific IWT scale between Vietnam and China after Vietnam first signed the CITES in 1994. For the latter, as the highest citation record out of the 29 articles that applied the MMR, Newton et al. (2008) prioritized selecting the local hunter at the conservational locations as the human-based approach to clarify the volume of pangolin's distributions and its related poaching in Vietnam. Combining those local communities with solid knowledge of wildlife ecology, historical and contemporary hunting practices, and field survey reports is an excellent point in MMR's design and implementation by those authors.

3.2. The Research's Scopes of Illegal Wildlife Trade in Vietnam

This section reviews (1) species-based victimizing and (2) geography-based approaches in research.

3.2.1. Wildlife Species as the Target of Illegal Trading

Various wildlife species, either live or their related products, are poached, snared, killed, and trafficked in Vietnam. In the earliest paper, the Chinese authors recorded that from 1993 to 1996, there were 55 species, including 15 species of mammals (pangolin), 10 species of birds, 29 species of reptiles (turtles, lizards, and snakes) and 1 species of amphibian (frogs) (Li and Li 1998). Many of them were species listed on the Vietnam and China protection list (and on the CITES' Appendix I and II), in which tortoises constituted the most significant part of total IWT's volume (61.36%) and snakes (13.22%). Although there are several mammals, birds, reptiles, and amphibians, the first publication did not record any illegal tiger, rhino, and/or leopard trade at that time (Li and Li 1998). On the other hand, in Vietnam's domestic areas, Nguyen (2008, p. 153) estimated that there are approximately 3000 to 4000 tons of live wildlife and around one million various wildmeat heads that are illegally traded in and out of Vietnam, with profits of about 21 million USD annually. The author admitted that similar to China, in Vietnam 'we can eat any species with four feet on the ground except the table; we can eat anything in the ocean that can swim except submarines; and we can eat anything in the sky that can fly except planes' (Nguyen 2008, pp. 153–54). In other words, as stereotypical style in foody culture and traditional medicine to Chinese style, these paradoxical needs led to high demand for the such specimen of wildlife for trading in Vietnam. These 'real' reflections of wildmeat consumption's behaviors and perceptions of Vietnamese have been demonstrated in the specific survey and interview of Drury's thesis and her publications (Drury 2009, 2011). Almost all these live wildmeat consumptions have still been confirmed and listed in the

recent investigation of those authors and his colleagues, which is higher profits from wildmeat trade compared to ten years ago, around 49.2 million USD per year (Nguyen et al. 2019, p. 40).

However, apart from the above species, the trend and patterns of wildlife consumption in Vietnam have changed dramatically with expansion of the IUCN Red List of Threatened Species and CITES—Appendix I, such as tiger and rhino since the 2000s. Surveying the wildmeat consumption in Hanoi (n = 915 respondents), Drury (2011, p. 250) revealed that both tiger and rhino are among the 22 top choices on at least one occasion in the last 12 months. Wildmeat consumption (58.9%) often occurred in restaurants rather than private houses. Consumers frequently referred to wild meat as rare (hiêm in Vietnamese) and precious (quy). By doing this, both *hiểm* and quy wild animals (e.g., bear, lion, rhino, and tiger) are also considered fashionable wealth and status in the luxurious way of life in big cities, which is still a correct reflection in the last five years, between 2015 and 2020 (Dang and Neilsen 2018; Dang et al. 2020; Davis et al. 2019, 2020; Nguyen et al. 2019; Smith 2018; Truong et al. 2016; Williams et al. 2017). For example, rhinos, alongside wildmeat consumption, are seen as 'utilitarian and hedonic values', using wildlife's products for traditional medicines, business gifts, and political favors in Vietnam (Dang and Neilsen 2018; Dang et al. 2020; Truong et al. 2016). Additionally, some new types have also been investigated to assess the (il)legal trade in Vietnam, such as tropical icon butterfly (*Teinopalpus aureus*) with high prices in the market that could be under 'multiple threat' by traffickers (Xing et al. 2019).

3.2.2. Geography-Based Research

Two main groups focus on geographical factors in this field inside and outside Vietnam. Firstly, the Vietnam-based approach as an inside content, many articles reflect different views of supply-and-demand scales in Vietnam since joining CITIES in 1994. Over 80% of reports reflect on the actual scenarios with varying perspectives on wildlife consumption in Vietnam. These publications have been conducted and researched by both Vietnamese and non-Vietnamese scholars (Nguyen 2008) for over 35 years. A range of geographical locations, either cities, provinces, or regions, has been identified and approached based on various criteria for covering natural hot spots and potential areas relating to WT/IWT in Vietnam. In particular, focusing on pangolin species, Newton et al. (2008) used a geographic information system (GIS) layer using ArcMap (Version 9.1) to produce the first distribution maps for the pangolins Manis pentadactyla and M. javanica in Vietnam. Then, they selected three study sites to interview local pangolin hunters who cover a range of one or both species (Cuc Phuong National Park, Ke Go Nature Reserve and Khe Net State Forest Enterprise, and Song Thanh Nature Reserve). Similarly, Le et al. (2018) surveyed and assessed the situation of illegal hunting, trapping, and poaching at 30 national parks, both under the management of the Vietnam Administration of Forestry (six locations) and provincial authorities (24 locations).

Since the 2010s, when researching wildlife consumption scenarios, almost all publications have focused on the demand side, such as the largest city (Ho Chi Minh City) and capital location (Hanoi) (Dang and Neilsen 2018; Dang et al. 2020; Davis et al. 2019, 2020; Drury 2011; Truong et al. 2016). Unfortunately, some vulnerable areas, such as ethnic groups in several remote regions, cross the Vietnam border with their neighbors, where the home of a diverse ecosystem with hundreds of wildlife, are still limited to research, except for articles by MacMillan and Nguyen (2014). They investigated factors influencing the illegal poaching of the wildlife of the Katu minority group. It is a unique publication among the 29 included articles to approach mountainous areas rather than surveying metropolitan cities.

Secondly, in Vietnam-based studies approaching as an outside content, the rest of the publications released their findings to illustrate Vietnam's roles in the process of IWT's activities, either a destination country or a transit hub. For example, analyzing the specific transit points in the EU Action Plan against Wildlife Trafficking, Lemaitre and Herve-

Fournereau (2020) demonstrated that Vietnam is one of the top four Asian countries (China, Malaysia, and Singapore) (Lemaitre and Herve-Fournereau 2020). In addition to that, the latest publications of Omifolaji et al. (2020) also revealed Vietnam and China as the largest market destinated 65% of pangolin incidents reported between 2012 and 2019 (57 seizure cases with 463,092 individual pangolins) from Nigeria. Similar to pangolin, in the total of 30 bear seizures in Laos between 2010 and 2016, Vietnam (n = 11 incidents) ranked as the top destination while China and New Zealand (n = 1 case per country) were the lowest (Gomez and Shepherd 2018, p. 4). Yet, based on the comparative price of pangolin in Nepal's local community in the period of 2014–2019 (a range of 96–218 USD per kg), Sharma et al. (2020, pp. 6–7) argued that the higher prices in some Asian countries, including Vietnam (484.91 USD per kg), is one of the main motivations to engage traffickers to poach and transship pangolins to there. The attractive market with high prices of rhino products has also led to several cases of poaching and transporting illegal from Nepal to Vietnam (and China), with at least 862 USD per rhino nail (Martin et al. 2013, p. 73).

On the other hand, as a transit point, Vietnam has been recorded as a pivotal hub for the transit of wildlife, either live or dry products, to other countries. The study by Nguyen et al. (2019, p. 43) pointed out that with a diversity of transportation systems, including roads, ports, airlines, and railways, almost all traffickers and traders took advantage of these transportation resources to transport wildlife in-and-out routes via Vietnam's porous borders to reach China, Korea, and Japan. In particular, Vietnam is one of the suppliers to provide (il)legal wildlife for China. Between 2008 and 2009, there were 2540 Chinese hwamei, a birdsong, during five surveys in Hanoi and Ho Chi Minh City, covering many birdsongs for sale in Vietnam (Shepherd et al. 2020). Ironically, the Chinese birdsong is not legally protected in Vietnam, which will likely become a potential target of IWT's focus for trading in China.

3.3. The Process of Illegal Wildlife Trade in Vietnam

This section looks at the process of IWT in Vietnam based on the current 29 publications researched. We assumed that this process covered four main stages, including poaching, transporting, processing, and distribution and consumption, which are likely to interchange among stages without clear separations in theory and practice (Wong 2019; Wyatt 2013).

Firstly, MacMillan and Nguyen (2014) unveiled the nature of poaching (how, what, where, when, and how much) and the motivations for trapping the Ktu's ethnic groups in remote areas Quang Nam province. Secondly, for processing, two main points show how wildlife's meats and products are handled after hunting. One is live wildlife for eating, and the other is wild animal parts for treating. For the former, from the monitor reports on IWT, both pre and post-CITES signing in 1994, several live wildlife products have been processed to serve Vietnamese traditional eating habits and healthy supplement beliefs (Drury 2009, 2011; Newton et al. 2008; Nguyen 2008; Li and Li 1998). There are also two main ways to take out wildlife parts for traditional medicine for the latter. One is to drink bile and/or blood such as bear and snake; the other is to cook bone glues such as leopard, tiger, lion, and/or rhino and to grind scale and/or horn such as pangolin and rhino (Dang and Neilsen 2018; Dang et al. 2020; Davis et al. 2020; Nguyen and Roberts 2020; Nguyen et al. 2019; Olmedo et al. 2018; Smith 2018; Truong et al. 2016). In recent years, taking and processing rhino horn has also been used as a gift to build up personal status and professional influences in social, business, and political scopes (Dang and Neilsen 2018; Dang et al. 2020; Nguyen et al. 2019; Truong et al. 2016).

Thirdly, two main directions are transporting wildlife, either Vietnam's domestic or outdoor locations, into Vietnam. Most Vietnam-based publications unveiled a range of different routes of IWT cases in the whole of Vietnam's territories without clear separations between region, cities, provinces, and cross-border hotspots (Drury 2009, 2011; Ngoc and Wyatt 2013; Nguyen 2008; Nguyen et al. 2019). Accordingly, there are various ways to import into Vietnam illegally; one is Vietnam-out and another the Vietnam-in way. For the former, transporting to Dongxing, Longyao, and Shuikou ports, at least 2.29 to 29.325 tons

of wildlife per day between 1993 and 1996 were transported illegally from Vietnam to China (Li and Li 1998, p. 903). Vietnamese researchers have also detailed this situation in the 15year observations, between 2002 and 2017, concerning a supply hub to China (Nguyen 2008; Nguyen et al. 2019). For the latter, Vietnam is also considered a critical destination with a high demand for wildlife consumption. Currently, alongside China, Vietnam is destined as the most predominated country to illegally transship in the region and beyond. Based on an automated web crawling surveillance system and the European Union Action Plan reports against WT, Vietnam ranked among the top five countries worldwide to destinate IWT's productions and species (Hansen et al. 2012; Lemaitre and Herve-Fournereau 2020). In the Asia network, the high prices of Vietnam's pangolin market as the potential factors were likely to hook local Nepal traders to hunt and transport (Martin et al. 2013; Sharma et al. 2020). On the other hand, from African locations, for example, in Nigeria, between 2012 and 2019, Vietnam occupied 28 out of 57 seizure pangolin incidents via several routes through air cargo and shipments with containers either directly or indirectly (Omifolaji et al. 2020). Similarly, various traditional Asian medicine's (TAM) products from rhino, tiger, lion, pangolin, and bear were targeted to explore and transport from South Africa to Vietnam. Those concerns have been examined by Nguyen and Roberts (2020) in their serial approaches in a survey of 183 TAMs shops between April and August 2017. Among those wildlife animals, rhino horn and lion were still transferred from these African countries to arrive and serve Vietnamese markets in five recent years (Dang and Neilsen 2018; Dang et al. 2020; Williams et al. 2017).

Fourthly, both Vietnamese-based research and outsiders were concerned with the high demand for wild meat and TAM's habits and social peers, leading to the complex scale of distribution and consumption. In the first study after joining CITES, Nguyen (2008, p. 154) estimated that total revenue of 12,270 USD daily led to Hanoi as the biggest city of wildmeat, with up to 13 species possibly being served in one wildlife restaurant. They included snakes, palm civets, monitor lizards, porcupines, leopards, pangolins, monkeys, forest pigs, hard-shell turtles, soft-shell turtles, civets, boas, and birds. These wildlife listings added up to 23 common species when Rebecca Drury gathered data to analyze her PhD's thesis—identifying and understanding consumers of wild animal products in Hanoi, between 2005 and 2009. Most of those species served Hanoians who are keen on 'wild meat rare and precious (*hiểm* and quý in Vietnamese) to show wealthy, successful and high-status individuals' (Drury 2009, p. 265) and to 'communicate prestige and obtain social leverage' (Drury 2011, p. 247). In Ho Chi Minh, drinking rhino horn powders exposes two main purposes. One is 'utilitarian use' for detoxicating alcoholic hangovers or treating other issues such as backache, acne and blisters, gouts, menstrual cramps, fever convulsion, and kidney problems. Another is 'hedonic purposes' for demonstrating the wealthy status and socio-economic influences (Dang and Neilsen 2018, pp. 240-41). Additionally, using rhino horns in Vietnam reflects on their 'initiative business' and 'political relationships' in the social and professional network among 287 out of 608 males interviewed in Hanoi and Ho Chi Minh City (Truong et al. 2016, p. 353). Lastly, consumers' perceptions and attitudes often depend on sharing among peers 'who have experience using rhino horns' based on 'trustworthiness and the influence of different groups' (Dang et al. 2020, p. 935).

4. Current Limitations

Apart from several contributions of 29 records, we found out at least three main concerns need to be recognized as the current limitations, including supply, demand, and harm reduction.

Firstly, relating to supply reduction issues, although several publications focus on Vietnam-based research or outside the context of IWT's topic, deeper investigations between supply's hosts (Africa and/or Asia) and Vietnam are still lacking. In addition to that, although some articles surveyed and found IWT's network from the European Union region (Hansen et al. 2012; Lemaitre and Herve-Fournereau 2020), there is still an unclear name of these nexus countries to Vietnam. Apart from the only study, by Nguyen and

Roberts (2020), that explored the inside of IWT's syndicates, there is no available research to explore criminal networks of IWT's process from South Africa (such as rhino) and Asia (such as pangolin and bear) to Vietnam. Recently, the study by Nožina (2021) explored the Vietnamese WT groups in the Czech Republic colluding with their counterparts in South Africa and Vietnam to establish rhino horn networks. Yet, there is a lack of research to deeper reveal the symbiotic relations between suppliers and demanders and even the middleman's connectors (EIA 2017, 2019; ENV 2020; ROUTES 2020; WJC 2017).

In the first public hearing relating to the *Nhi Khe* commune, the WJC considered that the Government of Vietnam has deliberately not been aggressive in cracking down on wildlife trafficking lines, despite being provided with sufficient evidence and detailed records of this serious crime and requiring serious handling (Covert 2016). Although Vietnam has taken significant action to stop the IWT with upgraded severer punishment (maximum of 15 prison years) and related prosecutions, smugglers at the highest levels were rarely arrested except for local connectors (Luong 2020, 2021). Young (2017) believed that most of those involved in Vietnam's IWT are locals and 'low-level criminals' rather than a hierarchical structure. There are several complex case studies in Vietnam with pyramid structures, primarily transnational IWT cases that cross the borderland of Vietnam and their neighbors and beyond (Cao 2017; EIA 2017; van Asch 2017). This led to the question of effective measures to explore the organizational structure and modus operandi of those cases for Vietnam's law enforcement agencies (LEAs) and their counterparts.

In addition, ill-structured organization and weak responsibilities of LEAs to control and combat IWT are some of the specific pieces of evidence to show the slow progress in dealing with IWT in Vietnam. Except for some projects that requested more enhancing role of LEAs (Dang and Neilsen 2018; Dang et al. 2020; Ngoc and Wyatt 2013; Nguyen et al. 2019; Truong et al. 2016), only a study by Le et al. (2018) surveyed and assessed (directly) the current rangers' and forest officials' activities and capacities to protect wildlife. According to those authors' warnings, lacking funding with unbalance budgets from authorities led to a limit and barrier for staff training, human resources, and professional equipment to protect and investigate poachers and traffickers in almost IWT cases. Most national park officers have training in forestry, agriculture and fisheries, biology, ecology, and environmental protection rather than law enforcement-focused training, which led to difficulties and limitations in preventing and combating IWT as the most severe concerns them (Le et al. 2018, pp. 11–12). As Young (2017) illustrated, it is a 'head-in-the-sand approach' and there are negative attitudes of Vietnamese LEAs towards tackling wildlife crime, with the main concern being a lack of political will and awareness. Most publications in the period of pre and post-CITES signing claimed the outdated regulations and slow reforms in legal systems, weak governance, and insufficient enforcement from LEAs (Dang et al. 2020; Davis et al. 2019; Le et al. 2018; MacMillan and Nguyen 2014; Truong et al. 2016; Li and Li 1998; Young 2017). Unfortunately, after nearly one decade released from TRAFFIC's investigation about the nexus trade of the rhino horn from South Africa to Vietnam (Milliken and Shaw 2012). There are still limited official publications from the government's authorities, particularly with LEAs and/or criminologists of Vietnam who conducted their empirical studies to argue and discuss this black market. Furthermore, investigating deeper operations to explain 'the phenomenon of pseudo-hunting' (Nožina 2021, p. 265), Vietnamese LEA's experts need further collaborations based on international and bilateral agreements in mutual legal assistance (Luong 2020, 2021).

Secondly, the scope of demand reduction strategies is limited with some analyses and its related examinations from NGOs/CSOs campaigns (Dang and Neilsen 2018; Dang et al. 2020) rather than the official authorities from government cabinets such as the Ministry of Environment and Resources and Ministry of Agriculture and Rural Development. Yet, these recent campaigns did not objectively examine scientific evidence that a 'delusive and paternalistic approach may backfire' in changing rhino horn consumer behavior (Dang and Nielsen 2021, p. 390). A half-decade ago, Truong et al. (2016) pointed out that based on social clubs and networks of users, demonstrating economic wealth, acquiring social leverage, and initiating business and political connections among those wealthy males who used rhino horns is a severe concern. However, no more empirical studies conduct further details to identify this nature of characteristics and how LEAs should be investigated for more evidence to tackle these points under the 2015 criminal law of Vietnam (article 244).

As part of the group identity's pressures, drinking rhino horn powder strengthens business relations (Dang and Neilsen 2018; Dang and Nielsen 2021). Yet, controversial debates about traditional medicine from wildlife productions still exist between policymakers, scholars, and practitioners. Particularly regarding rhinoceros' sexual stamina and potency aims, previous and recent publications have shown various approaches, either supporting or refuting arguments (Truong et al. 2016). The former can drive the rhino horn's consumption is likely to up-and-down the scale with unpredictable trends among consumers. Moreover, lacking in-depth investigation of those reference groups of consumers in Vietnam limited the understanding of how suppliers stand behind their demanders and how these supplier-and-demander relations drove the IWT's scale from Africa to Vietnam (Nožina 2021). It is questioning further research of the 'bandwagon effect' (quoted by Leibenstein 1950, cited in Dang et al. 2020, p. 924) to thoroughly investigate the dark figures of rhino horn's suppliers, either Vietnam or original countries (particularly in Africa region).

Thirdly, in terms of harm reduction, it was not until the spread of COVID-19 around the globe occurred in early 2020 that the abilities and practices of zoonotic transmission between wild animals and human beings were considered. Instead, several clues demonstrated the infectious abilities of bubonic plague and bacterial diseases from rats and fleas (Kruse et al. 2004). Among 29 publications, as early as the findings and recommendations of Li and Li (1998, p. 910) warned that biological invasion and epidemics of diseases are two of the most harmful impacts of IWT across the Sino-Vietnam border. For example, the pangolin is the highest percentage of the total mammal trade (61.21%) from 1993 to 1996 across Sino-Vietnam borderlands. It was likely to carry at least nine infectious diseases. They include foot-and-mouth disease, anthrax, Aujeszky's disease, rabies, pasteurellosis, tuberculosis, melioidosis, spirochaetosis in geese, and psittacosis, either animal-to-animal or animal-to-human beings (Li and Li 1998, pp. 910–11). Although Dang and Nielsen (2021) were recently concerned that unscientific support for any medical effects of rhino horn could lead to unsuccessful demand reduction strategies, further warnings and recommendations to harm reduction campaigns are unclear. To some extent, these similar study warnings have been absent among the other publications relating to IWT in Vietnam for more than 20 years.

5. Conclusions

While the amount of conservation literature on-demand consumption of wildmeat and its related products in Vietnam has been growing in recent years, fewer studies are involved in a comprehensive and systematic review assessing wildlife supply's concerns in Vietnam. This study used the SLR and meta-analysis method to offer an overall picture of various views on wildlife conservation concerns in Vietnam. In particular, the current findings showed the process of IWT's stages, including poaching, transporting, processing, and distribution and consumption. Since the eligibility criteria are English-written peer-reviewed journal articles on these issues, my findings might have missed some gray literature, NGOs, or institutional reports. For example, though all statements of the TRAFFIC, WJC, and the Environment Nature for Vietnam (ENV) have updated and detailed the trends and patterns of WT/IWT since the 2010s, our result do not include this literature because these documents do not meet the eligibility criteria. Furthermore, the outcomes exclude journal articles written in non-English languages, books, book chapters, Master's dissertations, or conference proceedings. Despite these limitations, however, we identified 29 full-text journal articles that provided the overall trends and patterns of wildlife research from 1994 to 2020 and examined all these four stages in IWT's process in Vietnam. Yet, the current finding unveiled that almost all publications focused on demand reductions rather than supply-and-harm reduction relating to wildlife.

This study calls for further research in the future with evidence-based approaches to address these above limitations, as follows:

- Looking for the inside of the reference group's consumers (demand side) of IWT, wild meat, and rhino horn powder (Dang and Nielsen 2021; Dang et al. 2020). Further empirical studies are needed to visualise the structure of a supplier-and-demander network, if applicable, to support LEAs with more informative evidence in their supply reduction operations to demonstrate the 'pseudo-hunting' phenomenon (Nožina 2021).
- Re-surveying, re-designing, and re-delivering for wildlife demander's awareness and education campaign, particularly with *quý* and *hiếm* such as rhino horn, lion, and/or tiger (Drury 2011). It helps authorities fully understand consumers' scale, nature, and how to re-fix and re-adjust their action plan as practically and effectively as possible.
- Encouraging to examine objectively and analyze, specifically the practical plan/program of the government authorities to explore and investigate supply wild animals and its specific parts. These activities should be conducted by environmental sectors or LEAs' bodies rather than only focusing on its related implementations by NGOs (Young 2017).
- Investigating inside the 'dark figure' of the IWT network, international and regional operations combined with a national scale to visualise their crime scripts (Kurland et al. 2017). By doing this, we can understand the full detail of connective interaction among 'dots' in each network's scale (macro-vision) rather than focusing on individual cases at each level (micro-vison) (Nožina 2021).
- Opening the floor to collaboration between conservationists and criminologists to combine their fields among Vietnamese and non-Vietnamese scholars. This aims to comprehensively understand the nature of green and conservation crime by conducting quantitative and empirical studies (Lynch and Pires 2019). It will clarify the intersection of green and conservation in criminology and ecology rather than only descriptive analysis extracted from secondary data.
- Calling for new approaches to investigate ecology harms in wildlife consumption to demonstrate the nexus relations in zoonotic transmission between wild animals and human beings (Kruse et al. 2004). Some previous lessons of Vietnam from preventing severe acute respiratory syndrome (SARS), avian influenza and bird flu (A/H5N1 and A/H5N6), and/or African swine fever virus should be researched and published to reflect any potential infections for promoting harm reduction in IWT.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

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