



OPEN ACCESS

EDITED BY
Beatrice Frank,
World Wildlife Fund Canada, Canada

REVIEWED BY
Vijaya Ramadas Mandala,
University of Hyderabad, India
Caroline Fukushima,
University of Hyderabad, India

*CORRESPONDENCE
Elizabeth Oneita Davis
eoneitadavis@gmail.com

SPECIALTY SECTION
This article was submitted to
Human-Wildlife Interactions,
a section of the journal
Frontiers in Conservation Science

RECEIVED 04 May 2022
ACCEPTED 02 September 2022
PUBLISHED 23 September 2022

CITATION
Davis EO (2022) Critical research gaps
in understanding Southeast Asian
women's wildlife trade and use
practices.
Front. Conserv. Sci. 3:936172.
doi: 10.3389/fcosc.2022.936172

COPYRIGHT
© 2022 Davis. This is an open-access
article distributed under the terms of
the [Creative Commons Attribution
License \(CC BY\)](#). The use, distribution
or reproduction in other forums is
permitted, provided the original
author(s) and the copyright owner(s)
are credited and that the original
publication in this journal is cited, in
accordance with accepted academic
practice. No use, distribution or
reproduction is permitted which does
not comply with these terms.

Critical research gaps in understanding Southeast Asian women's wildlife trade and use practices

Elizabeth Oneita Davis*

San Diego Zoo Wildlife Alliance, San Diego, CA, United States

The hunting and consumption of wildlife is a global practice with practices that are socially nested, mediated, and shared across social categories, including gender. Research into wildlife trade increasingly recognizes the importance of understanding and investigating social drivers and processes of hunting and consumption. However, studies of social norms, motivations, and actions specific to women are still lacking within wildlife trade literature, particularly within Southeast Asia. Women are central to how a society operates and to societal practices, and they are fundamental actors in initiating change in these practices. In Southeast Asia, women are especially powerful actors within resident matrilineal and bilateral societies. This article will reflect on wildlife trafficking through the roles and activities of women. While women's narratives are lacking across all current wildlife trade research, I will highlight in this article critical research gaps, gender-specific issues in methodology, and important research opportunities.

KEYWORDS

gender, Southeast Asia (SEA), illegal wildlife trade, wildlife consumption, poaching, kin networks

Introduction

The trade and consumption of wildlife are universal practices, engaged in by human actors across genders, societies, social strata, and geography. These practices can be sustainable, but a recognized driver of biodiversity loss is the global illegal and/or unsustainable trade in wildlife (Fukushima et al., 2021). In Southeast Asia¹, high biodiversity dovetails with illegal and/or unsustainable wildlife trade and consumption (hereafter IUWT) (e.g. Jiao et al., 2021; Nuttall et al., 2022). Much of this trade and consumption begins and ends within Southeast Asia (Blair et al., 2017), but some poaching and trade is intended to supply demand in China (van Uhm and Wong, 2021).

1 "Southeast Asia" refers to the following 11 countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Est, and Vietnam.

On a global scale, Southeast Asian demand is also an important driver of population declines of species in Africa (e.g. [Nguyen and Roberts, 2020](#)). While IUWT is becoming increasingly well-documented in this region, important research gaps exist. One of these is a gender gap in understanding- and addressing- women's² role in IUWT. This is important because IUWT is a continual process of social change (e.g. [Van Kirk, 1983](#)): actors enter and exit into the trade as poachers, traders, or consumers, according to complex social and contextual factors, including those mediated by gender (e.g. [Dwyer and Minnegal, 2010](#)). Preferences for wild products temporally fluctuate across this complex landscape of factors, and by extension, so do the specific mechanics of the trade itself (e.g. [Nijman et al., 2019](#)). Identifying and describing gender-specific motivations and practices represent an opportunity for understanding this particular landscape of social change, and shifting changing practices positively for conservation's ends.

Because there is a paucity of information on this issue within Southeast Asia, this article is not a formal review of available literature on this topic (although most, if not all, of the available published English-language literature is included here). Instead, I present some examples of the roles women can (and do) fill in IUWT, research gaps in understanding these roles, and suggestions for changes towards effective data collection and conservation practice. This article is not the first to call for more nuance in understanding gender-specific differences in the use of wildlife in general (see for example [Margulies et al., 2019](#)), and is not the first to focus entirely on research gaps in understanding women's role in wildlife trafficking (see the work of [Agu and Gore \(2022\)](#) and [McElwee \(2012\)](#)); however, this article is the first to present a synthesized roadmap of gaps and opportunities in IUWT research conducted within the Southeast Asian region. I have also aimed in this article to acknowledge women's complexities by highlighting poor methods for gathering women-specific information. Poor methods may influence IUWT research to focus on men over women, out of misplaced belief that men are more active participants in IUWT. Whether men are indeed more active participants in IUWT is an open question that has not been adequately addressed in many IUWT contexts. However, we can suspect that both men and women may be equally active in different ways; for example, [Nana \(2022\)](#) points out that men are most likely to be criminalized for poaching in Cameroon, but women do not receive the same penalties, and are the most active actors

in selling bushmeat. This complexity is discussed further within this article.

This article is a direct call to action to place women more firmly and centrally in scientific and practical considerations of the complex issues that drive IUWT in Southeast Asia. [Ardenner \(1985\)](#) noted the propensity of social scientists to declare that they “do not study women”, with little recognition that the study of any linguistically, geographically, and demographically demarcated group of people will constitute study of women. One can make a strong argument that this same research blindness exists in IUWT research (e.g. [Agu and Gore, 2022](#)).

The focus of this article is to present examples of women's roles in IUWT in Southeast Asia, situated within anthropological and sociological work around broader topics that can illuminate potential research paths (e.g., the roles of women in domestic and international trade within Southeast Asia). Through this process, I illustrate gaps in current research, and suggest some changes in research practices to best address these issues, as well as the uptake of conservation interventions designed to address these issues.

A theory that will underpin the arguments made in this article is [Appadurai \(1988\)](#) theory of commodities as “thoroughly socialized things”; i.e., as objects engaged with by diverse social actors in correspondingly diverse ways, attributed with culturally, socially, and even demographically-specific meaning. As such, one can theorize that women may potentially engage with wildlife products as commodities differently from their male counterparts, according to gender-specific differences in social structure, kinship (e.g. [Dube, 1997](#)), and biology (e.g., women with vaginas are unlikely to use a wildlife product to treat erectile dysfunction).

Behavior change is the conservation practice mainly referred to in this article, to illustrate deficiencies in research that can hamper the success of the implementation of conservation interventions to curb IUWT. Other conservation interventions will be described, where appropriate. Behavior change is used as the primary conservation touchpoint for this article because understanding and engaging with women is argued to be essential for the success of behavior change and other human-focused conservation strategies (e.g. [Davis et al., 2020](#); [Agu and Gore, 2022](#)).

“A women's place” in Southeast Asia

The historic societal structures of Southeast Asian countries offer a compelling foundational argument for the value of understanding socially-grounded, women-specific influences on individual action. Across the countries of Southeast Asia, societies tend towards matrilineality and bilaterality ([Dube, 1997](#)). Some characteristics of *matrilineality* are where women receive and control property rather than men, men move into their wife's household rather than vice versa, and women have a

2 “Women” here refers to any individual who would be treated and viewed as such in societies in Southeast Asia. This historically encompasses individuals regardless of the individual's “biological sex”. “Female” will also be used under the same definition, in certain sections of this article where the more common term within the literature is “female”, e.g. “female social networks”.

stronger influence within their society as a whole (Dube, 1997). Characteristics of *bilaterality* include property being split equally, married couples moving equally into either the male or female's family, and genders equally holding power and agency (Dube, 1997). Some scholars have argued for the influence of Chinese patrilineality within Southeast Asia, but convincing evidence has shown the enduring power of matrilineality and bilaterality (e.g. Whitmore, 1984). Southeast Asian men may claim their societies are patrilineal/patriarchal (*pers. obs.*), but consultation of the literature- or indeed, even limited ethnography within Southeast Asian countries- will show that this is hopeful speculation on the part of Southeast Asian men. In the context of kin, Dube (1997) notes the commonality of bilaterality across Southeast Asia, with households individually choosing which kin networks (husband or wife) they will become part of, versus patrilineal societies where women must always join their husband's kin. Men have a noted lack of control over women in Southeast Asia; vice versa, women can have extraordinary control over one another (Dube, 1997). Dube (1997) notes that throughout Southeast Asia men often are simply "interlopers" into "female clans", i.e., kin networks. Within these female clans, older females especially have immense agency and authority that they cultivate as they age. Rather than cultivating agency and authority in spite of restrictive societal ideals, Southeast Asian society encourages a "class" of strong women to influence and shape attitudes, norms, and practices. Plentiful research shows that regardless of economic status or situation, women in Southeast Asia can and do have ample agency and power within their families, communities, and society as a whole (Dube, 1997; Leshkovich, 2014; Akter et al., 2017; Papanek, 1975; Walker, 1999; Turner, 2010; Yokoyama, 2010; Tan, 2013). These powerful actors can, in turn, shape patterns of IUWT across Southeast Asia.

Women as physical actors

One conservation focus is on poaching as the driver of biodiversity decline, and poaching appears to be dominated by men (e.g. Nijman et al., 2017; Lunstrum and Givá, 2020). Women appear to be more constrained to the "home" and the duties within, while men appear to be more active in the forest, since they seem to be more likely to hunt (e.g. Murdock and Provost, 1973). However, women frequently enter spaces where they interact with wildlife; women work on rice fields, where wildlife is present (Villamor et al., 2015), and have the potential to be active participants in setting snare traps around field boundary edges (with one intent of limiting crop raiding by wildlife). In addition, while women may not be typical poachers with camping gear, guns, and snares (although we can note that no studies in Southeast Asia have researched whether women do poach in this manner), they may influence poaching

in other ways. In their reviews of women's role in wildlife trade in Africa and Europe, Agu and Gore (2020, 2022) summarized the different roles women have been found to play, from practical administrative roles in poaching syndicates (Hübschle, 2014) to more subtle "encouragement" of their male kin and connections who are engaged in poaching (Sundström et al., 2020). Women from forest-adjacent communities worldwide are also known to actively enter the forest to forage for herbs and other plants (Price and Ogle, 2012), and have been documented hunting opportunistically (Andrew and Agu, 2022).

Researchers may have neglected studying women as active individuals in physical (and social) spaces due to patriarchally-grounded beliefs that women have little agency in their families and within their communities. Such research biases can be exacerbated by methodology grounded in the researcher's own patrilineal/patriarchal social norms; for example, studies that speak only to the "head of a household", and/or assume that a household head is always male. These studies may then be unable to answer important questions about women's attitudes and actions, which is important because women can (and do) control their households' physical space, and poachers and traffickers can be invited into these homes, which facilitates participation in IUWT (e.g. Agu and Gore, 2022). Other research methods may also be faulty when investigating sensitive questions, without the use of methods designed to overcome biases. This is particularly important when considering the practices of women- there is evidence that women are less willing to discuss illicit behavior (e.g. Gregson et al., 2002). Reporting women's responses as directly truthful, when precautionary methods such as trust-building interviews and specialized questioning techniques are not employed, may also under-represent women's actual level of participation in IUWT.

Rapid economic growth across Southeast Asia has diversified opportunities for employment. Women dominate small-scale trade across the region (e.g. Turner, 2010; Tan, 2013; Elsing, 2019), and as such women are often the predominant actors within market spaces. Women predominantly sell goods, and purchase goods for their households. They are important actors in determining which commodities will enter into their households, both as commodities to be sold on to other actors, and as commodities to be used by the household. Women have been identified as directly acting to sell wildlife products in Africa (e.g. Agu and Gore, 2020). Two opportunities where behavior change-grounded conservation interventions may be applied are those with the intended outcome of reducing the sale of wildlife products by women at the market, and reducing the direct purchase of wildlife products at a market. As suggested by Graham (2022), women can be powerful "agents of change" in IUWT, in such critical contexts. However, within Southeast Asia it may be particularly challenging to stop women from selling wildlife products, in light of the widespread economic constraints, lack of alternative livelihoods across the region, and historic precedence (e.g. Fabinji, 2016; Friess et al., 2016;

Jaiteh et al., 2017). The COVID-19 pandemic has aggravated these challenges; Anagnostou et al. (2021) noted that the widespread closure of public markets that occurred in the pandemic caused high economic impact on the women who dominate these spaces. Women are often the most vulnerable group in a time of crisis, particularly when they are reliant on external forms of income (Agu and Gore, 2022). This can then push women into greater participation in IUWT; generalized economic impacts of COVID-19 (such as loss of employment) may spur greater reliance on natural resources, potentially leading to increased unsustainable wildlife harvesting (e.g. Lindsey et al., 2020 and Roe et al., 2020), and/or legal wildlife trade pushed into illicit markets (e.g. Booth et al., 2021). Additionally, women can be some of the most active players in the wildlife-human disease interface that can occur in markets by being the primary actors in the process of acquiring and even slaughtering domestic and wild animals. No available literature exists on this facet of wildlife trade in Southeast Asia, but it is an apparent and widespread practice in personal observations across the region, and in the recorded dynamics of trade in comparative (in terms of the scale of IUWT) regions such as West Africa (e.g. Nana, 2022). Understanding and engaging with the women who work within this context will be of benefit in advancing OneHealth ideas, most prominently that the preservation of wildlife and human health (particularly vulnerable individuals and societies) relies on tools such as decentralized emerging infectious disease surveillance at live wildlife markets (Aarestrup et al., 2021 and Watsa and Wildlife Disease Surveillance Focus Group, 2020). The success of these tools relies on the engagement of individuals directly at the disease interface, i.e. predominantly women.

Women are also important actors in cross-border trade. In Laos, cross-border women traders are specifically identified with the appellation *mae kha*, illustrating their critical societal role (e.g. Walker, 1999; Turner, 2010; Yokoyama, 2010; Tan, 2013). However, this small-scale trade generally does not provide significant opportunities for economic advancement (e.g. Nguyen et al., 2014), particularly for women who trade across the porous country borders in the region; these activities can be illegal (e.g., unpaid import fees) and therefore targeted by authorities who fine the traders (Endres, 2014). When a practice is already criminalized on one level, it is theoretically easier for an individual to perpetuate additional criminal acts (Brantingham and Brantingham, 1993); thus, it may be lucrative for women who are already engaged in these activities to begin illegally collecting, transporting, and selling wildlife. Trading more “dangerous” goods may also be attractive from a purely gender-specific standpoint; Endres (2014) points out a benefit for women as traders in that they can leverage their gender to present themselves as “weak” and therefore harmless, to gain smaller/no penalties (see also Agu and Gore, 2022). In light of these factors, women-focused qualitative studies at Southeast Asian borderlands would be of benefit.

Women-specific social drivers of behavior

Female social networks are extremely important to consider in studies of behavior; “[women] find strong bonds with each other in shared life experiences which can transcend ... differences” (Papanek, 1975). As two examples, Villamor et al. (2015) found such strong female social networks in Sumatra that women within these networks would work on one another’s rice fields without any pay, while Nguyen et al. (2014) found that small-scale women traders in Vietnam would all put money into a “pot” and use the aggregated funds to support each person in the network, on a rotational basis. These strong networks can in turn powerfully amplify the behavior of just one woman; e.g. if one woman begins using serow bone to treat her bruises, use may transmit more easily throughout the entire group [e.g. as seen in other cases illustrating such behavioral transmission (Tucker et al., 2011)]. Another important aspect of such social networks is that they can be maintained and strengthened through the giving of gifts, which can include wildlife products (e.g. Davis et al., 2021). Such “gifts” imply some form of reciprocity, so can be given in response to an altruistic act (such as helping out on a rice field), or with the expectation that the recipient will give something in return at a later date. Understanding the interplay and influence of these female-specific networks for the design and implementation of demand reduction interventions will advance IUWT research and inform successful interventions, for a wide variety of wildlife products.

Women have also been found to be primary users for certain wildlife products. For example, Doughty et al. (2019) found that individuals buying and using saiga horn in Singapore tended to be middle-aged, Chinese-heritage women. One driver of use of saiga by these women was that it was recommended to them by others as a treatment option for “heatiness”. In the case of these users, the most influential group was cited to be “Family”. While “Family” influence can be an important driver for all genders, across the world, women may be especially influenced by the desires and recommendations of close kin. Studies have shown that across societies, middle-aged women are often especially bound to their parents and children (Waite and Harrison, 1992). As such, they may be especially willing to engage in social activities with these kin-members that further strengthen the bond, such as purchasing and using a parent or child-recommended medicinal product. Middle-aged women are doubly “susceptible” due to exerting power over their children, and having power exerted over them by living parents. In addition, Chinese Singaporeans- and individuals in Chinese societies across China and Southeast Asia- have traditionally lived in multi-generational households, where older female actors can carry immense power over younger females in the household (e.g. Teo et al., 2003). This more “dominative” driver contrasts with the examples given in the preceding paragraph of “freely given” aid and assistance within largely equitable female

social networks; yet both examples illustrate the importance of understanding women-specific contexts when attempting to understand behaviors around wildlife consumption and use.

Another highly-specific example of a women-driven social driver is the suggestion of wildlife products for the treatment of women-specific uterine ailments, as noted by [Davis et al. \(2020\)](#) in Cambodia, with older female kin encouraging the use of bear bile by younger women, particularly to treat post-partum ailments. This encouragement can take the form of specific verbal encouragement, as well as purchase of the bear bile by older females, for use by the younger female kin. While bear bile is used by both genders in Cambodia, use of bear bile by women is specific to female clans (kin networks) and female-identifying individuals with uteruses. Older women within female kin networks represent a particularly influential group whose motivations will be of immense benefit to understand and leverage, as researchers increasingly seek to design behavior change interventions to address IUWT. In this respect, older women may be powerful “agents of change” who “are positioned within their social network in such a way [as] to engender transformation” ([Graham, 2022](#)).

A key social driver of behavior is attitude. In the Theory of Planned Behavior, a widely-used theory in conservation social science, attitudes are argued to be one of the direct mediators of behavioral intention, which in turn is a direct mediator of behavior ([Ajzen, 1991](#)). The argument follows that understanding attitudes in turn facilitates researcher understanding of actual and potential behavior (e.g. [Hrubes et al., 2001](#); [Shrestha et al., 2012](#); [Glikman et al., 2019](#)). While persuasive counterarguments have emerged that investigating attitudes alone does not provide sufficient understanding of behavior ([Nilsson et al., 2020](#)), attitudes (combined with other socially and contextually-grounded factors) do provide an approximate measure of the potential for X behavior to occur ([St. John et al., 2010](#)). As such, it is worth considering women’s attitudes towards wildlife, as part of broader understanding around why behaviors- such as the trafficking and/or consumption of wildlife- may occur. While a negative attitude held by a woman towards a wildlife species may not necessarily encourage her to initiate the behavior of poaching, trading, and/or consuming that species, she may influence other actors, such as her direct kin, to poach, trade, and consume (e.g. [Agu and Gore, 2022](#)). Women may also be more negatively affected by conservation decisions based only on male attitudes (e.g. [Doubleday and Rubino, 2022](#), [Flaherty and Jengjalern, 1995](#), and [Keane et al., 2016](#)). Conservation interventions lacking complete buy-in from all relevant stakeholders often fail ([Cooney et al., 2021](#)). Biased research can lead to ineffective conservation interventions that fail to consider women and their specific gender-based behavioral and social differences. A prominent example of of biased research is studies that sample household heads rather than a gender-balanced sample; although, studies that analyze specific differences in positive/negative conservation behaviors between male and

female-headed households can uncover greater nuance and by extension, can have greater impact in making effective conservation decisions (e.g. [Thoms, 2008](#)). Ultimately, thoughtfully designed studies that gather psycho-social information from both men and women will be most effective at guiding applied conservation interventions addressing important conservation issues, such as IUWT.

Conclusion

Gender-focused IUWT research is still arguably in nascent stages, particularly in Southeast Asia. I have identified within this article a number of gaps in knowledge, including: women’s role in hunting wildlife; women’s role in determining which wildlife is brought into the home; the extent of women’s involvement for trading wildlife; women’s motivations for trading wildlife; women’s motivations for using wildlife; the role female kin networks play in influencing transmission of wildlife use; the extent of women’s involvement in selling and slaughtering wildlife at a market; and motivations for selling and slaughtering wildlife. These are examples of important research avenues, but even more fruitful and important opportunities exist. Initiating research projects into these and other women-in-IUWT-specific questions will result in important outputs that- if applied appropriately- will unquestionably enhance the efficacy of IUWT-directed conservation interventions in Southeast Asia.

IUWT is one of the most significant challenges facing the world, with well-publicized negative impacts on global biodiversity and global health. To date, conservationists have struggled to adequately address this global crisis. Continued failure to consider influential groups, such as women, is likely to waste critical resources and hamper conservationists’ ability to have impact. To initiate the “social change” needed to safeguard global biodiversity and health, women must be acknowledged, understood, and engaged.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated

organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Aarestrup, F. M., Bonten, M., and Koopmans, M. (2021). Pandemics—one health preparedness for the next. *Lancet Regional Health-Europe* 9, 100210. doi: 10.1016/j.lanepe.2021.100210
- Agu, H. U., and Gore, M. L. (2022). *Women and wildlife trafficking: participants, perpetrators and victims* (New York City, New York, USA: Routledge). doi: 10.4324/9781003121831
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behav. Hum. Decision Processes* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T
- Akter, S., Rutsaert, P., Luis, J., Htwe, N. M., San, S. S., Raharjo, B., et al. (2017). Women's empowerment and gender equity in agriculture: A different perspective from southeast Asia. *Food Policy* 69, 270–279. doi: 10.1016/j.foodpol.2017.05.003
- Anagnostou, M., Moreto, W. D., Gardner, C. J., and Doberstein, B. (2021). Poverty, pandemics, and wildlife crime. *Conserv. Soc.* 19 (4), 294–306. doi: 10.4103/cs.cs_193_20
- Andrew, C., and Agu, H. U. (2022). Using a feminist political ecology lens to explore the gendered dimensions of wildlife trafficking literature. *Women Wildlife Trafficking: Participants Perpetrators Victims* (New York) 11. doi: 10.4324/9781003121831
- Appadurai, A. (1988). *The social life of things: Commodities in cultural perspective* (Cambridge, UK: Cambridge University Press).
- Ardener, S. (1985). The social anthropology of women and feminist anthropology. *Anthropology Today* 1 (5), pp.24–pp.26. doi: 10.2307/3032826
- Blair, M. E., Le, M. D., Sethi, G., Thach, H. M., Nguyen, V. T., Amato, G., et al. (2017). The importance of an interdisciplinary research approach to inform wildlife trade management in southeast Asia. *BioScience* 67 (11), pp.995–pp.1003. doi: 10.1093/biosci/bix113
- Booth, H., Arias, M., Brittain, S., Challender, D. W., Khanyari, M., Kuiper, T., et al. (2021). "Saving lives, protecting livelihoods, and safeguarding nature": risk-based wildlife trade policy for sustainable development outcomes post-COVID-19. *Front. Ecol. Evol.* 9, 99. doi: 10.3389/fevo.2021.639216
- Brantingham, P. L., and Brantingham, P. J. (1993). Environment, routine and situation: Toward a pattern theory of crime. *Adv. criminological Theory* 5 (2), pp.259–pp.294.
- Cooney, R., Challender, D. W., Broad, S., Roe, D., and Natusch, D. J. (2021). Think before you act: improving the conservation outcomes of CITES listing decisions. *Front. Ecol. Evol.* 9, 236. doi: 10.3389/fevo.2021.631556
- Davis, E. O. (2020). *Understanding use of bear products in southeast Asia: Human-oriented perspectives from Cambodia and Laos* (Bristol, UK: Doctoral dissertation, University of Bristol).
- Davis, E. O., Gibson, M., Lim, T., and Glikman, J. A. (2020). Bear bile use at the intersection of maternal health in Cambodia. *J. ethnobiology ethnomedicine* 16 (1), 1–9. doi: 10.1186/s13002-020-00380-6
- Doubleday, K. F., and Rubino, E. C. (2022). Tigers bringing risk and security: Gendered perceptions of tiger reintroduction in rajasthan, India. *Ambio* 51 (5), 1343–1351. doi: 10.1007/s13280-021-01649-0
- Doughty, H., Verissimo, D., Tan, R. C. Q., Lee, J. S. H., Carrasco, L. R., Oliver, K., et al. (2019). Saiga horn user characteristics, motivations, and purchasing behaviour in Singapore. *PLoS One* 14 (9), e0222038. doi: 10.1371/journal.pone.0222038
- Dube, L. (1997). *Women and kinship: Perspectives on gender in south and south-east Asia* (Tokyo ; New York: United Nations University Press).
- Dwyer, P. D., and Minnegal, M. (2010). Theorizing social change. *J. Royal Anthropol. Ins* 16 (3), 629–645. doi: 10.1111/j.1467-9655.2010.01643.x
- Elsing, S. (2019). Navigating small-scale trade across Thai-lao border checkpoints: Legitimacy, social relations and money. *J. Contemp. Asia* 49 (2), 216–232. doi: 10.1080/00472336.2018.1551559
- Endres, K. W. (2014). Making law: Small-scale trade and corrupt exceptions at the Vietnam–China border. *Am. Anthropologist* 116 (3), 611–625. doi: 10.1111/aman.12119
- Fabinyi, M. (2016). Producing for Chinese luxury seafood value chains: Different outcomes for producers in the Philippines and north America. *Mar. Policy* 63, 184–190. doi: 10.1016/j.marpol.2015.03.024
- Flaherty, M., and Jengjalern, A. (1995). Differences in assessments of forest adequacy among women in northern Thailand. *J. developing areas* 1, 237–254. Available at: <https://www.jstor.org/stable/4192440>
- Friess, D. A., Thompson, B. S., Brown, B., Amir, A. A., Cameron, C., Koldewey, H. J., et al. (2016). Policy challenges and approaches for the conservation of mangrove forests in southeast Asia. *Conserv. Biol.* 30 (5), 933–949. doi: 10.1111/cobi.12784
- Fukushima, C. S., Tricorache, P., Toomes, A., Stringham, O. C., Rivera-Téllez, E., Ripple, W. J., et al. (2021). Challenges and perspectives on tackling illegal or unsustainable wildlife trade. *Biol. Conserv.* 263, 109342. doi: 10.1016/j.biocon.2021.109342
- Glikman, J. A., Ciucci, P., Marino, A., Davis, E. O., Bath, A. J., and Boitani, L. (2019). Local attitudes toward apennine brown bears: Insights for conservation issues. *Conserv. Sci. Pract.* 1 (5), e25. doi: 10.1111/csp.225
- Graham, J. (2022). "3 women as agents of change in efforts to disrupt illegal wildlife trade," in *Women and wildlife trafficking: Participants, perpetrators and victims*, vol. 30. (New York: . Routledge).
- Gregson, S., Zhuwau, T., Ndlovu, J., and Nyamukapa, C. A. (2002). Methods to reduce social desirability bias in sex surveys in low-development settings: experience in Zimbabwe. *Sexually transmitted Dis.* 29 (10), 568–575. doi: 10.1097/00007435-200210000-00002
- Hrubec, D., Ajzen, I., and Daigle, J. (2001). Predicting hunting intentions and behavior: An application of the theory of planned behavior. *Leisure Sci.* 23 (3), 165–178. doi: 10.1080/014904001316896855
- Hübschle, A. (2014). Of bogus hunters, queenpins and mules: the varied roles of women in transnational organized crime in southern Africa. *Trends organized crime* 17 (1–2), 31–51. doi: 10.1007/s12117-013-9202-8
- Jaithe, V. F., Hordyk, A. R., Braccini, M., Warren, C., and Loneragan, N. R. (2017). Shark finning in eastern Indonesia: Assessing the sustainability of a data-poor fishery. *ICES J. Mar. Sci.* 74, 242–253. doi: 10.1093/icesjms/fsw170
- Jiao, Y., Yeophantong, P., and Lee, T. M. (2021). Strengthening international legal cooperation to combat the illegal wildlife trade between southeast Asia and China. *Front. Ecol. Evol.* 9, 105. doi: 10.3389/fevo.2021.645427
- Keane, A., Gurd, H., Kaelo, D., Said, M. Y., De Leeuw, J., Rowcliffe, J. M., et al. (2016). Gender differentiated preferences for a community-based conservation initiative. *PLoS One* 11 (3), e0152432. doi: 10.1371/journal.pone.0152432
- Leshkovich, A. M. (2014). *Essential trade: Vietnamese women in a changing marketplace* (Hawai'i, USA: University of Hawaii Press).
- Lindsey, P., Allan, J., Brehony, P., Dickman, A., Robson, A., Begg, C., et al. (2020). Conserving africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nat. Ecol. Evol.* 4 (10), 1300–1310. doi: 10.1038/s41559-020-1275-6
- Lunstrum, E., and Givá, N. (2020). What drives commercial poaching? from poverty to economic inequality. *Biol. Conserv.* 245, 108505. doi: 10.1016/j.biocon.2020.108505
- Margulies, J. D., Wong, R. W., and Duffy, R. (2019). The imaginary 'Asian super consumer': A critique of demand reduction campaigns for the illegal wildlife trade. *Geoforum* 107, 216–219. doi: 10.1016/j.geoforum.2019.10.005
- McElwee, P. (2012). The gender dimensions of the illegal trade in wildlife. *P. McElwee Gender sustainability: Lessons Asia Latin America*, 71–93.
- Murdock, G. P., and Provost, C. (1973). Factors in the division of labor by sex: A cross-cultural analysis. *Ethnology* 12 (2), 203–225. doi: 10.2307/3773347
- Nana, E. D. (2022). 6 women, wildlife crime, and sustainable livelihoods in Cameroon. *Women Wildlife Trafficking: Participants Perpetrators Victims*, 72. doi: 10.4324/9781003121831
- Nguyen, C., Frederick, H., and Nguyen, H. (2014). "Female entrepreneurship in rural Vietnam: An exploratory study," in *Women's entrepreneurship in the 21st century* (Northampton, MA, USA: Edward Elgar Publishing).

- Nguyen, T., and Roberts, D. L. (2020). Exploring the Africa-Asia trade nexus for endangered wildlife used in traditional Asian medicine: Interviews with traders in south Africa and Vietnam. *Trop. Conserv. Sci.* 13, 1940082920979252. doi: 10.1177/1940082920979252
- Nijman, V., Ardiansyah, A., Bergin, D., Birot, H., Brown, E., Langgeng, A., et al. (2019). Dynamics of illegal wildlife trade in Indonesian markets over two decades, illustrated by trade in sunda leopard cats. *Biodiversity* 20 (1), .27–40. doi: 10.1080/14888386.2019.1590236
- Nijman, V., Oo, H., and Shwe, N. M. (2017). Assessing the illegal bear trade in Myanmar through conversations with poachers: topology, perceptions, and trade links to China. *Hum. Dimensions Wildlife* 22 (2), 172–182. doi: 10.1080/10871209.2017.1263768
- Nilsson, D., Fielding, K., and Dean, A. J. (2020). Achieving conservation impact by shifting focus from human attitudes to behaviors. *Conserv. Biol.* 34 (1), 93–102. doi: 10.1111/cobi.13363
- Nuttall, M. N., Griffin, O., Fewster, R. M., McGowan, P. J., Abernethy, K., O'Kelly, H., et al. (2022). Long-term monitoring of wildlife populations for protected area management in southeast Asia. *Conserv. Sci. Pract.* 4 (2), e614. doi: 10.1111/csp2.614
- Papanek, H. (1975). Women in South and Southeast Asia: issues and research. *Signs: Journal of Women in Culture and Society* 1 (1), 193–214.
- Price, L. L., and Ogle, B. (2012). *Gender and natural resource management*. (New York City, New York, USA: Routledge), 229–258.
- Roe, D., Dickman, A., Kock, R., Milner-Gulland, E. J., and Rihoy, E. (2020). Beyond banning wildlife trade: COVID-19, conservation and development. *World Dev.* 136, 105121. doi: 10.1016/j.worlddev.2020.105121
- Shrestha, S. K., Burns, R. C., Pierskalla, C. D., and Selin, S. (2012). Predicting deer hunting intentions using the theory of planned behavior: A survey of Oregon big game hunters. *Hum. Dimensions Wildlife* 17 (2), .129–140. doi: 10.1080/10871209.2012.649885
- St John, F. A., Edwards-Jones, G., and Jones, J. P. (2010). Conservation and human behaviour: lessons from social psychology. *Wildlife Res.* 37 (8), .658–667. doi: 10.1071/WR10032
- Sundström, A., Linell, A., Ntuli, H., Sjöstedt, M., and Gore, M. L. (2020). Gender differences in poaching attitudes: Insights from communities in Mozambique, south Africa, and Zimbabwe living near the great Limpopo. *Conserv. Lett.* 13 (1), e12686. doi: 10.1111/conl.12686
- Tan, D. (2013). *Transnational dynamics in southeast Asia*. (Institute of Southeast Asian Studies, Singapore: ISEAS Publishing), 421–452.
- Teo, P., Graham, E., Yeoh, B. S., and Levy, S. (2003). Values, change and inter-generational ties between two generations of women in Singapore. *Ageing Soc.* 23 (3), 327–347. doi: 10.1017/S0144686X0300120X
- Thoms, C. A. (2008). Community control of resources and the challenge of improving local livelihoods: A critical examination of community forestry in Nepal. *Geoforum* 39 (3), 1452–1465. doi: 10.1016/j.geoforum.2008.01.006
- Tucker, J. D., Peng, H., Wang, K., Chang, H., Zhang, S. M., Yang, L. G., et al. (2011). Female sex worker social networks and STI/HIV prevention in south China. *PLoS One* 6 (9), e24816. doi: 10.1371/journal.pone.0024816
- Turner, S. (2010). Borderlands and border narratives: A longitudinal study of challenges and opportunities for local traders shaped by the sino-Vietnamese border. *J. Global History* 5 (2), 265–287. doi: 10.1017/S1740022810000082
- Van Kirk, S. (1983). *Many tender ties: Women in fur-trade society 1670-1870* (Oklahoma, USA: University of Oklahoma Press).
- van Uhm, D. P., and Wong, R. W. (2021). Chinese organized crime and the illegal wildlife trade: Diversification and outsourcing in the Golden Triangle. *Trends in Organized Crime*, 1–20. doi: 10.1007/s12117-021-09408-z
- Villamor, G. B., Akiefnawati, R., Van Noordwijk, M., Desrianti, F., and Pradhan, U. (2015). Land use change and shifts in gender roles in central Sumatra, Indonesia. *Int. Forestry Rev.* 17 (4), 61–75. doi: 10.1505/146554815816086444
- Waite, L. J., and Harrison, S. C. (1992). Keeping in touch: How women in mid-life allocate social contacts among kith and kin. *Soc. Forces* 70 (3), 637–654. doi: 10.2307/2579747
- Walker, A. (1999). *The legend of the golden boat: Regulation, trade and traders in the borderlands of Laos, Thailand, China and Burma* (Honolulu: University of Hawai'i Press).
- Watsa, M. Wildlife Disease Surveillance Focus Group (2020). Rigorous wildlife disease surveillance. *Science* 369 (6500), 145–147. doi: 10.1126/science.abc0017
- Whitmore, J. K. (1984). Social organization and Confucian thought in Vietnam. *J. Southeast Asian Stud.* 15 (2), 296–306. doi: 10.1017/S0022463400012534
- Yokoyama, S. (2010). The trading of agro-forest products and commodities in the northern mountainous region of Laos. *Japanese J. Southeast Asian Stud.* 47 (4), 374–402. doi: 10.20495/tak.47.4_374