DEMAND IN VIET NAM FOR RHINOCEROS HORN USED IN TRADITIONAL MEDICINE

International Trade Centre

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This study aims to understand better the demand for traditional medicine and more contemporary health-related reasons, collectively referred to as ATM in this report, in Viet Nam. The country is strategically important for illegally traded wildlife products, such as pangolin scales and rhino horn. Using an in-person survey of over 1,000 respondents on wildlife consumed as medicine, the study had four main objectives: identify consumer profile of ATM users (age, income, gender, etc.), identify recent trends in ATM consumption among users, focusing on two high conservation-value species (pangolin and rhino), identify the main attributes of demand (quality, price, harvesting method, etc.), evaluate the policy options to reduce demand for high-conservation species. To provide insights and broader overview of market trends, the authors also interviewed experts in ATM in Viet Nam. The report includes bibliographical references (pp. 65-66).

Descriptors: **Animal Byproducts, Endangered Species, Environment, Viet Nam.**

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Foreword

The rhinoceros species is facing a crisis. After a long period of gains in population of the Southern White Rhinoceros, in the last decade we have witnessed a dramatic rise in poaching on the African continent, from an estimated 60 rhinos in 2006 to 1338 in 2015. These levels of poaching now place the species at risk of extinction in the wild.

Despite a commercial trade ban on rhino horn and rhino products, strong economic growth in Asia has led to more trade links with African range states and a resurgence in poaching. Consequently, prices for illegally poached horn have risen sharply, with estimates ranging from $28,000 to $100,000 per kilogram in 2013.

Seventy-two per cent of the world's rhinos are found in the Republic of South Africa, which has borne the brunt of illegal poaching and as a result has faced escalating protection costs and diminishing income and investment in private game reserves.

In 2014, the CITES Management Authorities of South Africa and Viet Nam asked the International Trade Centre (ITC) to carry out research into understanding consumer demand in Viet Nam for rhino horn. The 17th meeting of the Conference of Parties in Johannesburg in September 2016 urged Parties to conduct research on the demand for illegal wildlife products and invited international organizations to provide technical support.

We know that rhino horn consumption is ingrained in the culture of traditional medicine and that new trends have emerged. However, there is a lack of data to understand consumer preferences for rhino horn and their responses to different policies to protect the species.

This study was undertaken in partnership with the Durrell Institute of Conservation and Ecology at the University of Kent and with the University of St Andrews. It surveys the preferences of over 1,000 consumers for animal products used in traditional medicine, including 239 rhino horn users. Having spoken to so many users, ITC has managed to gain a unique insight into why people consume rhino horn. This is vital to help CITES Parties design the most effective measures to conserve the species. The results tell us why people use rhino horn, the attributes they are willing to pay for and the impact of different policies on consumption including stricter prison sentences, demand reduction campaigns and a regulated, legal trade.

ITC is fully committed to providing objective, science-based evidence for policy, and to this end has signed a Memorandum of Understanding with the CITES Secretariat to support Parties with data and analysis on how markets work for sustainable use and conservation of biodiversity.

I would like to thank the CITES Management Authority of South Africa and CITES Secretariat for their support in implementing this project. In particular, I would like to extend my gratitude to the Viet Nam CITES Management Authority for its flexibility, expertise and support for the project as well as to the dedicated researchers and enumerators.

Arancha González
Executive Director
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ITC would like to extend its appreciation to the CITES Management Authority of the Republic of South Africa and Viet Nam respectively and the CITES Secretariat as well as to the members of the African Rhino Specialist Group (AfRSG) in the Species Survival Commission of the World Conservation Union (IUCN) who reviewed the work, including Michael Knight, Richard Emslie and Michael ‘t Sas-Rolfes. The team would like to thank Anders Aeroe, Matthew Wilson, and Robert Skidmore (ITC) for their support to the project.

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Abbreviations

Unless otherwise specified, all references to dollars ($) are to United States dollars, and all references to tons are to metric tons.

AfRSG	African Rhino Specialist Group
ATM	Animal-based Traditional Medicine
COP	Conference of Parties
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
ITC	International Trade Centre
LCRP	Latent Class Random Parameter
MKE	Mekong Economics
RPL	Random Parameters Model
TM	Traditional Medicine
VND	Vietnamese Dong
WTP	Willingness to Pay

Executive summary

The illicit trade in animal products for consumer markets in Asia is putting species at risk of extinction. There is high consumer demand in Asia for specific animal products including rhino horn and pangolin scales, particularly for traditional medicine, as a hangover remedy or even a miracle cure for cancer. These markets are supplied illicitly despite the trade's prohibition under the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The collection, trade and use of animal-based traditional medicine is an important aspect of Asian culture, with historical records indicating that use stretches back at least 1,300 years. Today, medicinal products from animals are widely used as health foods or healthcare products and are readily available from specialist traditional medicine shops and markets, as well as online shops. While it is known that a large variety of wildlife species are used, there are few systematic descriptions of consumers and their motivations. This is especially true for products sourced from endangered animal and plant species due to the illegal nature of the trade.

Demand appears to be rising, and concerns are growing that illegal hunting to procure ingredients is becoming the major threat to the survival of high-value conservation species including tiger (*Panthera tigris),* Chinese pangolin (*Manis pentadactyla)* and rhinoceros (e.g. *Rhinoceros spp*). Poaching gangs are incentivized to risk punishment or even death to supply this market, largely due to very high prices for these illicit goods.

To counter the illegal trade and curb the threat posed by poaching, the global community is committed to a dual strategy of supply-side trade restrictions (for example anti-poaching measures, import seizures, etc.) and demand reduction.

However, considerable uncertainty surrounds the efficacy of demand-reduction campaigns and associated measures in an Asian context, where crucial aspects of demand for illegally hunted wildlife for medicinal products are poorly understood. Previous research suggests that consumption trends are shaped by a complex array of factors including personal preferences, family and community traditions, and business culture, as well as demographic changes and economic cycles. To complicate matters further, consumption in Asia can be a measure of status and respect, rather than shame or embarrassment as in Western countries. As a result, traditional demand-reduction programmes may not resonate well with Asian consumers.

This study, commissioned in response to a request from the CITES Management Authorities of Republic of South Africa and Viet Nam respectively, aims to understand better the demand for animal products used in traditional medicine and for more contemporary health-related reasons such as a 'hangover cure' – collectively referred to as animal-based traditional medicine (ATM) in this report – in Viet Nam. The country is strategically important for illegally traded wildlife products, such as pangolin scales and rhino horn.

Using an in-person survey of more than 1,000 respondents on wildlife consumed as medicine, ITC had four main objectives:

1) Identify consumer profile of ATM users (age, income, gender, etc.)
2) Identify recent trends in ATM consumption among users
3) Focusing on two high conservation-value species (pangolin and rhino), identify the main attributes of demand (quality, price, harvesting method, etc.)
4) Evaluate the policy options to reduce demand for high-conservation species.

The authors decided that a large-scale interview survey targeting ATM users, and specifically those that used ATMs derived from high-value conservation species, was the most appropriate approach. To provide insights and broader overview of market trends, the authors also interviewed experts in ATM in Viet Nam, such as practicing professional pharmacists and business operators.

The survey and expert information was gathered by Mekong Economics under contract to ITC, which provided trained interviewers fluent in Vietnamese with the knowledge and ITC's choice experiment (CE) methodology. CEs are a well-established stated preference method of estimating consumer demand and willingness to pay (WTP) for changes in product attributes and have been increasingly used in the analysis of conservation policy including consumer demand for products from rare and endangered wildlife.

Due to the sensitive and clandestine nature of some of the subject matter concerning rare species, interviewees were initially recruited via contacts of traditional medicinal practitioners, with subsequent interviewees identified using the snowball sampling technique (Newing et al., 2014). Given the sensitivity of the subject matter, all interviews were conducted in the strictest confidence and under conditions of full anonymity.

The total sample size, including pilot data, was 1,023. As the focus was on ATM users and especially rhino horn users, the sampling frame distributed the total sample across four main groups. The quotas for each group reflected the need to generate some information about non-target groups (that is, non-ATM users) while at the same time focusing most effort on respondents most likely to have used rhino horn or pangolin.

- **Group i):** Respondents who have never used Traditional Medicine, or been to see a doctor or hospital that practises Traditional Medicine. Hereon referred to as 'Non-TM Users' (72 respondents).
- **Group ii):** Respondents who have used Traditional Medicine, or been to see a doctor or hospital that practices Traditional Medicine. However, they have never used ATMs. Hereon referred to as 'Non-ATM Users' (103 respondents).
- **Group iii):** Respondents who have used ATM, but not including rhino or pangolin species. Hereon referred to as 'ATM Users – Non-Rhino Horn' (561 respondents).
- **Group iv):** Respondents who have used or purchased (for themselves or someone else) rhino horn/pangolin as ATM. Hereon referred to as 'ATM Users - Rhino Horn'[1] (239 respondents).

The main results and conclusions are:

- **Users are mainly older males with above-average incomes.**

Most rhino horn users are older males with higher-than-average incomes, but there is evidence that younger consumers and females represent a significant segment of the market for rhino horn.

- **Rhino horn is used mainly to treat medical conditions.**

Rhino horn is most commonly purchased and used to treat a medical condition, often prescribed by a doctor. Gift-giving to enhance business and political relationships is relatively uncommon and new, more contemporary uses, such as hangover cure or aphrodisiac, are very rarely mentioned.

- **Consumption has declined slightly but is driven by individual medical need.**

Compared to five years ago, there were more respondents who stated they had reduced consumption than who had stated they were consuming more in the sample. However medical needs were the main reasons for varying consumption with price, income or preference changes less important.

- **Rhino horn users are also more likely to use ATM from other high conservation-value species.**

Rhino horn users are more likely to consume ATMs containing high conservation-value species such as tiger and shark than other ATM users.

- **Wild-sourced and non-lethal harvesting methods are important attributes of rhino horn for consumers.**

The results show that willingness to pay for rhino horn is largely influenced by source and harvesting method, with wild-sourced animals, where the horn is harvested non-lethally, the most valued. Rarity of the species is less influential on willingness to pay.

[1] As only four individuals were found who had used pangolin scales and all four had also used rhino horn, for simplicity hereon they are referred to this group as Rhino horn ATM users.

- **Willingness to pay is lower under legalization scenario due to loss of prestige associated with illegal consumption of rhino horn.**

Legalizing the rhino horn trade is likely to lead to an increase in the number of consumers, but consumers will pay significantly less, irrespective of the horn's attributes. The most likely explanation for this is the loss of prestige and exclusivity associated with illegal consumption.

Furthermore, the results show that horn that is non-lethally harvested is preferred over horn from an animal that is killed. The research concludes that the introduction of a legal supply has the potential to 'crowd out' poachers for two reasons, namely, consumers' strong preference for non-lethal harvesting, and an overall fall in price due to the loss of prestige and exclusivity of rhino horn in a legal and regulated trade.

The study found that there would be a small increase in the number of people who might consume more rhino horn due to legalization. Together with the predicted drop in price, there is a risk that legalization could lead to an overall increase in consumption. To prevent a shortage of rhino horn, which could provide future opportunities for poachers, it would be important for sufficient supplies of legal stock to be available to meet demand.

- There is no evidence of social 'stigma' from rhino horn consumption.

There is no evidence that consuming rhino horn is associated with any form of social stigma, even for non-medical uses. ITC found rhino horn consumers see little connection between saving endangered species and consuming wildlife for health reasons. In fact, the evidence suggests that in Viet Nam, the consumption of wildlife products of high symbolic value, such as rhino horn, may in fact be associated with high social esteem and status. Furthermore, there was little evidence from the study supporting the notion that a Western-style marketing campaign involving media celebrities could effectively stigmatize consumption.

- **Stiffer enforcement measures are most effective to reduce consumption.**

The survey evidence shows that demand-reduction measures could prove effective, with a strong, heavily resourced and well-designed media campaign potentially resulting in reduced consumption for more than 40% of respondents who said they were most likely to buy in the future (Definitely Would Buy: 52%, Probably Would Buy: 39%).

Stiffer enforcement measures such as fines and prison time would significantly reduce consumption further among this group, leaving only around 30% of those respondents unwilling to consume less. Reducing demand in this hardcore group of users will be challenging, as they may have a deep and abiding belief in rhino-horn consumption to treat serious illness, and there are some who will continue to perceive it as prestigious.

This finding will be of concern to policymakers, given that experts estimate that rhinos in the wild face extinction in five to 10 years.

- **More research is needed on poaching and demand and supply issues.**

Populations of rhino around the world are vulnerable due to their fragmented isolated distribution and their low numbers. The study finds that there is more research needed to explore how poaching can be reduced through a range of new interventions, ranging from community-based enforcement in source countries of Africa to demand management in countries such as Viet Nam.

The research suggests that the introduction of legal trade may help crowd out poaching (i.e. outcompete it) due to lower prices and a strong preference for non-lethal harvesting methods. However, further research is required into the economics of supplying rhino horn legally and sustainably at prices that render poaching uneconomic.

ITC is not advocating one policy over another, but providing scientific, peer-reviewed evidence to inform policymaking. Both the current and the alternative policies – namely, the ban on trade and a legal trade – carry risks.

Introduction

The collection, trade and use of animal-based traditional medicine (ATM) is an important aspect of Asian culture, with historical records indicating use that stretches back at least 1,300 years.[2] ATM products are widely used as health foods or healthcare products and are readily available from specialist traditional medicine shops and markets, as well as online shops. A large variety of wildlife species are used in ATM, but there are few systematic descriptions of consumers and their motivations.

This is especially true for ATM products sourced from endangered animal and plant species, due to the illegal nature of the trade. Demand appears to be growing[3] and there are increasing concerns that illegal hunting to procure ingredients for ATM is becoming the major threat to the survival of high-value conservation species including tiger (*Panthera tigris),* Chinese pangolin (*Manis pentadactyla)* and rhinoceros (e.g. *Rhinoceros spp*), mainly due to rising prices. For example, prices for illegal poached rhino horn have climbed from an estimated $7,500 per kg (at 2013 prices) in 1993[4] to $28,000-$100,000 per kg in 2013.[5]

To counter the illegal trade and curb the threat posed by poaching, the global community is committed to a dual strategy of supply-side trade restrictions (such as anti-poaching measures and import seizures) and demand reduction. At the 16th Session of the Conference of the Parties (CoP16) of CITES (Convention on the International Trade in Endangered Species of Wild Fauna and Flora) member countries implicated in the rhino horn trade were required to '*develop and implement long-term demand-reduction strategies or programmes and immediate actions aimed at reducing the illegal movement and consumption of rhino horn products*' (COP 16; Decision 16.85).

However, considerable uncertainty surrounds the efficacy of demand-reduction campaigns and associated measures in an Asian context, where crucial aspects of demand for illegally hunted ATM products are poorly understood. The importance of generating data and research on demand was underlined by the CITES CoP17, when Parties were urged '*to conduct in-depth and regular research on the demand for specimens of illegally traded CITES-listed species, where possible, using standard methodologies to understand the drivers and dynamics of the demand and to provide solid information for use in demand-reduction campaigns*[6]' (Resolution Conf. 17.4).

Previous research suggests that consumption trends are shaped by a complex array of factors including personal preferences, family and community traditions and business culture, as well as demographic changes and economic cycles.[7] To complicate matters further, consumption of ATMs in Asia can be a measure of status and respect, rather than shame or embarrassment as in Western countries.[8] Hence, traditional demand-reduction programmes may not resonate well with Asian consumers. Furthermore, new and non-traditional uses for rhino horn and other wildlife products such as 'hangover cure' are emerging.

This study, commissioned in support of CoP17, aims to understand better the demand for ATMs in Viet Nam, a strategically important country for illegally traded ATM products such as pangolin scales and rhino horn.[9] Using an in-person survey of more than 1,000 respondents – the largest survey if its kind ever undertaken in Viet Nam on traditional medicine involving wildlife – this report had four main objectives:

1. Identify the consumer profile of ATM users.
2. Identify recent trends in ATM consumption among users.
3. Focus on two high conservation-value species and identify the main attributes of demand.
4. Evaluate the potential of reducing the demand through alternative intervention strategies.

[2] Huang, 1994.

[3] Challender and MacMillan 2014; Di Minin et al., 2014, NTCA 2012; Biggs et al. 2013.

[4] Loh and Loh, 1994.

[5] Viet Nam News, 2013; Halter, 2013.

[6] CITES Resolution 17.04 https://cites.org/sites/default/files/document/E-Res-17-04.pdf

[7] Shairp et al., 2016; Hinsley et al., 2015; Challender and MacMillan, 2014.

[8] Li and Su, 2007.

[9] New contemporary uses such as 'hangover cure' are introduced in this study, also refered to as ATM to simplify terminology.

Chapter 1 Choosing the best methodology

In order to meet the research objectives, it was decided that a large-scale interview survey that targeted ATM users, and specifically those that used ATMs derived from high-value conservation species, was the most appropriate approach. Experts in ATM in Viet Nam (such as practising professionals and business operators) were also interviewed to obtain insights and a broader overview of market trends.

The survey and expert information were gathered by Mekong Economics (MKE), which provided trained interviewers fluent in Vietnamese and with knowledge of the topic and the novel Choice Experiment (CE) methodology. The approach and methodology is explained in more detail below.

1.1 Survey preparation

Before starting the project, a team from ITC travelled to Viet Nam to prepare the survey instruments with MKE economists and MKE's external consultant. The team also had an initial meeting with the CITES Vietnam Management Authority under the Ministry of Agriculture and Rural Development in Hanoi – for a consultation on issues of wildlife trafficking in Viet Nam.

1.2 Survey team

The survey was carried out by 20 enumerators: 12 in Hanoi and eight in Ho Chi Minh City. The two teams were led by two supervisors, one based in each city. Prior to the start of the data-collection stage there were two days of training in Ho Chi Minh City and two of days training in Hanoi for enumerators to improve their knowledge of the questionnaires and their interview skills. A survey coordinator ensured the progress of the survey implementations and monitored the sample size, making sure that it reached the targets agreed with ITC. He was also in charge of reporting the progress to ITC and other team members.

The enumerators' trainings and all the interviews were conducted in Vietnamese. All interviewees were Vietnamese and discussion in Vietnamese made them feel more comfortable to share their opinion and experience. All questionnaires, choice cards and interview guidelines provided by ITC were translated into Vietnamese without any changes in format and structure.

In-depth interviews with rhino horn suppliers were organized and conducted by traditional medicine specialists. The traditional medicine specialists also supported MKE in survey implementation and report writing.

The detailed team structure adopted by MKE to implement the project is provided in Appendix IX.

1.3 In-depth interviews of ATM suppliers

Traditional medicine specialists from the team conducted 20 face-to-face semi-structured interviews with representatives of companies supplying ATM. These interviews aimed at understanding the issues and obstacles to a sustainable wildlife ATM trade. The ATM specialists, assisted by the MKE team, conducted 20 in-depth interviews with ATM suppliers in Hanoi and in Ho Chi Minh City.

Rhino horn suppliers selected for interviews include representatives of traditional hospitals, private pharmacies and some individuals who sell rhino horn. The in-depth interviews were conducted in Hanoi and Ho Chi Minh City by MKE's traditional medicine specialist with details as in Appendix I. The list of questions used as a guide in these in-depth interviews is described in Appendix II.

1.4 Questionnaire development and design

The questionnaire was developed following a review of previous ATM surveys in Asia and in close consultation with MKE and TM specialists. The aim was to ask a series of largely close-ended questions,

on demand and consumer characteristics, together with a choice experiment (CE) focusing on demand attributes for rhino horn and pangolin.

The questionnaire was divided into five main sections:

- Section A covered general use of ATM
- Section B explored rhino/pangolin ATM use
- Section C asked about purchase of rhino horn/pangolin ATM
- Section D focused on the choice experiment (see below)
- Section E covered questions about response to various demand reduction interventions and socioeconomic questions

Choice experiment methodology

Embedded within the survey we designed a relatively simple CE that required respondents to choose between two alternative ATM products. CEs are a well-established stated preference method of estimating consumer demand and willingness to pay (WTP) for changes in product attributes.[10] They have been increasingly used in the analysis of conservation policy over the last 15 years,[11] and more recently the technique has been used to investigate consumer demand for illegally hunted wildlife products.[12]

Design

In discussion with CITES Vietnam Management Authority, we initially agreed to focus on single design that could be applied to ATM ingredients from two high conservation-value species: rhino horn and pangolin scales.[13]

The experimental design was based upon four attributes and associated levels to describe two ATM product choices. These attributes and levels were identified from interviews with local traditional medicine practitioners in Viet Nam (see Table 1) and the literature.

Using a D-efficient experiment design,[14] attribute levels were combined to create a CE design containing five blocks each with eight identical choice sets (or cards). This meant that each respondent would be allocated to a Block and be asked to make eight choices from either Product A and Product B, where both products would differ from choice set to choice set, depending on the attribute levels selected by the design software. Respondents were able to select '*Neither'* if they preferred not to purchase either A or B, for example, because of the price. An example choice set, with supporting show cards describing the attributes and their levels, is shown in Appendix 4.

All participants except those who stated that they would definitely not use rhino-horn TM in the future were invited to participate in the CE.

[10] Hanley and Barbier, 2009.

[11] Hanley et al, 2003; Moro et al., 2013; Verissimo et al., 2014; Hinsley et al., 2015.

[12] Dutton et al., 2011; Sharip et al., 2016.

[13] As only four users of pangolin scales were interviewed, this version of the CE was dropped from further analysis.

[14] D-efficiency quantifies the goodness of efficiency in the experimental design.

Table 1: Attributes and Attribute Levels used in choice experiments

Attribute	Level
Source	1) Farmed; 2) Semi-Wild; 3) Wild
Rarity of rhino species	1) Very Rare - less 100 of these species in the wild 2) Rare - less than 5,000 animals of these species left in the wild 3) Least Rare - more than 10,000 animals of this species left in the wild
Harvesting method	1) Lethal 2) Non-lethal
Price of rhino horn ATM ($/100 grams)	1) 1,200 2) 2,400 3) 3,600 4) 4,800 5) 6,000 6) 7,200 7) 8,400 8) 9,600

Source: ITC survey

Scenarios

The sample was divided into two scenarios that explored demand for different legislative frameworks. Half of the sample was asked to consider their choices under a scenario where a regulated legal trade in rhino horn was allowed, with the other half making choices under the status quo (illegal trade). This split sampling approach allowed us to independently test for differences in respondent choice under the two trade scenarios, for example, in terms of attribute preferences and WTP.

Piloting

The questionnaire was screened by MKE TM experts before piloting with 50 respondents between November and December 2015 to test the suitability of each question, the overall structure and to provide some initial WTP estimates that could be used to refine the offered prices for rhino horn in the main survey. No changes in the questionnaire were made following the pilot exercise, although a new D-efficient experiment design had to be estimated that slightly altered price levels in the main survey. The main survey was conducted between April and June 2016 (the timetable for the full study is presented in Appendix V).

1.5 Sampling frame for main survey

Due to the sensitive and clandestine nature of the subject, and the likely prospect that rhino horn users represent a very small fraction of Vietnamese society, the survey sought to recruit respondents via the list of contacts in the field of traditional medicine (doctors and hospitals). Subsequent interviewees were identified using the snowball sampling technique, which is recommended when dealing with people who are hard to reach via conventional systematic or random sampling approaches.[15] Due to the sensitive

[15] Newing et al., 2014.

nature of the subject, all interviews were conducted in the strictest confidence and under conditions of full anonymity.

The total sample size, including pilot data, was 1,023. As the focus was on ATM users and especially rhino horn users, the sampling frame distributed the total sample across five main groups. The quotas for each group reflected the need to generate some information about non-target groups (such as non-ATM users) while at the same time focusing most effort on respondents most likely to have used rhino horn. The planned and actual sample quota size is presented in Table 2.

- Group i) Respondents who have never used Traditional Medicine, or been to see a doctor or hospital that practices Traditional Medicine. Hereon referred to as 'Non TM Users'.
- Group ii) Respondents who have used Traditional Medicine, or been to see a doctor or hospital that practices Traditional Medicine. However, they have never used Traditional Medicine with ingredients from animals. Hereon referred to as 'Non ATM Users'.
- Group iii) Respondents who have used Traditional Medicine using ingredients from animals (not including rhino or pangolin species). Hereon referred to as 'ATM Users - Non Rhino Horn'.
- Group iv) Respondents who used or purchased (for themselves or someone else) rhino horn/pangolin as a ATM. Hereon referred to as 'ATM Users - Rhino Horn'[16].
- Group v) Respondents who indicated that there was a chance they might purchase rhino horn in the future. Hereon referred to as 'Potential Future Buyers' and who were subsequently given the opportunity to participate in the CE.

Table 2: Attributes and Attribute Levels used in CE

User group	Question	Response	Total Sample	Sub Sample 1: Illegal	Sub Sample 2: Legal
i) Non TM User	A1	NO	72 (70)	36 (35)	36 (35)
ii) Non-ATM User	A1 A2	YES NO	103 (100)	58 (50)	45 (50)
iii) ATM User – Non Rhino Horn	A1 A2 B1	YES YES NO	561 (500)	273 (250)	288 (250)
iv) ATM User - Rhino Horn	B1	YES - USED	239 (200)	105 (100)	134 (100)
v)[17] Potential Future Buyer	D1	A, B,C, or D	855 (800)	404 (400)	451 (400)

[16] As there were only four individuals who had used pangolin scales and all four had also used rhino horn, for simplicity the report hereon refers to this group as rhino horn ATM users.

[17] This group includes respondents from the other groups.

During the fieldwork, the enumerators tried to approach the different types of respondents to achieve the agreed sample size for each category, based on responses to specific questions in the survey as shown in Table 2. The final overall breakdown for Groups i-iv is also shown in Figure 1. Due to varying response rates, however, the number of individuals in some groups of respondents was higher than originally outlined. For example, finding respondents for group (iv), Rhino Horn ATM Users, to carry out the CE under the illegal scenario was especially difficult, so enumerators had to adopt the 'legal scenario' more often than was originally envisaged.

Interviews were largely conducted in Hanoi (45%) and Ho Chi Minh City (47%), with fewer than 10% conducted in provinces nearby these cities. It is worth noting that some of the respondents interviewed in Hanoi and Ho Chi Minh City indicated that their home location was elsewhere is the country (home location is presented in map format in Appendix VI).

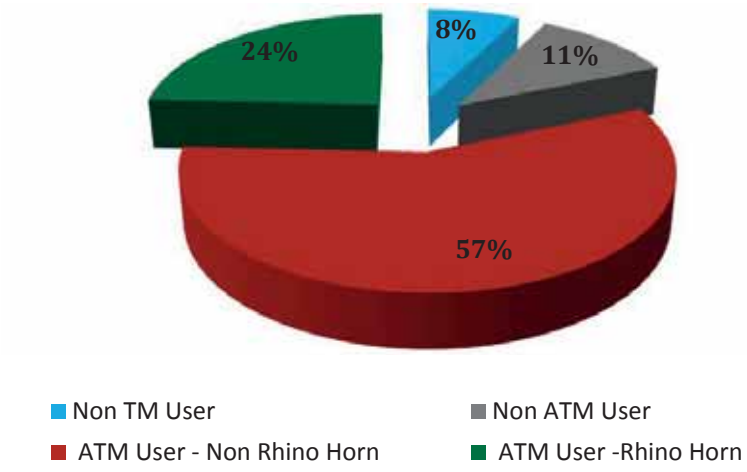
1.6 Limitations of survey and data collection

This section describes the difficulties encountered during the field work and the measures taken to mitigate their impact on the final results. Almost everyone in Viet Nam has used some kind of ATM such as honey bee, so it was not difficult to find and collect information from ATM users and non-users. But finding and persuading rhino horn users and buyers to answer the questionnaires was a significant challenge for the survey team as people often do not want to participate in a survey about sensitive and illegal activities.

MKE was aware of these difficulties and planned to facilitate the interviews with TM users and non-users by interviewing networks of enumerators' friends and relatives, friends of friends and relatives of friends. At the same time, the enumerators asked the interviewees to introduce them to rhino horn users and buyers that they knew. When interviewing rhino horn users, the enumerators tried to persuade them to introduce the buyers by assuring them that this survey was for research purposes only. MKE also sought the help of the external consultant, who has a strong network of ATM users and buyers.

Despite these measures, a small number of respondents who were known to have purchased or used rhino horn agreed to be interviewed but would only admit to using rhino horn received as a 'gift' from friends. The sample of rhino horn consumers and potential consumers is large, but because virtually nothing is reliably known or published about rhino horn consumers in Viet Nam, there is no possibility to assess whether the sample is representative of rhino horn users as a whole.

Figure 1: Percentage breakdown of user groups



Source: ITC survey

Chapter 2 Findings from interviews, surveys and choice experiments

2.1 Interviews with ATM suppliers

Recent trends in ATM consumption

The semi-structured interviews of key informants indicate that usage of ATMs in Viet Nam has declined slightly, due to a sharp drop in the availability of certain wild species as well as the introduction of tougher legal trading restrictions that further lowered supply and raised prices. Other contributing factors include improved social awareness of the side effects of ATM in treatment and the importance of wild animal conservation. In addition, as ATM prices rise, questions about effectiveness become more prominent. Last, but not least, the high availability of counterfeit products, driven by the high market price, makes it almost impossible to identify genuine ATMs, resulting in falling customer confidence levels with respect to ATM usage.

People often use products derived from wild animals such as tiger and rhino to express their high status, because these products are often very expensive and rare.[18] For example, the representative of Ha Dong General Hospital said treatments using ATMs are usually 2–7 times more costly than ordinary measures such as herbal treatment or acupuncture, depending on the components and sources of animal by-products (i.e. natural or domestic feeding). As a rule of thumb, medicine sourced from wild animals is 2–5 times more expensive than that sourced from farmed animals (such as horn from wild deer vs. farmed deer). In some instances, prices are higher because consumers and practitioners believe that medicines sourced from wild animal are more effective, and are therefore willing to pay more for them.

Current prices for high conservation-value species

An in-depth interview with Son Lam Pharmacy Private Company has provided the average prices of some ATMs as follows:

- Pangolin scales: VND 2–3 million/100g
- Tiger bone: VND 5 million/100g
- African rhino horn: VND 70–80 million/100g

Demand for rhino horn TM

Interviewees said rhino horn was used for general detoxification, cancer treatment, hepatitis, antipyretic treatment, skin care (such as rash treatment), drinking with Angong Niuhuang Wan[19] in stroke treatment, etc. The main rhino horn buyers were rich people who bought rhino horn for use in family or to give to other people as gifts. People with serious health problems such as cancer, cirrhosis or infertility also tend to buy rhino horn. Some interviewees said most patients prefer wild rhino horn over farmed horn because they believe that only wild rhino horn provides the full medical benefits. Overall, the role of rhino horn-based traditional medicines in treatment remains undiminished, but the high price, low availability and prevalence of counterfeit products in the market has reduced consumption. In most hospitals, TMs containing rhino horn is not openly prescribed.

Supply of rhino horn

Some suppliers said rhino horn from Africa, Indonesia and some other Southeast Asian countries was usually imported in original form (typically 1–2 kg of horn) to Viet Nam through the border gates in the

[18] Based on information from in-depth interview with representative of the Military's Traditional Medicinal Hospital on 23 November 2015.

[19] The *An-Gong-Niu-Huang* Wan (AGNH), a Chinese traditional medicine, has been used for treatment of cerebral diseases for centuries in China and other Asian countries, and is approved by the State Food and Drug Administration of China for the treatment of stroke.

central region by road or sea. In general, rhino horn is supplied through word of mouth. Typically, suppliers will contact doctors or other interested parties (officials or wealthy people) through their intimate relationships with those people. Brokers will receive payment after each successful transaction. People seeking rhino horn for the first time must obtain access to this network by interacting with many people.

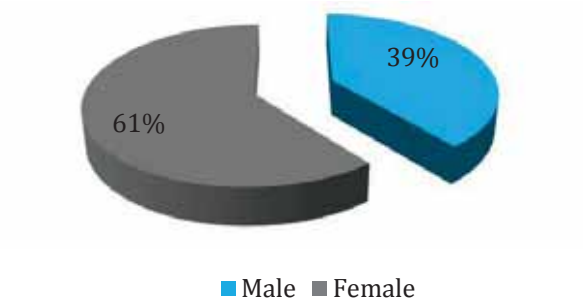
2.2 Results of the consumer survey

Socioeconomic characteristics of respondents

Gender

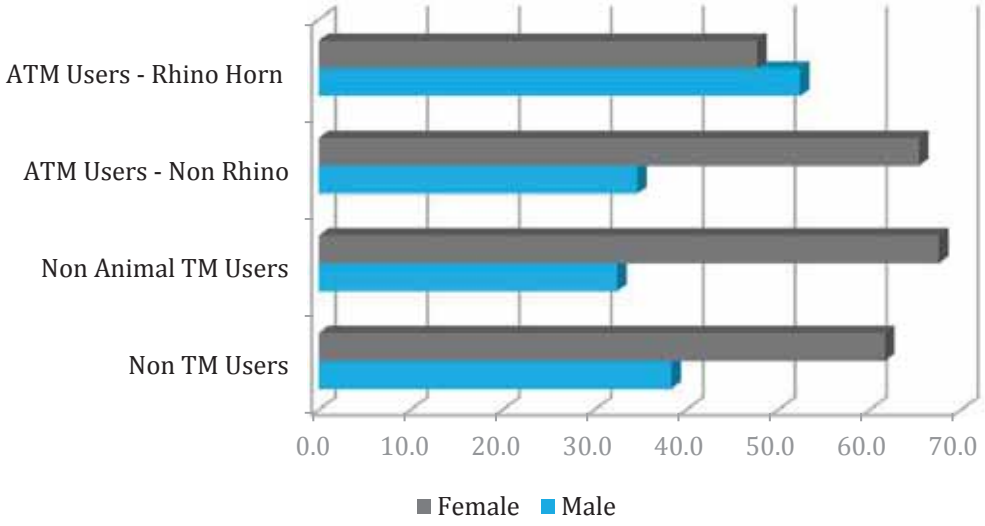
A large proportion of respondents were female (Figure 2), and this pattern is repeated across all user categories except rhino horn users (Figure 3). A chi-square test was highly statistically significant, with rhino horn users much more likely to be male (Chi-square p-value: 0.001). This breakdown is not representative of Vietnamese society as a whole where the gender balance is around 50% women (Chi-square p value > 0.001).

Figure 2: Percentage breakdown by gender



Source: ITC survey

Figure 3: Gender and user group (%)

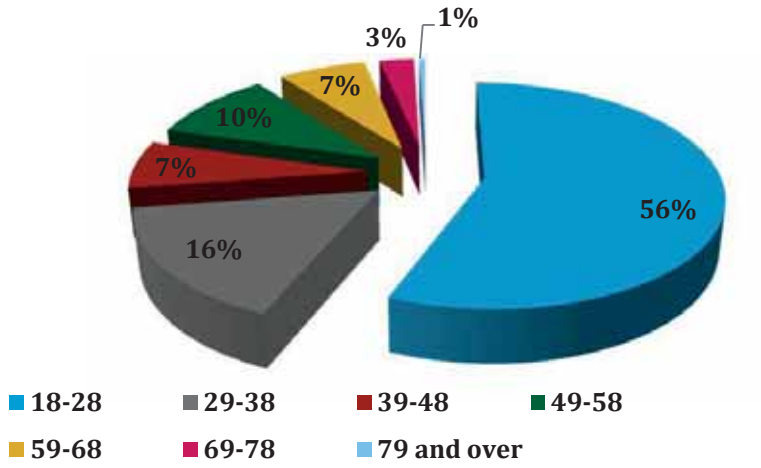


Source: ITC survey

Age

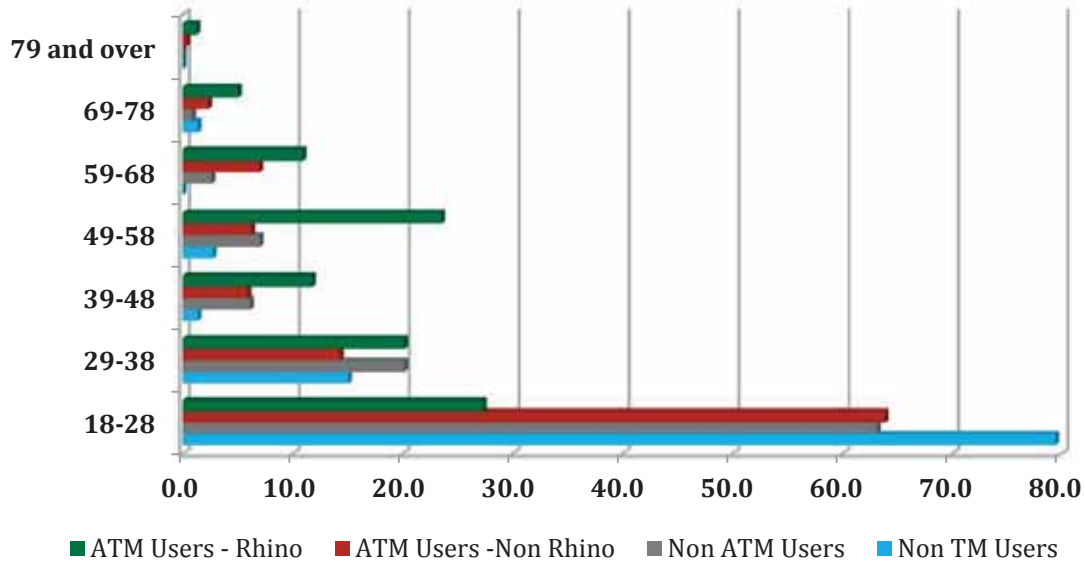
More than half of all respondents were under the age of 29 (56%), with 72% under age 39 (Figure 4). The modal age category is 18–28, and the mean age falls within the 29–38 age category. This is similar to the Vietnamese population as a whole, where the mean age is 30.4 years.[20] This pattern is repeated across all user groups except rhino horn users (Figure 5), where the mean falls into the 39–48 age category. A chi-square test was highly statistically significant, with rhino horn users much more likely to be older (Chi-square p-value > 0.001).

Figure 4: Age-range distribution



Source: ITC survey

Figure 5: Percentage of respondents in each age category by user group



Source: ITC survey

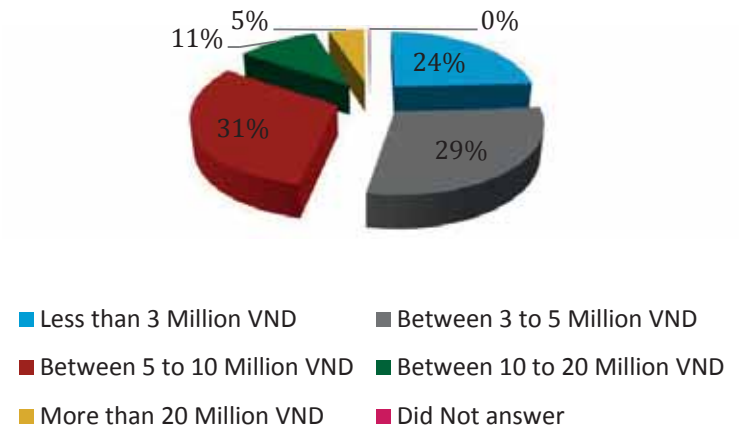
[20] Source: https://www.gso.gov.vn/Default_en.aspx?tabid=491

Income and occupation

Across the whole sample, personal annual income ranged from less than VND 3 million to over VND 20 million. Mean income across the sample was estimated at between VND 5–10 million (using midpoint in the range category), which is much higher than the average income for Viet Nam (VND 2.64 million) but in line with Hanoi and Ho Chi Minh City, where most of the interviews were conducted (VND 6.7 million and VND 9.6 million[21]).

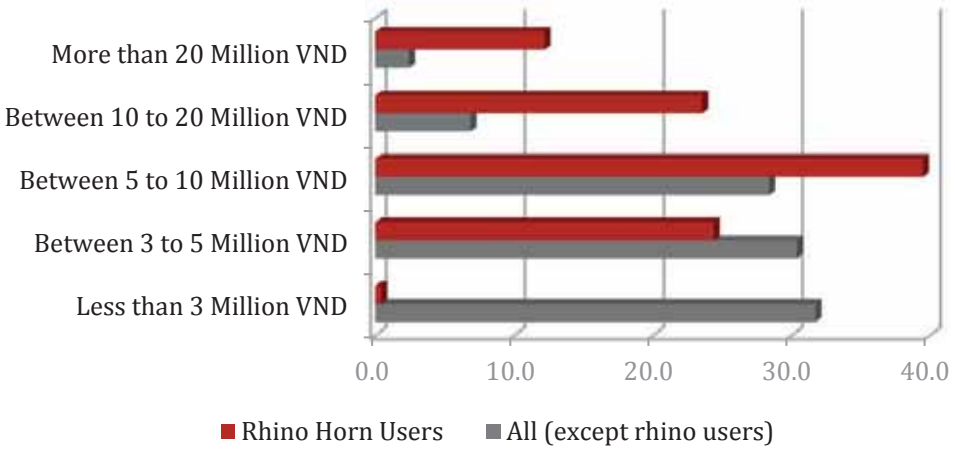
There are clear differences when rhino horn users are compared with the rest of the sample, with this category earning higher income with an estimated average income (calculated using the midpoints of each category) of around VND 10 million. A Chi-square test indicates that rhino horn users are significantly wealthier than the rest of the sample (Chi-square p-value > 0.001).

Figure 6: Income distribution



Source: ITC survey

Figure 7: Income distribution of ATM rhino horn users and others (except rhino horn users)

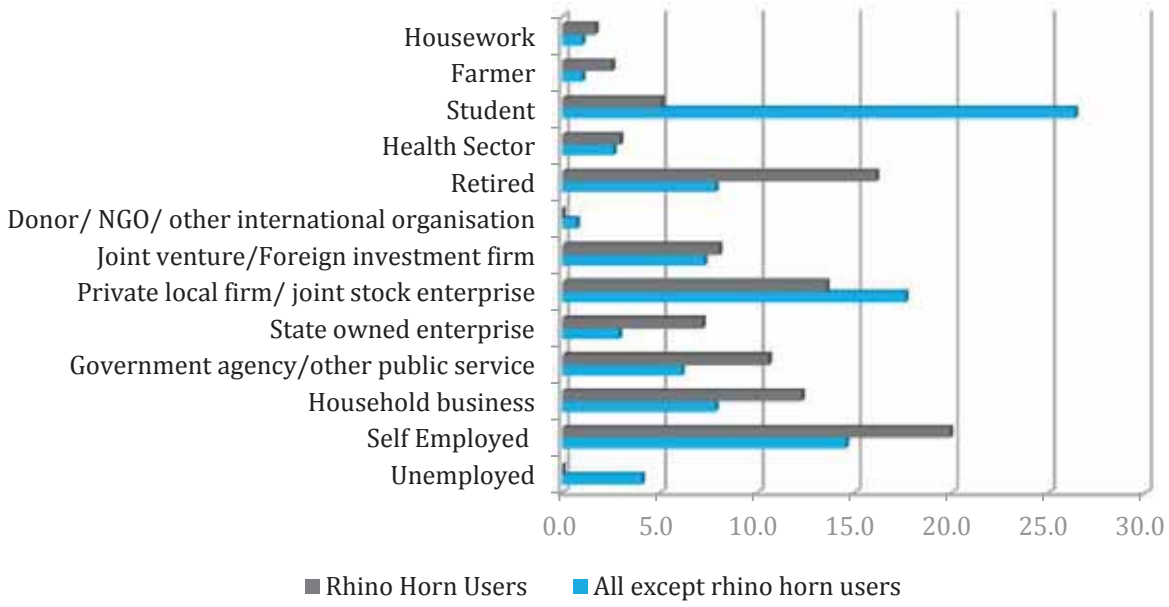


Source: ITC survey

[21] https://www.gso.gov.vn/Default_en.aspx?tabid=491

There is a broad range of occupations in the sample. The most common occupation in Viet Nam is student, covering with just over 25% of the sample. This is similar to the percentage of students in the Vietnamese population as a whole (also 25%). A higher percentage of rhino horn users are farmers, working for the State, retired or self-employed (Chi square value > 0.005).

Figure 8: Percentage of rhino horn users and all respondents except rhino horn users in different employment categories

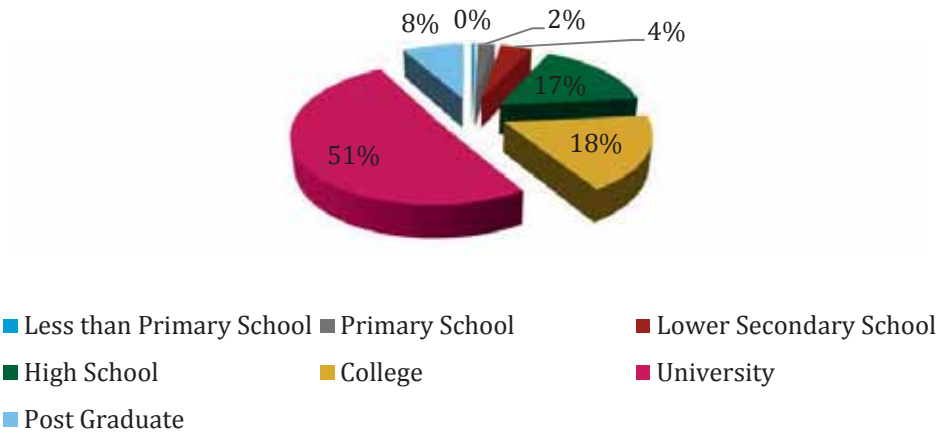


Source: ITC survey

Education level

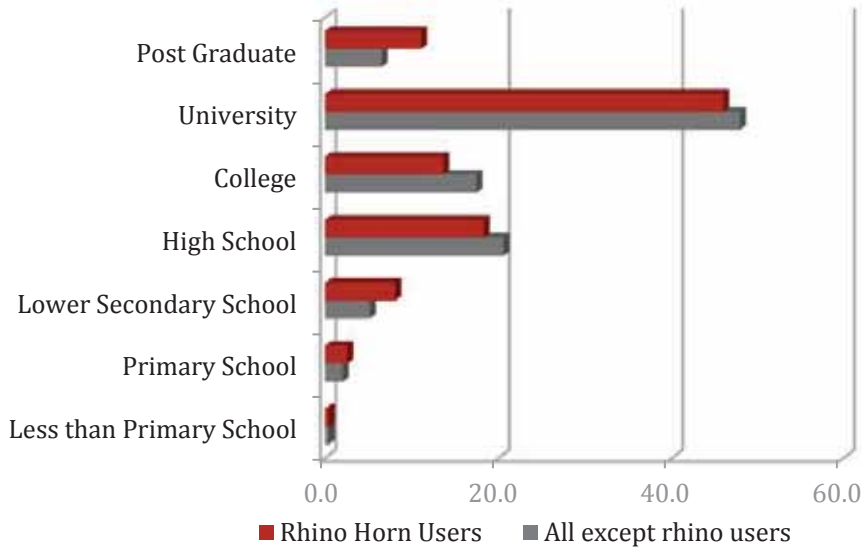
Just over half of the survey respondents attended university, with a further 8% qualified at postgraduate level (Figure 9). Comparing rhino horn users with all other respondents, there are no statistically significant differences across educational levels based on Chi-square test (Figure 10).

Figure 9: Highest educational level



Source: ITC survey

Figure 10: Education level as percentage of total



Source: ITC survey

ATM consumption – species, motivation and trends

This section includes responses to questions the survey posed about the type of species used in ATMs recently consumed by the sample and trends in consumption.

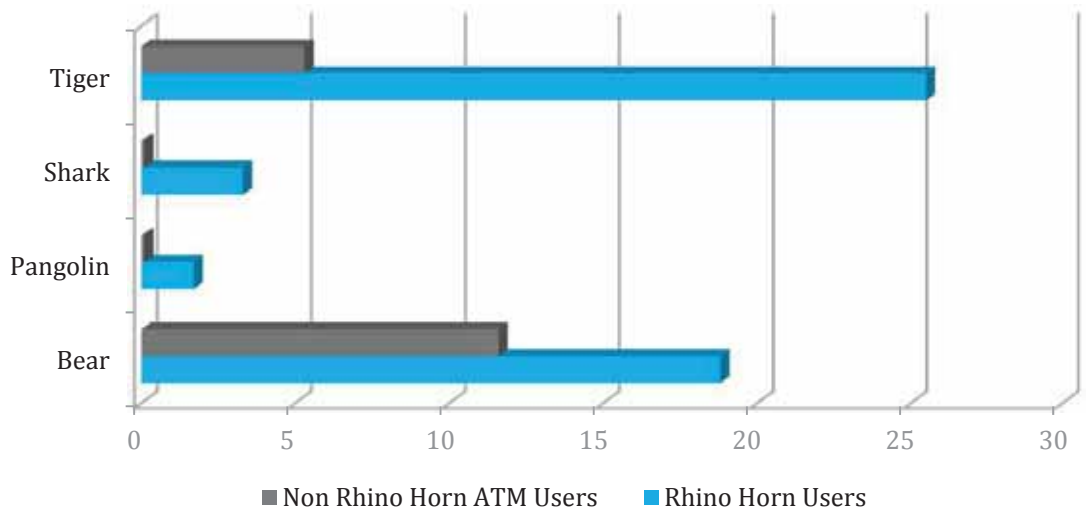
Species used in ATM

As previously mentioned, about 80% of the sample indicated that they were ATM users, of which 24% had at some time used rhino horn. These respondents were asked to list up to five species they had consumed as an ingredient of a ATM medicine in the last five years. Honey bee is by far the most common animal species in ATM used by respondents, followed by bear for gall, and then snake (typically python or cobra), for blood and gall. Rhino horn, deer antler, horse and tiger (or "tiger glue") were used to a lesser extent in TM. Only four respondents mentioned pangolin as an ingredient in their ATM, thus confirming it is one of the least used animal species.

Figure 11 describes the contrast in percentage of respondents who consumed four species of high conservation value (tiger, bear, pangolin and rhino) between rhino ATM users and non-rhino ATM users. Rhino ATM users consume these species more often, with statistically significant higher rates of consumption for all four species compared to non-rhino ATM consumers (Chi square p value: > 0.001). For example, 25% of all rhino horn ATM users listed tiger, compared to 5% of non-rhino ATM users.

This result suggests that rhino horn users not only share a desire for these other highly protected species, but they also have the necessary wealth and supply network to acquire them. What could be further deduced from this is that many rhino horn users are 'hard core' consumers who may be difficult to reach with conventional demand-reduction campaigns.

Figure 11: Percentage of respondents who listed high conservation-value species among their top five most commonly used ATMs over the last five years

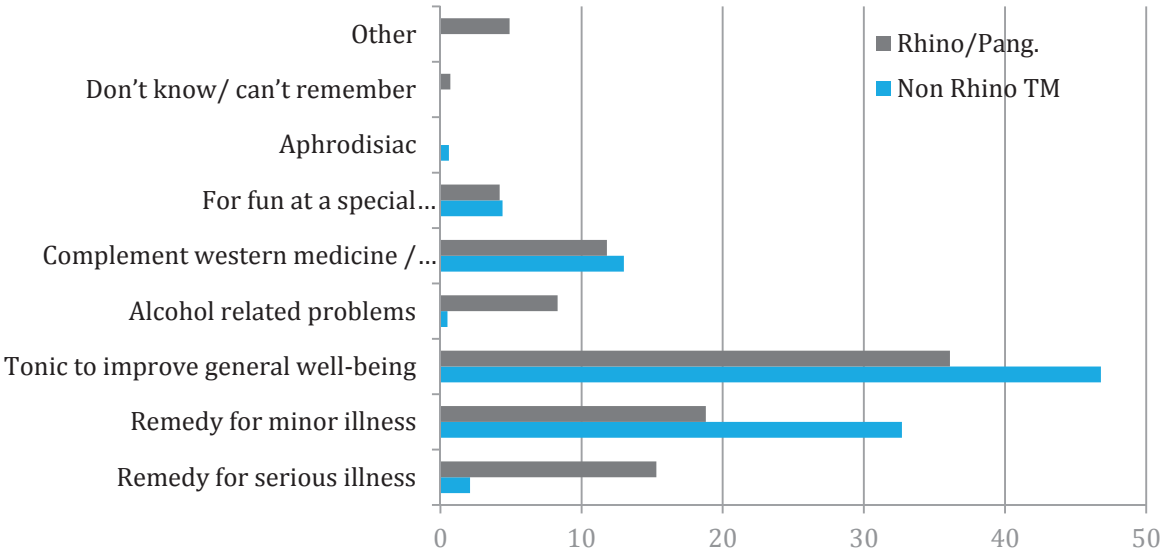


Source: ITC survey

Reason for most recent use

The survey asked rhino and non-rhino ATM users why they used an ATM on the most recent occasion. (In the case of rhino users, it asked them to consider rhino horn ATM only). The most common reason across both categories was a tonic to improve wellbeing. The percentage of respondents who used rhino horn TM as a treatment for serious illness and for alcohol-related conditions was significantly higher than among non-rhino users of other ATMs (Chi-square p-value > 0.001). Interviews with the local TM experts inform us that rhino horn is often prescribed for high fever and for chronic alcohol-related conditions (rather than as a hangover cure).

Figure 12: Reasons for use of ATMs by non-rhino users and rhino ATMs by rhino horn users (%)



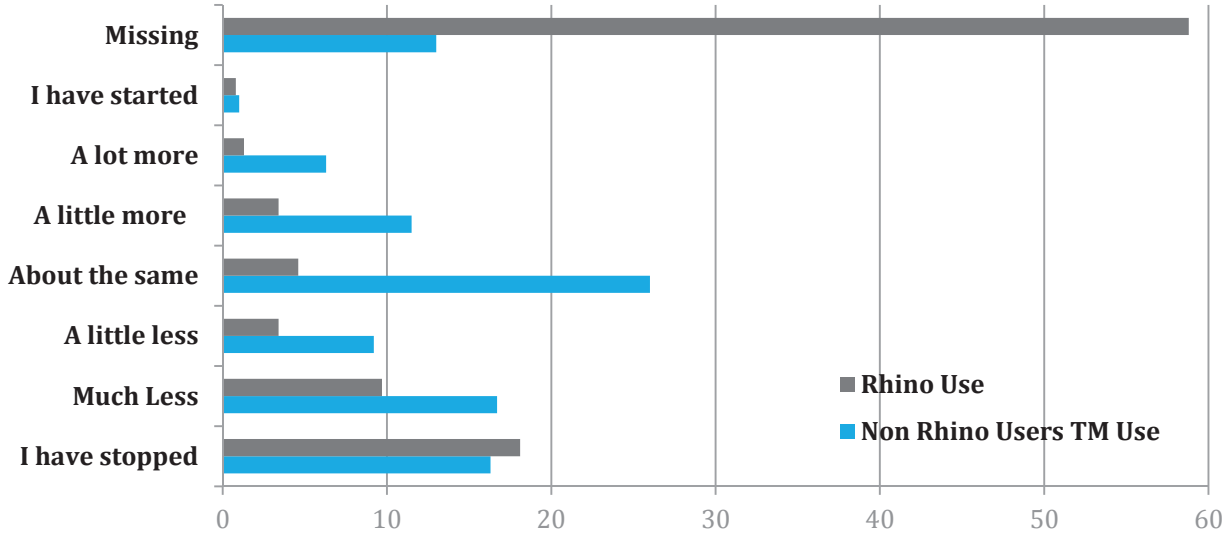
Source: ITC survey

Trends in consumption over last five years

ATM users were asked how their consumption of ATMs had changed from five years ago. Figure 13 reveals responses to this question for non-rhino ATM consumers and rhino TM consumers separately, with the latter being asked to consider the trend for rhino horn usage only.

Overall, there would appear to be a downward trend in non-rhino ATM consumption, with just over 40% reporting a decline or stopping outright, compared to 19% who said they were using more. The percentage of rhino horn users who reported a decline in use of rhino horn was less, at around 30%, with only 6% increasing consumption. The percentage of users who have stopped is about the same for rhino and non-rhino ATMs at only 18% and 16% respectively, with 1% starting for first time.[22] Overall, there appears to be a downward trend in rhino horn consumption in terms of number of users, but due to the nature of the data, it is not certain how this translates into the actual quantity consumed.

Figure 13: Change in usage of ATMs by non-rhino users and rhino ATMs by rhino horn users (over five years in %)

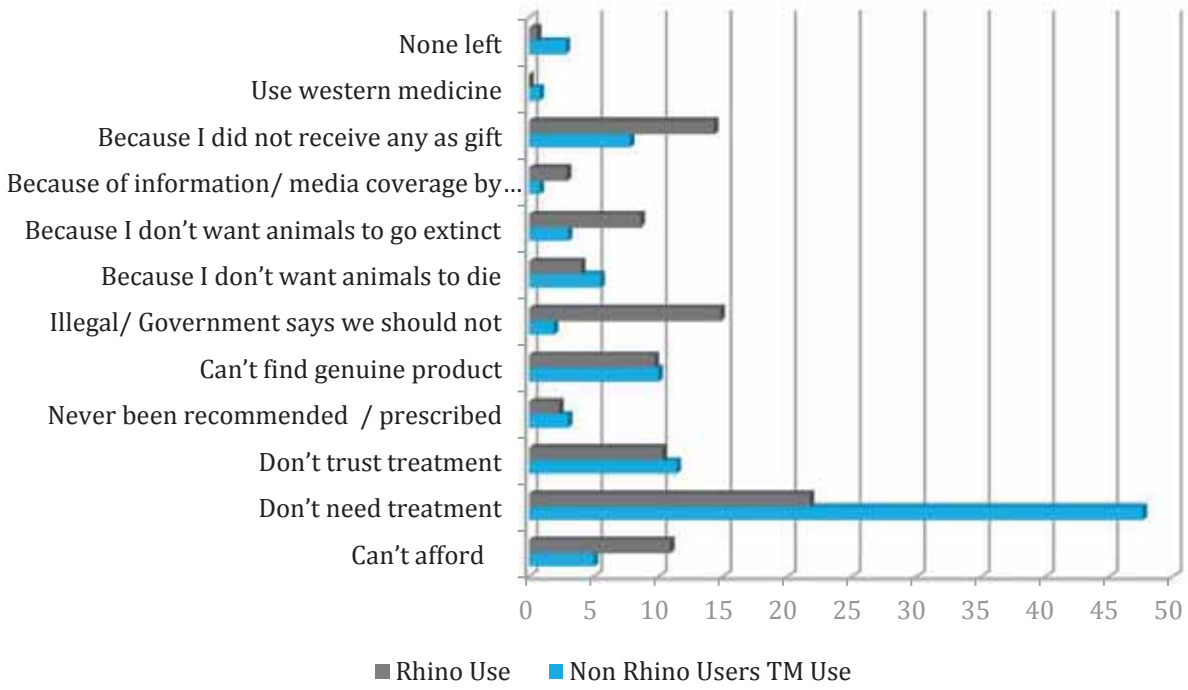


Source: ITC survey

The survey explored the reasons people reduced consumption in the last five years (Figure 14). The most common reason, for both rhino and non-rhino ATM users, was medical-related (not sick or did not need that particular treatment). This is especially true for non-rhino ATM users, of whom almost half gave this response. There were significant differences between the two groups (Chi-square p value > 0.05) and rhino ATM users more likely to have reduced consumption because of the trade's illegal status (14% compared to 2%), because they did not receive it as a gift (14% to 8%), and because they could not afford to buy (11% compared to 5%).

[22] However, it should be noted that these data may underestimate trends in use especially in relation to rhino horn ATMs consumption as a very high percentage of rhino horn users (59%) did not answer this question. It is plausible and indeed likely that, given the very sensitive nature of the question arising from recent media campaigning about rhino horn, many rhino horn users who may increased their consumption declined to answer.

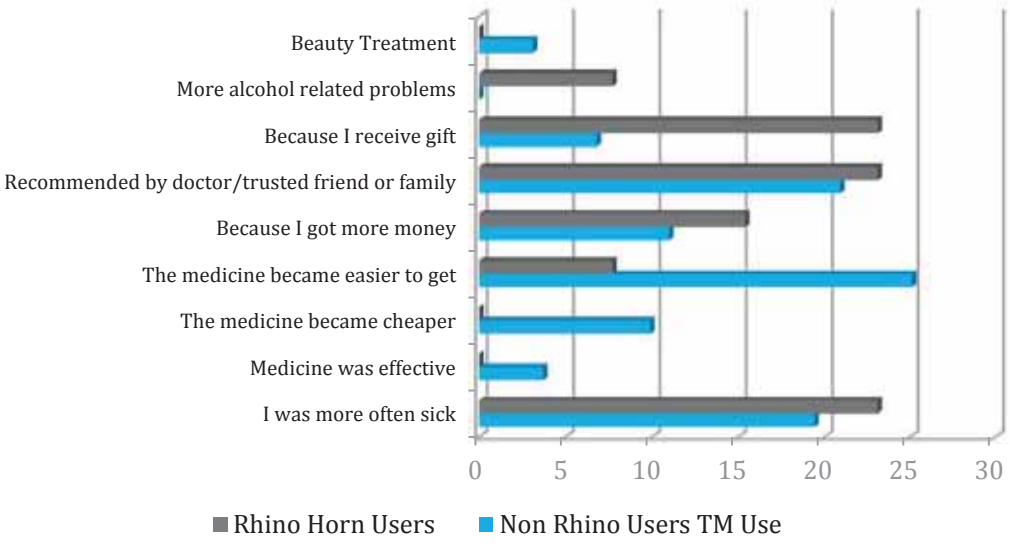
Figure 14: Reasons for decline in usage over the past five years between ATM and other users



Source: ITC survey

Figure 15 shows that for those respondents who had increased consumption of rhino horn ATM, medical reasons were also dominant (e.g. more often sick, alcohol problems, prescribed by doctor). The role of gift-giving is also significant, especially for rhino horn ATM users. Better availability, effectiveness of treatment and affordability were relatively more important for non-rhino users. These differences were significant (Chi-square p value > 0.001).

Figure 15: Reasons for increased consumption over the past five years (% of total)

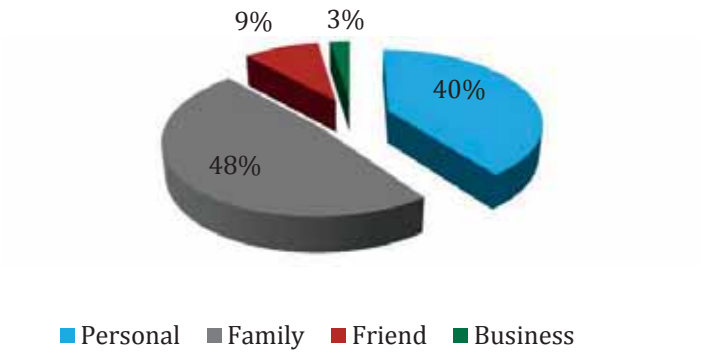


Source: ITC survey

Why do people buy rhino horn?

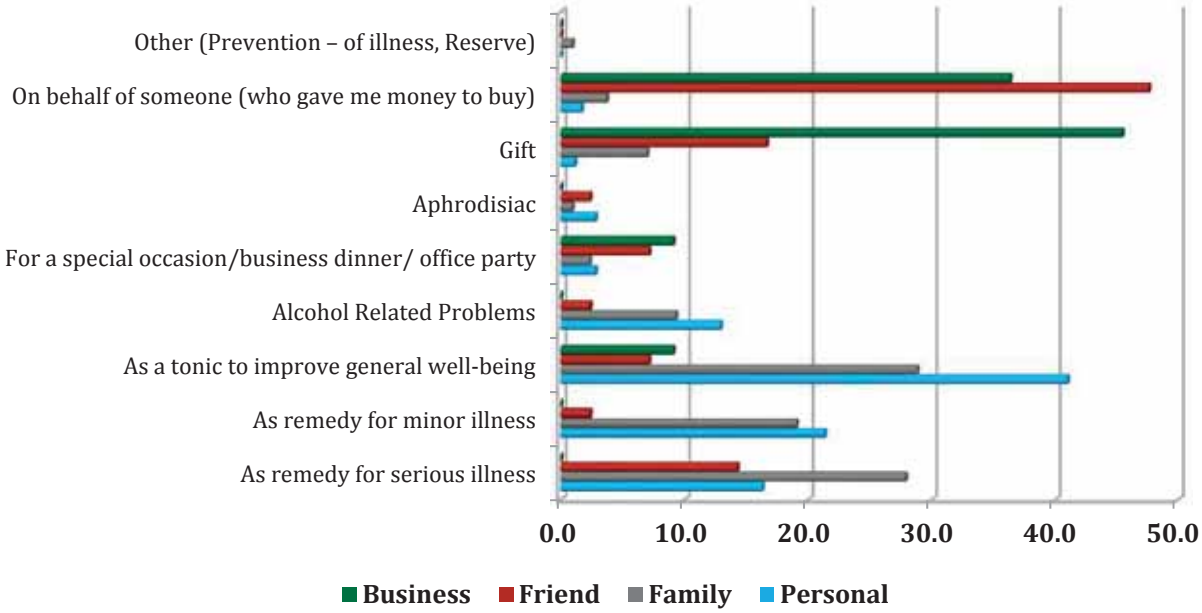
The survey also asked about the decision to buy rhino horn ATM.[23] Figure 16 shows that rhino horn was bought either for personal or family use. Purchases for a friend or as a business gift were much less common, accounting for only 12%. Most rhino horn ATM purchases were related to health for personal or family use. Gift-giving was an important reason for business-related purchases, as was buying on behalf of someone else.

Figure 16: Recipient of rhino horn purchased by respondent



Source: ITC survey

Figure 17: Reasons for buying rhino horn

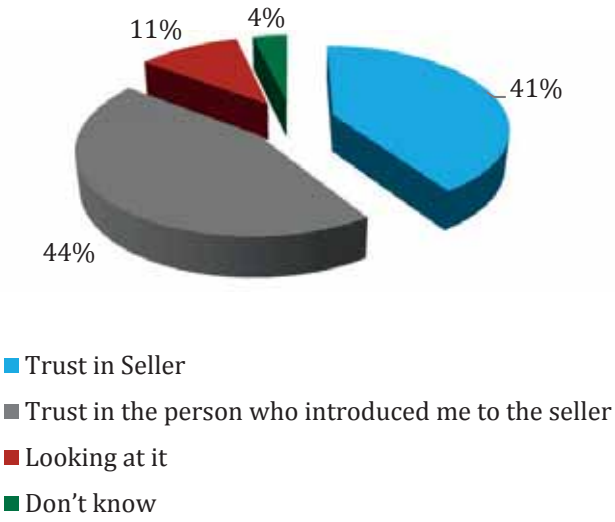


Source: ITC survey

[23] The survey responses revealed that not all rhino horn purchasers are users and vice versa (see Figure 1).

The survey also explored how buyers ascertained that their rhino horn was genuine (Figure 18). Trust in the seller or the 'middle man' who introduced the seller are dominant responses, together accounting for 85% of all responses.

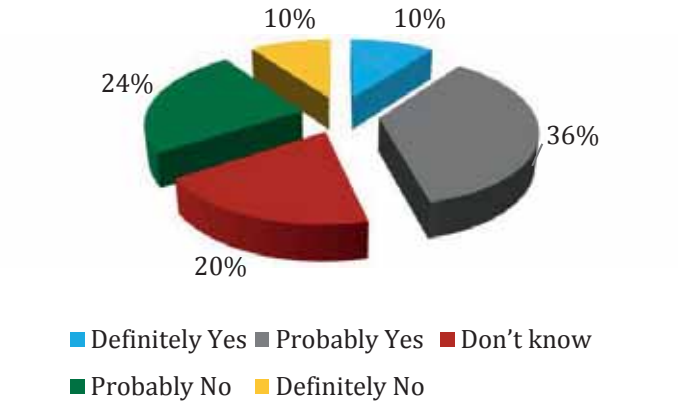
Figure 18: How buyers know if rhino horn is genuine



Source: ITC survey

They survey explored future trends concerning rhino horn consumption, asking all survey respondents how likely they were to buy horn in the future. Figure 19 shows that 46% of respondents would definitely or probably purchase rhino horn in the future, with only 10% declaring they would definitely not.

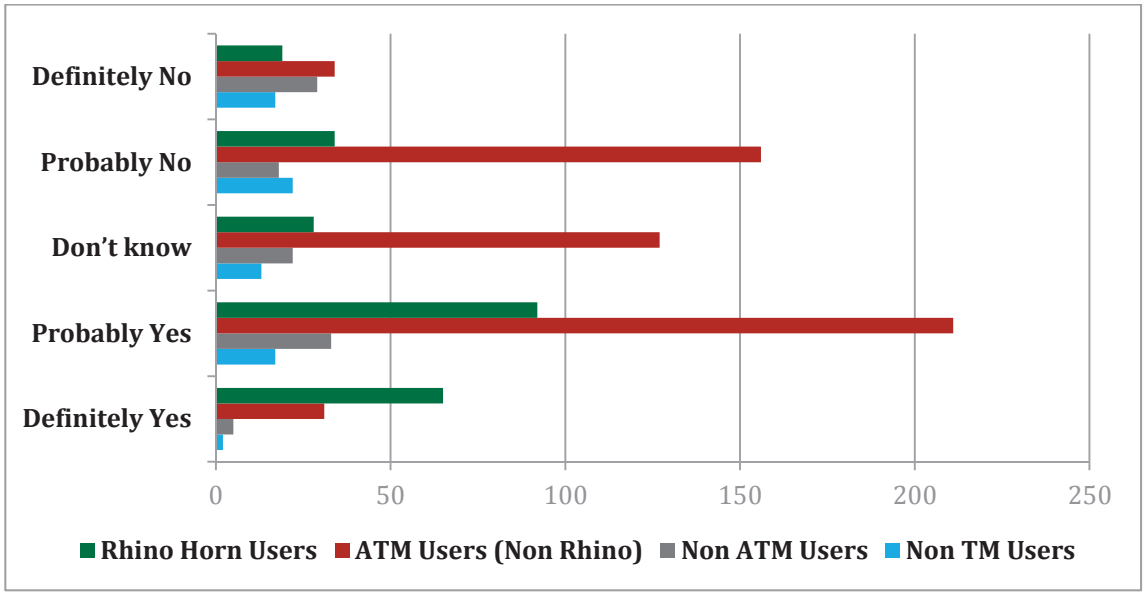
Figure 19: Percentage of respondents who are likely to buy rhino horn ATM in future



Source: ITC survey

The survey breaks this down across all four users group in Figure 20. While the likelihood of future purchase is higher and more positive among those who are already rhino horn ATM, there is also potential demand evident among respondents who have not yet used a rhino horn ATM, including those who have not even used an ATM or a TM. Probably 'Yes' is the most common response for all user categories, except those respondents who have never used a TM.

Figure 20: Percentage of respondents likely to buy rhino horn in the future, by user group



Source: ITC survey

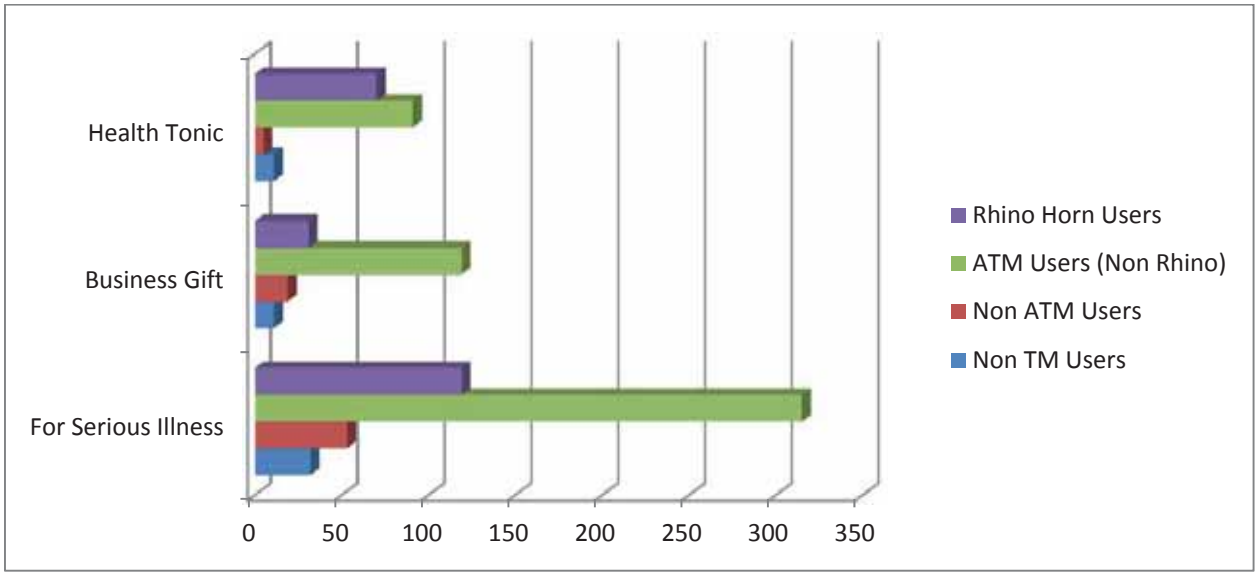
2.3 Choice experiment findings

To explore the attributes of rhino horn ATM that were most important to potential consumers, the survey asked all respondents, except those who said they would definitely not purchase rhino horn in the future, to complete the CE. Initially, each respondent was asked to select which of three scenarios would be the most probable reason for their future purchase: serious illness, business gift or general tonic (Table 3). Serious illness was most commonly selected across all user groups (Figure 21).

Table 3: Scenario options for rhino horn ATM purchase

Scenario1: Serious Illness Imagine that you are suffering from a serious illness such as stroke, epilepsy or dangerous fever, and someone you trust suggests that a traditional medicine made from rhino horn is the best treatment.
Scenario 2: Business Gift Imagine that you want to make a gift of rhino horn ATM to an important business contact or work boss.
Scenario 3: Health Tonic Imagine that you want to purchase a rhino horn ATM because a trusted friend/doctor recommended it as a health tonic.

Figure 21: Future scenario (respondents' choice experiment)



Source: ITC survey

Several discrete choice experiment models have been estimated, and the best models were a Random Parameter (RPL) model and a Latent Class Random Parameter (LCRP) model. These models were similar, but as the LCRP model – where latent class membership probabilities were explained by demographic variables, and individual taste heterogeneity is explained by the experience (being a buyer) and scenario (legal vs. non-legal framework) – provides better insights into respondent preferences, the estimation results of the LCRP model are described only here.

First, the three classes of respondents are identified by the LCRP model. Latent classes are groups of respondents who have similar choice behaviour and can be differentiated further by demographic variable such as gender, age, education and income. Income was the main influence on group membership, with low-income respondents tending to fall into Class 1 and wealthier respondents into Class 3. Furthermore, 70% of all buyers and 50% of users fell into Category 3. Similar tendencies are observed for respondent education, where the higher the education level, the more likely the respondent would fall into Class 3.

Attributes that influence WTP for rhino horn ATM

Table 4 presents the results from the LCRP model for all main attribute variables and interaction with sociodemographic variables, whether buyer or not and policy scenario.

Price

Price is statistically significant and negative across all three classes, which means that all respondents favour lower prices over higher prices. Class 1 members display the highest price sensitivity across all three classes, which is not surprising given that they represent the lower earners in the CE. As one might have expected, buyers of rhino horn products (Constant (ASC)*Buyer coefficients) are more likely than non-buyers to select one of the 'purchase' alternatives.

Rarity

For Class 2 respondents, the attribute level 'rare' is statistically significant and negative, that is, they are willing to pay significantly less for rare species compared to least rare or very rare species. By contrast, Class 3 members (who are most likely to have used and/or bought rhino horn), prefer rare over either 'very rare' and 'least rare' species. Rare is not a statistically significant attribute level for Class 1 respondents. Least rare species across all three classes are not statistically different from 'very rare'.

Table 4: Estimation results for RPL and LCRP models with attribute level-dummy variables and demographic variables

	Latent Class Mixed Logit		
	Class 1	**Class 2**	**Class 3**
ASC	3.412*** (0.871)	-4.473*** (0.349)	0.152 (0.286)
Semi-Wild	-0.026 (1.004)	-0.016 (0.087)	-0.410* (0.211)
Farmed	-0.166 (0.806)	-0.048 (0.120)	-0.702*** (0.204)
Rare	0.868 (0.656)	-0.277** (0.122)	0.721*** (0.233)
Least Rare	0.113 (0.856)	0.009 (0.078)	0.228 (0.185)
Non-Lethal	0.597 (0.173)	0.096 (0.123)	1.203*** (0.209)
Price (in $1,000)	-0.678*** (0.173)	-0.041*** (0.016)	-0.169*** (0.032)
ASC*Legal	-1.176 (0.848)	-1.182*** (0.351)	0.127 (0.373)
ASC*Buyer	-2.347*** (0.700)	4.544*** (0.462)	-6.596*** (0.842)
ASC*Income			
ASC*Education			
Semi-Wild*Legal	-0.816 (0.937)	-0.208* (0.124)	-0.231 (0.279)
Semi-Wild*Buyer	-0.224 (0.729)	0.664*** (0.174)	-0.990* (0.512)
Semi-Wild*Age			
Farmed*Legal	-1.225 (0.767)	-0.541*** (0.166)	-0.053 (0.264)
Farmed*Buyer	-0.121 (0.671)	0.590*** (0.213)	-1.435*** (0.433)
Rare*Legal	-0.619 (0.673)	0.559*** (0.181)	-0.750** (0.321)
Rare*Buyer	-0.122 (0.577)	-0.077 (0.244)	-1.184** (0.554)
Least Rare*Legal	1.453* (0.845)	0.025 (0.109)	-0.096 (0.239)
Least Rare*Buyer	-0.530 (0.671)	0.057 (0.146)	-1.977*** (0.355)
Non-Lethal*Legal	0.813 (0.616)	-0.186 (0.182)	-0.187 (0.285)
Non-Lethal*Buyer	-1.472*** (0.557)	1.942*** (0.263)	-2.534*** (0.542)
Non-Lethal*Income			
Non-Lethal*Education			
Price*Legal	0.100 (0.164)	-0.118*** (0.024)	0.060 (0.042)
Price*Buyer	0.245** (0.123)	0.015 (0.037)	-0.121** (0.053)
Std. dev (SQ const)			
Std. dev (Semi-Wild)			
Std. dev (Farmed)			
Std. dev (Non-Lethal)			
Std. dev (Price)			
Pr(class)	0.327	0.496	0.178

Pr(class)*Female	-0.094 (0.261)	-0.421* (0.246)	
Pr(class)*Age	-0.014 (0.009)	-0.020** (0.009)	
Pr(class)*Income	-0.053** (0.026)	0.004 (0.024)	
Pr(class)*Education	-0.379*** (0.130)	-0.483*** (0.126)	
Pseudo R2	0.3759		0.3800
LogLik	- 4700.6568		-4669.7466
AIC/n	1.378		1.390

Source: ITC survey

Notes:

1. For the class membership probabilities, only the variable that is significant (income) is reported, though the model includes four demographic variables (gender, age, income, education).
2. The estimates of standard deviation for random coefficient distributions in the LCRP model are not reported because none are significant.
3. The baseline attribute levels are wild, very rare and lethal, and dummies for them are not included in the model.
4. Standard errors of the estimates are provided in parentheses. ***, **, * indicate significance at 1%, 5%, 10% level.

Lethal harvesting

Class 3 is the only class where choices are significantly influenced by harvesting method, with 'non-lethally harvested' preferred over 'lethally harvested' rhino horn.

Source

Class 3 was also the only group of respondents who showed any statistically significant preference regarding source, with a marginal preference for wild-sourced over semi-wild sourced horn and a more robust preference for wild-sourced over farmed horn.

Influence of class membership

Following the lines of Swait & Adamowicz (2001), the survey found that the positive and significant 'neither of the two' option constant (ASC in the Table 3) for Class 1 means that, given the baseline attribute levels, the respondents from this class generally prefer the 'neither' option (not purchase). At the same time, the respondents from Class 2 prefer one of the two proposed alternatives, as do Class 3 respondents.

Some of the findings change depending on class and policy scenario, and whether the respondent is a buyer. For example, Class 2 respondents who are told that the rhino horn trade has been legalized are more willing to choose a rhino product, while the decision to choose neither option for people in Class 1 and 3 is less likely to be influenced by legalisation of rhino products.

Most buyers are grouped into Class 3. Being a buyer reduces the price coefficient in different ways for different classes (Price*Buyer in Table 3). For Class 3 members, the coefficient becomes more negative (i.e. more price sensitive) and more positive (i.e. lowers price sensitivity) for Class 1 ('low-income') respondents.

The legal framework of the choice experiment turns out to be important, determining attribute coefficient values, often in different directions for the different latent classes. For example, although the 'legal' dummy has no effect on the price coefficient for Class 1 ('low-income') and Class 3 ('well-off') members, it increases the sensitivity to changes in rhino horn price (makes the coefficient more negative) for Class 2 members.

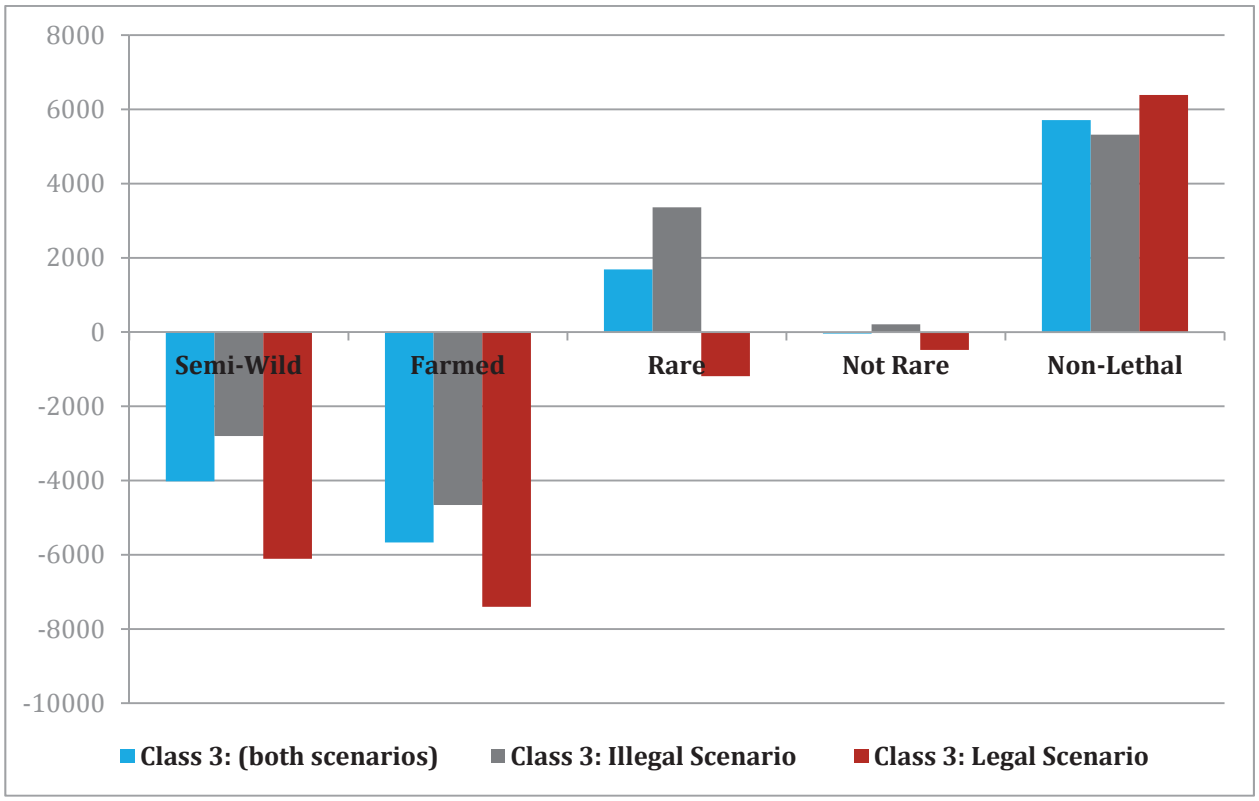
Willingness to pay estimates

Figure 22 shows how each attribute level influences marginal WTP (US dollar/100 grams) for rhino horn for Class 3 respondents – that is, those most likely to be rhino horn buyers. Marginal WTP is expressed in

relation to the base line case which corresponds to 'wild' for rhino horn source, 'very rare' for rarity level, and 'lethal' harvesting method

It finds that marginal WTP is most influenced by source, with negative WTP for semi-wild and farmed across both policy scenarios. This effect is especially pronounced under the legal policy scenario. There is also a strong positive WTP for rhino sourced non-lethally across both policy scenarios. Rarity of the species has least influence, with marginal change WTP for switching to 'least rare' species from 'very tare' negligible.

Figure 22: Marginal WTP (Class 3 respondents)



Source: ITC survey

Table 5 also estimates total WTP for horn of different types under the two different policy scenarios,[24] expressed in terms of US dollar per 100 grams. These values represent the overall value placed by the survey respondents, taking into account the variables that statistically influenced choices in CE.

It focuses on six horn types that are most relevant to the current debate.

Type 1: Horn sourced from a wild rhino carried by a least rare species, and lethally harvested. This is equivalent to a poached southern white rhino.

Type 2: Horn sourced from a wild rhino, carried by a very rare species and lethally harvested. This is equivalent to a poached Javan rhino.

Type 3: Horn sourced from a wild rhino, carried by a least rare species and non-lethally harvested. This would be equivalent to a wild southern white rhino where the horn is removed under sedation.

[24] The survey follow the procedure outlined by LaRiviere et al., (2014) by estimating WTP from the negative ratio of an attribute coefficient to the price coefficient.

Type 4: Horn sourced from semi-wild rhino, carried by a least rare species and non-lethally harvested. This would be equivalent to a ranched wild southern white rhino where the horn is removed under sedation.

Type 5: Horn sourced from farmed rhino, carried by a least rare species and non-lethally harvested. This would be equivalent to a farmed southern white rhino where the horn is removed under sedation.[25]

Type 6: Horn sourced from farmed rhino, carried by least rare species lethally harvested. This would be equivalent to a poached animal taken from a rhino farm.

Table 5: Willingness to pay for different policies under legal and illegal CE scenarios (per 100g of product)

	Illegal	Legal
Type 1: wild, very rare, lethal	19,830	11,690
Type 2: wild, least rare, lethal	19,890	11,910
Type 3: wild, least rare, non-lethal	24,300	16,900
Type 4: semi-wild, least rare, non-lethal	23,100	15,370
Type 5: farmed, least rare, non-lethal	21,670	12,780
Type 6: farmed, least rare, lethal	17,250	7,790

Source: ITC survey

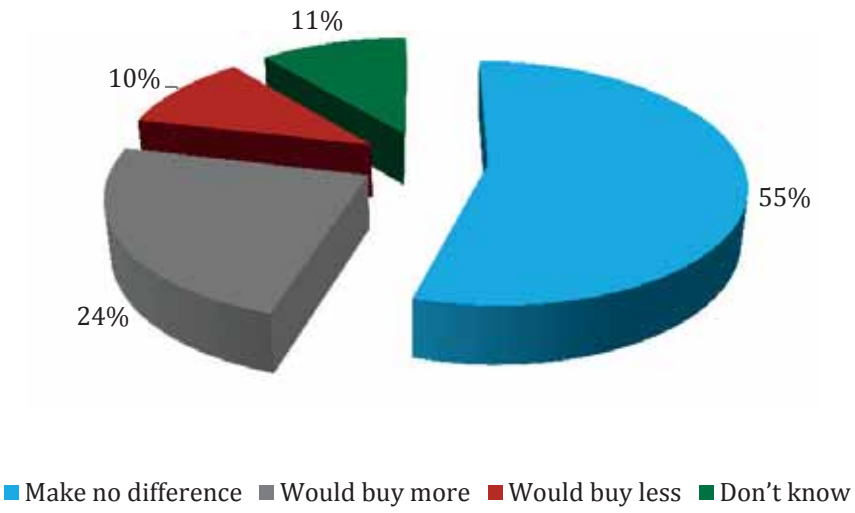
Table 5 finds that the highest value horn is Type 3, which is equivalent to a wild sourced southern white rhino where the horn is removed under sedation. The lowest WTP are for Types 1 and 2 horn, which are typical of horn currently supplied by the illegal market. Types 4 and 5, the most likely source for horn under legal trade, have higher value than poached horn, which means that legal horn from farmed or ranched sources is preferred as long as the animal is not killed as part of the horn removal process.

Under a legal market a similar picture emerges, with Type 3 the most valued and Types 1 and 2 the least valued. What is also striking about the legal scenario is the fall in price across all types, with horn values around approximately 60% of illegal poached horn.

The survey also asked potential customers how they would react if the rhino horn trade was legally regulated in Viet Nam. Figure 23 presents the response to the hypothetical question *'If the government of Viet Nam actually legalized the use/purchase of rhino horn, would this influence your future purchase of rhino horn?* Overall, 24% of the total sample said they would buy more, 10% would buy less and 55% said it would make no difference.

[25] Types 4 and 5 are most likely to be primary source of any future legal supply.

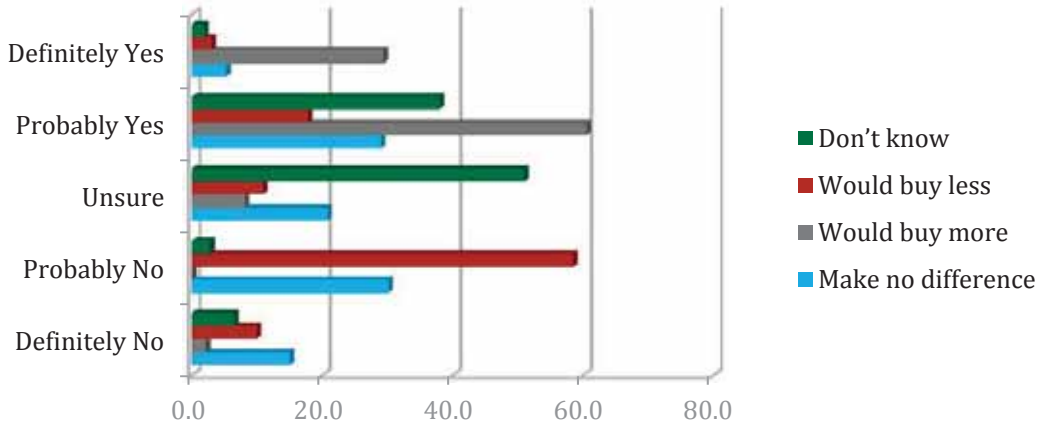
Figure 23: Responses to legalizing trade in rhino horn



Source: ITC survey

Figure 24 explores differences in the response to legalization between the different groups identified in Figure 19. Those most likely to consume in the future ('definitely' and 'probably' buy), are more likely than other groups to purchase if the trade is legalized. For example, 60% of those respondents who would 'probably buy' in the future, would buy more if the trade were legalized. The corresponding percentage for people who would 'definitely buy' is 29%. Among people less likely to buy in the future, the reverse is the case, with most people saying they would buy less if the trade were legalized, perhaps suggesting that for this group, at least, the illegal nature of the trade is alluring.

Figure 24: Breakdown of responses to legalization based on likelihood of future purchase



Source: ITC survey

2.4 Effectiveness of demand-reduction findings

The international conservation community has identified demand reduction as a key component to combating the illegal trade in rhino horn. This section explores survey responses to alternative approaches to reduce demand:

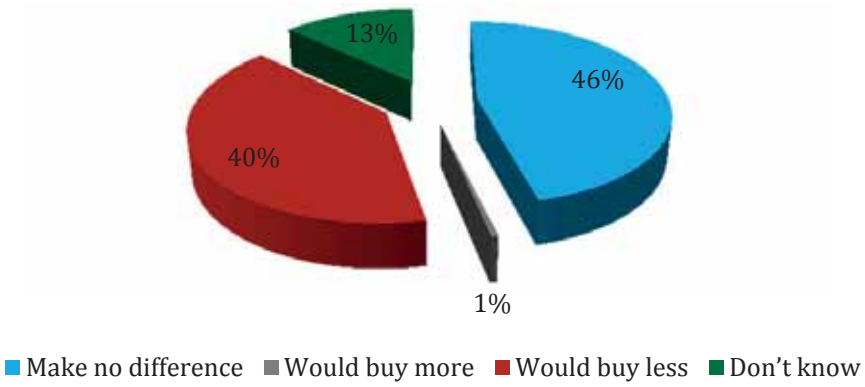
1) Government-backed media campaigns
2) Doubling existing financial penalties
3) A mandatory six-month prison sentence

Media campaign

Several short-lived media campaigns targeting rhino horn consumption, funded by conservation NGOs, were undertaken in Viet Nam in recent years. In the last five years, only 3% of rhino horn ATM users consumed less because of these campaigns (Figure 14). The survey therefore looked at the potential impact of a more intensive and concerted media campaign backed by the government, on future consumption.

Figure 25 presents the overall response to the hypothetical question: '*If the government started a strong advertising campaign on radio, TV and street posters involving Vietnamese VIPs that tell you to stop using rhino horn, would this influence your future purchase of rhino horn?'* 40% of respondents would buy less or stop altogether, with 1% indicating they would actually buy more.

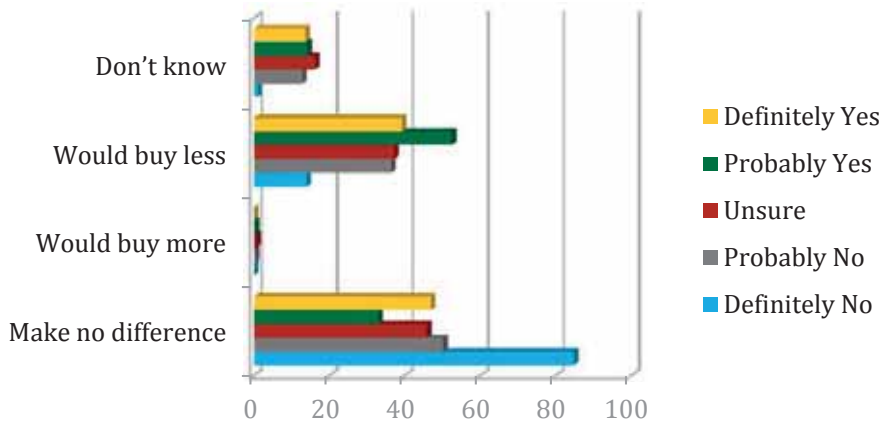
Figure 25: Responses to concerted advertising campaign by government to reduce rhino horn consumption



Source: ITC survey

Figure 26 explores differences in the response to legalization between the different groups identified in Figure 19. Thirty-nine per cent of those who would 'definitely' buy and 52% who would 'probably' buy in the future, would purchase less if there was a major media campaign.

Figure 26: Breakdown of responses to media campaign based on likelihood of future purchase

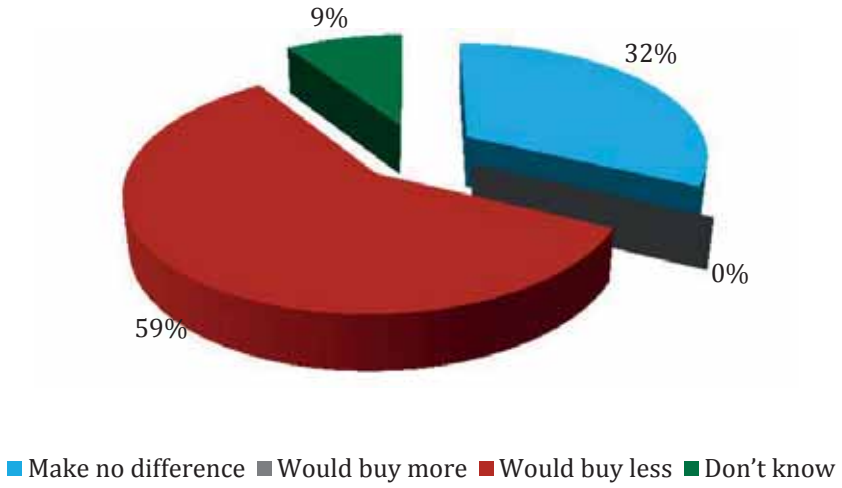


Source: ITC survey

Higher fines

People involved in the rhino horn trade in Viet Nam can potentially be punished by fines if caught, but this law is rarely imposed and awareness is low. The survey therefore asked how people would respond if the government signalled a crackdown on illegal rhino horn consumption and doubled the current fine. Figure 27 presents the response to the hypothetical question: *'If the government informed you that it was doubling the current fine for purchasing rhino horn, would this influence your future purchase of rhino horn?'* This means that this measure would lead to 59% of all respondents buying or stopping altogether, but 32% would not alter their intended purchase behaviour.

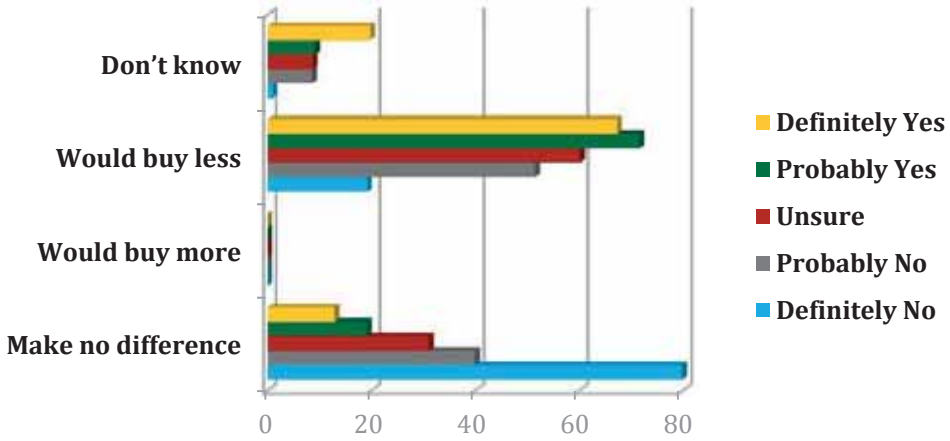
Figure 27: Response to doubling of current fine by Vietnamese Government



Source: ITC survey

Figure 28 explores differences between the groups (refer to Figure 19) and find that those most likely to consume in the future are more likely to purchase less. For example, of respondents who said they would 'definitely purchase' in the future, 67% would cut the amount they would bought if fines were doubled. The corresponding figure for respondents who would 'probably purchase' rhino horn ATMs in the future was 72%.

Figure 28: Breakdown of responses to doubling of current fine based on likelihood of future purchase

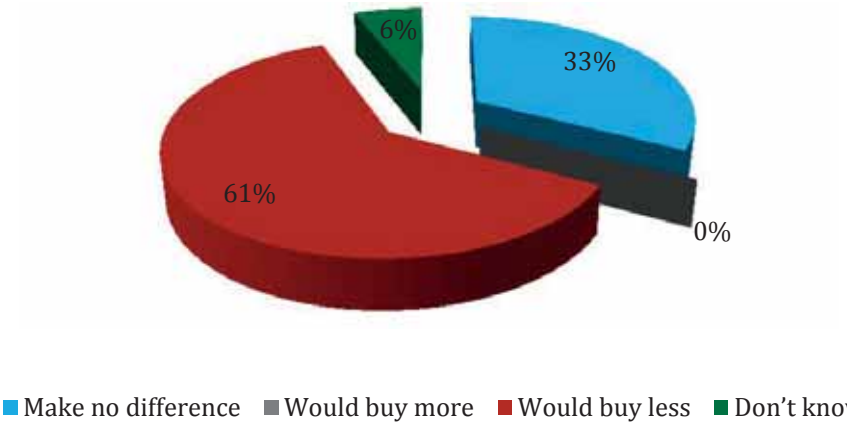


Source: ITC survey

Six-month imprisonment

The survey enquired how potential respondents would react if the government signalled a crackdown on rhino horn consumption by imprisoning anyone buying rhino horn for six months. This represents the most severe form of punishment conceivable in Viet Nam. Figure 29 presents the response to the hypothetical question: *'If the government informed you that you could go to prison for six months for purchasing rhino horn, would this influence your future purchase of rhino horn?'* A punishment of six months in jail would make no difference to 33% of the total sample, with 61% saying they would buy less. This option, as expected, has a more negative impact on future consumption than a higher financial penalty.

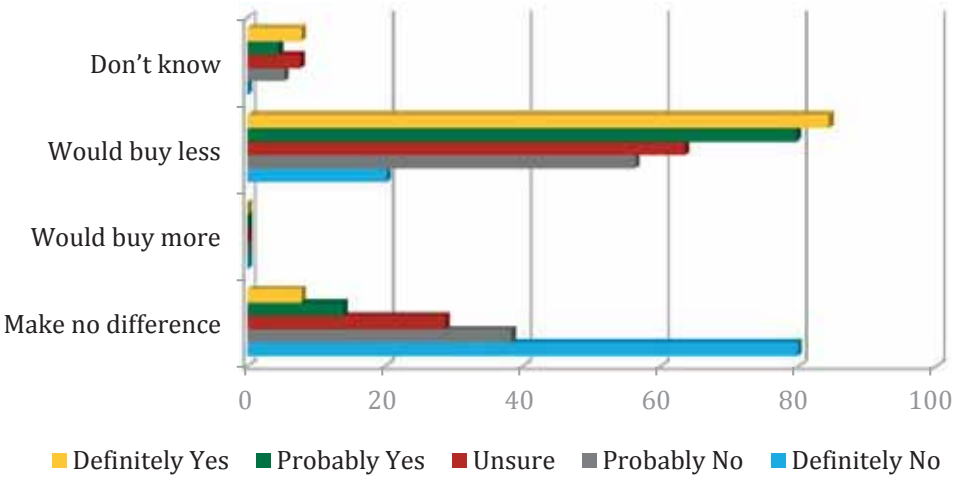
Figure 29: Breakdown of responses to six-month prison sentence



Source: ITC survey

Figure 30 explores differences between the groups (refer to Figure 19) and find that of respondents who would 'definitely purchase' in the future, 84% said they would reduce the amount they would buy if they risked imprisonment. The corresponding figure for respondents who would 'probably purchase' rhino horn ATMs in the future was 80%. This leaves a small group of 'hard-core' consumers among those most likely to buy of around 15%–20%, who would not reduce consumption even if they risked imprisonment.

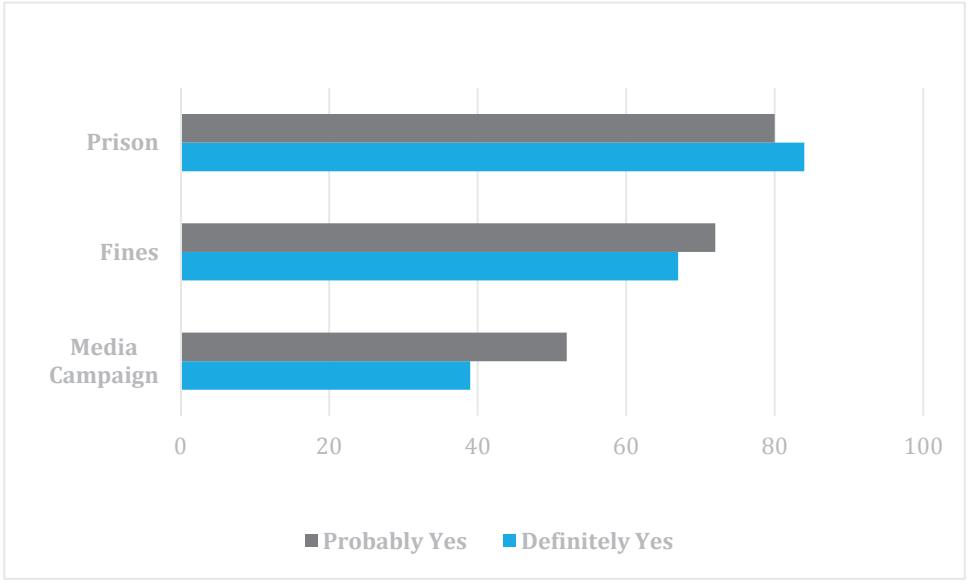
Figure 30: Breakdown of responses to six-month prison sentence based on the likelihood of future purchases



Source: ITC survey

Not surprisingly, bigger reductions in demand are associated with the risk of stronger penalties. Figure 31 summarizes the responses of people most likely to purchase in the future ('probably yes' and 'definitely yes' combined) and the trend is clear, with tougher action leading to more people opting to buying less or stopping altogether.

Figure 31: Breakdown of responses (%) to various interventions to reduce demand for respondents who are most likely to buy in the future



Source: ITC survey

Chapter 3 Main findings and policy implications

Rhino horn users are mainly older, wealthy males with some younger users

This is the largest survey of its kind ever undertaken in Viet Nam of ATM users, and the overall sample appears to be broadly representative of the Vietnamese population with respect to socioeconomic indicators, except gender.

As the survey used snowball sampling, rather than probabilistic sampling, to identify and interview rhino horn users, the research is not able to confirm that the sample is representative of rhino horn users. However, the results tend to support the assumption of previous studies that have focused on older, wealthy males as being the most important group of rhino horn consumers (see, for example, TRAFFIC, 2013).

The study also revealed that rhino horn use extends well beyond this demographic to include men and woman of all ages and in a range of occupations. The results also suggest that ATM use is common among younger age groups, with the highest levels of use among people under age 38. This contrasts with findings by Gratwicke et al. (2008b) and Venkataraman (2007), who both record the highest levels of use among people in the 46–55 age range.

Range of species is used in ATM

A wide range of species are used in ATMs with honey bee, followed by bear and then snake (typically python or cobra), being the most common. The results show that rhino ATM users consume high conservation-value species such as tiger and shark more often than other non-rhino ATM consumers.

TRAFFIC (2013) also found that rhino horn consumers often used other illegal wildlife products such as bear bile and tiger bone. This may have implications for demand-reduction campaigns as there would appear to be a hard core of ATM users who consume high conservation-value species.

Rhino horn is used typically for medical purposes

The study found that rhino horn was typically prescribed by a doctor and purchased for either personal or family use, usually to treat medical conditions including serious illness such as cancer, high fever, delirium or convulsions and for minor illness and as a general tonic. There was little evidence to support stories that rhino horn was also being widely used as an aphrodisiac or consumed at parties or social gatherings, although some instances were recorded.

The number of people consuming rhino horn has fallen from five years ago, mainly because of medical need. Negative media campaigns, the illegal nature of consumption and economic factors were less important reasons for reducing consumption.

Gift giving is relatively rare

In contrast to some previous studies, the study found that gift-giving to enhance business and political relationships and other reasons is relatively uncommon, being mentioned by only 12% of purchasers. This is perhaps a little surprising given the role gift-giving plays in promoting good relations across both business and government and is known to be a big part of Vietnamese business culture.[26]

Of course, it is possible that some of the respondents were reluctant to admit this as a reason for buying rhino horn, given that the object of gift-giving is to secure patronage. A medical reason may have been given as a more acceptable justification for use.

[26] Shairp et al., 2016; TRAFFIC, 2013.

Slight recent fall in consumption of rhino horn

The results show a slight downward trend in both non-rhino ATM and rhino ATM consumption compared to five years ago, with just over 40% reporting a decline or stopping outright, compared to 19% who said they were using more. When asked why their consumption had changed, most consumers cited medical-related reasons rather than any significant change in their socioeconomic situation or preferences. For example, the study found that only 5% of non-rhino horn ATM users cited reduced affordability.

In contrast, Venkataraman (2007), working in Hanoi, found the most frequently cited reason for giving up the use of ATM products from wild animals was the rising cost (42% of all respondents). Furthermore, few respondents cited the impact of demand-reduction media campaigns and the core themes of campaigns such as efficacy of treatment, animal death and suffering, and species extinction risk were also rarely mentioned.

Potential for demand growth

The potential for demand to grow is apparent when considering future intentions regarding future purchase of rhino horn. The results show that 38% of non-rhino ATM users and 30% of non-ATM users were probably going to buy rhino horn in the future. This is consistent with the TRAFFIC (2013) study, which focused on individuals in the A (upper middle class) and B (middle class) social classes of Hanoi and Ho Chi Minh City, where 5% admitted to buying or consuming rhino horn, but a further 16% reported they might become consumers in the future. This result may be linked to future expectations regarding health-treatment needs, as rhino horn gives ‘strength’ and vitality to older people (Conrad, 2012), or future wealth.

Strong preferences for wild and non-lethally harvested rhino horn

The results of the choice experiment demonstrated a strong preference among respondents for wild rhino horn over semi-wild or farmed. The importance of ‘wild sourcing’ was also stressed by ATM suppliers who indicated that medicine sourced from wild animals was worth 2–5 times that of farmed animals, because there is a strong perception that wild animal products are medically more effective. Dutton et al. (2011), using a CE approach, also found that consumers were willing to pay considerably more for wild bear bile than farmed and Gratwicke et al. (2008), who surveyed 1,880 residents in six Chinese cites, found that 71% of consumers said they preferred wild to farm-sourced tiger products.

The strong preference for wild is thought to stem from the nature of the animals themselves – with rhinos, bears and tigers perceived to be unconquerable in wild nature and therefore wild-sourced material is the most potent.[27] This preference for wild also extends into food in Viet Nam. Shairp et al. (2015), for example, found a widespread preference for wild-sourced animals, with survey participants describing captive-bred animals as “ordinary” and “not tasty” whereas wild-caught specimens were more natural and chemical free. In China, which shares many cultural similarities with Viet Nam, 37% of urban wild-meat consumers reported a strong preference for “real” wild meat[28] over farmed meat that may be tainted.[29]

The survey also found a strong preference for non-lethal forms of harvesting. As far as we are aware, no other study has reported this preference, and it raises some important questions about substitution rates between illegal and legal horn, with the latter supplied potentially from non-legally sourced animals. Another interesting finding is the relatively limited influence ‘species rarity’ has on WTP for rhino horn. Shairp et al. (2016) explored this issue in detail in a study of wild-meat consumption in Ho Chi Minh City, and found that rare species are purchased especially to promote good business relations and aid the contract-signing process, with rarity a key attribute where wildlife was consumed as a business ‘gift’.

In the case of rhino horn, where use is largely associated with health-related conditions rather than gift-giving, rarity may not have the same cache. Although the suppliers interviewed suggested that Asian horn has higher value than African horn, this premium could be more closely related to provenance rather than rarity per se.[30] The survey therefore does not find any evidence that demand for ATMs containing very rare

[27] Lee, 1998; Servheen, 1999; Gratwicke et al., 2008.

[28] Lee, 1998.

[29] Tong, 2007.

[30] These effects are partially confounded in the design, and more research is required to explore this issue.

species may increase as the animal approaches extinction and thereby contribute to its demise in the wild[31] – a phenomenon referred to as the anthropogenic Allee effect.[32]

Impact of legalization on demand – slight increase in consumption and reduced willingness to pay

The survey shows interesting results with respect to the legalization of the rhino horn trade. When respondents were asked how they would react if the trade in rhino horn were legally regulated in Viet Nam, the survey found that only 24% would buy more and 10% would buy less. Furthermore, of those respondents who were least likely to purchase in the future ('probably no'), almost 60% would actually buy less and none (0%) would buy more under a legal trade. This is an interesting result and challenges the view that legalization would result in a modest increase in demand rather than a 'demand surge'.[33]

The results of the CE model show that legalizing the rhino horn trade has an inverse effect on the WTP for rhino horn. Consumers would be WTP less for rhino horn if it were traded legally and rhino horn with attributes of legally sourced rhino using non-lethal methods were preferred to poached horn. The most likely explanation for these results probably relates to the loss of prestige and exclusivity that stems from buying an illegal high-value ATM product in Viet Nam, which under the illegal trade is generally only available to well-off and well-connected individuals.

In Asian society, wildlife consumption is shaped by a complex array of socioeconomic factors that drive demand, such as personal preference, family and community tradition and business culture. Relative affluence and purchasing power and the challenges of shifting consumption patterns are also significant. Furthermore, individuals are preoccupied with their own position in hierarchical, collectivist Asian societies, and wildlife products of high symbolic value such as rhino horn are used to achieve higher status and to reinforce inter-group differences in status, hierarchical position and face.[34]

Possible conservation implications of change in consumer demand under legal trade

The impact of legalization on poaching is difficult to predict as there are many uncertainties and unknowns about the supply economics of poaching. As price is a key driver of poaching, any drop in price is likely to reduce incentives to poach. Given the economies of scale that may emerge from a managed legal supply, it is possible that legalizing trade would crowd out poachers, i.e. outcompete them, especially if horn production could quickly rise to meet demand. The potential prospect of crowding out poaching is also enhanced by the finding that horn taken from animals that are not killed is much preferred over poached horn.

Research is needed on supply response to legalization. Further research would be required to explore the full economics of horn production under a legalized trade scenario. Issues to examine include assessing production costs, the profitability of legally sourced horn at lower prices, the effectiveness of anti-laundering safeguards such as certification. These are crucial factors in determining the extent to which a legal trade would displace poaching.

In relation to production costs, the results suggest a premium would be still be attached to horn sourced from wild rhino. The economic and management implications of harvesting from the wild population would require further research, as costs are likely to be higher than for ranched or farmed horn. A resilient and robust system of certification would be necessary, and such specialized projects for wildlife products face high transaction costs (Dickson, 2003).

Tough enforcement is potentially more effective than media campaigns

The research finds that tougher enforcement regimes are potentially more effective in reducing demand than media-based campaigns. It was not feasible to explore this matter in great depth in the questionnaire

[31] Rivalan et al., 2007.

[32] Courchamp et al., 2006.

[33] Dutton et al., 2011; Drury, 2011

[34] Li and Su, 2007.

approach, and there are obvious issues that need further investigation, such as risk perceptions about actually being caught and penalized.

In the survey, the prospect of tougher enforcement measures had a much greater impact on future purchase decisions concerning rhino horn, with only a hard core of 15%–20% not inclined to reduce consumption even in the face of a six-month prison sentence. On the other hand, it is worth noting that the enforcement of such measures would necessitate a major change in approach, and this would be challenging given that many users are highly placed government officials and/or members of the business elite.

There is a hopeful precedent from neighbouring China, where the government banned the serving of shark fin soup at official functions and banquets in 2012. Reporting in 2014, an antitrade campaigning organization reported an 82% decline in reported sales and a significant decrease in the price (47% retail and 57% wholesale) of shark fins. Furthermore, 85% of Chinese consumers surveyed online said they gave up shark fin soup within the past three years.

Media campaigns have been effective in Western countries in the past (the fur coat trade in the 1970s, for instance), but their potential scope to make a significant impact is less encouraging, with only 40% of people who would definitely buy rhino horn in the future saying that media campaigns would motivate them to consume less.

It should also be noted that conventional campaign themes such as efficacy of treatment, animal death and suffering, and species extinction appeared to have little traction with consumers, as these issues were rarely mentioned as a reason why consumers had reduced or stopped consumption of rhino horn and other ATM products.

No evidence of a ‘stigma’ about rhino horn consumption

The findings of this study challenge the conventional view that the consumption of wild animals is stigmatized. The Oxford English dictionary defines stigma as a mark of disgrace associated with a particular person, group, activity or behaviour. In the context of the wildlife trade, the stigma is associated with extreme disapproval of a person or organization that kills or hurts animals in a way that offends the values or conflicts with the cultural norms of people who support conservation or animal welfare.

In the context of rhino horn consumption in Viet Nam, however, stigma may be a less important phenomenon. Fischer (2004), for example, notes that stigma is most important for display goods, such as ivory or diamonds, rather than consumed goods, such as rhino ATM. Second, it has been noted that in Viet Nam, consumption of wildlife products of high symbolic value, such as rhino horn, generates status, esteem and social position.[35] Third, rhino horn tends to be purchased by wealthy consumers who form part of the ruling business and political elite, and it is not clear how easily this group could be stigmatized by a Western-style marketing campaign involving media celebrities. Finally, the literature indicates that ATM consumers see little contradiction between saving endangered species and consuming rare wildlife for health reasons.

For example, Gratwicke et al. (2008b) found that 93% of people who consume tiger parts also supported tiger conservation. Furthermore, TRAFFIC (2013) found that most rhino horn consumers are aware that the species is at risk, but do not see themselves as the catalysts for the current rhino-poaching crisis. Recent research by Olmedo (2015) found serious shortcomings with the design and implementation of nine rhino horn and elephant ivory demand-reduction interventions in Viet Nam relating to underlying assumptions, sample size, implementation and evaluation.

[35] Li and Su, 2007.

Appendix I In-depth interview questions for suppliers

1. What are the recent general trends in wildlife ATM consumption and price in Viet Nam?
2. Can you explain these trends? (e.g. changes in income or demographic measures etc.)?
3. In general what impact does price have on demand for ATMs from wildlife?
4. What are ATMs containing rhino horn used for?
5. What type of people buy rhino horn ATM?
6. Do you think the demand for ATMs containing rhino horn has changed in recent years?
7. What is the price of ATM with rhino horn and has the price changed in recent years?
8. Rhino horn is illegal to buy so how does someone who wants to buy some get it?
9. Sometimes the government and NGO runs campaigns to persuade people to stop buying rhino horn – what impact do you think these media / government campaigns have on demand for rhino horn ATM?
10. What would be the impact of introducing and synthetic alternative on the demand for illegal sourced rhino horn?
11. If the supply of rhino horn is legal and certified origin from Africa appeared in Vietnam, the needs have changed?

Appendix II List of suppliers involved in in-depth interviews

No	Suppliers	Location
1	Doctor Minh (Phuc Hung pharmacy)*	Hanoi
2	Nhat Kinh Pharmacy*	Hanoi
3	Ha Dong General Hospital	Hanoi
4	Son Lam Pharmacy Private Company	Hanoi
5	Supplier 5 (name withheld)	Hanoi
6	Military's Traditional Medicinal Hospital	Hanoi
7	Ministry of Police Traditional Medicinal Hospital	Hanoi
8	Ha Tay Pharmacy Company	Hanoi
9	Supplier 9 (name withheld)	Hanoi
10	Minh Phuong company	Hanoi
11	Ho Chi Minh Hospital of Traditional Medicine	Ho Chi Minh
12	Faculty of Oriental Medicine - Hospital 175	Ho Chi Minh
13	Hoa Thach company	Ho Chi Minh
14	Supplier 14 (name withheld)	Ho Chi Minh
15	Eastern Medicine Center	Ho Chi Minh
16	Luong The Vinh Oriental Medicine clinic	Ho Chi Minh
17	Tan Khanh Company	Ho Chi Minh
18	Faculty of Traditional Medicine - Binh Tan Hospital	Ho Chi Minh
19	OPC Pharmaceutical JSC	Ho Chi Minh
20	Supplier 20 (name withheld)	Ho Chi Minh

*In-depth interviews conducted during preparation phase of the survey and CE.

Appendix III Questionnaire

Introduction

- I work for Mekong Economics and we are doing a study on behalf of the United Nations International Trade Centre in Geneva, Switzerland.
- We are conducting a survey on the purchase and use of Traditional Medicine in Viet Nam and we would like to answer a few questions.
- The survey may take anytime between 20 to 30 minutes depending on your use of traditional medicine.
- The survey is formed of 5 parts. Not all questions will apply to you, but please try to answer as best you can.
- We appreciate your cooperation and please note the survey is anonymous and completely confidential.

The first section is about your use of Traditional Medicine

A1. In your life have you ever used Traditional Medicine, or been to see a doctor or hospital that practices Traditional Medicine? (Tick one)

Yes	
No	**Go to A3**
Don't know / Can't remember	**Go to A7**

A2. In your life have you ever used Traditional Medicine with ingredients from animals? (ATMs)? (Tick one)

Yes	**Go to A5**
No	**Go to A3**
Don't know / Can't remember	**Go to A7**

A3. Why have you not used any TMs or ATMs? (Tick all that apply)

A	Can't afford
B	Rarely been sick
C	Not an effective treatment
D	Never been recommended by doctor / trusted friend or family
E	Can't find genuine product – too many fakes

F	Government says we should not
G	It is illegal
H	I don't want animals to die
I	I don't want animals to go extinct in the wild
J	Other… please specify
K	Other… please specify
L	Other… please specify

A4. If you don't use ATMs, what do you use if you are sick? (Tick all that apply and then go Part B)

A	Use Western medicine
B	Use a herbal TM
C	Don't use medicine
D	Other – please specify
E	Other… please specify
F	Other… please specify

Go to Part B

A5. In last 5 years, how many different ATMs have you used? (Tick one only)

A	None	Go to A6
B	One	Go to A8
C	Two	Go to A8
D	2-5	Go to A8
E	More than 5	Go to A8

A6. Why have you not used any in last 5 years? (Tick all that apply)

A	Can't afford
B	Not been sick
C	Not an effective treatment
D	Never been recommended by doctor / trusted friend or family
E	Can't find genuine product – too many fakes

F	Government says we should not
G	It is illegal
H	I don't want animals to die
I	I don't want animals to go extinct in the wild
J	Other… please specify
K	Other… please specify
L	Other… please specify

A7. If you did not use TM or ATMs in last 5 years what do you prefer to use if you are sick? (Tick all that apply then go to Part B)

A	Use Western medicine
B	Use a herbal TM
C	Don't use medicine
D	Other – please specify
E	Other – please specify
F	Other – please specify

Go to Part B

A8. Please list the name any of the animal species used in the ATMs you have used in last 5 years? (Maximum of 5)

1.
2.
3.
4.
5.

If one of the animal species mentioned is RHINO please go directly to Part B

A9. Which of these have you used most frequently in last 5 years? (One only)

A10. When did you last use a ATMs? (Tick one only)

A	2015
B	2014
C	2013
D	2012
E	2011

A11. Thinking about the last time you used a ATM, why did you use it? (Tick all that apply)

A	Remedy for serious illness, bad fever etc
B	Remedy for minor illness, mild fever etc
C	To complement Western medicine treatment or TM treatment
D	Tonic to improve general well-being
E	For fun at a special occasion/business dinner/ office party
F	Aphrodisiac
G	Hang over cure
H	Don't know/ can't remember
I	Other – please specify
J	Other – please specify
K	Other – please specify

A12. In general, compared to say 5 years ago are you using ATMs more or less now? (Tick one only)

	Reason	
A	I have stopped	Go to A13
B	Much Less	Go to A13
C	A little less	Go to A13
D	About the same	Go to Part B
E	A little more	Go to A14
F	A lot more	Go to A14
G	I have started	Go to A14

A13 Why? (Tick all that apply)

	Reason
A	Can't afford as much
B	Not as sick as before
C	Not an effective treatment

D	Never been recommended by doctor/trusted friend or family
E	Can't find genuine product – too many fakes
F	Government says we should not
G	Because the ATM(s) I use is now illegal
H	Because of information/ media coverage by conservation NGO
I	Because I don't want animals to die
J	Because I don't want animals to go extinct
K	Because I did not receive any as gift
P	Other (please specify)
Q	Other (please specify)
R	Other (please specify)

A14 Why? (Tick all that apply)

	Reason
A	I was more often sick
B	The medicine became cheaper
C	The medicine became easier to get
D	Because I got more money
E	Recommended by doctor/trusted friend or family
K	Because I receive gift
F	Other (please specify)
G	Other (please specify)
H	Other (please specify)

Part B: Use of rhino horn TM

B1. Have you ever used or purchased (for yourself or someone else) rhino horn as a ATM? (Tick all that apply)

	USED	PURCHASED
YES		
NO		
Don't Know / Can't Remember		

All respondents who state that they have 'Purchased' rhino horn ATM go directly to Part C

If a respondent states that they have used rhino horn ATM, but have not purchased it then they go to **B4.**

All other respondents answer B2 and B3 then go to Part D

B2. Why have you not used any TM from rhino horn? (Tick all that apply)

A	Can't afford
B	Have rarely been sick
C	Not an effective treatment
D	Never been recommended by doctor / trusted friend or family
E	Can't find genuine product – too many fakes
F	Government says we should not
G	It is illegal
H	I don't want animals to die
I	I don't want animals to go extinct in the wild
J	Other… please specify
K	Other… please specify
L	Other… please specify

B3. If you don't use ATMs from rhino horn what do you prefer to use when you are sick? (Tick all that apply and then go to Part D)

	Reason
A	Prefer to use Western medicine
B	Prefer to use herbal TM
C	Prefer to use another Animal TM
D	Don't use any medicine
E	Other – please specify
F	Other – please specify
G	Other – please specify

Go to Part D

B4. In last 5 years, how many different times have you used a ATM from rhino horn? (Tick one only)

A	None	Go to B5
B	One	Go to B7
C	Two	Go to B7
D	3-5	Go to B7
E	More than 5	Go to B7

B5. Why have you not used any in last 5 years? (Tick all that apply)

A	Can't afford
B	Have rarely been sick
C	Not an effective treatment
D	Never been recommended by doctor / trusted friend or family
E	Can't find genuine product – too many fakes
F	Government says we should not
G	It is illegal
H	I don't want animals to die
I	I don't want animals to go extinct in the wild
J	Other… please specify
K	Other… please specify
L	Other… please specify

B6. If you didn't use ATM from rhino horn what would you prefer to use as an alternative? (Tick all that apply and then go to Part C)

	Reason
A	Prefer to use Western medicine
B	Prefer to use herbal TM
C	Prefer to use another Animal TM
D	Don't use any medicine
E	Other – please specify
F	Other – please specify
G	Other – please specify

Go to Part D

B7. When did you last use a ATM from rhino horn? (Tick one only)

A	2015
B	2014
C	2013
D	2012
E	2011

B8. Thinking about the last time you used a TM from rhino horn, why did you use it? (Tick all that apply)

A	Remedy for serious illness, bad fever etc
B	Remedy for minor illness, mild fever etc
C	To complement Western medicine treatment or TM treatment
D	Tonic to improve general well-being
E	At a special occasion/business dinner/ office party
F	Aphrodisiac
G	Hangover cure
H	Don't know/ can't remember
I	Other – please specify
J	Other – please specify
K	Other – please specify

B9. In general, compared to say five years ago, are you using ATMs from rhino horn more or less now? (Tick one only)

	Reason	
A	I have stopped	Go to B10
B	Much Less	Go to B10
C	A little less	Go to B10
D	About the same	Go to Part D
E	A little more	Go to B11
F	A lot more	Go to B11
G	I have started	Go to B11

B10 Why? (Tick all that apply)

	Reason
A	Can't afford as much
B	Not as sick as before
C	Not an effective treatment
D	Never been recommended by doctor/trusted friend or family
E	Can't find genuine product – too many fakes
F	Government says we should not
G	Because it is illegal
H	Because of information/ media coverage by conservation NGO
I	Because I don't want animals to die

J	Because I don't want animals to go extinct
K	Because I did not receive any as gift
P	Other (please specify)
Q	Other (please specify)
R	Other (please specify)

Go to Part D

B11 Why? (Tick all that apply)

	Reason
A	I was more often sick
B	The medicine became cheaper
C	The medicine became easier to get
D	Because I got more money
E	Recommended by doctor/trusted friend or family
K	Because I did not receive any as gift
F	Other (please specify)
G	Other (please specify)
H	Other (please specify)

Go to Part D

PART C: Purchase of rhino horn

This section is about the **purchase** of rhino horn.

C1. When did you last purchase a TM from rhino horn? (Tick one only)

A	This year
B	Last 5 years
C	6-10 years ago
D	More than 10 years ago

C2. Why did you purchase this last time? (Tick all that apply)

	Reason	Me	Family	Friend	Business Contact	Other
A	As remedy for serious illness					
B	As remedy for minor illness					

C	As a tonic to improve general well-being					
D	For a special occasion/business dinner/ office party					
F	Aphrodisiac					
G	Hang over cure					
H	Gift					
I	On behalf of someone (who gave me money to buy)					
J	Don't know/ can't remember					
K	Other – please specify					
L	Other – please specify					
M	Other – please specify					

C3. In general, compared to say 5 years ago are you using ATMs from rhino horn more or less now? (Tick one only)

	Reason	
A	I have stopped	Go to C4
B	Much Less	Go to C4
C	A little less	Go to C4
D	About the same	Go to Part D
E	A little more	Go to C5
F	A lot more	Go to C5
G	I have started	Go to C5

C4 Why? (Tick all that apply)

	Reason
A	Can't afford as much
B	Not as sick as before
C	Not an effective treatment
D	Never been recommended by doctor/trusted friend or family
E	Can't find genuine product – too many fakes
F	Government says we should not
G	Because it is illegal
H	Because of information/ media coverage by conservation NGO
I	Because I don't want animals to die
J	Because I don't want animals to go extinct

K	Because I did not receive any as gift
P	Other (please specify)
Q	Other (please specify)
R	Other (please specify)

Go to Part D

C5. Why? (Tick all that apply)

	Reason
A	I was more often sick
B	The medicine became cheaper
C	The medicine became easier to get
D	Because I got more money
E	Recommended by doctor/trusted friend or family
K	Because I did not receive any as gift
F	Other (please specify)
G	Other (please specify)
H	Other (please specify)

C6. Some rhino horn is not genuine, for example, it can be from the antler of a deer. How do you decide if the rhino horn you buy is genuine? (Tick all that apply)

A	I trust the seller
B	I trust the person who introduced me to the seller
C	I can tell by looking at it
D	I can tell some other way *(please specify)*
E	I don't care very much
F	I don't know
G	Other (*please specify*)
H	Other (*please specify)*
I	Other (*please specify)*

Part D: Rhino horn choice experiment

D1. Is it possible that you may purchase rhino horn in the future? (Tick one only)

A	Definitely Yes	1	
B	Probably Yes	2	
C	Don't know	3	
D	Probably No	4	
E	Definitely No	5	Go to Part E

D2. If you were to purchase rhino horn in the future, what is the most probable reason? (one only)

A. **You have serious illness -** Go to scenario 1
B. **You want to give a gift to important business contact -** Go to scenario 2
C. **You want to use as a healthy tonic (Aphrodisiac, pick me up etc) -** Go to scenario 3

Scenario 1 (Read this)

Imagine that you are suffering from a serious illness like stroke, epilepsy or dangerous fever and it is suggested by someone you trust that a traditional medicine made from rhino horn is the best treatment.

We will show you 2 different possible purchases of rhino horn medicine that you can make: Option A or Option B.

Assume the rhino horn is definitely genuine, but there is a risk of being caught breaking the law because the purchase of rhino horn is illegal.

The horn differs in certain ways such as source, rarity of the rhino species the horn is taken from, whether the animal is killed or not to produce the horn, and the price per 100 grams.

We want you to choose the product that you would like to buy most – please look at the choices carefully and the price it would cost and tell us which one you would prefer.

If you decide you would not purchase either option (for example, because price is too high in both options) then say 'Neither'.

Talk through each attribute of the choice while showing the appropriate card

Source – 3 levels (farmed, semi-wild, or wild): SHOW CARD 1

Rarity of rhino species - 3 levels (Very Rare, Rare and Least Rare): SHOWCARD 2

Very Rare – less 100 of these species in the wild

Rare – less than 5,000 animals of these species left in the wild
Least Rare - more than 10,000 animals of this species left in the wild.

Harvesting method – 2 levels (lethal and non-lethal): SHOW CARD 3

Price –Price of rhino horn ATM can vary depending on a lot of different factors. For this exercise please imagine this is the price you would actually have to pay (in USD).

Scenario 2 (Read this)

Imagine that you want to make a gift of rhino horn ATM to an important business contact or work boss.

We will show you 2 different possible purchases of rhino horn medicine that you can make: Option A or Option B.

Assume the rhino horn is definitely genuine, but there is a risk of being caught breaking the law because the purchase of rhino horn is illegal.

The horn differs in certain ways such as source, rarity of the rhino species the horn is taken from, whether the animal is killed or not to produce the horn, and the price per 100 grams.

We want you to choose the product that you would like to buy most – please look at the choices carefully and the price it would cost and tell us which one you would prefer.

If you decide you would not purchase either option (for example, because price is too high in both options) then say Neither.

Talk through each attribute of the choice while showing the appropriate card

Source – 3 levels (farmed, semi-wild, or wild): SHOW CARD 1

Rarity of rhino species - 3 levels (Very Rare, Rare and Least Rare): SHOWCARD 2

Very Rare – less 100 of these species in the wild

Rare – less than 5,000 animals of these species left in the wild
Least Rare - more than 10,000 animals of this species left in the wild.

Harvesting method – 2 levels (lethal and non-lethal): SHOW CARD 3

Price –Price of rhino horn ATM can vary depending on a lot of different factors. For this exercise please imagine this is the price you would actually have to pay (in USD).

Scenario 3 (Read this)

Imagine that you want to purchase a rhino horn ATM because a trusted friend/doctor recommended it as a health tonic.

We will show you 2 different possible purchases of rhino horn medicine that you can make: Option A or Option B.

Assume the rhino horn is definitely genuine, but there is a risk of being caught breaking the law because the purchase of rhino horn is illegal.

The horn differs in certain ways such as source, rarity of the rhino species the horn is taken from, whether the animal is killed or not to produce the horn, and the price per 100 grams.

We want you to choose the product that you would like to buy most – please look at the choices carefully and the price it would cost and tell us which one you would prefer.

If you decide you would not purchase either option (for example, because price is too high in both options) then say neither.

Talk through each attribute of the choice while showing the appropriate card

Source – 3 levels (farmed, semi-wild, or wild): SHOW CARD 1

Rarity of rhino species - 3 levels (Very Rare, Rare and Least Rare) : SHOWCARD 2

Very Rare – less 100 of these species in the wild

Rare – less than 5,000 animals of these species left in the wild
Least Rare - more than 10,000 animals of this species left in the wild.

Harvesting method – 2 levels (lethal and non-lethal): SHOW CARD 3

Price –Price of rhino horn ATM can vary depending on a lot of different factors. For this exercise please imagine this is the price you would actually have to pay (in USD).

PART E: Background Information

E1. Gender (tick one only)

A	Female	0/1
B	Male	0/1

E2. Age (circle one answer)

A	18-28	1
B	29-38	2
C	39-48	3
D	49-58	4
E	59-68	5
F	69-78	6
G	79 and over	7

E3. Occupation (tick one only)

A	Unemployed	0/1
B	Self Employed	0/1
C	Household business	0/1
D	Government agency/other public service	0/1
E	State owned enterprise	0/1
F	Private local firm/ joint stock enterprise	0/1
G	Joint venture/Foreign investment firm	0/1
H	Donor/ NGO/ other international organization	0/1
I	Retired	0/1
G	Other- please specify	0/1

E4. Average Monthly Income per person (tick one only) [SHOW CARD - Cols 1 & 2 only]

A	Less than 3 Million VND	1
B	Between 3 to 5 Million VND	2
C	Between 5 to 10 Million VND	3
D	Between 1 to 20 Million VND	4
E	More than 20 Million VND	5

E5. Highest Education Level (circle one answer)

A	Less than Primary School	1
B	Primary School	2
C	Lower Secondary School	3
D	High School	4
E	College	5
F	University	6
G	Post Graduate	7
H	Other- please specify	8

E6. Which city / province do you live?

E7. If the government of Viet Nam actually legalized the use/purchase of rhino horn, would this influence your future purchase of rhino horn? (Tick one only)

A	No, would make no difference
B	Yes, would buy more
C	Yes, would buy less
D	Not sure / Don't know
E	Yes, would stop immediately
F	Yes, would slowly stop
G	Yes, would start for first time
H	Other – please specify

E8 If the government started a strong advertising campaign on radio, TV and street posters involving Vietnamese VIPs that tell you to stop using rhino horn would this influence your future purchase of rhino horn? (Tick one only) / Show Card 5

A	No, would make no difference
B	Yes, would buy more
C	Yes, would buy less
D	Not sure / Don't know
E	Yes, would stop immediately
F	Yes, would slowly stop
G	Yes, would start for first time
H	Other – please specify

E9. If the government informed you that they were doubling the current fine for purchasing rhino horn would this influence your future purchase of rhino horn? (Tick one only)

A	No, would make no difference
B	Yes, would buy more
C	Yes, would buy less
D	Not sure / Don't know
E	Yes, would stop immediately
F	Yes, would slowly stop
G	Yes, would start for first time
H	Other – please specify

E10. If the government informed you that you could go to prison for 6 months for purchasing rhino horn would this influence your future purchase of rhino horn? (Tick one only)

A	No, would make no difference
B	Yes, would buy more
C	Yes, would buy less
D	Not sure / Don't know
E	Yes, would stop immediately
F	Yes, would slowly stop
G	Yes, would start for first time
H	Other – please specify

Thank you very much for your cooperation. We will not reveal your answers to anyone and the survey is completely confidential.

Appendix IV Example choice set and attribute show cards

Choice card 1

Attribute	Choice A	Choice B	Neither A or B
Source	Wild 	Semi-Wild 	
Rare?	Rare	Rare	
Harvesting method	Non-Lethal 	Lethal 	
Price per 100 grams	$2,400	$8,400	

Show card 1

WILD - Rhinos living naturally in large protected areas

RANCHED - Rhinos live freely and naturally in large protected areas. If required, additional natural food and water is given

FARMED - Rhinos are kept at high density with food and water provided daily

Show card 2

VERY RARE – less than 100 in the wild
Javan rhino (Asia)
Sumatran rhino (Asia)

RARE – less than 5000 in the wild
Black rhino (Africa)
Indian rhino (Asia)

LEAST RARE – more than 10,000 in the wild
White rhino (Africa)

Show card 3

LETHAL – Rhino is killed by rifle and horn removed

NON-LETHAL – Rhino horn is removed carefully from living animal without causing any pain.
After some time the horn re-grows naturally.

Appendix V Project timetable

Description	October				November				December 2015				January				April				May				June				July
	Weeks																												
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Develop pilot questionnaire	■	■	■	■	■	■	■	■																					
In-depth interviews with ATMs suppliers					■	■	■	■																					
Pilot survey of 50 respondents								■	■	■	■																		
Processing and reviewing of pilot data												■																	
Revising and finalizing questionnaires													■	■															
Finalizing data entry guidelines														■	■														
Actual survey Batch 1 (419 respondents)																■	■	■											
Actual survey Batch 2 (327 respondents																			■	■									
Actual survey Batch 3 (96 respondents)																					■	■							
Actual survey Batch 4 (?? Respondents)																							■	■	■	■			
Report phase																											■	■	■

Appendix VI Respondent home residence location

Source: Google Maps

Appendix VII Economic model

Preference elicitation methods are based on the assumption that individuals have preferences defined over a set of choice alternatives via utility functions. This utility maximization framework is very well described in (Train, 2009) in application to discrete choice experiment (DCE) models, so we just use the probability formulas derived there as a starting point for our model description.

One of the most widely used models is the random parameters logit (RPL) model, often called the mixed logit model, as its specifications are versatile enough to model a wide spectre of respondent behaviour. The model formulation is similar to the multinomial logit model (MNL) for choices of an individual i who faces a choice situation t with J alternatives described by K attributes:

$$\Pr(y_{it} = j) = \frac{\exp(\alpha_{ij} + \boldsymbol{\beta}_i' \mathbf{x}_{ijt})}{\sum_{q=1}^{J} \exp(\alpha_{iq} + \boldsymbol{\beta}_i' \mathbf{x}_{iqt})}, \tag{0.1}$$

where choice-specific constants and individual-specific taste parameters vary around fixed means and are modelled as follows:

$$\begin{aligned} \beta_{ik} &= \beta_k + \boldsymbol{\delta}_k' \mathbf{z}_i + \sigma_k \nu_{ik}, \\ \alpha_{ij} &= \alpha_j + \boldsymbol{\delta}_j' \mathbf{z}_i + \sigma_j \nu_{ij}, \end{aligned} \tag{0.2}$$

and where β_k is the population mean, ν_{ik} is the individual specific heterogeneity, with mean zero and standard deviation one, and σ_k is the standard deviation of the distribution of β_{ik} around β_k (we assume the normal distribution). The means of the parameter distributions are also allowed to be heterogeneous with observed demographic data z_i.

The latent class random parameters (LCRP) model allows to model two layers of preference heterogeneity: it assumes that there are several classes of individuals in the population that are additionally distinguished by different distribution of parameters within each class. The specification of LCRP model with Q classes is as follows:

- the unconditional choice probability:

$$\Pr(choice_i \mid \mathbf{x}_i) = \sum_q \Pr(class = q) * \Pr(choice_i = j \mid \mathbf{x}_i, \boldsymbol{\beta}_{i|q}), \tag{0.3}$$

- class membership probability, dependent on demographics z_i:

$$\Pr(class = q) = \pi_{iq}(\mathbf{z}_i, \boldsymbol{\theta}) = \frac{\exp(\boldsymbol{\theta}_q' \mathbf{z}_i)}{\sum_{q=1}^{Q} \exp(\boldsymbol{\theta}_q' \mathbf{z}_i)}, \boldsymbol{\theta}_Q = \mathbf{0}, \tag{0.4}$$

- conditional choice probability, with individual-specific taste parameters:

$$\Pr(choice_i = j \mid \mathbf{x}_i, \boldsymbol{\beta}_{i|q}) = \frac{\exp([\boldsymbol{\beta}_q + \boldsymbol{\Delta}'_q \mathbf{z}_i + \mathbf{w}_i]' \mathbf{x}_{ijt})}{\sum_{q=1}^{J} \exp([\boldsymbol{\beta}_q + \boldsymbol{\Delta}'_q \mathbf{z}_i + \mathbf{w}_i]' \mathbf{x}_{iqt})}, \quad (0.5)$$

where $\mathbf{w}_{i|q} \sim Normal(\mathbf{0}_q, \boldsymbol{\Sigma}_q)$ is the individual-specific within-class random variation of taste parameters.

Appendix VIII Estimation results for RPL and LCRP models with attribute level-dummy variables & demographic variables

	Mixed Logit	Latent Class Mixed Logit		
		Class 1	Class 2	Class 3
ASC	-4.950*** (1.470)	3.412*** (0.871)	-4.473*** (0.349)	0.152 (0.286)
Semi-Wild	0.091 (0.143)	-0.026 (1.004)	-0.016 (0.087)	-0.410* (0.211)
Farmed	-0.303*** (0.111)	-0.166 (0.806)	-0.048 (0.120)	-0.702*** (0.204)
Rare	-0.120 (0.083)	0.868 (0.656)	-0.277** (0.122)	0.721*** (0.233)
Not Rare	0.109* (0.059)	0.113 (0.856)	0.009 (0.078)	0.228 (0.185)
Non-Lethal	0.120 (0.462)	0.597 (0.173)	0.096 (0.123)	1.203*** (0.209)
Price (in 1,000 USD)	-0.099*** (0.017)	-0.678*** (0.173)	-0.041*** (0.016)	-0.169*** (0.032)
ASC*Legal		-1.176 (0.848)	-1.182*** (0.351)	0.127 (0.373)
ASC*Buyer		-2.347*** (0.700)	4.544*** (0.462)	-6.596*** (0.842)
ASC*Income	-0.213*** (0.042)			
ASC*Education	0.850*** (0.850)			
Semi-Wild*Legal		-0.816 (0.937)	-0.208* (0.124)	-0.231 (0.279)
Semi-Wild*Buyer	0.337** (0.155)	-0.224 (0.729)	0.664*** (0.174)	-0.990* (0.512)
Semi-Wild*Age	-0.010** (0.004)			
Farmed*Legal	-0.446*** (0.155)	-1.225 (0.767)	-0.541*** (0.166)	-0.053 (0.264)
Farmed*Buyer		-0.121 (0.671)	0.590*** (0.213)	-1.435*** (0.433)
Rare*Legal		-0.619 (0.673)	0.559*** (0.181)	-0.750** (0.321)
Rare*Buyer		-0.122 (0.577)	-0.077 (0.244)	-1.184** (0.554)
Not Rare*Legal		1.453* (0.845)	0.025 (0.109)	-0.096 (0.239)
Not Rare*Buyer	-0.458*** (0.124)	-0.530 (0.671)	0.057 (0.146)	-1.977*** (0.355)
Non-Lethal*Legal		0.813 (0.616)	-0.186 (0.182)	-0.187 (0.285)
Non-Lethal*Buyer	0.748*** (0.283)	-1.472*** (0.557)	1.942*** (0.263)	-2.534*** (0.542)
Non-Lethal*Income	-0.043** (0.020)			
Non-Lethal*Education	0.145* (0.084)			
Price*Legal	-0.081*** (0.022)	0.100 (0.164)	-0.118*** (0.024)	0.060 (0.042)
Price*Buyer	-0.070** (0.028)	0.245** (0.123)	0.015 (0.037)	-0.121** (0.053)
Std. dev (SQ const)	7.159*** (0.442)			
Std. dev (Semi-Wild)	0.391*** (0.131)			

Std. dev (Farmed)	0.863*** (0.159)			
Std. dev (Non-Lethal)	1.845*** (0.145)			
Std. dev (Price)	0.152*** (0.017)			
Pr(class)		0.327	0.496	0.178
Pr(class)*Female		-0.094 (0.261)	-0.421* (0.246)	
Pr(class)*Age		-0.014 (0.009)	-0.020** (0.009)	
Pr(class)*Income		-0.053** (0.026)	0.004 (0.024)	
Pr(class)*Education		-0.379*** (0.130)	-0.483*** (0.126)	
Pseudo R2	0.3759		0.3800	
LogLik	- 4700.6568		-4669.7466	
AIC/n	1.378		1.390	

Notes: 1. For the class membership probabilities, only the variable that is significant (Income) is reported, though the model includes four demographic variables (Gender, Age, Income, Education).

2. The estimates of standard deviation for random coefficient distributions in the LCRP model are not reported because none of them are significant.

3. The baseline attribute levels are Wild, Very Rare, and Lethal, and dummies for them are not included in the model.

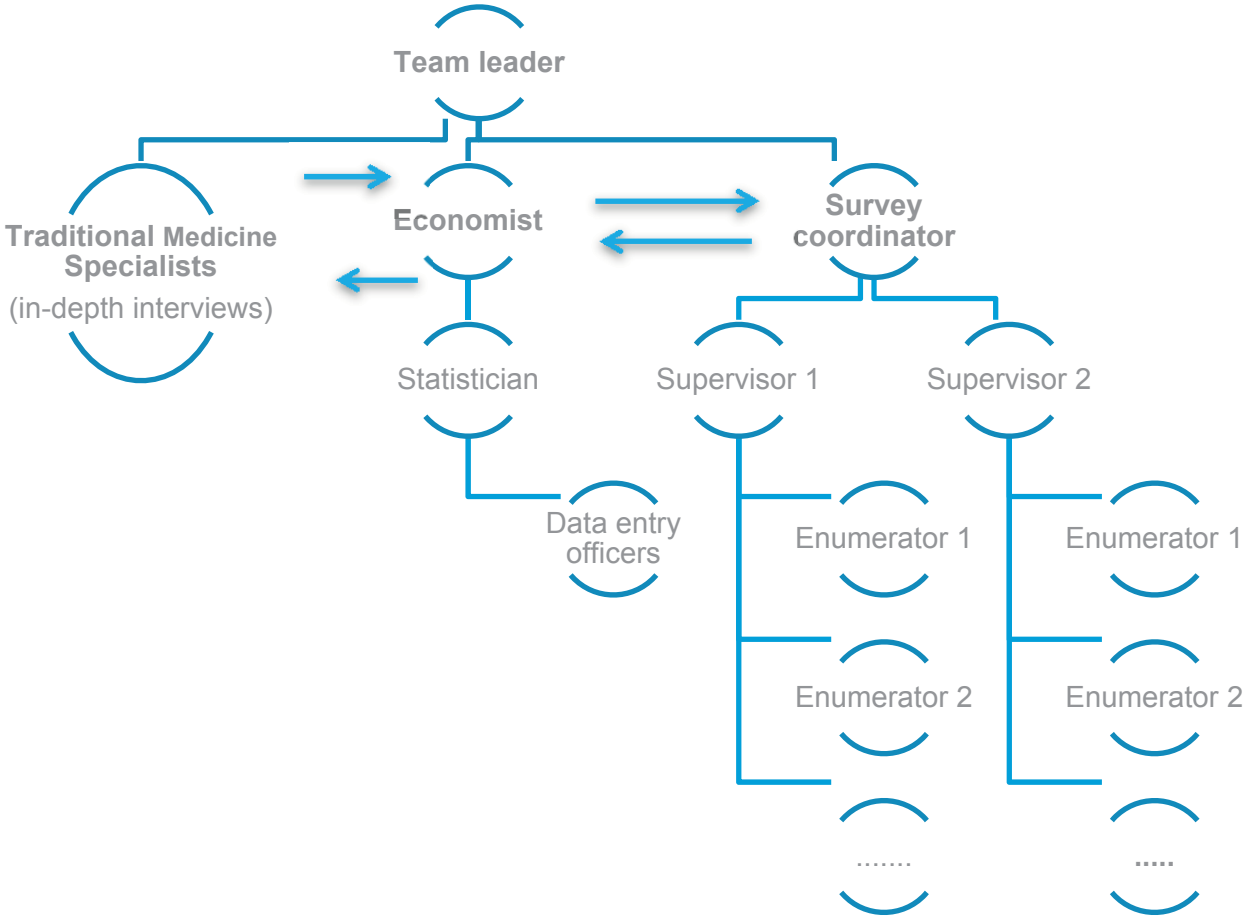
4. Standard errors of the estimates are provided in parentheses. ***, **, * indicate significance at 1%, 5%, 10% level.

Appendix IX Comparative table of marginal WTP values for different models (expressed in $1.000 per 100g of product)

	Latent Class Mixed Logit Marginal WTP Estimates		
	Class 1 'least wealthy'	**Class 2 'middle class'**	**Class 3 'most wealthy'**
Semi-Wild	-0.70	-0.52	-4.02
Farmed	-1.23	-2.57	-5.67
Rare	0.94	-0.25	1.69
Not Rare	1.21	0.27	-0.04
Non-Lethal	1.37	2.07	5.71
Illegal Scenario			
Semi-Wild	-0.07	1.21	-2.80
Farmed	-0.27	0.23	-4.66
Rare	1.31	-7.19	3.36
Not Rare	0.09	0.36	0.21
Non-Lethal	0.70	7.15	5.32
Legal Scenario			
Semi-Wild	-1.56	-1.02	-6.11
Farmed	-2.53	-3.37	-7.40
Rare	0.43	1.74	-1.19
Not Rare	2.73	0.25	-0.48
Non-Lethal	2.29	0.61	6.39

Appendix X Mekong economics team structure

In order to implement this project, MKE organized a team structure.



Enumerators:
There were 12 enumerators in Hanoi and 8 in Ho Chi Minh City. Prior to the start of the data collection stage there were two days training in Ho Chi Minh City and two days training in Hanoi for enumerators to improve their knowledge of the questionnaires and their interview skills.

Vietnamese was the language used during project implementation as all interviewees were Vietnamese and discussion in Vietnamese made them feel more comfortable to share their opinion and experience. All questionnaires, choice cards and interview guidelines provided by ITC were translated into Vietnamese without any changes in format and structure.

Economist:
The economist was in charge of conducting a preliminary data analysis and writing a summary report with the interpretation of key statics. The economist worked in collaboration with the survey coordinator and the external consultant to write the final MKE report to ITC.

Traditional medicine specialists
Traditional medicine specialists were responsible for implementing in-depth interviews with rhino horn suppliers and providing meeting notes from the interviews. The traditional medicine specialists also supported MKE in survey implementation and report writing.

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