Closing Shop?
An analysis of cultural, spatial and temporal trends of Indonesian wildlife markets through traders’ eyes

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A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science and the Diploma of Imperial College London
DECLARATION OF OWN WORK

I declare that this thesis

Closing Shop? An analysis of cultural, spatial and temporal trends of Indonesian wildlife markets through traders’ eyes

is entirely my own work and that where material could be construed as the work of others, it is fully cited and referenced, and/or with appropriate acknowledgement given.

Signature .................................................................

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- Prof. E.J. Milner-Gulland
- Dr Chris. R. Shepherd
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<tr>
<td>AAE</td>
<td>Anthropogenic Allee Effect (AEE)</td>
</tr>
<tr>
<td>BKSDA</td>
<td>Balai Konservasi Sumber Daya Alam (Natural Resources Agency)</td>
</tr>
<tr>
<td>CBD</td>
<td>Convention of Biological Diversity</td>
</tr>
<tr>
<td>CITES</td>
<td>Convention on International Trade of Endangered Species</td>
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<tr>
<td>CR</td>
<td>Critically Endangered (IUCN Red Listing)</td>
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<td>EBA</td>
<td>Endemic Bird Areas</td>
</tr>
<tr>
<td>EN</td>
<td>Endangered (IUCN Red List)</td>
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<td>IFFTA</td>
<td>Indonesian Fauna and Flora Traders Association</td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature (World Conservation Union)</td>
</tr>
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<td>JAAN</td>
<td>Jakarta Animal Aid Network</td>
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<tr>
<td>LC</td>
<td>Least Concern (IUCN Red List)</td>
</tr>
<tr>
<td>LIPI</td>
<td>Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Science Research)</td>
</tr>
<tr>
<td>NDF</td>
<td>Non-Detriment Findings</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
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<tr>
<td>PIC</td>
<td>Prior Informed Consent</td>
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<tr>
<td>PHKA</td>
<td>Perlindungan Hutan dan Konservasi Alam (Forest Protection and Nature Conservation)</td>
</tr>
<tr>
<td>Red List</td>
<td>IUCN Red List of Threatened Species</td>
</tr>
<tr>
<td>SARS</td>
<td>Severe Acute Respiratory Syndrome</td>
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<td>TM</td>
<td>Traditional Medicine</td>
</tr>
<tr>
<td>TCM</td>
<td>Traditional Chinese Medicine</td>
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<tr>
<td>TRAFFIC</td>
<td>Trade Records Analysis of Flora and Fauna in Commerce</td>
</tr>
<tr>
<td>UNEP</td>
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<td>Vulnerable (IUCN Red Listing)</td>
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<td>WCS</td>
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</table>
Abstract

Wildlife trade is a leading threat to biodiversity conservation and a common vector for infectious diseases and invasive species. There is an increasing need to understand all drivers of trade to reduce supply, consumer demand and increase enforcement efforts. Economic and social factors drive demand and supply, yet to fully understand how to mitigate this conservation challenge, requires a thorough understanding of human behaviours. There is a significant knowledge gap in traders’ perceptions and attitudes impacting long-term, sustainable solutions. Extinction is probable at current exploitation and consumption rates of our natural resources, and nowhere is that more of a concern than Southeast Asia. With increasing wealth and emerging consumer trends for wildlife for food or medicine, there’s a need to bridge this. As we move toward possible, irreversible resource depletion, it’s time to act beyond rules and regulations and understand how human interactions can shape social behaviour and policy. This study looked at the cultural values attached to wildlife trade in Indonesia and the impact on species’ populations. Interviewing traders across markets in Jakarta and Bali provided a new insight into demographics and socio-economics to aid in mitigating this concerning trend. Education of conservation impact and environmental issues is largely lacking and to ensure the next generation have the tools to enable a change in attitude to trade.

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To my best friend in the world and fiancee, Tim Rice, for always supporting me in my endeavours in my quest to ‘make a difference’ whilst looking after our business in my absence. Returning to study was never going to be easy, but your love from thousands kilometres away, helped me throughout the past 365 days. Here’s to our next chapter............... with love always

To my family and friends across the world who forever think I am mad for turning in a career as a corporate guru (or wanna-be samba dancer) for running with pumas, rehabilitating orang-utans, move to Bali to re-introduce some fluffy endemic white bird, invited by the Chinese government to be their Panda queen or getting all of Australia to change their behaviour at a click of a switch during Earth Hour. Yes, it has been an interesting transition and one I wouldn’t change for the world. Thank you for believing in me and following my pursuits - I look forward to sharing all my new adventures when I see you next.

To Femke, Rio, Pram and the amazing team at the Jakarta Animal Aid Network. Without your support, this research would never have happened. Thank you for your generous time, energy and friendship – wildlife in Indonesia would be in an even worse state if it wasn’t for your passion and commitment. I will always be there if you need a helping hand! Thank you to Dwi, Jatmiko and Dr Ron Lilley for providing an even deeper insight of this endless situation. I hope I have done you proud in representing the work you do and that it can enlighten us further to combat biodiversity issues in Indo from a social perspective.

A big thank-you to my Imperial supervisor, E.J. Milner-Gulland for her guidance and support and the other course directors, Colin Clubbe, John Fa and Marcus Rowcliffe for making this a memorable year. I hope our paths will cross again in the future.
To Chris Shepherd and the TRAFFIC Southeast Asia office, with special thanks to the three awesome ladies, Sarah Stoner, Ling Lee and Dr Jennifer Mailey from TRACE Forensics. “Esmeralda” is forever grateful in offering your homes and hearts. Thank you for the endless fun shared over “Tiger” beers during tough and frustrating times.

The past year has been a challenging one filled with laughter, tears and lots of thai curry and apple crumble. The process of writing this thesis with sleepless nights working until 4am in the mornings, worries and woes...none of this could have been endured without good friends. A special thank you to the “Felid Lady”, Ms Boron – life at Silwood would not have been the same without you and our daily banter. It has been a memorable year. To Valeria, Jack and Andy, thank you for always being there when the going gets tough and for the shopping trips to Waitrose. Who said red wine does not uplift the spirits?

Wildlife trade is not a sexy topic nor is it particularly welcomed in the wider circles of conservation but it has been one of the most rewarding and personal journeys. I saw the dark and seedy side of illegal wildlife trade, yet was humbled by some of the traders I met and interviewed who allowed me an insight into their lives. The experience gained over the past year and my personal journey transitioning from corporate to conservation, has spurred me on even more to become a global change-agent. Watch this space...........................................

I dedicate this thesis to my grandmother who always encouraged me to follow my passions and dreams – this is for you Oma!
1. Introduction

"Trade is the arch-exterminator of animal life". RWG Hingston, 1930

The Oxford University expedition to British Guiana Geographical journal 76

Wildlife trade, the sale or exchange of wild animal and plant resources is causing a biodiversity crisis with humans overharvesting all forms of life. It is a multi-faceted commerce continuum involving a number of different actors along the complex supply chains between harvester and end-consumer (Broad et al, 2003). Wildlife refers to all specimens of wild animals, plant and fungal species, both terrestrial and aquatic species that continue to occur in the wild in a non-domesticated form (Roe, 2002). Trade in this context, refers to transactions of goods between two or more individuals or entities. Use of wildlife can be consumptive and non-consumptive. People can value wildlife for commercial, recreational, scientific, aesthetic or spiritual/ cultural reasons (Robinson and Redford 1991) and may be sold and used locally, transported for sale in urban centres, sent across national borders in neighbouring countries or shipped around the world (Roe, 2002). Wildlife trade may undergo no processing prior to sale to end-consumers (Roe, 2002) for example live birds, reptiles and mammals can be sold as exotic pets or their parts and derivatives for consumption and traditional medicine. Much of the large-scale wildlife trade involves long-distance, international trade chains, often illegal and corrupt and in 90’s, TRAFFIC estimated the value of global legal wildlife products as US$160 billion which increased to 323 billion in 2009.

The levels of exploitation of have increased dramatically over recent decades to unsustainable levels across much of the humid tropics so that many of the species hunted are facing local or global extinction (Milner-Gulland et al. 2003). Wildlife trade was rated as a priority global biodiversity concern (Sutherland et al. 2009) requiring urgent action to manage the future of wild populations. Attitudes, perceptions and actions are not equal. Interpretations of the way in which humans interact with their environment range from extremes of the romanticised ‘noble savage’ (Redford 1991) to the rational exploiter who destroys for short-term gain in “tragedy of the commons” (Hardin, 1968). Conservation science is interdisciplinary and considers a variety of disciplines ranging from biology, anthropology, ethno-biology, politics, sociology, economics, geography and psychology.
Economic and social factors drive demand and supply, yet there are significant knowledge gaps in understanding socio-economic aspects (TRAFFIC 2008), reflected in reviewed literature with most published work focussed on quantitative assessments, trade volumes, regions, species’ types and harvest quotas. Trade assessments are essential to feed into policy and decision-making institutions such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) but does not answer issues directly related to human behaviour. Research on supply chains and the actors involved has focussed primarily on hunters/harvesters but not on traders; the ‘middle-men’ between suppliers and consumers. There is limited understanding of the economic and social drivers of trade. A complex array of socio-economic factors shape people’s participation in wildlife trade as harvesters, wholesales, and retailers (Rao and McGowan, 2002). Conservation actions are ultimately human behaviours, hence it is vital to understand how social factors such as cultural beliefs and values, laws, policies and demographics, shape human interactions with the environment and choices to exploit or conserve biodiversity (Mascia et al. 2003).

Indonesian trade involves protected, threatened and rare species, and little is known about their wild populations. Continuing, uncontrolled trade will have a negative impact on its survival. Currently, there does not seem to be a consistent approach or correlation between Red List and CITES Appendix listings. The research focused on 12 focal Indonesian species, 7 bird, 3 reptile and 2 mammal species, (Table 1.1), some which are nationally protected and listed as CITES Appendix I or II as well as Critically Endangered (CR) or Endangered (E) in the Red List, yet are still widely and illegally available for sale. In addition to analysing traders’ perceptions and attitudes, I will also critique current wildlife trade regulatory mechanisms to highlight issues and possible solutions for national and international legislation.
1.1 Aims and Objectives

The aim of this research was to analyse market trends and socio-economic and socio-cultural variables for the growing live, exotic pet-trade at Indonesian markets. It focuses on assessing traders’ attitudes, perceptions and behaviour to integrate social-science perspectives towards sustainable wildlife trade solutions and long-term behavioural change. This study is aimed to bridge the existing knowledge gap and develop solutions and recommendations for social interventions and policy enforcement. This study takes place at 6 local Indonesian markets in Jakarta, Java and Denpasar, Bali with 12 focal species as indicators (Table 1.2).

The following objectives are addressed:

- Describe the socio-economic profile of Indonesian traders, their perceptions, attitudes and actions to wildlife trade
- Assess cultural, spatial and temporal trends of the live pet trade for 12 focal species
- Review price and buying trends (Willingness to Pay) to assess whether rarity influences trade dynamics
- Does a provision of alternative livelihoods influence traders’ decision to stop trading? (Willingness to Accept)
- Evaluate whether captive-breeding is a sustainable conservation tool
- Evaluate attitudes and awareness towards zoonosis
- Describe the loopholes between international and national institutions and Indonesian wildlife trade policy and regulations.
<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Local Name</th>
<th>Indonesian Origin</th>
<th>Indonesian Species Status</th>
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<th>Red List</th>
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<td>Pycnonotus zeylanicus</td>
<td>Cucak Rawa</td>
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<td>Gracula religiosa</td>
<td>Beo</td>
<td>Sumatra</td>
<td>Not protected</td>
<td>Appendix II</td>
<td>LC</td>
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<td>Sumatran Laughingthrush</td>
<td>Garrulax leucolophus</td>
<td>Poksai Sumatra</td>
<td>Sumatra</td>
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<td>Not listed</td>
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<td>Cacatua goffiniana</td>
<td>Kakatua Goffini</td>
<td>Tanimbar</td>
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<td>Appendix I</td>
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<td>Black-capped Lorrikeet</td>
<td>Loriculus lory</td>
<td>Nuri Kepala Hitam</td>
<td>Papua</td>
<td>Protected</td>
<td>Appendix II</td>
<td>LC</td>
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<td>White-rumped Shama</td>
<td>Copsychus malabaricus</td>
<td>Murai Batu</td>
<td>Sumatra and Kalimantan</td>
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<td>Not listed</td>
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<td>Acridotheles melanopterus</td>
<td>Jalak Putih</td>
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<td>Tokay Gecko</td>
<td>Gekko gecko</td>
<td>Tokek</td>
<td>Throughout</td>
<td>Not protected</td>
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<td>Radiated Tortoise</td>
<td>Astrochelys radiata</td>
<td></td>
<td>Madagascar</td>
<td>Imported</td>
<td>Appendix I</td>
<td>CR</td>
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<td>Pig-nosed turtle</td>
<td>Carettchelys insculpta</td>
<td>Kura-kura Mancung babi</td>
<td>Papua</td>
<td>Protected</td>
<td>Appendix III</td>
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<td>Slow loris</td>
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<td>Javan Slow loris</td>
<td>Nycticebus coucang</td>
<td>Kukang / Malu-malu</td>
<td>Sumatra</td>
<td>Protected</td>
<td>Appendix I</td>
<td>VU</td>
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<tr>
<td></td>
<td>Nycticebus javanicus</td>
<td></td>
<td>Java</td>
<td></td>
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<tr>
<td>Large Flying Fox</td>
<td>Pteropus vampyrus</td>
<td>Kelelawar</td>
<td>Sumatra, Java</td>
<td>Not protected</td>
<td>Appendix II</td>
<td>NT</td>
</tr>
</tbody>
</table>

Table 1.1 List of focal species and their conservation status
<table>
<thead>
<tr>
<th>Bird Species</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straw-headed Bulbul</td>
<td>Large Bulbul with loud, rich melodious song.</td>
</tr>
<tr>
<td><strong>Distribution:</strong> Peninsular Thailand to Indonesia (Sumatra, Java and Kalimantan). Believed to be extinct in Thailand, Java and Sumatra. Decreasing population - Exploited for the cage-bird trade.</td>
<td></td>
</tr>
<tr>
<td><strong>Photo credit:</strong> Marvin Guah</td>
<td></td>
</tr>
<tr>
<td>White-rumped Shama</td>
<td>Long black tail with white outer feathers. Value of the bird is based on physical appearance and song capability. Birds with longer tails fetch a higher price. Decreasing population - Exploited for the cage-bird trade</td>
</tr>
<tr>
<td><strong>Male White-rumped Shama</strong></td>
<td><strong>Photo credit:</strong> Lee Kip Yang</td>
</tr>
<tr>
<td>Hill Mynah</td>
<td><strong>Distribution:</strong> Large range throughout Southeast Asia Known for its mimicking ability including human speech. Decreasing population due to the pet trade.</td>
</tr>
<tr>
<td><strong>Photo credit:</strong> Wikipedia</td>
<td></td>
</tr>
<tr>
<td>Black-winged Starling</td>
<td>White body with black wings and tail.</td>
</tr>
<tr>
<td><strong>Distribution:</strong> Endemic to islands of Java and Bali. Rapid decline due to overexploitation for bird trade - rare and difficult to find.</td>
<td></td>
</tr>
<tr>
<td><strong>Photo credit:</strong> GraceandBradley.blogspot.com</td>
<td></td>
</tr>
<tr>
<td>Sumatran Laughingthrush</td>
<td>Old World Babbler <strong>Distribution:</strong> Endemic to highland forests of Sumatra. Rapid decline due to over-exploitation for bird trade - rare and hard to find.</td>
</tr>
<tr>
<td><strong>Photo credit:</strong> Andrew Owen</td>
<td></td>
</tr>
<tr>
<td>Black-capped Lorikeet</td>
<td>Colourful lorikeet with black cap. <strong>Distribution:</strong> West Papua, Indonesia and Papua New Guinea Traded for the live exotic pet trade</td>
</tr>
<tr>
<td><strong>Photo credit:</strong> Chris Shepherd/ TRAFFIC SEA</td>
<td></td>
</tr>
<tr>
<td>Tanimbar Cockatoo</td>
<td>Crested cockatoo covered with salmon or pink coloured feathers. <strong>Distribution:</strong> Small range restricted to the Tanimbar Islands in Indonesia. Rapid decline due to habitat loss and trapping for the bird trade.</td>
</tr>
<tr>
<td><strong>Photo credit:</strong> Flickr.com</td>
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<tr>
<td>Reptile species</td>
<td>Description</td>
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<tr>
<td>Pig-nosed Turtle</td>
<td>Species of turtle native to freshwater lagoons and rivers with a nose like a pig. Carapace (upper shell) covered with leather. Distribution: West Papua (Indonesia), Papua New Guinea and Northern Territories (Australia) Photo credit: Jennifer Croes</td>
</tr>
<tr>
<td>Radiated Tortoise</td>
<td>Black rays of a star pattern form fan-like design on about one quarter of the scute (scale). Traded in the exotic live trade. Distribution: Madagascar; introduced to Mauritius; Reunion Photo credit: TRAFFIC SEA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mammal species</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Loris</td>
<td>Nocturnal primate with characteristic face masks, forward-facing eyes and human-like hands with an opposable thumb and a venomous bite. Distribution: Found throughout Southeast Asia and protected in range countries and listed in CITES Appendix I. There are five species which make up the genus Nycticebus. Heavily traded for the live, exotic pet trade, food or traditional medicine. Photo credit: WWF Malaysia / M. Kavanagh</td>
</tr>
<tr>
<td>Large Flying Fox</td>
<td>Old World Fruit Bat – largest bats in the world with a wingspan of 1.5 metres, but do not possess echolocation. Distribution: Malay Peninsula, Philippines and Indonesia. Found in mangrove forests and coconut groves. Threatened with extinction due to overharvesting for food consumption believed to cure asthma. Photo credit: Wikipedia</td>
</tr>
</tbody>
</table>
2. Background

2.1 Wildlife Trade in Southeast Asia

Southeast Asia is the hub for international wildlife trade, as a key consumer and supplier (TRAFFIC, 2008) with the industry fuelled by globalisation and increased economic prosperity. The region supplies local and global markets involving many actors across its entire supply chain ranging from rural harvesters, professional hunters, traders at several points along the supply chain and final consumers (World Bank 2008). In Indonesia, habitat is quickly disappearing across the archipelago especially in Sumatra, Kalimantan and Papua opening up previously remote areas granting easier access for hunters and poachers, facilitating the unmanaged wildlife trade. Commercial hunting derived through the influence of colonisation created a market demand other than subsistence hunting (Hardin 1969) with severe consequences. The increasing demand for many species has depleted wild populations, indicating a loss of commercially valuable biodiversity in the region due to trade and overexploitation (World Bank 2008). Many are recognised and listed as critically endangered under IUCN Red-List of Threatened Species and endemic to Southeast Asia. Consumption of wild-caught fauna and flora for medicinal benefit is a major driver of wildlife trade with China being the world’s largest importer of wildlife products for food or Traditional Chinese Medicine (TCM). Affluence in the emerging middle-class, especially in China, is a strong driver of illegal wildlife trade. China’s exponential economic growth, particularly in the Southern provinces is unprecedented in magnitude.

2.2 Profile of Indonesia

Indonesia is an archipelago of 17,508 islands divided into 33 provinces (Fig 2.1). It is the fourth most populous country with a population of 248.2 million people (CIA, 2012) of which 241 million reside on the islands of Java and Bali. Jakarta is the capital city and the focus of this research. With a turbulent history of colonisation by the Dutch and Japanese, Indonesia gained independence on 17 August 1945. The country is comprised of a number of ethnic groups, each with a distinct dialect and culture. However, even with such diversity a shared identity was developed with the motto “Bhinneka Tunggal Ika” (Unity in Diversity) and implementation of a national language, Bahasa Indonesia.
The major ethnic groups are Javanese (40.6%), Sundanese (15%) and Madurese (3.3%)-(Indonesian Census Statistics 2011). Despite its large population and densely populated regions, Indonesia has vast areas of wilderness containing 40% Southeast Asia’s forests with a high level of biodiversity. However these habitats, home to a variety of endemic species are rapidly being logged and converted into monoculture plantations such as palm oil, causing a massive decline in species’ abundance. The illegal trade of protected species continues to flourish across Indonesia’s archipelago, pushing numerous species towards extinction, threatening biodiversity with the potential of causing an “empty forest syndrome”- the defaunation of tropical forests as coined by Redford (1992). Forests, a perfect habitat for species, stand empty and quiet because the areas have been drained by hunting for bush meat, traditional medicine, pet trade, and trophies (Bennet 2009). Such drastic changes in species interactions, has cascading effects throughout the remainder of the biota.

Figure 2.1 Map of Indonesia  Source: UNEP
2.3 Historical and cultural significance of bird-keeping in Indonesia

Bird-keeping is an Asian tradition that plays a significant role in people’s lives and religion. The Chinese have always been fond of birds and its symbolism as depicted in paintings, literature and poetry. Songbirds were prized among senior officials of the Emperor Court in Peking (Beijing) during the Ching dynasty-AD 1644-1911 (Layton 1991). Bird-keeping is firmly entrenched in Indonesian culture and tradition and are kept for their song, beauty and social status. Ownership of rare and protected species is a popular way of showing that one is sufficiently important and powerful and immune from prosecution (Nash, 1993). In traditional Javanese culture, a caged bird symbolises status and bird-keeping and bird singing contests are part of the cultural identity. Competition songbirds are called ‘kicauan’ with ‘kicau-mania’ (bird-idol competitions) a cultural phenomenon (Jepson and Ladle, 2011). Birds are the most popular pet within urban household, threatening the long-term survival of many songbird species, especially on the islands of Java and Bali (Jepson and Ladle 2009). The demand for Bali Mynahs (Leucopsar Rothshildi) as a status symbol for wealthy Indonesians left only six birds left in the wild (Croes, unpublished 2007).

Indonesia’s national emblem is the Garuda, a mythical golden eagle, symbolising strength and power (Fig. 2.2). It was inspired by the Elang Jawa or Javan Hawk-eagle (Spizaetus bartelsi), an endangered, endemic raptor of Java. The feathers of the Garuda are arranged to represent the date of 17 August 1945, Independence Day. The Javan Hawk-eagle was declared as the national bird of Indonesia by Presidential decrees, giving this rare, endangered species very high protection.

Figure 2.2 Indonesia’s national emblem - “Garuda”
2.4 Indonesian Bird and Pet Trade

Southeast Asia is particularly rich in bird species with approximately 2,400 species recorded so far. Birdlife International (2012) recognises 38 Endemic Bird Areas (EBAs) in Indonesia with 117 globally threatened birds. Indonesia’s diverse avifauna is a reflection of the country’s tropical latitude and its location between the Asian and Australian landmasses where Asian species populate the Greater Sunda islands, (Sumatra, Java, Bali and Borneo) and the Australasian species dominate in West Papua. The transitional region known as Wallacea, Sulawesi, the Moluccas, Sumba, Sumbawa and Flores) contain a unique mixture of fauna from both Asia and Australia (Fig 2.3)

![Figure 2.3 Indonesia regional landmasses](image)

The international bird pet-trade is the most immediate threat (WCS Policy report No. 2) to wild populations with Passerines (finches and songbirds) and Psittacines (parrots, macaws, cockatoos and parakeets) heavily traded. Animals are perceived as ‘free for the taking’ with little incentive for long-term sustainability. If a species is on the verge of local extinction, hunters may relocate to another area and focus on another species until that yield declines. Indonesian domestic trade exceeds exports making it the most active trader of its own species in Southeast Asia (Nash, 1993). Imports also form part of the domestic trade with a wide availability of Chinese and other imported birds indicating a continuous, transient movement of imported birds within the country (Nash, 1993). A considerable number of non-CITES species are exported as well as imported into Indonesia, which is interesting considering the extent of its own avifauna.
2.5 Regulation and Enforcement

2.5.1 CITES
The trade in wild plants, animals and their parts and derivatives is big business with most of the trade illegal and regulatory mechanisms have been questioned. Command and control measures aimed at tightening laws, regulations, enforcement and penalties are not enough (TRAFFIC 2008). Sustainable resource management and market-based incentive schemes have an opportunity to make a difference. CITES is responsible for regulating international trade in endangered wild fauna and flora to ensure it does not threaten the survival of the species (CITES 2012). Trade is regulated by classifying species into three categories (Table 2.1). The number of species covered by CITES is small relative to the overall number of species traded. Trade data is indicative rather than actual and illegal trade is not documented. CITES is restricted to international trade regulation and cannot stop hunting, trade or consumption within a country. TRAFFIC (Trade Records Analysis of Flora and Fauna in Commerce) was created in 1976 to gather and analyse wildlife trade data to monitor trade, assess trends to inform policy and enforcement along the spectrum of the wildlife trade chain. Most wildlife trade is within national borders, out of the scope of international CITES regulation. Indonesia is one of the signatories to CITES ratified in 1978.

Table 2.1 CITES Appendices definitions

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Description</th>
<th>Number of listed species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix I</td>
<td>Species threatened with extinction International trade completely banned</td>
<td>900</td>
</tr>
<tr>
<td>Appendix II</td>
<td>• Species that could become threatened if trade is not strictly regulated</td>
<td>33,790</td>
</tr>
<tr>
<td></td>
<td>• Commercial trade allowed with export permit from the country of origin.</td>
<td></td>
</tr>
<tr>
<td>Appendix III</td>
<td>Species protected by the state that nominate them and which is seeking assistance of other parties to control trade.</td>
<td></td>
</tr>
<tr>
<td>Appendix IV</td>
<td>Non-detriment Findings</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: CITES website 2012
2.5.2 Indonesian Conservation Act (No. 5)
Indonesia passed the Act of the Republic of Indonesia on Conservation of Living Resources and Ecosystems in 1990, also known as the Conservation Act (no. 5), which is the legal binding authority for the management and conservation of wildlife for protected species only (Edwards and Jenkins 1993). Indonesia has little control of its trade throughout its 17,508 islands. Although harvest quotas also apply to domestic trade with a zero quota for protected species, national controls are ignored or easily circumvented through corruption and bribery, with the trade largely unregulated and poorly documented. Article 20 of the Conservation act renders that “...all plants and animals are listed as protected or unprotected”, recognising 70 mammal, 70 bird and 30 reptile species as protected (Government regulation 1999 republic No.7 - Preserving species of plants and animals). Enforcement efforts are hampered by ambiguous laws, lenient penalties and limited species’ identification training. Hunting is legal except for protected species or within Protected Areas (PA). Outside PAs, the laws are unclear, even for protected species (Edwards and Jenkins 1993). Vagueness results in wide interpretation of rules and regulations. Intentional trade in protected species is liable to punishment by imprisonment for a maximum of five years and a fine of up to Rp 100,000,000 (USD $10,000). Trade in protected species through negligence is liable to one year’s imprisonment. Institutions dealing with wildlife trade in Indonesia outlined in Table 2.2.

Table 2.2 Indonesian wildlife trade authorities

<table>
<thead>
<tr>
<th>Institution</th>
<th>Objective</th>
</tr>
</thead>
</table>
| BKSDA | National Resources Conservation Agency  
Balai Konservasi Sumber Daya Alam  
Set annual harvest quota |
| IFFTA | Wildlife trade authority  
Indonesian Fauna and Flora Traders Association  
- Conserve Indonesian wild fauna and flora based on sustainable utilisation  
- Enhance ‘added value’ of wild species by further development of the wildlife industry  
- Utilise wildlife to maximise the welfare of Indonesia’s people |
| LIPI | Indonesian Institute of Science Research - Scientific authority – review harvest quota levels  
Lembaga Ilmu Pengetahuan Indonesia |
| PHKA | Directorate General of Forest Protection & Nature Conservation  
Perlindungan Hutan dan Konservasi Alam  
CITES Management authority |
2.5.3 Harvest Quotas
Harvest quotas for non-protected species are issued by PHKA and adjusted annually with input from LIPI and IFFTA. Quota systems are ineffective as Indonesian export quotas regularly exceed harvest quotas, yet these are typically increased the following year. Non-quota species are harvested without limits. In 1982, Indonesia adopted a policy to encourage captive-breeding of species listed as protected. I have interpreted the ambiguity and duplication of Indonesian regulatory bodies in the below schematic (Fig 2.4) from my understanding of the current issues concerning sustainable harvesting to meet CITES Appendix IV obligation of Non-Detriment Findings (NDF).

Indonesian Harvest Quotas process flow to establish Non-detriment findings

Fig 2.4 Indonesian Harvest Quota process flow (study results interpretation)
2.6 Wildlife markets in Indonesia

Nearly every city in Indonesia, particularly Java and to a lesser extent Sumatra and Bali has a bird market. In Java alone, there are around 70 bird markets (ProFauna, 2009) but they don’t just sell birds. The markets sell everything; legal and illegal, behind the façade of the bird trade. The easiest and most extroverted form of trade is at these markets, especially at Pramuka, considered to be the largest live animal market in Southeast Asia, where anything can be found for sale; you just need to ask. The markets vary in size, from small pop-up markets surrounding shopping centres to large, multi-storey buildings selling an array of wildlife. Markets sell live, exotic animals for the hobby and pet trade as well as consumption and Traditional Medicine. The locations of these also vary, catering to different target audience. Some markets contain permanent stalls with long-term traders whilst others sell based on opportunistic trade availability – setting up a small pop-up “shop” to sell opportunistic trade such as civet cats, macaques, fruit bats or pythons alongside dogs, cats and rabbits. This has the potential for a real threat to human public health as many dangerous infections have their origins in wild birds and mammals (Weiss 2001).
3. Methods

“Fieldwork is an intensely personal experience and the quality of that experience is often as important for the final analysis as the data which are gathered” (H. Russell Bernard)

3.1 Study Sites:
Data was collected at 6 of Indonesia’s largest bird market at various locations in Jakarta and Bali including, Jatinegara, Pramuka, Barito, Kartini, Satria and Sesetan (Fig 3.1; Table 3.1) between May and July 2012 with time spent at the TRAFFIC Southeast Asia office based at Petaling Jaya, Malaysia.

Figure 3.1 Market locations in Jakarta, Java and Denpasar, Bali
Table 3.1 Study site locations and description

<table>
<thead>
<tr>
<th>Market</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pramuka</td>
<td>East Jakarta</td>
<td>Largest bird market in Indonesia with over 200 stalls. Networks with other markets throughout Indonesia.</td>
</tr>
<tr>
<td>Jatinegara</td>
<td>East Jakarta</td>
<td>Notorious for wildlife crime syndicates selling protected species.</td>
</tr>
<tr>
<td>Barito</td>
<td>Exclusive, rich part of South Jakarta</td>
<td>Small market with around 30 stalls selling all kinds of animals.</td>
</tr>
<tr>
<td>Kartini</td>
<td>North Jakarta. Located close to Chinatown and turtle consumption markets</td>
<td>Selling all kinds of fish and reptiles, especially endangered, protected turtles</td>
</tr>
<tr>
<td>Satria</td>
<td>Denpasar, Bali</td>
<td>Medium market with around 50 stalls selling birds, mammals, fish and reptiles</td>
</tr>
<tr>
<td>Sesetan</td>
<td>Denpasar, Bali</td>
<td>Small market with around 20 stalls only selling birds.</td>
</tr>
</tbody>
</table>

Note: An extra market was added to the sample size (Sesetan). A number of other ‘pop-up’ markets like Thamrin and Kreneng were found, selling live animals as well as animal parts and derivatives but these were not added to the sample.

3.2 Data Collection

Four main methods were used to gather the information;
- Literature review
- Social surveying through semi-structured interviews
- Direct observation
- Key informant interviews

3.2.1 Literature Review:

Preparation of the research design was commenced with an extensive literature review of empirical data of previous wildlife trade research in Southeast Asia, particularly Indonesia. Literature review included books, journal articles and papers, working papers, policy reports and other unpublished material, however there were very few studies from a social-science perspective to uncover key drivers for long-term behaviour change. I looked at the cultural significance of bird-keeping and bird-singing contests in Indonesia, trade and species’ trends and regulation and policy. This enabled the development of a valid, qualitative and quantitative social survey aimed at Indonesian wildlife market traders to frame my own research questions. I also attended a wildlife crime conference held at the Jill Dando institute on 17 April, 2012.
3.2.2 Questionnaire

“The difficulty in most scientific work lies in framing the questions rather than finding the answers” A.E. Boycott 1928

The questionnaire was composed of 30 questions to obtain information for the key research hypotheses through informal, face to face semi-structured interviews with a targeted audience - purposive sampling (Milner-Gulland and Rowcliffe, 2007). The majority of the questions were close-ended with a set list of answers provided, for easier and standardised analysis, complemented by some open-ended questions to get a personal opinion from the traders. This research required specific targeted data due to time and the nature of this research therefore the questions had to be carefully considered to enable gathering information on quantifiable variables such as demographics, personal perceptions on trade and price trends to compare the responses and look at patterns. Social survey research methods were applied as described in De Vaus (2002) and Newing (2011). I compiled and translated the questionnaire in Bahasa Indonesia.

3.2.3 Pilot Study

The questionnaire was prepared and reviewed in the UK with the intention to pilot at markets in Malaysia with TRAFFIC staff. Malaysia however, does not have open wildlife markets like other parts of Southeast Asia. Instead, the questionnaire was tested on experienced TRAFFIC staff to criticise and validate the procedure. I discussed the extent and approach of the questioning with Dr Jennifer Mailey who works at TRACE forensics to obtain advise based on her expertise of interviewing thieves. The questionnaire was field tested at the Barito market as it was considered to be ‘safest’ environment. Certain words elicited a negative reaction such as wildlife (satwa liar) which had to be rephrased to animals (binatang). The word protected (dilindungi) also got tentative response with traders appearing anxious and uncomfortable. Upon testing, the question to gauge whether species were protected was omitted from further interviews to ensure that no suspicion was raised and research could continue. Based on these findings, the survey was shortened and questions revised to avoid sensitivity.
3.2.4 Sampling Strategy

I was prepared for a relative small and selected sample size due to time constraints and the nature of this research. The target sample size was 25 traders (at least 5 individual traders at 5 markets) selling one or more of the focal species, to gather enough comparable data to provide an accurate understanding of the issues being analysed in the study population. As 7 of the 12 focal species were birds, it was expected that it would be relatively easy to meet the set survey sample size, however there were not as many traders selling the focal songbird, mammal and reptile species. 21 traders were interviewed instead of the targeted of 25 (Table 3.2).

Table 3.2 Study sample size

<table>
<thead>
<tr>
<th>City</th>
<th>Market name</th>
<th>Survey sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jakarta</td>
<td>Pramuka</td>
<td>4</td>
</tr>
<tr>
<td>Jakarta</td>
<td>Jatinegara</td>
<td>7</td>
</tr>
<tr>
<td>Jakarta</td>
<td>Barito</td>
<td>4</td>
</tr>
<tr>
<td>Jakarta</td>
<td>Kartini</td>
<td>1</td>
</tr>
<tr>
<td>Bali</td>
<td>Satria</td>
<td>4</td>
</tr>
<tr>
<td>Bali</td>
<td>Sesetan</td>
<td>1</td>
</tr>
</tbody>
</table>

3.2.5 Reconnaissance of the Bird Markets

I performed a reconnaissance of each market, prior to interviewing, to scope out the environment, situation and presence of the focal species. This enabled seeking out traders who sold the focal species as a point of reference and targeting them in the next visit for interviewing. During this time, I acted as an ordinary, unaware tourist, openly taking photos of everything as I was advised that once you start interviewing, traders are more reluctant to allow photos for fear of prosecution. During this time safety concerns arose and I requested assistance from the Jakarta Animal Aid Network (JAAN), a Jakarta based NGO who work in wildlife trade throughout Indonesia, to accompany me in the interview process.
3.2.6 Semi-Structured Interviews and direct observations
Once familiar with the layout of the markets and the situation interviews took place generally 5-7 days after the reconnaissance. Targeted traders were approached to conduct open and honest (not undercover), face-to-face, semi structured interviews. This was backed up by direct observation to analyse species’ availability, animal welfare conditions and general market environment. To approach the targeted traders, I told them I was personally interested in bird-keeping as a hobby and wanted to learn about their lives as traders. This piqued their interest as it was not threatening and acted as an ice-breaker to get them talking. Once a rapport was build the interview took its natural course. Targeted sampling focusing on traders selling one or more of the focal species, had a snowball effect with some traders recommending I talk to one of their friends/acquaintance.

3.2.7 Ethics
In preparation of the questionnaire, social and cultural contexts were considered to avoid the sensitivities it may arouse. Upon commencement of the interview the research objectives were explained to the traders with a guarantee that the data collected remains anonymous and confidential to obtain their Prior Informed Consent (PIC) (De Vaus, 2002)

3.2.8 Key Informant Interviews
Detailed information such as supply chain trade routes, harvesting techniques, protected species, legislation and enforcement were discussed with key informants. I contacted experts in their field considered to be particularly knowledgeable about wildlife trade in Jakarta and throughout Indonesia. These face-to-face meetings were conducted as semi-structured interviews to allow them to have a say following by probing to gain further knowledge. This expert knowledge was one of the richest sources of information about wildlife trade at Indonesia’s markets. It unveiled answers to questions too sensitive for traders. The selected informants were carefully selected based on their experience in wildlife trade in Indonesia, especially in Jakarta and Bali, as well as their knowledge and awareness of legislation around this subject. The informants were from WCS Wildlife Crime Unit Indonesia, ProFauna, independent consultant and the Jakarta Animal Aid Network (JAAN).
3.2.9 Constraints and Data limitations
Some data constraints are due to the sample size obtained as there was a limited availability of traders selling one or more of the focal species. In hindsight, the research could have been more general to approach more traders to increase the sample size and make the data more representative. Considering time constraints, this research focussed on Jakarta (and Bali) as this is the main hub for all wildlife trade, yet other locations throughout Indonesia may uncover different trends and profiles. Traders are very clued up and suspicious and it was not the safest environment to be conducting lone research. On-the-ground support as discussed in preparation never eventuated and this resulted in loss of data-collection time. All traders selling CITES Appendix I and II listed protected species such as slow lorises, all refused to participate, indicating their awareness of illegal trade activities. The time constraint was a major factor as it takes time to conduct social research to build a rapport and gain trust with the wildlife traders (Fig 2.3).
4. Results

The results are divided into the following two sections, 1) demographic and socio-economic profile of Indonesian wildlife traders and 2) market trends (demand and supply).

4.1 Socio-economic profile of Indonesian traders

4.1.1 Gender and age

Males dominate both from a selling and buying perspective. Based on the survey, wildlife trade at Indonesia’s bird markets is very much gender-based with men dominating trading roles with 20 of the respondents (n=21) being male, and only one female trader across the 6 markets. From observation, males were dominant in all trading roles, from live pets, selling cages and bird-feed with the occasional female selling bird-feed. Across the six markets, 15 respondents have been trading for more than 10 years. The mean age of traders is 43 years old. Barito and Pramuka appeared to have an older generation of males trading with 8 traders in the 50+ category. Two traders at Barito (63 and 70 years old) had traded for over thirty years and became involved as a means income as there were no other opportunities available. Seven traders in the 31-40 age category were mainly located at Jatinegara. There is an emerging trend of younger traders entering the scene (6 traders under thirty years old) which was more common at Balinese markets like Satria, than Jakarta.

4.1.2 Ethnic Origin

Transmigration (Transmigrasi) was an initiative to move people from populated areas like Java to less populous areas such as Papua, Kalimantan and Sumatra. The program has been controversial due to the concern of the spread of Islam and “Javanisation” across the country. I surveyed traders’ ethnic origins to evaluate whether ethnicity and regional cultural values play a significant role influencing trader’s perceptions, attitude and behaviours. 18/21 traders were of Javanese origin which may be associated with the tradition of bird-keeping originating from Java and where live-animal trade is the most significant and profitable. Four of the Javanese traders were from the capital city, Jakarta and have lived there all their lives. Three traders were from Madura, an island, north-east of Java. Madura is one of the poorest regions and traders moved to more profitable and
economically viable areas like Bali, to make a living. Other ethnic groups, particularly the Javanese, also moved to Bali as it is perceived to be easier to set up ‘shop’. Only one trader was from Sumatra, who moved to Jakarta during Indonesia’s economic decline after the fall of the Suharto regime in the 90’s and has been trading reptiles at Kartini for over ten years.

4.1.3 Motivational Drivers
Money was expected to be the key motivational driver for getting involved in wildlife trade. A third of the traders stated cash income as their main reason however 6 traders reported getting involved to pursue their hobby for bird-keeping (Fig4.1). This may be associated with the cultural significance of bird-keeping and bird-singing contests in Indonesia, “It's my interest and I earn money from something I enjoy” (age 32 from Pramuka market). Three traders followed into their family's footsteps to continue the traditional family business, now in its third generation of trade. Older respondents stated “It's becoming more difficult to sell and make money” (age 70 from Barito market).

![Motivational Drivers](imageURL)

Fig 4.1 Motivational drivers for becoming a trader
4.1.4 Alternative livelihoods
All respondents rely on wildlife trade as their sole source of income. Thirteen traders would continue wildlife trading with the majority located at Jatinegara market. The results were influenced by the markets at which they operate. A respondent at Satria market commenced trading in the family business when he was 13 years old, however completed his high-school studies, whilst one trader at Barito market commented, that given the opportunity, would opt to continue his studies and exit the trade. The turtle trader at Kartini would stop trading if provided with an alternative livelihood to support his family. Seven traders citing income as their driver, consider wildlife trade as their only livelihood option due to limited education levels.

Continue the family business?
All respondents stated they would not want their children to continue trading, especially if they had daughters. All aspire for better opportunities for their children to continue their studies, complete University and choose a different career path “My children want to become doctors or police”. Some traders in the business for over thirty years, have children who have subsequently set-up their own stalls, however, would not want their grandchildren to follow in their footsteps.

4.1.5 Education & Conservation Awareness
Eight traders completed primary school (Sekolah Dasar), 3 middle-school (Sekolah Menengah Pertama) and 8 senior-high school (Sekolah Menengah Atas). Two respondents attended University and appeared to be the most articulate and aware of Indonesia’s environmental issues and national and international trade legislation. They also successfully export overseas with one trader selling huge volumes of tokay geckos beyond quota levels (2 million a year), and the other selling protected, pig-nosed turtles and other endangered turtle species. Traders were asked which environmental issues concern them the most to understand their level of awareness and connection to nature. The majority (9 traders) replied "I don't know" and did not seem to understand what environmental issues were or the conservation impact of wildlife trade. They said that their priority is to earn money to put food on the table and send their kids to school. Those that did answer rated Pollution, especially in Jakarta, natural disasters like volcano
eruptions in Java and tsunamis like the one that hit Indonesia in 2004, as a concern for the future. Pollution was defined as air-pollution caused by traffic congestion in Jakarta. The five respondents reporting Habitat loss and Species' extinction were more educated having completed high school and University and had concerns for long-term sustainability of wild populations. One trader expressed concern for deforestation and habitat loss as it directly impacts wildlife, and stated that the government needs to take action. General awareness of climate change, habitat loss and natural disasters was low as expected considering the limited education provided around these topics at schools.

“Palm oil is real problem as animals are getting killed and therefore harder to find”
(age 52 from Pramuka market)

To validate their perceptions of wildlife trade and its conservation impact, I asked “How do you see the future for wildlife in Indonesia?”. This was an open-ended question and generated a wide response. Responses were grouped into – Concerned, Not Concerned, I don’t Know and No Answer. Eight traders expressed Concerned about species’ extinction– “Animals will become more ‘rare’ as there will be fewer of them” (age 63 from Jatinegara market). One trader was concerned about the wild population of Tokay geckos and the impact on his business and suggested that sustainable harvesting should be implemented to avoid captive-breeding. It was encouraging that some traders understood the long-term impact of hunting on wildlife trade. A young trader aptly summarised the future of wildlife in Indonesia without any intervention “All Gone!” (age 23 from Satria market).“I think the future is critical for Indonesia's wildlife” (Man, aged 70 from Barito market). Four traders were Not Concerned and assume there is an infinite supply of animals; “Animals will always be around - there is no shortage of supply” (Man, aged 39 from Jatinegara market). Most of these non-concerned traders buy their stock from markets like Pramuka which has a constant supply of animals. They believe that captive-breeding can substitute depleted wild-populations in the future. Seven traders did not want to answer and two did not understand the question. “It’s time to change the perception of the role that animals play in Indonesian culture” (WCS informant)
4.2 Demand Trends

4.2.1 Rarity and price trends

Based on a number of factors, the majority (11/21) believe that trade volume has decreased. A trader at Barito, trading for 35 years said that he has seen a “huge change in the market”. Four respondents believe trade has increased and six said it is the same as before. The general feedback is that the number of traders has diminished and that a changing Indonesian economy has affected customer purchasing power. 14 respondents expressed that it is getting difficult to find the animals in demand, particularly Straw-headed Bulbuls, Sumatran Laughingthrushes, Black-winged starlings and White-rumped Shamas. “It is becoming more difficult to trade and there used to a much larger variety of bird species” (Man, aged 58 from Barito market). This change in trade occurred about a decade ago, at the same time as the global bird-flu pandemic. There is a general perception that animals are getting more difficult to find in the wild and a number of traders quoted “the rarer the species, the higher the price”. I observed a lot of domestic pets such as rabbits, dogs and cats at suggesting substitution for wildlife. There is an increasing demand for Tokay geckos and large fruit bats for traditional medicine.

Rarity is a big selling point and there is an emerging trend to sell endangered species, such as the slow loris for magical powers as this renders them “untouchable” (Key informant). Traders, especially wildlife-crime syndicates at Jatinegara, are fully aware of the next ‘hot ticket item’ and are informed about CITES, IUCN Red List and national protected species and use identification guidebooks to lure customers into buying a ‘precious’ animal (Key informants). Fifteen traders reported that prices have increased dramatically. Ten years ago, Tokay geckos cost Rp 10,000 (approx.USD $1), now the average price now is USD $9.20 (Table 4.1). 18/21 traders sold more than 50 animals in one year, however this question needed a bigger differentiation of volumes as it appeared that that the turnover of sales is huge with bird traders able to sell more than 50 birds daily, particularly captive-bred species such as canaries and lovebirds.
Table 4.1 Average price per Focal Species

<table>
<thead>
<tr>
<th>Species</th>
<th>Mean (in USD$)</th>
<th>Sample Size (n)</th>
<th>Range (USD$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawheaded bulbul</td>
<td>$770.71</td>
<td>6</td>
<td>$210.19 - $1,576.45</td>
</tr>
<tr>
<td>Hill Mynah</td>
<td>$208.76</td>
<td>11</td>
<td>$26.27 - $578.03</td>
</tr>
<tr>
<td>Sumatran laughingthrush</td>
<td>Not observed</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>Tanimbar cockatoo</td>
<td>Not observed</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>Black-capped Lorikeet</td>
<td>$236.47</td>
<td>2</td>
<td>$157.64 - $315.29</td>
</tr>
<tr>
<td>White-rumped shama</td>
<td>$248.15</td>
<td>9</td>
<td>$78.82 - $630.58</td>
</tr>
<tr>
<td>Black-winged starling</td>
<td>Not observed</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>Tokay gecko</td>
<td>$9.20</td>
<td>2</td>
<td>$7.88 - $10.50</td>
</tr>
<tr>
<td>Radiated tortoise</td>
<td>$367.84</td>
<td>1</td>
<td>$367.84</td>
</tr>
<tr>
<td>Pig-nosed turtle</td>
<td>$315.29</td>
<td>1</td>
<td>$315.29</td>
</tr>
<tr>
<td>Slow loris</td>
<td>No price provided</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>Fruit bat</td>
<td>$12.96</td>
<td>3</td>
<td>$10.50 - $17.86</td>
</tr>
</tbody>
</table>

Figure 4.2 highlights categories of sale to customers. Twelve traders sell to hobbyists or bird-fanciers, 6 for pets; and 1 trader sells to customers for status symbol reasons. Two traders export Tokay geckos for the Traditional Chinese Medicine (TCM) market.

**Fig 4.2 Category of sales; reasons why customers buy**
4.2.2 Bird-flu and the impact on trade
Wildlife trade is a mechanism for disease transmission to humans, as well as livestock, native wildlife populations and the health of eco-systems (Karesh et al 2007). One of my research questions explores traders’ perceptions and awareness of potential emerging infectious diseases (zoonosis) such as bird-flu, to assess whether fear and education could curb demand. Twelve traders believe bird-flu affected business, decreasing customer demand for fear of possible contagion. As aptly put by one trader, “No customers, no demand”. Traders’ perceptions of zoonosis is astounding with most believing bird-flu is a myth which never reached Indonesia’s bird markets and was a way of scaring people.

Results indicated that trade did decrease as the global pandemic influenced customer behaviours however some traders were sceptical and did not believe disease transmission is possible and have a very laissez–faire attitude towards public health. Bird markets such as the study sites for this research, are notorious for housing more than just birds. Based on personal observations, there was no basic sanitation with dead animals co-mingled with live animals or killed on the spot such as the fruit bats for consumption or traditional medicine (jamu) to supposedly cure asthma. Traders were often unaware of dead animals until advised and it was unknown how long they had been dead and possible diseases transmitted to the remaining live animals. There are no sanitary disease control or quarantine regulations, and dead animals were disposed of amongst general rubbish where poor people look for items to recycle or even food, reinforcing the concern of imminent threats to human health.
4.3 Supply Trends

4.3.1 Focal species availability
The 6 markets in this study displayed a diversity of species for sale. All the markets are known as ‘bird markets’, however behind this facade is a diversity of species available for sale to meet the growing demand for the exotic pet-trade market. Trade in Indonesian protected species is vast, and Langurs (*Trachypithecus auratus*), all species of owls (*Strigiformes*) and raptors (*Falconiformes*), White-rumped Shamas and all species of slow-loris were observed. In addition, Southern pig-tailed macaques (*Macaca nemestrina*), leopard cats (*Prionailurus bengalensis*) and Asian palm civets (*Paradoxurus hermaphroditus*) were also widely available. New trends emerge frequently to meet consumer tastes. Whilst CITES is only applicable for international or cross-boundary trade, many CITES-listed species and critically endangered species on the IUCN red-list were often present. Indonesian protected, non-CITES focal species available were Straw-headed Bulbuls, Hill Mynas, Black-capped Lorikeets, Black-winged starling which looks like the CITES Appendix I listed Bali Starling (*Leucopsar Rothshildi*) and tokay geckos. A key informant stated that traders often know the identity of species better than LIPI, BKSDA or customs and trade in protected species using names of unprotected ones on trade permits. Permits are required for capturing, transporting and selling wildlife, yet none of the traders interviewed had a permit to own a stall or sell wildlife. This is known amongst law-enforcers yet nothing is being done to act on this illegal trade. Table 4.2 highlights the presence and absence of focal species observed during this study.
### Table 4.2 Focal Species Presence/Absence at the markets

<table>
<thead>
<tr>
<th>Species</th>
<th>Protected Status</th>
<th>Presence/Absence</th>
<th>Observation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawheaded Bulbul</td>
<td>Not protected</td>
<td>Presence (limited)</td>
<td><strong>Wild-caught.</strong> Locally extinct and relatively absent compared to a decade ago. Currently being imported from China (Shepherd et al 2007)</td>
</tr>
<tr>
<td>Hill Mynah</td>
<td>Not protected</td>
<td>Presence (extensive)</td>
<td><strong>Wild-caught.</strong> Found at every market in large quantities.</td>
</tr>
<tr>
<td>Sumatran Laughingthrush</td>
<td>Not protected</td>
<td>Virtually absent</td>
<td>One sighting across all 6 markets indicative of its population decline in the wild</td>
</tr>
<tr>
<td>Tanimbar Cockatoo</td>
<td>Protected</td>
<td>Absence</td>
<td>Not observed</td>
</tr>
<tr>
<td>Black-capped Lorrikeet</td>
<td>Protected</td>
<td>Presence (limited)</td>
<td><strong>Wild-caught.</strong> Limited sightings.</td>
</tr>
<tr>
<td>White-rumped Shama</td>
<td>Not protected</td>
<td>Presence (extensive)</td>
<td><strong>Wild-caught</strong> with species originating from Sumatra rarer and harder to find, resulting in a much higher price than those from Kalimantan.</td>
</tr>
<tr>
<td>Black-winged Starling</td>
<td>Protected</td>
<td>Absence</td>
<td>Locally extinct, substituted by the White-rumped Shama.</td>
</tr>
<tr>
<td>Tokay Gecko</td>
<td>Not protected</td>
<td>Presence</td>
<td><strong>Wild-caught.</strong> This once accessible reptile is getting difficult to find in the wild. No preference for wild-caught or captive-bred.</td>
</tr>
<tr>
<td>Radiated Tortoise</td>
<td>Imported</td>
<td>Presence</td>
<td><strong>Wild-caught</strong> and imported from Madagascar. Listed under CITES Appendix I yet widely available at Kartini market for the exotic pet trade. I observed one trader (not part of the study) selling &lt;20 individuals</td>
</tr>
<tr>
<td>Pig-nosed turtle</td>
<td>Protected</td>
<td>Presence</td>
<td><strong>Wild-caught</strong> and seen at Kartini.</td>
</tr>
<tr>
<td>Slow loris</td>
<td>Protected</td>
<td>Presence (extensive)</td>
<td><strong>Wild-caught.</strong> Listed under CITES Appendix I and protected under Indonesian law yet readily available at Barito and Jatinegara markets.</td>
</tr>
<tr>
<td>Greater Flying Fox</td>
<td>Not protected</td>
<td>Presence (extensive)</td>
<td><strong>Wild-caught</strong> with a 2012 harvest quota at 245 individuals. These species were widely available at all markets, sold for traditional medicine.</td>
</tr>
</tbody>
</table>
4.3.2 Hotspots of trade and emerging trends
I wanted to assess geographical trends over time to understand changes in regional sources of origin from Sunda, Wallacea or Sahul, and also understand import levels.
Fig 4.5 show the results obtained from the six markets indicate that the majority of focal species still come from Sunda (Sumatra, Kalimantan, Java and Bali). The Sunda region is rapidly getting depleted and I was interested to find out whether a new region, such as Papua (Sahul) is the next hotspot source of origin for trade. I was advised by the key informants that West Papua is already a major exporter of many kinds of wildlife but due to its remoteness to patrol, most of the trade goes under the radar. Papuan customs allow people to carry wildlife freely through airports and seaports and species misidentification is common. To prevent further exploitation, there is an urgency to concentrate on understanding Papuan biodiversity and lobby for protected areas, stop demand and intercept all actors along the supply chain. As wildlife populations plummet, harvests and traders move to another new species to seek new supplies, creating a trend (Key informant). There is an emerging trend for Papuan tree kangaroos retailing for around Rp 6,000,000 (US$ 600) for the exotic pet trade (Key informants).

![Fig 4.5 Regional source of origin break-down](image-url)
4.3.3 Correlation between CITES and IUCN Red List

I wanted to test the correlation between CITES Appendix listings and the Red List status for the 12 focal species (Fig 4.6). The resulting Spearman co-efficient (Rho = 0.484, p= 0.094, d.f.=11) indicate that there was only limited correlation between the two institutions.

**Fig 4.6 Spearman’s Correlation ranking between CITES and IUCN Red List**
4.3.4 Supply chain routes

Based on the interviews, Pramuka is the main receiver and supplier of wildlife stock. Traders at Barito, Jatinegara (Jakarta) and Satria and Sesetan (Bali) obtain their stock from Pramuka (Fig 4.7). Domestic consumers (hobbyists, pet and consumption/traditional medicine) purchase animals from all six markets. Results indicated that only Pramuka and Jatinegara were sources for TM ingredients. If in-demand species are no longer available for sale, they are substituted with any other animal available - opportunistic approach of buying/selling. Details of international and export supply-chain routes were obtained from key informants and can be found in Appendix III.

Figure 4.7 Domestic Supply Chain
4.4 Mortality Rates

I asked about the average rate of mortality through lives lost once animals arrive at the market. Traders did not like this question as it reinforced the message of wastage, with the majority of traders choosing No Answer or I don’t know. Eight traders admitted a lot of animals, such as birds and baby mammals die within 1 week of arrival due to stress, disease and malnutrition and one trader said some can die within 24-hours. Reptiles such as tokay geckos are more resilient and can last up to one month. From personal observation across the markets, particularly at Jatinegara and Pramuka, it was evident that traders do not consider animal welfare or wastage. Animals were kept in dirty and cramped conditions, with no clean water or food. Large flying-foxes were in the worst condition, with up to 15 individuals cramped into small cages followed by mammals and reptiles. Birds however, are highly prized and depending on the rarity of the species, were kept in bigger cages. White-rumped shamas and Straw-headed Bulbuls were particularly highly regarded and usually hung high within the market stall, covered in traditional cloth (batik). Hill Mynas, once highly prized for their mimicking ability are not that fortunate. Those that have the capability of mimicking have a higher selling price and kept solitary whilst others are cramped in cages of up to 20 birds. Tokay geckos are kept in cages of up to 50 individuals. As illustrated in Fig 4.8, 13 traders receive a new batch of animals on a weekly basis. It is assumed that animals can be easily replaced hence concerns pertaining to animal welfare are a low priority.

![Frequency of Inventory Supply](image)

Fig 4.8 Frequency of inventory supply to replenish inventory
4.5 Captive-breeding - a conservation tool or another form of exploitation?”

Wildlife laundering is the concept of selling wild-caught animals as captive-bred. Traders’ perceptions of customer preference for wild-caught or captive-bred animals, was assessed to elucidate emerging trends of this new phenomena. All respondents admitted that their focal species were wild-caught individuals. From their perspective, wildlife supply is infinite and more cost-effective than captive-breeding. Customers can be defined into three categories; 1) Hobbyist, 2) Pet owner or 3) Consumption & Traditional Medicine. 12 cite ‘hobbyists’ as their most predominant customer, purchasing birds for singing-contests. 11/21 traders believe that most hobbyist customers prefer wild-caught birds as their singing voice is more distinct and increases the status symbol and its reputation at bird contests. Seven traders stated that customers prefer captive-bred birds as they are tamer and easier to maintain and three stated this is species-specific. Plumage and singing voice-abilities influence customer preferences - “Birds’ singing voices are much better if they are from the wild” (Man, aged 53 from Barito market). For example, demand for wild-caught, White-rumped Shamas is higher if they originate from Sumatra rather than Kalimantan as they have longer tails and a better singing voice (pers. comm). This results in higher prices as White-rumped Shamas from Sumatra are rarer and harder to find. The Hill Mynah is on the same trajectory as the White-rumped shama. Based on my results, some traders were not at all concerned about wildlife depletion and believed here is no issue to obtain wildlife in the future as captive-breeding will replenish wild-caught populations to meet demand. Most animals purported to be captive-bred, are in fact wild-caught as substantiated by the key informants. Well-managed captive-breeding of rare species would provide job opportunities, replace wild-caught stock and reduce prices to undercut the illegal trade. Most of the trade is fuelled by buyers assuming stock comes from sustainable sources. Work with the bird-keeping communities (captive-breeders, traders and hobbyists) and include them in the consultative process in the protection and regulation of birds (Profauna informant)
5. Discussion

5.1 Does rarity impact trade dynamics?

The world’s most vulnerable species are targeted by collectors and hobbyists. Market demand exerts huge pressure on rare species and this tends to increase as they become rarer (Adams, 2004). Not all species are equally desirable. Songbirds such as the White-rumped Shama are entered into bird singing contests to win prizes, fame and wealth for their owners. Other species are desirable for their plumage, character or vocal abilities such as the Hill Mynah or Straw-headed Bulbuls. A new economic theory shows that adding human behaviour to the equation, specifically the human penchant for rarity, reveals an unexpected mechanism of exploitation with alarming implications for species survival (Courchamp et al. 2006). Hobby-collections such as bird-keeping and singing contests are where rare items are the most valued, demanding higher prices. Luxury food items such as caviar from sturgeons all listed as (Gault et al. 2008). In the case of the focal species, pig-nosed turtles are in high demand in China (pers. Observation 2012) to display wealth and social status. Affluence and the desire to own fashionable items like snake-skin accessories place exaggerated value on rarity renders them even rare and hence more desirable. Courchamp et al (2006) assert that humans can trigger an anthropogenic Allee Effect (AEE) in rare species through a paradox of value driving species into an extinction vortex. When rarity acquires value, prices for scarce species can increase as seen by pricing trends for Straw-headed Bulbuls, White-rumped Shamas, and Tokay gecko (refer to Table 4.1), which increases exploitation and precipitates extinction.

The Javan hawk eagle (Spizaetus bartelsi) is endemic to Java and one of the world’s least known raptors. It was declared Indonesia’s rare and precious animal (Satwa langka Nasional) in 1993 by President Soeharto and all trade was made illegal. There was a significant increase in trade after it was declared rare to the public resulting in an increased demand (Nijman et al. 2009). The rationale for listing a species’ rarity or conservation status is to raise awareness and protect it from extinction however it can actually jeopardise the conservation of the species as seen with traders selling protected, endangered species Stuart et al (2006). Any trade in exotic species, whether wild-caught or captive-bred, usually leads to an increase in popularity and demand for the
international pet trade. The Roti Island snake-necked turtle (Chelodina mccordi) was hunted to near extinction after being described in scientific literature (Stuart et al. 2006). Traders use a species’ threatened status to capitalise on consumer demand (Rivalan et al. 2007) and this was also evident in my results. Any possession of a rare species renders a person as ‘untouchable’ (key informant)

5.2 Culture and Tradition
Results indicated that bird-keeping, novelty pets, emerging trends such as civet coffee (Kopi Luwak) and the penchant for cult medicine entrenched within Indonesian culture are key factors in wildlife trade. Wealth and social status are cultural afflictions in Indonesian society. The rich are getting richer and want more unattainable ‘products’, including protected species such as orang-utans, gibbons, tigers reptiles, song-birds like Straw-headed Bulbuls and White-rumped Shamas or Papuan species like Cassowaries (Casuarius casuarius) and Black-capped lorikeets, observed personally at individual menageries across Jakarta and Bali. Jepson and Ladle (2005) reported that bird-keeping is a more common pastime for rich households, however, based on personal observations and communication with customers (not a target group for this research) at the study sites, regardless of income, low-income level Indonesian men especially Javanese, also pursue this hobby, with many sacrificing up to 3 months’ salary to purchase a White-rumped Shama valued at over USD $300.00. Regardless of income-levels, this cultural pastime is causing a rampant decline in bird species across the archipelago.

5.2.1 Animal use in Traditional Medicine
For centuries, healers and indigenous communities have collected plants and animals for medicines without threatening the species’ population dynamics (Alves and Rosa 2005), to heal human ailments known as zoonotherapy (Lev, 2003). Traditional medicine continues to play a significant role and it is estimated that as many as 80% of people in developing countries still rely on animal and plants for their primary health-care needs
The reliance on wildlife to treat ailments has the potential for the emergence and spread of new infectious diseases transmitted from animals to humans (zoonoses). Organs, tissues, bones and bile can be a source of Salmonella (Alves and Rosa 2005). Rare animals are also used for magic cult medicine emerging in Bali by Javanese ‘cult healers’. Cult healers observed at Kreneng market in Bali (not included in the study), espouse the view that dried slow lorises (Fig 5.2) are the latest cures for asthma and tokay geckos are falsely claimed to cure HIV and Aids (Fig 5.1; Table 5.1), resulting in an emerging trend of overharvesting and demand in East Asia (TRAFFIC 2012). Large flying-foxes are found at every ‘bird’ market and cut up to treat asthma for only USD $30 (pers. obs.).

Table 5.1 Focal species used in traditional medicine and magic.

<table>
<thead>
<tr>
<th>Species</th>
<th>Part used</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straw-headed Bulbul</td>
<td>Meat</td>
<td>Assist people with speaking disorders</td>
</tr>
<tr>
<td>Hill Mynah</td>
<td>Meat</td>
<td>Assist people with speaking disorders</td>
</tr>
<tr>
<td>Slow loris</td>
<td>Meat</td>
<td>Treatment for asthma</td>
</tr>
<tr>
<td>Large Fruitbat</td>
<td>Meat and organs</td>
<td>Treatment for asthma</td>
</tr>
<tr>
<td>Tokay gecko</td>
<td>Meat</td>
<td>Treatment for HIV/ Aids</td>
</tr>
</tbody>
</table>

Ingredients are rarely prescribed in isolation, hence, no single ingredient is irreplaceable, a substitute can theoretically be made for any of them. Alves and Rosa (2007) suggest substituting threatened species with others in traditional medicine recipes to reduce the pressure on over-exploited populations however substitution of one species for another can have severe implications. Decreasing the demand for animal parts is a challenge due to the deeply ingrained cultural beliefs in the efficacy of certain wildlife medicines. Any
change may be based on a generational time-scale but unfortunately, we don’t have the luxury of time for many species currently targeted by trade (Bennett, 2011)

Fig 5.2 Dried Slow lorises used for cult medicine in Bali.
Credit: Jakarta Animal Aid network

5.3 Zoonosis - “Can fear and education of potential emerging infectious diseases curb demand?”

The prevalence of trade has brought many species into contact with diseases and parasites for which they have little resistance (Snyder, 1992) and is of concern for the ever-increasing pandemics sweeping the globe. The threat of infectious diseases spreading among people and other animals is rising, fuelled by the bushmeat and wildlife trade of exotic animals (Walsh et al 1993). Infectious diseases between hosts can be transmitted airborne or vector-borne. I was interested in exploring traders’ perception and awareness of zoonotic diseases such as bird-flu (H5N1) based on the global impact it had on economies and human health. Results indicate very limited knowledge and risk awareness of infectious diseases. In overcrowded conditions at the markets, reptile, avian, amphibian and mammalian species become cross-infected through mixing of
species and populations not usually found in their native habitat (Karesh et al. 2007). As observed at the markets, due to limited cage availability, species were co-mingled or located in close proximity to each other – bats next to bird cages, civet cats with primates and so on. Add rodents, invertebrate pest species and the extent of human handlers; hunters, traders, end-consumers and cooks to the mix and there is a recipe for disaster waiting to happen. There is a complete disregard of possible disease transmission as the traders opportunistically put everything out “on show” to be sold. In a list of 1,415 human pathogens, 61% are known to be zoonotic (Taylor et al. 2001). Since 1980, over 35 new infectious diseases (about 1 every 8 months) emerged in humans (Hamburg et al. 2003). Table 5.2 illustrates pandemics directly linked to animals as the host-origin.

Table 5.2 Zoonotic pandemics linked to animal host-origins

<table>
<thead>
<tr>
<th>Pandemic</th>
<th>Cause / Host-origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Immunodeficiency Virus (HIV)</td>
<td>Human consumption of non-human primates for bushmeat (Feng et al 2009)</td>
</tr>
<tr>
<td>Ebola virus</td>
<td>Human contact with infected great apes hunted for bushmeat (Leroy et al 2004)</td>
</tr>
<tr>
<td>Avian flu (H5N1)</td>
<td>Aquatic birds (Horimoto 2001)</td>
</tr>
<tr>
<td>SARS coronavirus</td>
<td>Associated with international trade in small carnivores and bats (Bell et al 2004)</td>
</tr>
<tr>
<td>Monkeypox</td>
<td>Associated with prairie dogs infected by Gambian jumping rats imported for the exotic pet trade (Reed et al 2004)</td>
</tr>
</tbody>
</table>

There are concerns for the increasing threat of transmitting infections from animal preparations to patient (Still, 2003). A 2007 study of animal utilisation for traditional medicine in Java, identified products from 54 species such as birds, bats, squirrels, monkeys, palm civets, pangolins, turtles and snakes, recommended to treat over 50 types of illnesses including respiratory, skin, increase stamina and energy. Although most parts are cooked, some parts such as blood, liver and bone marrow are used in raw form and may lead to zoonotic agents (Massy’ud and Kusrini, 2008).

Severe acute respiratory syndrome (SARS) emerged in southern China in 2003 and spread globally as a human pandemic. SARS was recognised as the first severe, emerging
infectious disease in the 21st Century to pose as a serious threat to economies and human welfare (WHO 2012). SARS animal-host origins were associated with wildlife markets, restaurants and breeding-farms in China. A significant proportion of this wildlife enters China from a regional network of illegal wildlife trade (Bell et al 2004). Three species of small carnivores Masked palm civets- *paguma larvata* (viverrid), Racoon dog – *Nyctereutes procyonoides* (canid) and Ferret Badger-*Melogale moschate* (Mustelid) were identified as being the origin source with these species currently exploited across the region (Bell et al. 2004). Li *et al* (2005) reported a species of bats as the natural host of coronaviruses closely related to the SARS outbreak. With bats and civet cats observed with a dominant presence at the study sites to meet the growing demand for traditional medicine and new trend for captive-bred civet coffee, could there be an imminent threat of another zoonotic disease affecting Indonesia? Disease is common in captive populations due to the enhanced exposure of exotic pathogens. Traditional approaches to eradicate pathogens or wild species such as culling or vaccination are not feasible for the myriad of species included in wildlife trade (Karesh *et al*, 2007). Hence, it would be deemed sensible and cost-effective to apply the Precautionary Principle *(CBD 1992)* to reduce transmission and prevent future pandemics. Key lessons learnt from SARS is the underlying root of emerging zoonotic diseases in parallel with the biodiversity crisis of massive species loss due to over-exploitation of wild animal populations (Bell *et al* 2004). This has not yet impacted for the 12 focal species of this study, yet low absence of 3/7 bird species requires precautionary measures.

5.4 Mortality Rates
The live, exotic live pet-trade is responsible for the death of millions of birds, reptiles, amphibians and some mammal species. Many pet owners are unaware of the suffering and damage their hobby ensues. Import and export permits do not accurately calculate the number of birds legally traded, as mortality plays a huge role, resulting in underestimates in trade figures (Beissinger, 2001). The majority of animals die during capture or transport to the markets and may never reach the consumer (Lyons and Natush, 2011). Animals must be kept alive after harvest to have any value, but mortality is high, as demonstrated in the results with approximate survival of one week to a month,
highlighting high rates of wastefulness. Nash (1993) referred to this as a ‘cut-flower’ industry where certain species which do not survive very long in captivity requiring continuous collection of short-lived communities. Results indicate it would be more profitable for traders to invest in animal welfare to keep their stock alive rather than the weekly replenishment due to mortality.

5.5 Captive breeding, a conservation tool or another form of exploitation?
The concept of captive-breeding is contentious and controversial and often associated with zoos and ex-situ species population programs. It has been successful for charismatic megafauna, such as tigers and rhinos, which evoke widespread public interest (Olney, Mace and Feistner, 1994) - “Captive breeding should be viewed as a last resort in species recovery” (Snyder et al 1996). Increasing demand for wildlife is putting a strain on wild populations through unsustainable harvesting resulting in biodiversity loss (Roe, 2008). Captive-breeding can play a significant conservation role in wildlife trade, alleviating pressures on wild population however, is often exploited with no proper regulation or enforcement. In response, captive-breeding farms were created but there is an emerging trend of wild-caught animals laundered as “captive-bred”. Lyons and Natush (2011) report green pythons (Morella viridis) in Indonesia have been traded as captive-bred whilst illegally wild-caught from the provinces of Maluku, West Papua and New Guinea. Indonesia is the only range-state allowing export of captive-bred green pythons for commercial purposes. It is one of the few studies providing data and evidence relating illegal wildlife laundering through breeding farms. It is difficult to differentiate between wild-caught and captive-bred animals, especially reptiles. Under CITES, importation of regulated species must be on a non-detrimental basis that does not harm wild populations. Captive-bred specimens of Appendix I listed species are treated as Appendix II species. In Indonesia, protected species can be legally traded if captive-bred with a permit. Hence it is common to fraudulently misdeclare wild-caught animals as captive-bred to circumvent the law through bribery and corruption and issuing of fake permits. Captive breeding of some species is considered as a solution to meet TCM demand. The risk of ‘farming’ may in fact increase the promotion of wildlife as a commodity and increase demand without reducing unsustainable harvesting of wild populations. Tiger farms in China are flooding the market with legal, captive-bred tiger parts and products to
undercut the illegal supply from tiger poachers and benefit wild tigers (Mitra, 2006, and Lapointe, 2007). However, as demand continues to exceed supply, TCM consumers prefer products from wild-caught animals believing they are more effective. Economic incentives are not compelling for captive-breeding over wild harvesting. Cost analysis of wild-caught versus farmed tiger parts indicate that it would cost at least $4,000 to raise a captive-bred tiger to adulthood (Lapointe, 2007) and approximately US $15-$20 to poach a wild tiger (Damania et al. 2003). This cost discrepancy offers economic incentives for poachers to undercut farmers in any legal market (Gratwicke et al. 2007). Many species with slow-reproductive cycles are not economically viable. For example, pig-nosed turtles or green pythons cannot be bred fast enough to meet demand (Lyons and Natush 2011).

Captive breeders have no vested interest in securing populations and it can be argued that if wild sources are no longer available, that the breeders are in a position to have complete control of the global market for farmed animals and their parts (Gratwicke et al. 2007). The misconception amongst the respondents of captive-breeding replenishing depleted populations is a real concern. Jepson and Ladle (2005) assumed substitution through captive-breeding was occurring at a large scale, however my results indicate captive-breeding is currently only reserved for bird species such as budgerigars, cockatiels, canaries, finches and love-birds (Fig 5.3). Focal song-bird and parrot species are still wild-caught, either trapped as free-flying adults or taken as nestlings. There is a ‘collector mentality’ of owning rare and endangered species resulting in a continuing dependence on wild-caught animals and whilst collection and sale of wild-caught stock is so easy and cheap, people are less likely to invest in captive breeding farms. Breeding is not used as a conservation tool as it is not replacing wild-caught species (key informant) and bird-keeping communities should be part of the consultative process. A market-based policy instrument, capable of shifting bird-keeping trends to captive-bred alternatives would align easily with Indonesia’s macro-policy agendas relating to pro-poor growth and job creation (Jepson et al. 2011).
5.6 Sustainable harvesting to avoid the risk of extinction

Sustainable harvesting is defined in Article 2 of the Convention of Biological Diversity (CBD) as - “use in a way and at a rate that does not lead to the long-term decline of biodiversity thereby maintaining its potential to meet the needs and aspirations of future generations”. Trade quotas should be determined on an assessment of intrinsic and extrinsic factors (population numbers, distribution, life histories, ecosystem functional role, reproductive capacity and behaviour) of the harvested species (Reynolds et al 2001). Sustainable harvesting of any resource is dependent on the rate of its renewal (Kokko et al, 2001). Reynolds et al (2001) illustrate a continuum of attitudes (Preservation, sustainable exploitation and Hit & Run) in relation to cost and benefits of exploitation effort (Fig 5.4). Maximum Sustainable Yield (MSY) is where harvest off-take sustainable and does not threaten a population to extinction. The break-even point of exploitation (costs equals benefits) is at open access and further increases in exploitation will result in net losses (exploitation of open access resources). This theory is based on single-species harvesting and in unregulated open wildlife markets like Indonesia with a “Hit & Run” attitude it concerns multiple species where the loss of one can species can be compensated by another as seen in the over-exploitation and absence of Sumatran laughing thrushes, Black-winged Starling and Tanimbar cockatoos.
Establishing harvest limits based on a constant proportion of population is a safer biological approach rather than setting a fixed, numerical harvest quote as is done by CITES for ease of approval, reporting and regulation (Leader-Williams 2010; Milner-Gulland and Rowcliffe 2007). The “Hit and Run” attitude may lead to maximum exploitation. Small off-take of rare species may have much greater significance than capture of common species in large quantities. To achieve sustainable use of wild species and adhere to Article IV of CITES (NDF), harvesting quotas should consider biological traits and lifecycles of species as well as population estimates. PKA and LIPI supposedly conduct wild-population assessments for all harvested species, yet due to their limited expertise and resources this is not being done (Nijman et al. 2012). Instead, random national quotas are established. 10% of the harvest quota may be used for domestic purposes and the remainder for export. Indonesia’s harvest levels always exceed established annual quotas as is seen in the trade of tokay geckos quota of 50,000 (TRAFFIC 2012) slow loris (CITES I hence zero quota) and Greater flying-fox with a quota of 245 (CITES 2012). There is no regulation to monitor and penalise exceeding annual quotas.

**Fig 5.4 Attitudes to nature and natural resources diagram**

**Source:** Source: Reynolds et al, 2001
5.7 Command & Control or Market-based Incentive schemes?

“Conservation is better done (more effectively and equitable) by carrots than sticks: Better driven by incentives that reward sustainable management rather than by attempts to stamp out uses of nature that are vital to people’s survival” (Adams 2004).

The conservation movement has developed two contrasting approaches to wildlife trade; 1) CITES - an international regulatory body with supporting institutions linked to domestic legislation to control the harvest of international trade; 2) Non-state, voluntary, market-driven policy to embed environmental and social values within supply chains (Jepson et al. 2011). It is presumed that trade bans reduce demand and deter illegal trade however, without proper enforcement across trade routes and markets there are plenty of loopholes to circumvent the law. Regulation, enforcement and officials are being outwitted by sophisticated, organised crime syndicates. Wildlife-crime is not seen as a priority and enforcement and governance is lax (Bennett, 2011). CITES is only applicable for international or cross-boundary trade. Many CITES-listed species including Slow lorises, Radiated tortoises, Pig-nosed turtles, Straw-headed Bulbuls were present at the markets, highlighting a domestic loophole. Trade in specimens of these species is permitted only in exceptional circumstances and it is difficult to understand the purpose of international and national legislation when protected species are widely available for sale. It may be that local market availability may in fact be an interim measure before export. Non-cites listed species such as White-rumped Shamas, Sumatran Laughing-thrushes, Tokay geckos and large fruit bats are not even afforded the limited protection of international laws.

Rivalan (2007) showed that CITES listings actually encourages trade increases. The request to list or up-grade a species to a more restrictive appendix can take up to a year after submission of the proposal, allowing a year for traders to acquire specimens (stock-pile for parts and derivatives) before trade restrictions apply with the possibility of threatened wild populations being decimated. The CITES Secretariat and its affiliated committees depend on national agencies to regulate trade, yet many CITES parties fail to systematically monitor and report wildlife trade (Phelps et al. 2010). Many countries, including Indonesia are not compliant to the requirements of systematically monitoring and reporting wildlife trade and incentives are high for biased analyses and misreporting.
(Courchamp, 2006). Permits are required for capturing, transporting and selling wildlife, yet none of the interviewed traders had a permit to own a stall or sell wildlife. This is widely known amongst law-enforcers yet, nothing is being done to act on this illegal trade, hence if they had to abide by a certification system, this would be much easier to monitor and control.

CITES has been regarded as an old-fashioned command and control convention (Hutton and Dickson 2000) and a more flexible, pro-active approach like voluntary, market-based schemes may show conservation potential to reform trade chains towards sustainable trade (Cooney and Jepson 2006). This has been demonstrated in certification systems for sustainable forestry through the Forest Stewardship Council (FSC) and sustainable fishing with the Marine Stewardship Council (MSC), developed on the notion of sustainable harvesting and ethical consumerism. In theory, an incentive-driven mechanism with proper monitoring and evaluation procedures in place, could work if it is able to address issues such as wildlife laundering, currently occurring at captive-breeding farms. The value of market-based schemes depends on their ability to engage other parties to the fore such as commercial enterprises as seen in FSC and MSC and the general public to promote public awareness of conservation issues and encourage conscious purchasing behaviour.

Traditional, customary laws like ‘awig-awig’ in Bali also acts as a pro-active conservation tool and disincentive for wildlife trade (Croes, 2007, unp). There have been numerous attempts to re-introduce the Bali starling in its endemic habitat of West Bali National Park with only six individuals reported in 2001 (Begawan Foundation 2007). With strong government and conservation opposition, the birds were successfully re-introduced on Nusa Penida in 2006, with the implementation of awig-awig from all 12 villages on the island to eliminate poaching and trade. Customary law manifests the uniqueness of each culture and is more effective and feared than national law (hukum) with a strong root in tradition. (Fig 5.6) awig-awig serves as a village identity and if not obeyed, an offender may be ostracised from the community, the worst kind of punishment for the Balinese.
Fig 5.6 Balinese customary law saving the Bali Starling
5.8 Recommendations

5.8.1 Trader and Consumer demand and awareness

- Reduce consumer demand and change public perception through education, media and government intervention.
- Shift cultural beliefs and trends of consuming or keeping rare, endangered wildlife and work towards a mutual understanding between TM practitioners, consumers and conservationists to encourage sustainable alternatives.
- The limited level of awareness of bird-flu amongst traders showed a need for increased disease mitigation procedures to avoid any future global pandemics.
- Regulate the listing and description of a species’ conservation status as rare or endangered to the general public to avoid the increase in demand for rarity (Hall et al. 2008).

5.8.2 Social marketing and change

Focus on social change initiatives to shift behavioural and social norms to reduce threats to biodiversity. RARE (http://rareconservation.org/) empowers local communities to solve global conservation challenges. In Laos, they successfully implemented a social campaign to curb tiger trade at the Nam Et-Phou Louey National Protected Area (RARE 2010). Their “theory of change” equation (Figure 5.6) outlines an increase in knowledge (K) plus a change in attitude (A) through interpersonal communication (IC), in the presence of an appropriate barrier removal (BR) leads to behaviour change (BC) to facilitate biodiversity threat reduction (TR) to ensure conservation results (CR).

![Fig 5.7 RARE Theory of Change equation to address biodiversity issues through social change.](image-url)
5.8.3 Wildlife trade policy and regulation

- Increase coordination and trade linkages between CITES parties and other international and regional institutional bodies to enhance data collection and enforcement, rather than the current inconsistencies.
- Improve the Non-Detriment Findings methods towards sustainable harvesting.
- Build local capacity in wildlife crime and increase the numbers of trained staff along the trade chain to combat bribery and corruption.

5.8.4 Indonesian Wildlife Trade policy and regulation

- Review Conservation Act No. 5 to avoid ambiguity and loopholes for traders to circumvent the law. Enforce written legislation and impose penalties and fines for illegal domestic and export trade. Increase the number of national protected species, aligned with updated CITES and IUCN Red List categories.
- Increase national protected species according to updated CITES and Red List status. There should be a correlation with each of these independent conservation bodies rather than the disparity shown in the results in Fig XX.
- Increase monitoring of traders’ licensing and registration to combat illegal trade.
- Evaluate the effectiveness of the wildlife management authorities’ structure.
- Implement Animal Welfare laws to coincide with capture, transport and sale.
- Monitor captive-breeding farms to avoid wildlife laundering.
- Collaborate with the International Consortium on Combatting Wildlife Crime (ICCWC) set up by Interpol in 2010.
- Propose that 12 focal species are submitted for review based on the recommendation listed in Table 5.3 in the upcoming COP 15 to be held in Bangkok in March 2013.

5.8.5 Market-based regulation

- Implement market-based incentive schemes for captive-bred wildlife to substitute wild-caught stock, such as a bird-certification scheme (Jepson et al 2008) which may apply to other species and improve monitoring of the entire custody chain to avoid wildlife laundering.
• Work with bird-keeping communities and make them key stakeholders in the consultative process.
• Consider a non-invasive form of commercialisation such as eco-tourism. A wild animal might generate more tourist revenue in its lifetime, exceeding its value in the live trade or consumption.

5.8.6 Further Research
This study highlighted some significant gaps in current wildlife trade analysis. Through the interview process, talking directly to traders, I gained new insights, indicating that further knowledge could be obtained from this kind of research. Integrating social-science with future wildlife trade research to understand people’s motivations, perceptions and attitudes may aid in developing social interventions to manage trade. I would recommend undertaking a similar approach across other markets in Indonesia and throughout Southeast Asia. Beyond the supply-side, it is crucial to also conduct thorough research with end-consumers/wildlife. Lastly, it is imperative to ensure that findings of this research are accessible to key target audiences for long lasting impact for both traders and consumers alike.

5.8.7 Conclusion
To ensure Indonesian forests do not suffer from an “Empty-Forest” syndrome, there is a need to understand local, national and international drivers of wildlife trade and the interactions between them. People are at the helm of the entire issue of wildlife trade and for any change to occur requires a significant behavioural shift. An assessment of traders’ attitudes, perceptions and behaviour to integrate social-science perspectives towards wildlife trade solutions is necessary to overcome the barriers of deeply-rooted social norms and culture such as bird-keeping and singing contests and the keeping of rare and endangered species as ‘pets’ and status symbols.Removing barriers through education and conservation impact awareness will lead to long-term social behavioural change. Increase the extent of protected areas if biodiversity is to be maintained in the face of unsustainable wildlife trade.
<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Indonesian Species Status</th>
<th>Current CITES listing</th>
<th>Current Red List</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawheaded bulbul</td>
<td><em>Pycnonotus zeylanicus</em></td>
<td>Not protected</td>
<td>Appendix II</td>
<td>VU</td>
<td>National Protection Upgrade to Appendix I and E</td>
</tr>
<tr>
<td>Hill Mynah</td>
<td><em>Gracula religiosa</em></td>
<td>Not protected</td>
<td>Appendix II</td>
<td>LC</td>
<td>National Protection and upgrade to NT</td>
</tr>
<tr>
<td>Sumatran Laughingthrush</td>
<td><em>Garrulax leucolophus</em></td>
<td>Not protected</td>
<td>Not listed</td>
<td>LC</td>
<td>List as Appendix I Upgrade Red List to Endangered</td>
</tr>
<tr>
<td>Tanimbar Cockatoo</td>
<td><em>Cacatua goffiniana</em></td>
<td>Protected</td>
<td>Appendix I</td>
<td>NT</td>
<td>Perform population assessment to review Red List</td>
</tr>
<tr>
<td>Black-capped Lorrikeet</td>
<td><em>Lorius lory</em></td>
<td>Protected</td>
<td>Appendix II</td>
<td>LC</td>
<td>Perform population assessment to review Red List</td>
</tr>
<tr>
<td>White-rumped Shama</td>
<td><em>Copsychus malabaricus</em></td>
<td>Not protected</td>
<td>Not listed</td>
<td>LC</td>
<td>Indonesian national Protection Appendix II upgrade to NT</td>
</tr>
<tr>
<td>Black-winged Starling</td>
<td><em>Acridotheres melanopterus</em></td>
<td>Protected</td>
<td>Not listed</td>
<td>CR</td>
<td>List as Appendix II</td>
</tr>
<tr>
<td>Tokay Gecko</td>
<td><em>Gekko gecko</em></td>
<td>Not protected</td>
<td>Not listed</td>
<td>ND</td>
<td>List as Appendix II and perform population assessment to recognise in Red List</td>
</tr>
<tr>
<td>Radiated Tortoise</td>
<td><em>Astrochelys radiata</em></td>
<td>Imported</td>
<td>Appendix I</td>
<td>CR</td>
<td>As is</td>
</tr>
<tr>
<td>Pig-nosed turtle</td>
<td><em>Carettochelys insculpta</em></td>
<td>Protected</td>
<td>Appendix III</td>
<td>VU</td>
<td>Upgrade to Appendix II Perform population assessment</td>
</tr>
<tr>
<td>Slow loris</td>
<td><em>Nycticebus coucang</em></td>
<td>Protected</td>
<td>Appendix I</td>
<td>VU</td>
<td>Perform population assessment</td>
</tr>
<tr>
<td>Javan Slow loris</td>
<td><em>Nycticebus javanicus</em></td>
<td>Protected</td>
<td>Appendix I</td>
<td>VU</td>
<td>Perform population assessment</td>
</tr>
<tr>
<td>Large Flying Fox</td>
<td><em>Pteropus vampyrus</em></td>
<td>Not protected</td>
<td>Appendix II</td>
<td>NT</td>
<td>Perform population assessment</td>
</tr>
</tbody>
</table>
6. References


7. Appendices

Appendix I - Market Survey

1. How long have you been a trader at <Name of Market>? 
   Berapa lama Anda adalah pedagang di <Nama Pasar>? 
   - < 1 tahun (tahun = year) 
   - 1-5 tahun 
   - 5-10 tahun 
   - >10 tahun

2. How/Why did you become a trader? 
   Mengapakah Anda menjadi Pedagang satwa liar? 
   - Tradisi bisnis keluarga (Orang-tua dan Kakek/Nenek adalah pedagang juga) 
   - Pendapatan/ Uang 
   - Keamanan pekerjaan 
   - Kenikmatan 
   - Tidak ada pilihan lain 
   - Personal interest in birds and wildlife 
   - Yang lain (Silahkan menjelaskan)

3. What do you like about working here? (What's good about running a wildlife shop?). 
   Apakah Anda suka tentang kerja di sini? (Silahkan berikan tiga contoh) 
   1. ____________________________________________________________
   2. ____________________________________________________________
   3. ____________________________________________________________

4. And what do you not like about it? If you can, please give 3 reasons: 
   Dan apakah tidak suka? 
   1. ____________________________________________________________
   2. ____________________________________________________________
   3. ____________________________________________________________

5. Over the past year, which species have you been trading the most? Please rank in % proportion. 
   Selama 1 tahun terakhir, apakah jenis dijual terbesar? Tolong daftar dengan %
6. Has this changed from before? (Assessing species’ composition change over time)

Dan keadaan ini dirubah daripada sebelumnya? Kapan ini terjadi?

___________________________________________________________________

7. Why do you think this has happened?

Mengapa ini terjadi?

___________________________________________________________________

Zoonosis, assess the spread of disease impacting trade and human health

8. Did the outbreak of Avian/Bird Flu in 2003 have an impact on the number (and species) of birds you sell/trade?

Apakah flu burung pada tahun 2003, disebabkan dampak pada perdagangannya?

- YES
- NO

If YES how?

___________________________________________________________________

9. Have you ever been ill or injured from working at the market?

Apakah anda pernah merasa sakit atau terluka dari bekerja di pasar?

1. Never (Tidak pernah)
2. Once (Satu kali)
3. < setahun (less than once a year)
4. > setahun (more than once a year)

10. And if YES, what caused it? (eg, bird flu, swine flu, rabies, bites, scratches)

Kalau YA, apakah disebabkan? (eg, flu burung, rabies, digigit, scratches)

___________________________________________________________________

11. Generally, do you think that wildlife trade has increased or decreased?

Umumnya, perdagangan hewan meningkat atau menurun? Dan mengapa
1. Increased (Meningkat)
2. Decreased (Menurun)
3. Same as before (Sama-sama seperti sebelumnya)
4. I don’t know (Tidak Tahu)

**Hotspots of wildlife capture**

12. Where are most of the animals from that you have had in stock for the last 12 months? Please state in % proportion. *Dimana asalnya kebanyakan hewan dijual saham selama 12 bulan? Tolong daftar dengan proporsi persen %.*

<table>
<thead>
<tr>
<th>Asal</th>
<th>% Sumber asal di satwa liar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sumatra</td>
<td></td>
</tr>
<tr>
<td>Kalimantan</td>
<td></td>
</tr>
<tr>
<td>Jawa</td>
<td></td>
</tr>
<tr>
<td>Sulawesi</td>
<td></td>
</tr>
<tr>
<td>Bali</td>
<td></td>
</tr>
<tr>
<td>Nusa Tengara</td>
<td></td>
</tr>
<tr>
<td>Papua Barat</td>
<td></td>
</tr>
<tr>
<td>Not from Indonesia</td>
<td></td>
</tr>
<tr>
<td>Tidak asal dari Indonesia</td>
<td></td>
</tr>
</tbody>
</table>

13. Do customers prefer Captive-bred or Wild-Caught animals, and Why

*Apakah pelanggan lebih memilih hewan diterak atau ditangkap di hutan? Mengapa?*

1. Captive-Bred (Diterak)
2. Wild-Caught (dari alam)
Conservation Status and legislation awareness and awareness of species’ trade quotas

15. Aku sangat tertarik pada tren baru untuk beberapa spesies.

<table>
<thead>
<tr>
<th>Jenis</th>
<th>Ditangkap di hutan/ liar</th>
<th>Tawanan Peternak</th>
<th>Dilindungi?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tertangkap sendiri</td>
<td>Langsung dari pemburu</td>
<td>Middlemen</td>
</tr>
<tr>
<td>Burung</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straw-headed Bul Bul</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><em>Cucak Rawa</em></td>
<td></td>
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</tr>
<tr>
<td>Hill Mynah <em>Beo</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sumatran Laughingtrash</td>
<td></td>
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<tr>
<td><em>Poksa</em> <em>Sumatra</em></td>
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<tr>
<td>Tanimbar Cockatoo</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><em>Kakatua Goffini</em></td>
<td></td>
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<tr>
<td>Black-capped Lory</td>
<td></td>
<td></td>
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<tr>
<td><em>Nuri Kepala Hitam</em></td>
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<tr>
<td>White-rumped Shama</td>
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<tr>
<td><em>Murai Batu</em></td>
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<tr>
<td>Black-winged Starling</td>
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<tr>
<td><em>Jalak Putih</em></td>
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<tr>
<td>Reptil</td>
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<td></td>
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<tr>
<td>Tokay Gecko <em>Tokek</em></td>
<td></td>
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<tr>
<td>Radiated Tortoise</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pig-nose Turtle</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><em>Kura-Kura Mancung Babi</em></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Mamalia</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Slow Loris</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><em>Kukang (Malu-Malu)</em></td>
<td></td>
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<td></td>
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<tr>
<td>Fruit Bats</td>
<td></td>
<td></td>
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<tr>
<td>Lawar</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. Do you have a permit to sell animals here?
   *Apakah Anda perlu izin untuk menjual hewan di sini?*

   ____________________________________________________________

   ____________________________________________________________

17. If those species are not longer available for sale, what other species would you sell instead?
   *Kalau spesies terdaftar tidak lagi tersedia untuk dijual, spesies yang lain Anda akan*
18. Is it getting harder to find the animals?

*Apakah semakin lebih sulit untuk menemukan hewan tersebut?*
- Ya
- Tidak
  
  Kalau Ya, mengapa?

19. How often do you receive a supply of animals?

*Bagaimana sering menerima pasokan hewan?*
1. Daily (Sehari-harian)
2. Weekly (Mingguan) Which day?
3. Bulanan (Monthly)
4. Pada urutan (On order)
5. Tidak tahu (I don’t know)
6. Tidak ada jawaban (No Answer)

20. What is the mortality rate of the animals?

*Apakah hewan kematian kalau tiba di pasar? Berapa lama?*
1. 24 hours (24 jam)
2. 48 hours (48 jam)
3. 1 week (minggu)
4. 1 month (sebulan)
5. 6 months or more (6 bulan lebih)
6. I don’t know (Tidak tahu)
7. No Answer (Tidak ada jawaban)

**Sales (Penjualan)**

21. Who are your main customers and what is the proportion?

*Siapakah adalah pelanggan utama?*
1. Local (Lokal)
2. Nasional (Please specify from where)
3. Internasional (Please specify from where)
4. Foreigners/Tourists (Orang Asing/ Wisatawan)

22. What do you think are the main reason(s) they buy the animal?

*Apakah alasan yang utama untuk mereka membeli hewan?*
1. Pet (Hewan peliharaan)
2. Consumption (Konsumsi)
3. Traditional Medicine (Jamu)
4. Species’ rarity (Kelangkaan)
5. Beauty (Kecantikan)
6. Status symbol (Simbol status)
7. Bird-singing competitions (Kompetisi menyanyi Burung)
8. Other (Lain)
9. I don’t Know (Tidak tahu)
10. No Answer (Tidak ada jawaban)

23. In the past 12 months, how many animals have you sold?
   Selama 1 tahun terakhir, berapa ekor hewan Anda dijual?
   1. <10
   2. <25
   3. <50
   4. >50
   5. Tidak tahu
   6. Tidak ada jawaban
   7.

24. Selama minggu yang lalu, apakah Anda menjual salah satu sasaran spesies? Kalau YA, species yang mana dan berapa jumlahnya?

<table>
<thead>
<tr>
<th>Spesies</th>
<th>Kuantitas</th>
<th>Harga (Rupiah)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Straw-headed bulbul</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Hill Mynah</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Sumatran Laughingtrash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 White-rumped Shama</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Tanimbar Cockatoo</td>
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<td></td>
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<tr>
<td>6 Black-capped Lory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Black-winged Starling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Tokay Gecko</td>
<td></td>
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<tr>
<td>9 Radiated Tortoise</td>
<td></td>
<td></td>
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<tr>
<td>10 Pig-nosed Turtle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Slow Loris</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Fruit Bats</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

25. Generally, what are the price trends for wildlife trade within the last 5-10 years and why?
   Umumnya, apakah tren harga untuk perdagangan satwa liar di dalam 5-10 tahun terakhir? Mengapa?
   1. Increased (Meningkat)
   2. Decreased (Menurun)
   3. Stable (Stabil)
   4. Varied (Bervariasi)
   5. I don’t Know (Tidak tahu)
6. No Answer (Tidak ada jawaban)

26. Which of the following environmental issues concern you and your family?

Untuk isu-isu lingkungan berikutnya, yan mana Anda dan keluargamu peduli?

1. Species’ extinction (Kepunahan spesies hewan dan tumbuhan)
2. Plantations and Habitat loss (Penebangan dan kehilangan habitat)
3. Natural Disasters (Bencana alam)
4. Man-made Disasters (Bencana dibuat manusia)
5. Climate Change (Perubahan iklim)
6. Pollution (Pollusi)
7. Populations Growth (Pertumbuhan penduduk)
8. Wildlife Trade (Perdagangan satwa liar)

27. If there was an alternative source of income, I would prefer:

Kalau ada sumber pendapatan gaji yang lain, Saya lebih suka:

- Other market trade (Pedagangan yang lain)
- Farmer (Petanian)
- Forestry (Kehutanan)
- Mining (Pertambangan)
- Restaurant/Hotels
- Factory (Pabrik)
- Cleaner (Kebersihan)
- Study at University (Belajar di Universitas)
- Other (Yang lain.....)

28. How do you see the future of wildlife in Indonesia (focus on specifics about animals being traded at the moment).

Bagaimana Anda melihat keadaan satwa liar di masa depan di Indonesia?

29. Would you like your children to continue trading? Anda mengharap anak-anak dan cucu-cucu langsung pedagang?

Respondent Information:
Informasi ini adalah anonim. Dapatkah saya meminta umur dan asal?

Jenis kelamin: Berumur:

- Male (Laki-Laki)
- Female (Perempuan)
**Suku:** Ethnic Origin

Anda berasal darimana? Education Level (Tingkat Pendidikan):

1. Lokal dari Jakarta
2. Java
3. Sumatra
4. Indo-Chinese
5. Kalimantan
6. Nusa Tengara
7. Yang lain

1. SD
2. SMP
3. SMA
4. Universitas

**Terima Kasih untuk waktu dan pembantuanmu**
Appendix II

Key Informant Interview Questions

\textit{Closing Shop?} - An assessment of wildlife trade at Indonesia’s open animal markets in Jakarta and Bali based on conducting semi-structured interviews with traders to gain an insight into their perceptions and attitudes to wildlife trade

1. \textbf{What is <Insert Organisation or Individual’s name> involvement with open wildlife markets in Indonesia?}

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2. \textbf{What if some traders are selling nationally protected species?}
   \textbf{What do you do?}

________________________________________________________________________________________

3. \textbf{What about unprotected species, but endangered – What can be done?}

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4. \textbf{What do you think can be done to curb the open, domestic trade?}

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5. \textbf{How can certain species national protected or listed and/or upgraded in CITES?}

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6. \textbf{How is Rarity a selling point?}

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7. \textbf{What are the biggest wildlife trade/crime issues in Indonesia?}

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8. I am focusing on two West Papuan focal species as I believe that this will be the next “Hotspot” for sourcing wildlife. What can be done to prevent this?

9. How can we change peoples’ mindsets and behaviour of animal/birdkeeping?

Thank you for your time.
Appendix III

Fig 6.1 Indonesian wildlife trade supply chain routes

Fig 6.2 International Trade Routes