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OF WILD FAUNA AND FLORA
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TRADE IN PYTHON SKINS: IMPACT ON LIVELIHOODS IN PENINSULAR MALAYSIA

This document is submitted by Malaysia with respect to agenda item 10.[*]

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TRADE IN PYTHON SKINS:
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IN PENINSULAR MALAYSIA

In collaboration with

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Abstract for trade information services

This study uses a sustainable livelihoods framework to examine the impact of the python skin trade on the livelihoods of people in Peninsular Malaysia. The report details the livelihood profiles of people participating in trade, and draws on its results to discuss the livelihoods outcomes, conservation implications and challenges of participation in the python skin trade. The report is relevant for importers and exporters, regulators, policymakers, non-governmental organizations, community representatives and researchers seeking to improve sustainability of the python skin trade and the associated benefits derived by people in Peninsular Malaysia.

Descriptors: **Hides and Skins, Leather, Biodiversity, Endangered Species, Sustainable Development, Economic Development, Rural Development, Malaysia.**

English

The International Trade Centre (ITC) is the joint agency of the World Trade Organization and the United Nations.

ITC, Palais des Nations, 1211 Geneva 10, Switzerland (www.intracen.org)

Foreword ITC

The majority of the world's poorest live in rural areas and in developing countries, largely dependent on natural resources for food, shelter, medicine and income. For this reason, the protection of the forests and oceans are two of the 17 Sustainable Development Goals (SDGs) agreed by United Nations members in 2015.

Trade has been recognized as a 'means for implementation' of the Global Goals, and particular attention should be given to trade in natural resources given the contribution this can make to addressing Global Goal 1: the reduction of poverty. In 2012, the International Trade Centre (ITC) and the Convention on the International Trade in Endangered Species (CITES) signed a Letter of Agreement where ITC committed to provide knowledge and capacity-building for Parties to CITES in order to strengthen the sustainability and livelihood benefits of their trade in wildlife.

This study and the accompanying publication 'Trade in Python Skins: Impact on Livelihoods in Viet Nam' are ITC's direct contribution to this agreement.

Following the publication of an ITC report in 2012 identifying sustainability, legality and animal-welfare issues in the python supply chain, ITC, together with the World Conservation Union's Boa and Python Specialist Species Group and Kering, an international group of luxury and sport & lifestyle brands, established a Public Private Partnership called the Python Conservation Partnership (PCP).

This PCP is a unique example of a United Nations organization, the private sector and scientists working together to tackle sustainability issues in conservation. It has pooled financial resources as well as expertise on markets, the fashion business and conservation biology. This has resulted in the provision of scientifically sound evidence for policymakers, such as CITES Parties, to regulate the trade more effectively. It has brought a business reality to the discussion and created greater awareness in the industry around options for enhancing the sustainability of trade in the species. Finally, it has identified capacity-building needs for traders, authorities and the communities managing wildlife.

As part of its contribution to the PCP, ITC has carried out an analysis of the livelihood benefits of the trade in python skins in Malaysia and Viet Nam. Despite the high visibility of the trade on the catwalks of Milan and London, there is very little awareness about who derives an income from the trade and how value can be increased for rural livelihoods. By carrying out this research, ITC and the PCP present evidence that the sustainable use of wild-harvested python skins is raising incomes for some of the poorest people in South-East Asia. In this respect, the trade contributes to social stability and reduced poverty.

I would like to thank the Boa and Python Specialist Group of the IUCN Specialist Survival Commission, the CITES Authorities in Malaysia and Viet Nam, the CITES Secretariat, Kering and its brand Gucci for their collaboration and support in producing the research.

I remain confident that the findings will contribute concretely to discussions at the 17th meeting of the Conference of the Parties of CITES in September 2016 and beyond, as well as direct a greater level of interest and resources towards improved sustainable management and livelihood benefits from the trade in flora and fauna.

Arancha González

Executive Director
International Trade Centre

Foreword PERHILITAN

Trade in wildlife provides income to millions of people around the world, particularly to rural communities in developing countries. With the exception of fisheries, the harvest of reticulated pythons for skins is perhaps the most important wildlife trade in Peninsular Malaysia. Therefore, ensuring wild harvests and trade in pythons are sustainable is a similarly important challenge.

Internationally, this challenge is championed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). As a party to the CITES treaty, the challenge of ensuring sustainable trade in pythons from Peninsular Malaysia falls principally on the Department of Wildlife and National Parks of Peninsular Malaysia (PERHILITAN, the CITES Scientific Authority and Management Authority) and the Ministry of Natural Resources and Environment (NRE, the lead CITES Management Authority).

The harvest of wild pythons for their skin is regulated through a licensing system that covers hunting up to trading as well as import and export. Since 2002, however, the European Union has banned imports of reticulated python skins from Peninsular Malaysia due to concerns about harvest sustainability. Despite this ban remaining in place, PERHILITAN has worked hard to improve management and regulation of the python skin trade because of the benefits the trade brings to local communities. The ability for people living in rural areas to capture pythons, worth up to $30 each, contributes significantly to livelihood resilience. But without access to such a significant market, Malaysian business and communities are not realizing the potential value of this important resource.

In 2014, PERHILITAN began collaboration with the Python Conservation Partnership to improve the management and sustainability framework governing the python skin trade in Peninsular Malaysia. A critically important component of this work was to better understand how participation in the python skin trade impacts people's livelihoods and how regulatory changes can be tailored to mitigate adverse outcomes for trade participants.

With the publication of this report, a previously overlooked component of this trade has been recognized and an important information gap has been filled. I would like to acknowledge the support of the Python Conversation Partnership, and especially the International Trade Centre and the IUCN SSC Boa and Python Specialist Group, for contributing expertise and galvanizing efforts to support local livelihoods through sustainable trade.

The findings of this report will be useful for a variety of stakeholders, from NGOs and national conservation agencies, to regulatory bodies (e.g. CITES) and fashion houses. Specifically, this report is critical for the department's ongoing aim of ensuring the sustainable, legal and transparent trade of reticulated python skins, while at the same time safeguarding this important income stream for Malaysians and their families.

Dato' Abd Rasid Samsudin

Director General
Department of Wildlife and National Parks Peninsular Malaysia

Acknowledgements

About the Python Conservation Partnership

A collaboration between Kering, the International Trade Centre and the Boa and Python Specialist Group of the International Union for Conservation of Nature (IUCN/SSC Boa and Python Specialist Group), the Python Conservation Partnership (PCP) was established in November 2013 with the aim of contributing to the improved sustainability of the python skin trade and to help facilitate industry-wide change. The PCP's programme of research is focused on research and recommendations to improve sustainability, transparency, animal welfare and local livelihoods for the python skin trade.

About the International Trade Centre

The International Trade Centre (ITC) is the joint agency of the World Trade Organization and the United Nations. ITC supports businesses in developing countries to become more competitive in global markets, speeding economic development and contributing to the achievement of the United Nations' Millennium Development Goals. ITC works with policymakers, trade support institutions, exporters and other stakeholders in the public and private sectors to enable export success of small and medium-sized enterprises in developing countries and transition economies.

About the Boa and Python Specialist Group

The Boa and Python Specialist Group (BPSG) is a global network of volunteer experts, part of the IUCN Species Survival Commission (SSC). The BPSG is the leading world authority on boas and pythons. Its mission is to provide expert opinion and scientific advice to IUCN and other conservation organizations, government and non-government agencies, applicable to the conservation of boas and pythons.

About Kering

A world leader in apparel and accessories, Kering develops an ensemble of powerful Luxury and Sport & Lifestyle brands: Gucci, Bottega Veneta, Saint Laurent, Alexander McQueen, Balenciaga, Brioni, Christopher Kane, McQ, Stella McCartney, Tomas Maier, Boucheron, Dodo, Girard-Perregaux, JeanRichard, Pomellato, Qeelin, Ulysse Nardin, Puma, Volcom and Cobra. By 'empowering imagination' in the fullest sense, Kering encourages its brands to reach their potential in the most sustainable manner. Present in more than 120 countries, the Group generated revenue of more than €11.5 billion in 2015 and had more than 38,000 employees at year end. The Kering (previously PPR) share is listed on Euronext Paris (FR 0000121485, KER.PA, KER.FP).

About PERHILITAN

The Department of Wildlife and National Parks of Peninsular Malaysia (known locally as Jabatan Perlindungan Hidupan Liar dan Taman Negara, Semenanjung Malaysia – PERHILITAN) is a government organization responsible for the protection, management and conservation of wildlife and national parks in Peninsular Malaysia. PERHILITAN is responsible for the control and monitoring of the python skin trade in Peninsular Malaysia.

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Abbreviations

Unless otherwise specified, all references to dollars ($) are to United States dollars and all references to tons are to metric tons. An average 2014 exchange rate of 1 Malaysian ringgit (MYR) to $0.306 is used throughout.

The following abbreviations are used:

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DFID	UK Department for International Development
FPD	Forest Protection Department
GDP	Gross domestic product
IBP	International Business Publications
ITC	International Trade Centre
IUCN	International Union for Conservation of Nature
PC	Personal computer
PCP	Python Conservation Partnership
SRG	Scientific Review Group
SSC	IUCN Species Survival Commission
PERHILITAN	Department of Wildlife and National Parks, Peninsular Malaysia

Executive Summary

Trade in Python Skins: Impact on Livelihoods in Peninsular Malaysia is the fourth report delivered by the Python Conservation Partnership (PCP). PCP is a collaboration between the International Trade Centre (ITC) and the International Union for Conservation of Nature (IUCN SSC Boa & Python Specialist Group) and Kering, that was established in November 2013 to contribute to a robust and sustainable python skin trade and to facilitate industry-wide change. PCP's research program focuses on developing science-based recommendations to improve sustainability of the python skin trade, and through enhanced transparency ensure benefits for local livelihoods and high standards of animal welfare.

The trade in python skins has attracted increasing international attention in recent years, particularly among those concerned about the overexploitation of python species. As such, efforts are being made both to improve transparency and sustainability in the supply chain and to understand the impact of the trade on the livelihoods of rural households and communities.

This report focuses on the socioeconomic benefits of the python skin trade for people in Peninsular Malaysia. The research seeks to provide insight into: (1) the role of the trade in supporting local livelihoods in Peninsular Malaysia; (2) the social and trade-related challenges facing Malaysian python hunters and traders; and (3) opportunities to improve local trade benefits.

This report concentrates on harvest and trade in pythons from Peninsular Malaysia. It does not touch upon harvest and trade in East Malaysia (Sabah and Sarawak).

Python harvest and trade in Peninsular Malaysia

Malaysia is among the largest exporters of reticulated python (*Python reticulatus*) skins, which have been collected from the wild for European and Asian markets since the 1970s. The European Union (EU) banned the import of python skins from Peninsular Malaysia in 2002 due to concerns about conservation risks associated with wild harvest. Although the ban has affected local business and trade and python exports have declined significantly, Malaysia continues to export python skins to Asia.

The python trade provides a valuable income source for households in Peninsular Malaysia. There are 948 registered python hunters and 23 registered python-processing facilities in Peninsular Malaysia, located mostly in the central-western states. Pythons are primarily found in forest and palm plantation habitats, but are also captured in villages and other farmlands. While some trade participants are full-time professionals, many hunters operate opportunistically alongside other employment activities.

Research approach

The International Trade Centre (ITC), in conjunction with the Department of Wildlife and National Parks (PERHILITAN) and the IUCN/SSC Boa and Python Specialist Group, surveyed python skin trade participants in Peninsular Malaysia. The survey was designed following the Sustainable Livelihoods Framework developed by the UK Department for International Development (DFID). Following this framework, the survey considered three core components of local livelihoods, namely:

- The livelihood assets available to households;

- The livelihood strategies (or activities) undertaken by households; and

- The livelihood outcomes associated with pursuing livelihood strategies, including income, wellbeing and reduced vulnerability.

The survey was conducted in five states where most of Peninsular Malaysia's pythons are hunted and processed: Selangor, Perak, Johor, Kedah and Penang.

A total of 80 trade participants were surveyed, including 42 hunters, 3 agents, 20 employees processing skins and 15 facility owners or managers. Facilities were identified from PERHILITAN records, while hunters and agents were identified through records held by facility owners or word of mouth.

Livelihood assets of python trade households

Five types of capital defined livelihood assets: human capital (e.g. education and literacy levels), social capital (e.g. business connections and informal networks), physical capital (e.g. infrastructure and equipment), financial capital (e.g. income and savings) and natural capital (e.g. land, water and biodiversity).

The python skin industry has contributed to advancing human and social capital, with participants often passing skills between family and friends. For many trade participants, the industry had enabled households to finance essential assets such as housing, transport and food. For many (83% managers, 71% employees and 28% hunters), the python trade was their only source of household income and the main means to strengthen livelihood assets. Most respondents (71%) reported the trade to be 'very important' to their livelihood.

Livelihood strategies of python trade households

The average household respondent has participated in the python trade for 16 years. Managers were typically more experienced than other participants (average 25 years) and were nearly all running second- or third-generation family businesses. Employees were typically transitory and in the trade for less than five years, while hunters averaged 19 years' experience. The python trade was viewed as a means of income diversification and employment and, for managers, as a means of continuing the family business. Many employees, in particular, have difficulty finding other work.

A large number of hunters were in the trade to supplement household income. Most hunters (68%) combined python collecting with other income sources. One-third combined hunting with palm plantation work, while another third participated in other business activities such as truck driving or rice cultivation.

While financial income collected through the survey was largely incomplete, reported income ranged from a few thousand to several hundred thousand US dollars a year.

Livelihood outcomes of trade participation

There are 23 registered processing facilities and 948 registered hunters participating in the python skin trade in Peninsular Malaysia. However, there are undoubtedly a significant number of unregistered hunters opportunistically capturing small numbers of pythons.

The contribution of the trade to livelihoods varies widely between participants. In 2014, the median Malaysian wage was $5,783 and the median total household income was $16,836. Data from this study suggest that most facility managers, agents and large-scale hunters would earn above this median. While small-scale hunters would mostly earn below this median, hunters generally supplement hunting with other full-time or casual employment. In contrast, employees typically rely solely on the python industry, and would be considered low-income earners.

The python trade contributes to livelihood outcomes by providing income for food, housing, utilities and other expenses. It also gives households an opportunity to diversify income and thereby strengthen livelihood resilience. Respondents said the returns from the python industry are higher than they could secure elsewhere. Importantly, python hunting allows low-skilled and low-income earners to continue to make a living from a relatively open-access resource during times of shock (when other employment opportunities are seasonal or scarce). The ability to use renewable and abundant resources from the surrounding environment contributes significantly to livelihood resilience.

More broadly, however, the uncertainty of a trade dependent on wild resources and susceptible to market fluctuations has affected participants in recent years. Managers are heavily invested in the trade and are unlikely to leave, despite lower quantities demanded since the European ban. Most hunters found the industry 'hard' and 'dangerous' and would not recommend the work to others. Many hunters felt trapped in the industry due to a lack of skills and employability. While the majority of hunters had other paid employment, hunting provides a higher income relative to other low-skilled, local work available.

Conservation implications of trade

Malaysia's large-scale palm oil industry has increased the density of pythons, which thrive on commensal rodents feeding on palm kernels. Many people consider python hunting to be a means of python population control, as the snakes pose a threat to people and livestock.

Most hunters and processing facility owners said the number of pythons in Peninsular Malaysia had grown or remained stable over the past five years. Although most trade participants said the average size of pythons had remained the same, they believed giant snakes had become less common. This was attributed primarily to the expansion of oil palm plantations, which results in fewer areas for big snakes to hide and has reduced the abundance of large prey. In forested areas, wild harvest provides an incentive for hunters to maintain python populations. More than half of hunters (57%) take specific steps to maintain a sustainable supply of pythons, including rotating hunting areas and catching only larger pythons.

Although this report cannot offer a robust determination of harvest sustainability, the duration of trade (several decades) and continuing abundance of pythons in Peninsular Malaysia suggest that a degree of sustainability has been achieved. This, in addition to a large and unharvested system of protected areas, suggests maintainence of pythons in Peninsular Malaysia is about commercial sustainability, and not about the extinction of the species.

Challenges facing the python trade

The survey data reveal a number of challenges for python trade participants. As with other resource-based sectors, the python trade is characterized by high volatility and uncertainty. Most workers are self-employed and vulnerable to market fluctuations, potentially contributing to livelihood insecurity. Smaller processing facility managers and hunters without other work opportunities can be significantly affected by changes in the market or the environment.

The main challenge is the EU ban on imports of python skins. The EU is the largest buyer of skins globally. Malaysian businesses, workers and households capture a smaller market share because of the ban, which poses a livelihood constraint on Malaysian households and has no evident sustainability or conservation benefits – particularly as pythons are reportedly exported to Singapore for re-export to the EU without restrictions. The licensing system established in Peninsular Malaysia is one step the government has taken towards regaining access to European markets.

Exporters have noticed a market downturn in the past two years. Many have stockpiled pythons until markets rebound. While some processing facilities have reduced the price paid to hunters, most continue to pay for pythons to retain their supplier base. This has contributed to widespread stockpiling of skins and is unlikely to be sustainable for these businesses in the longer term. At least one facility has closed.

Health, safety and sustainability also affect local livelihoods for trade participants. One in three hunters called the industry 'dangerous'. While there are no data on hunting-related injuries, there are risks associated with handing wild species, navigating forests and setting and retrieving nets. Health and safety are also likely to be a risk for python handlers at processing facilities (e.g. disease risk), although no respondents raised this concern.

Finally, while there is an obvious abundance of pythons across Peninsular Malaysia, ongoing sustainability of the industry relies heavily on maintaining healthy python populations. Establishment of robust monitoring and management procedures is thus critical for ensuring sustainability and maintaining access to conscious consumer markets.

Implications for capacity-building

Python hunting and trade provide jobs, income and livelihood opportunities for many households in Peninsular Malaysia. Despite being significantly hampered by reduced market access, the industry continues to offer a viable business and income-diversification strategy for many households. For hunters with low skills and limited assets, the ability to hunt pythons provides an important contribution to social and economic wellbeing.

Livelihood outcomes associated with the trade could be improved by re-enabling access to the European market, improving hunting safety and sustainability, and strengthening domestic market linages.

The Malaysian industry needs to ensure a reliable, sustainable supply of high-quality python skins that can meet the needs of European and other buyers. Steps that can demonstrate the sustainability of the trade are urgently needed to regain access to European markets. Beyond that, monitoring and traceability that can achieve and demonstrate sustainability will also help Malaysia to differentiate itself as a leading and reputable global supplier of wild-harvest python skins, potentially adding significant value to the trade and improving the livelihoods of the households involved.

Chapter 1: Malaysian wild python harvest

Reticulated pythons (*Python reticulatus*) are harvested in Peninsular Malaysia for their skins, meat and gall bladders. Python skins are exported internationally, primarily for the production of fashion items such as handbags, wallets and garments, as well as musical instruments.[1]

Previous studies have explored the economic and conservation impacts of the global trade in python skins.[2] While the livelihoods of those involved in collecting and processing pythons for their skins has long been acknowledged, attention has been paid only recently to improving understanding about the impacts of the python skin trade on local people, and particularly on household welfare.

In 2013, the Python Conservation Partnership (PCP) began a work programme led by the International Trade Centre (ITC) to assess the livelihood impacts of the global trade in python skins. The first assessment examined the impact of trade on people farming (captive breeding) pythons for skins in Viet Nam.[3]

This report extends that work by examining a very different (yet complementary) system of python harvest from the wild in Peninsular Malaysia. Malaysia is the world's second-largest exporter of reticulated python skins, after Indonesia. Unlike Viet Nam, Malaysia legally exports pythons only from wild sources. Malaysian wild populations appear to be stable, and up to 162,000 skins a year may be exported under current quota limits.[4]

This report uses a qualitative survey-based livelihoods analysis to evaluate trade impacts by addressing the following specific questions:

1. What is the role of trade in supporting local livelihoods in Malaysia?

2. What are the social, environmental and trade-related challenges affecting households in the Malaysian python industry?

3. What are the opportunities for improving trade benefits and enhancing livelihood resilience for those involved in the trade?

This report is structured as follows:

Chapter 1 provides an introduction and overview of the Malaysian python trade. Chapters 2 and 3 outline the approach to livelihoods analysis used in this research and summarizes the main results of the research to create a livelihoods profile for households participating in the python skin trade. Chapters 4 to 6 draw on the results to discuss the livelihoods outcomes, conservation implications and challenges of participation in the python skin trade, and offer recommendations for capacity-building for improving trade and livelihood resilience.

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[1] Kasterine et al. 2012

[2] Kasterine et al. 2012.

[3] Nossal et al. 2016

[4] Natusch and Lyons, 2014

Chapter 2: Python skin trade in Penisular Malaysia

2.1   Wildlife harvest and trade

Peninsular Malaysia allows the harvest of a number of wildlife species for both export and domestic consumption. The main species valued on export markets include reticulated pythons (*Python reticulatus*), monitor lizards (*Varanus salvator*), softshelled turtles (*Amyda cartilaginea*) and freshwater turtles (*Cuora amboinensis*). The Wildlife Conservation Act 2010 [*Act 716*] and the International Trade in Endangered Species Act 2008 [*Act 686*] regulate the harvest of wildlife in Peninsular Malaysia. Under these acts, people who hunt wild species must hold a licence and adhere to regulations on catch and harvest quantities. There are also separate licences for wildlife processing, trading, import andexport.

2.2   Python harvest and trade

Indigenous communities in Malaysia have hunted pythons for hundreds of years. Until the 1970s, pythons were primarily hunted by indigenous people for their meat and as a way to control python populations, especially as they preyed on domestic livestock such as pigs, goats and chickens in areas inhabited by humans. Since the 1970s, however, pythons have been hunted mainly for their skins, which are valued by international consumers. By the 1990s, Malaysia was the world's largest exporter of reticulated python skins.[5] The global trade in python skins offered an economic opportunity for many poor people living in rural areas of Peninsular Malaysia, and a number of small businesses involved in processing and exporting python skins have been established.

Farrel Fransiskus prepares reticulated python skins at a processing facility. © Daniel Natusch

The Department of Wildlife and National Parks (PERHILITAN) regulates python harvest and trade in Peninsular Malaysia. At the same time, states may have additional controls for protecting and conserving wildlife (since wildlife is a state matter under the Malaysian Constitution). For example, since 2012 no wildlife hunting (including pythons) is permitted in the Johor State with the exception of wild pig (*Sus scrofa*). PERHILITAN regulates and oversees both harvest and trade through a licensing system. Licensed processing facilities and traders of pythons are only permitted to source pythons from licence-holders, and all transactions must be logged in PERHILITAN-issued logbooks. For *P. reticulatus,* there are also restrictions on hunting methods (capture by hand or using nets only), as well as catch limits.

In 2002, the European Union banned the import of python skins from Malaysia due to concerns about the sustainability of the wild harvest.[6] The information used to inform this decision is unclear, yet the embargo will remain in place until the European Commission Scientific Review Group (SRG) is satisfied that imports of skins from Malaysia are not detrimental to wild populations of reticulated pythons.

Python skin exports from Malaysia have declined significantly since the EU ban was imposed. Specifically, exports have fallen from 340,000 skins in 2000 to an annual average of 160,000 skins.[7] An annual export

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[5] Kasterine et al., 2012

[6] Khadiejah, 2013

[7] UNEP-WCMC CITES Trade Database, 2015

quota of 162,000 skins has been in place for Peninsular Malaysia since 2008. Most python skins are now exported to Singapore, Japan, China and Korea.

Although 23 registered facilities – including one tannery – process python skins in Peninsular Malaysia today, most python skins are exported raw (air-dried only). In 2015, PERHILITAN issued 3,138 licences to 948 individuals for hunting reticulated pythons, mostly in the central-western states of Perak, Selangor and Pahang (see Table 1). Some of these hunters operate professionally, but most hunt opportunistically, finding pythons in the forest or oil palm plantations while doing other work. The number of people capturing pythons is probably significantly higher than licence records suggest (see Chapter 3.3 for a detailed discussion).

Table 1. Number of reticulated python hunting licences issued to each state and number of individual applicants[8]

State	No. Hunting licenses	No. Individual applicants
Perlis	19	14
Kedah	230	86
Pulau Pinang	14	9
Perak	768	227
Selangor	1 037	231
Negeri Sembilan	376	77
Melaka	179	88
Johor	*No licences issued	
Pahang	452	177
Kelantan	24	10
Terengganu	39	29

Source: Compiled by the enforcement division of PERHILITAN, based on licence records.

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[8] A decree by the Sultan of Johor prohibits wildlife hunting in that state.

Chapter 3: Research approach

3.1   The sustainable livelihoods framework

The Sustainable Livelihoods Framework was followed in this study to improve understanding about the livelihoods of those participating in the python skin trade. The UK Department for International Development (DFID) developed the framework for livelihoods analysis. The framework can be broadly applied and adapted to local circumstances using a participatory research approach.[9] In particular, the framework has been widely applied to a rural development context, and was also used for the PCP research evaluating the impact of the python skin trade on local livelihoods in Viet Nam.[10]

The term 'livelihood' can have multiple interpretations, but is generally understood to comprise *'the capabilities, assets and activities required for a means of living'*.[11] A livelihood is considered sustainable *'when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base'*.[12]

The Sustainable Livelihoods Framework has three core components: livelihood assets, livelihood strategies and livelihood outcomes. The general premise is that households pursue livelihood outcomes by drawing on a set of assets to undertake a range of activities or strategies.

In applying the framework, this study examines each element as follows:

- **Livelihood assets:** examines the assets households may draw upon to derive a livelihood. Most commonly, assets are defined in terms of access to five types of capital: human, social, natural, physical and financial (see Box 1).

- **Livelihood strategies:** examines how households draw on these assets to derive livelihood outcomes. These include various activities and choices that people make to achieve their livelihood goals, including work in the python trade. The livelihood assets of households directly influence what livelihood strategies individuals may undertake.

- **Livelihood outcomes:** examines the outcomes of livelihood strategies and may include higher income, improved wellbeing, reduced vulnerability and more sustainable use of natural resources.

As shown in Figure 1, household assets, activities and livelihood outcomes may also be influenced by personal preferences and priorities as well as external factors such as policies, governance processes, seasonal constraints, economic shocks and changes to the environment.[13] (

In this study, the livelihood assets and strategies of python trade participants in Malaysia are collected to determine the resulting contribution to livelihood outcomes, including income, employment and other livelihood benefits. Using participatory research methods, the focus is on the needs, concerns and priorities identified by people themselves.

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[9] DFID, 1999

[10] Nossal et al. 2015

[11] DFID, 1999

[12] DFID,1999

[13] Ashley and Hussein, 2000

Box 1: Types of capital

The livelihoods of households in the python industry can be characterized by their assets as defined by five types of 'capitals': human, social, physical, financial and natural, identified in the Sustainable Livelihoods Framework (DFID, 1999).

Human capital

Human capital reflects the skills, knowledge and abilities that enable people to pursue livelihood strategies (DFID, 1999; Schultz, 1961). It varies between households according to household size, age of members, education, training and experience, among other factors.

Social capital

Social capital comprises the network connections that households can draw upon in pursuing livelihood strategies (DFID, 1999; Sobel, 2002). It may include membership of formal networks (such as a producer association) or a set of informal connections and acquaintances. Business connections, including supplier-buyer relationships, also contribute to social capital.

Physical capital

Physical capital includes the infrastructure, tools and equipment needed to support livelihood activities. It includes assets such as access to transport, energy, shelter and buildings. Lack of physical capital can significantly limit livelihood strategies and outcomes for households (DFID, 1999).

Financial capital

Financial capital comprises the financial resources that households use to adopt livelihood strategies and achieve livelihood outcomes, including income, credit and savings (DFID, 1999; Kanji et al., 2005).

Natural capital

Natural capital includes the natural resource stocks that support livelihoods, such as land, water and biodiversity resources (DFID, 1999).

Figure 1. A simplified sustainable livelihoods framework
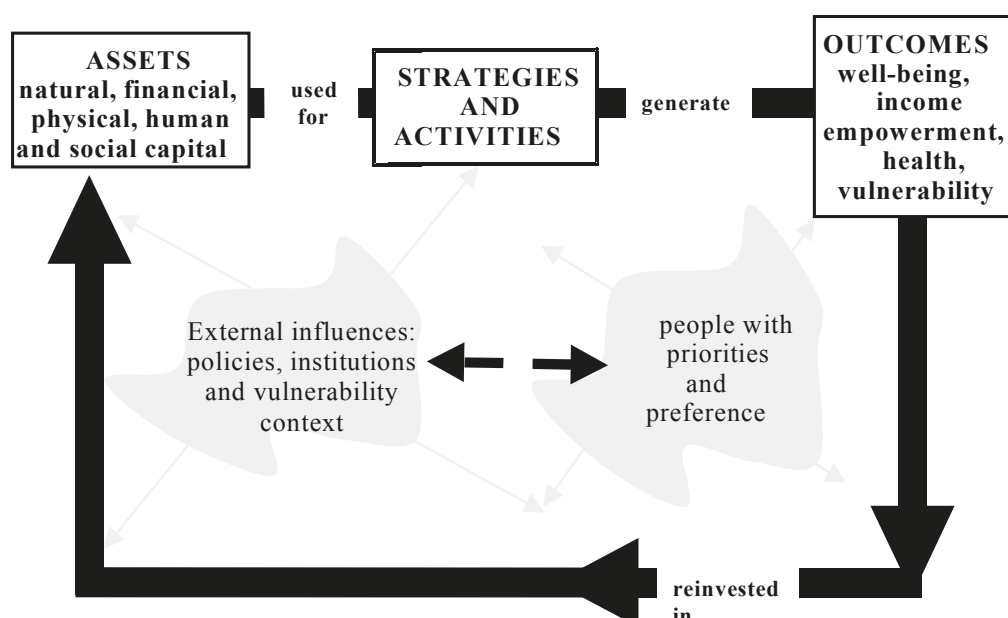
Source: Ashley and Hussein (2000)[14].

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[14] adapted from DFID, 1999, and Carney, 1998

3.2   Research methods

3.2.1 Study site

The livelihoods analysis was conducted in five states where most python hunting and trade takes place: Selangor, Perak, Kedah, Johor and Penang (see Figure 2). These states were selected due to their active involvement in the python trade over several years. Across these states pythons are found in all environments, but most commonly in forested areas (primary and secondary forest) and plantations (predominately oil palm, but also rubber and other agricultural lands). While Selangor, Penang and Johor are wealthy states with well-developed industry and infrastructure, Kedah and Perak remain relatively poorer regions.[15]

Malaysia is a newly industrialized, upper-middle income economy following a period of rapid economic development during the 1980s and 1990s. Malaysia has a substantial manufacturing sector and draws significant foreign revenue from electronics, petroleum and natural gas exports. Services are the main contributor to gross domestic product (50%), followed by manufacturing (26%), mining (13%) and agriculture (11%). The main agricultural exports are palm oil, rubber and cocoa. GDP (in terms of purchasing power parity) doubled between 2009 and 2014 and the share of households living below the poverty line is less than 1%.[16] GDP per capita was US$10,092 in 2013, but varies widely between states.[17] Considerable poverty and income inequality remain, particularly in rural areas and among certain ethnic minorities.[18]

Malaysia has a multi-ethnic population of 30 million people.[19] Malays and other indigenous peoples comprise 65% of the population, followed by Chinese (22%), Indians (7%) and other ethnic groups (1%).

Figure 2. Map of Malaysia with survey areas circled in red

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[15] IBP, 2015

[16] World Bank, 2015

[17] Department of Statistics, 2014

[18] IBP, 2015

[19] PWC, 2014

Selangor

Selangor is Malaysia's most populous (5.9 million people) and second most wealthy state in economic terms, with a GDP per capita of US$11,585 in 2013. It holds well-developed infrastructure, including Malaysia's largest port and airport. Located on the west coast of Peninsular Malaysia, it covers an area of 8,104 km². Despite widespread industrialization about 30% of Selangor is under natural forest (see Figure 3).

Johor

Johor borders Singapore at the southern tip of Peninsular Malaysia. Johor is an important trading point with Singapore, and is one of Malaysia's most developed states. GDP per capita was $7,919 in 2013.[20] Approximately 35% of Johor remains under natural forest (see Figure 3).

Perak

Perak lies north of Selangor on Malaysia's west coast, and is the second-largest state in Peninsular Malaysia, boasting 20,904 km². Perak holds significant tin deposits, which were the mainstay of the economy before the tin price crashed in the 1980s and many mines closed. Perak has since shifted towards manufacturing, but remains less developed relative to other wealthier states.[21] GDP per capital was $6,472 in 2013.[22]

Kedah

Kedah is located in the northwestern part of Peninsular Malaysia and borders with Thailand. Its area is 9,486 km². Most of Kedah's population lives in rural areas, and agriculture remains the mainstay of the economy. Recent government investment has sought to establish a small manufacturing sector. Kedah accounts for half of Malaysia's rice production. In 2013, GDP per capita was $4,993. Around 35% of Kedah remains under permanent forest reserve.[23] (Figure 3)

Penang

Penang in northwest Peninsular Malaysia covers two parts: Seberang Prai and Pulau Pinang (Penang Island). Combined, the state covers 1,046 km². In 2013, GDP per capita was $11,737, the highest state average in Malaysia.[24] Penang is highly industrialized and has large manufacturing and tourism sectors. Oil palm and rice are the main agricultural industries, followed by rubber. Around 7% of the state remains forested.

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[20] Malaysian Department of Statistics, 2015

[21] IBP, 2015

[22] Malaysian Department of Statistics, 2015

[23] Kedah Forestry Department, 2015

[24] Department of Statistics, 2015

Figure 3. Map of Peninsular Malaysia with natural forest cover marked in green
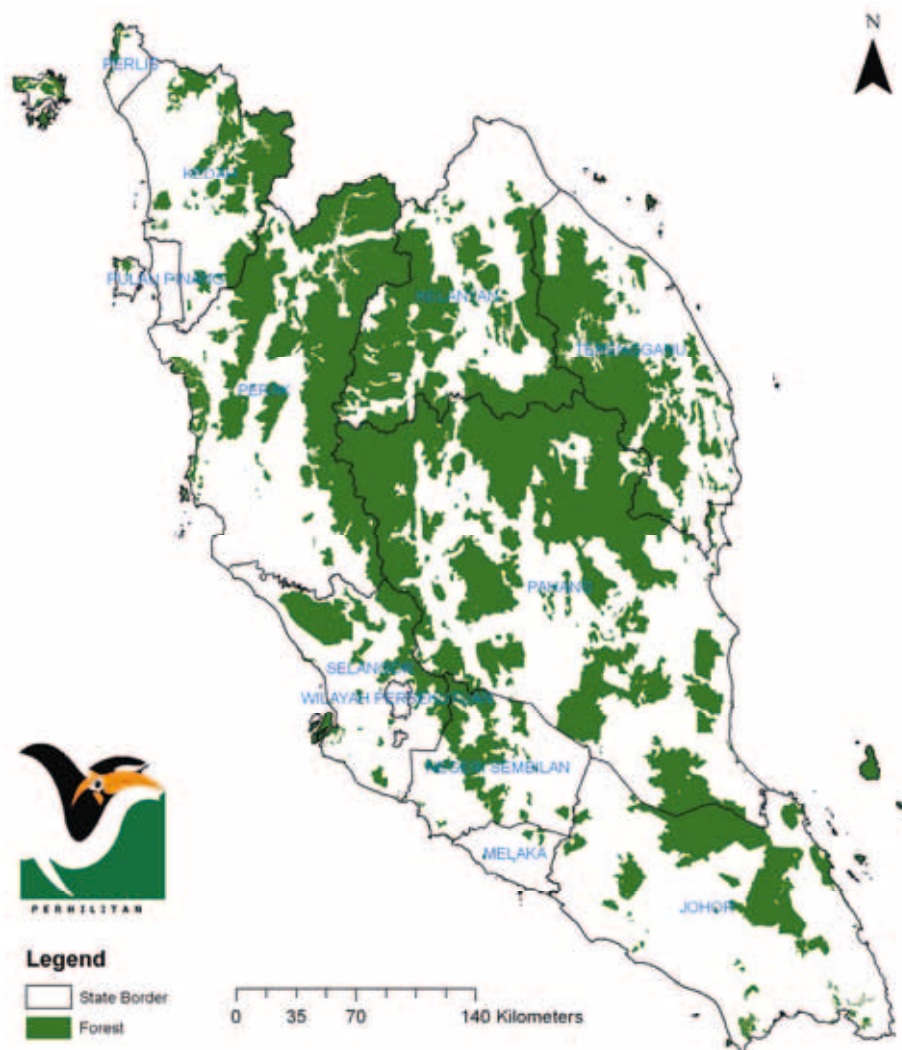
3.2.2 Data collection and analysis

In 2015, under the PCP framework, the ITC in partnership with PERHILITAN and the IUCN BPSG surveyed households working in the python skin trade. The study focused on collecting information to improve understanding about the livelihoods of those participating in the trade, including hunters, processors and exporters. The survey covered the livelihood assets of industry participants, python trade activities, and their economic and social impacts. The survey was semi-structured (respondents were allowed to provide their own answers rather selecting than from a menu of choices). Data collection was carried out through in-depth face-to-face interviews. PERHILITAN officers led the identification of survey participants using local licence records, in addition to recommendations from processing facility owners. Surveys were conducted at 52% (12/23) of the registered processing facilities in Peninsular Malaysia and included approximately 5% (42/948) of registered python hunters.

A total of 80 trade participants were surveyed. All households had a minimum of one member involved in the python skin trade, including those working as hunters (n=42), agents (n=3), employees (n=20) and facility owners/managers (n=15).

- **Hunters:** People involved in collecting pythons from wild sources, including forests, palm plantations and village areas.

- **Agents:** People involved in collecting pythons from hunters for delivery to processing facilities. Typically employed by the facility.

- **Employees:** People working at python-processing facilities, including processors, skin pinners (people working to pin python skins to wooden boards for drying), skin packers and office administrators.

- **Facility Owners/Managers:** People who own or manage python processing, tanning and/or export facilities.

Most interviews were conducted at the respondents' home or workplace. To increase sample sizes, several respondents were asked to travel to local PERHILITAN offices, where they were interviewed. Each interview lasted approximately 60 minutes and was conducted in Malay before being transcribed into English for analysis.

The data were examined for key themes using descriptive analysis to build a livelihood profile for trade participants. The data provide a broad context for the impacts of the python trade on local livelihoods reflecting the situation at the time of study (August/September 2015) across the four regions. Household-level data were aggregated to ensure personal information remained confidential.

Chapter 4: Livelihoods profile of households in the python trade

4.1 Socioeconomic profile of households

A total of 80 households participated in the survey, including hunters, agents, employees and owners (or managers) of python processing facilities. The respondents were from the southern, central and northern regions of Peninsular Malaysia, across five states: Johor, Selangor, Perak, Kedah and Penang.

Most respondents were from Selangor and Perak States, where most python processing and trading takes place (Table 2). Pythons collected by hunters in these and other states are typically delivered for processing at the nearest facility (potentially in a neighbouring state, as is the case in Johor, where a processing facility is located but no hunting is allowed). Hunters may sell their yield directly to the local processing facility, or to a regional agent who will travel between villages to collect pythons from individual hunters.

Table 2. Location of respondents interviewed, by job type

	Managers	Employee	Agent	Hunter	TOTAL respondents
Selangor	6	13	1	17	37
Perak	5	4	1	17	27
Kedah	2	0	1	5	8
Penang	1	0	0	3	4
Johor	1	3	0	0	0
TOTAL respondents	15	20	3	42	80

Source: ITC survey,

Table 3. Ethnic groups of respondents, by job type

	Managers	Employee	Agent	Hunter	Total
Han Chinese	13	2	2	7	24
Indian	0	0	0	22	22
Aboriginal	0	0	0	12	12
Malay	0	2	0	1	3
Indonesian	0	13	0	0	13
Myanmar	0	3	0	0	3
Other (Chinese-Malay / Chinese-Indian)	2	0	1	0	3
Total	15	20	3	42	80

Source: ITC survey

There was a clear divide in the roles undertaken by the various ethnicities, including Han Chinese, Indian, Aboriginal, Malay, Indonesian and the people of Myanmar (Table 3). Facility owners, managers and agents were typically of Han Chinese descent (with two Chinese Malay and one Chinese-Indian manager). Workers at python facilities included female Han Chinese and Malays in administrative and skin-packing roles (often working as part of a family business). Processing (killing and skinning of pythons) was undertaken predominately by people from Indonesia or Myanmar who were working temporarily in Malaysia, where wages are higher. The exception was smaller facilities in Perak and Kedah, where Chinese owners and their families were involved in all aspects of the business, including operations and sales, as well as processing. Hunters were mainly Indian and Orang Asli (the indigenous peoples of

Peninsular Malaysia). Many Orang Asli were involved in hunting pythons (and other wildlife) as a means of continuing their traditional practices. As is common in Malaysia, nearly all respondents (95%) were multilingual, speaking Malay (Bahasa Malaysia) alongside one or more other languages (including multiple dialects of Chinese as well as Tamil, Indonesian and/or English).

Python trade activities involved people aged 17 to 68 (see Figure 4). Facility managers ranged in age from 31 to 55, with a median age of 47. Employees were predominantly in their 30s. Hunters across all age groups were active, ranging from 20 to 68 years of age, with a median age of 40. With the exception of the female administrative workers and skin packers, all owners, managers, processers, agents and hunters were male.

Figure 2. Age of respondents
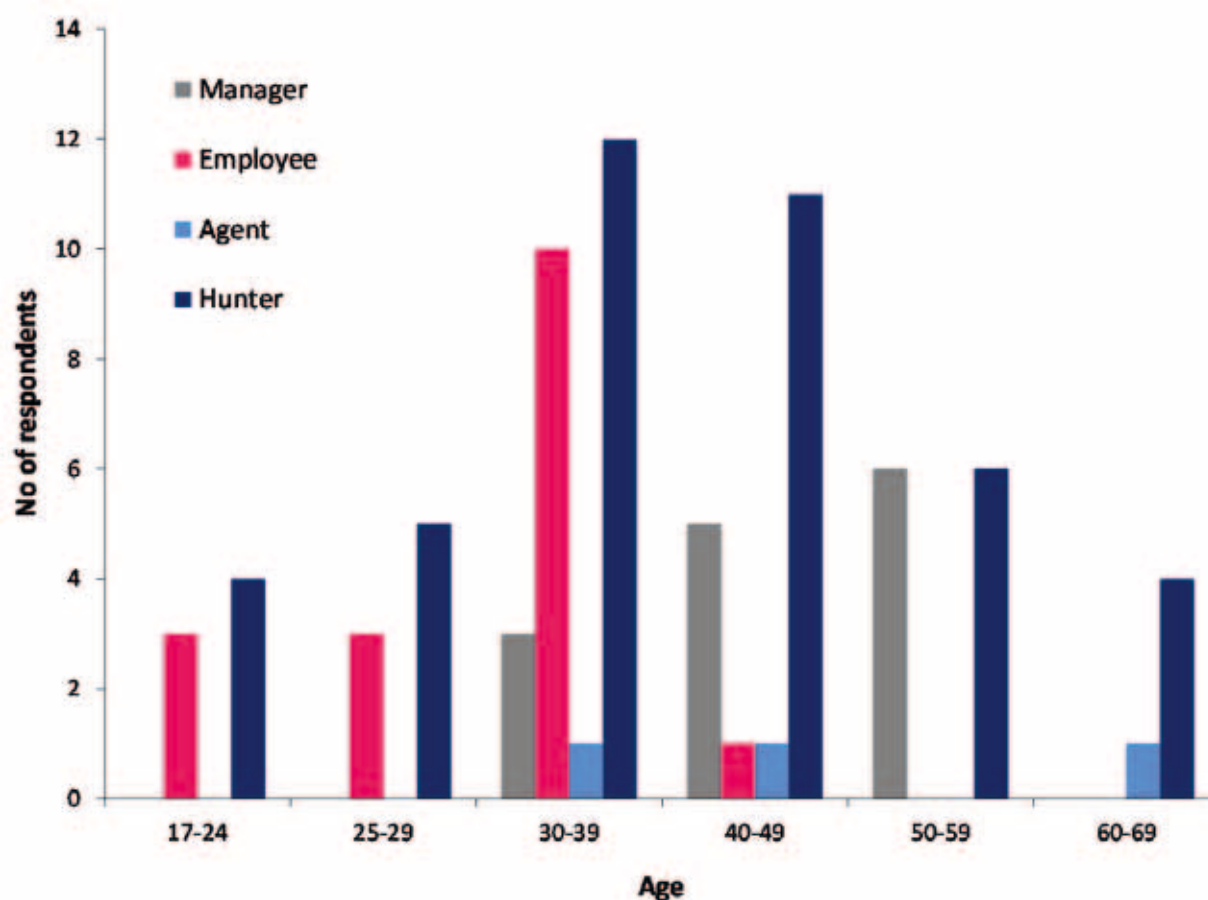
Source: ITC survey.

On average, python trade participants in Malaysia were supporting five household members, including an average of 2.2 children per household. Households had between 2 and 18 people living together, including up to 7 children (see Table 4).

Table 4. Household characteristics of respondents

Household characteristic	Mean/ Share	Median	Min.	Max.	No. respondents
Years in village (no.)	27.4	32.0	0.4	62.0	n=69
Years in the python trade (no.)	16	15	1	47	80
Household size (no. of persons)	4.9	5	2	18	n=76
Age of respondent	39.4	38	17	68	n=80
Age of spouse	38.1	35	18	68	n=62
No. of children	2.8	3	0	7	n=69
No. of children (under 20)	1.9	2	0	7	n=67
Education of respondent (no. of years)	7.4	6	0	14	n=74
Government support (% of respondents)	12				n=75
Home/farm ownership (% of respondents)	66				n=76
Raise animals for food (% of respondents)	26				n=74
No. of TVs	1.1	1	0	3	n=80
No. of PCs	0.3	0	0	3	n=76
No. of cell phones	2.4	2	0	6	n=79
No. of motorbikes	1.4	1	0	5	n=76
No. of cars/trucks	0.6	0	0	3	n=76
Internet use (%)	38				n=80
Household savings (% of respondents)	49				n=79
Household debt (% of respondents)	46				n=80

Note: Blank cells represent percentages where median, maximum and minimum numbers cannot be calculated.

Source: ITC survey.

4.2 Livelihood assets of python trade participants

Following the Sustainable Livelihoods Framework (see Section 3.1), the livelihoods of people working in the python skin trade can be characterized by their capital assets, including their human capital, social capital, physical capital, financial capital and natural capital. These assets differed between python facility owners/managers and their agents, employees at python facilities, and python hunters.

Human capital

Managers were typically more educated than employees and hunters, all having completed secondary (lower or upper; 83%) or tertiary education (17%) (see Figure 5 and Table 5).

Owners/Managers/Agents: All python facility managers and agents had completed lower secondary or upper secondary school. Two owners had also attended university. Most owner/managers (86%) had advanced literacy skills. All owners/managers of processing and trading facilities were the second or third generation operating the family business.

Employees: Workers typically held less human capital, with fewer than half (47%) having completed secondary schooling. Some 70% of the workers from Indonesia and Myanmar (mostly involved in processing roles) had not completed secondary schooling. Nevertheless, most employees (69%) held advanced literacy skills. Most employees had joined the industry after graduation or had left other low-skilled, labour-intensive jobs such as working in factories or oil palm plantations. An exception was the two

female office administrators working to prepare accounts and licencing documents – both were highly educated and had previously held other managerial roles.

Hunters: Most hunters had only primary (68%) or no formal education (15%). Of the seven that continued to secondary school, only one had graduated. Most hunters had only basic (59%) or moderate (20%) literacy skills and many could not read, write or count.

Figure 3. Education of respondents
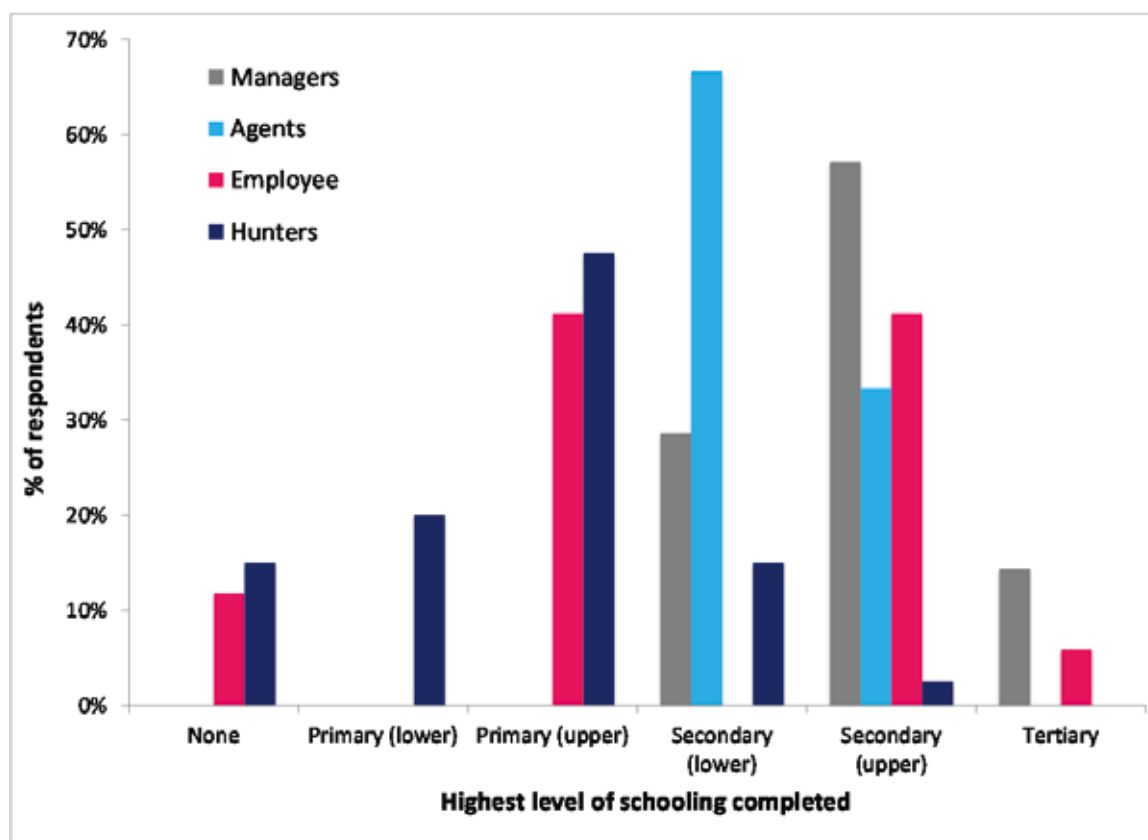
Source: ITC survey.

Table 5. Education and literacy level

Level of schooling	Years of schooling	Managers	Agents	Employees	Hunters
		n=15	n=3	n=20	n=41
None	0	0%	0%	12%	15%
Primary (lower)	1 to 3	0%	0%	0%	20%
Primary (upper)	4 to 6	0%	0%	41%	48%
Secondary (lower)	7 to 10	29%	67%	0%	15%
Secondary (upper)	11 to 12	57%	33%	41%	3%
Tertiary	13+	14%	0%	6%	0%
Literacy					
Basic		0%	67%	25%	59%
Moderate		14%	33%	6%	20%
Advanced		86%	0%	69%	22%

Source: ITC survey.

Social capital

For a number of reasons, the python trade industry is not well interconnected across Peninsular Malaysia. Malaysian small businesses are typically private in nature and unwilling to share their business 'secrets' or experience with others.[25] More importantly, most processing facilities are simply too small and far from one another to share information. Most facilities only discuss the trade with their buyers. Employees at processing facilities were often transitory – typically from Myanmar and Indonesia, and working in Malaysia to save money before returning home. However, most employees in the businesses had heard about work opportunities from family and friends.

Hunters were more connected than other python trade participants. Half of interviewed hunters said they met with others to discuss the python industry, and 41% hunted in pairs or groups of three or four.

Physical capital

Facility Managers/Agents: Facility managers were more likely to hold physical assets than other trade participants. Larger business owners were the wealthiest, and held multistory properties in prestigious neighbourhoods. Most households (86% of owner/managers and 58% of agents) owned their home. All owners, managers and agents had at least one car, with the average household holding 1.8 cars. The average household for owners and managers had more than one television and personal computer, one motorbike and 3.6 cell phones. None of the agents used Internet, although 93% of facility managers did (see Tables 6 and 7).

Employees: Most employees also owned their home (53%), but had fewer physical assets than managers and agents. More than half of households had a motorbike (64%) and only two had a car (the office administrators). Employees were unlikely to own a PC and only 41% used Internet.

Hunters: Python hunters were mostly homeowners (64%), and all but one possessed a motorbike. Motorbike was the main form of transport among hunters, with households owning, on average, 1.7 motorbikes and 0.4 car. The average household had one television, while only five hunters had a PC and just 21% used Internet (see Tables 6 and 7).

Table 6. Physical assets of respondents (average number per household)

	Televisions	PCs	Cell phones	Motorbikes	Cars
Owners/Managers	1.6	1.2	3.6	1.1	1.8
Agents	1.7	0.3	3.0	3.0	1.7
Employees	0.9	0.1	1.9	0.5	0.1
Hunters	1.0	0.1	2.1	1.7	0.4

Source: ITC household survey, 2015.

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[25] Natusch, unpublished data

Table 7. Physical assets of respondents (average number per household)

	Internet use	Own home	Raise animals for food
Owners/Managers	93%	86%	7%
Agents	0%	58%	42%
Employees	41%	53%	50%
Hunters	21%	64%	22%

Source: ITC survey.

Financial capital

Facility managers/Agents: Managers' finances varied with the performance of the industry from year to year. Most owners indicated that market prices had been poor in recent years, and their annual profits had been affected. Of the respondents, 50% received household income from other sources. The sources of other income were spouses or other relatives also working in the business, income from processing other wildlife and/or other work on palm plantations. Most (87%) received the bulk of their household income from the python trade. Only two respondents had other full-time work – one as a fish wholesaler and the other (an agent) as a truck driver.

Owners, managers and agents were more likely to have both savings and debt when compared to other trade participants. Of these respondents, 64% held savings (mostly for housing and vehicles) while 76% held debt.

Employees: Employees received a monthly wage and typically did not have other income sources. Employees earned $275 to $400 a month, depending on their experience and their responsibilities. For employees from Indonesia and Myanmar, this salary included boarding expenses. Around one-third (29%) of employees had other household income from a spouse or other relative.

Most employees (65%) believed their household income had increased over the past five years as a consequence of entering the python industry. Employees generally had some savings (58%) and only 23% had a debt. Workers from Myanmar and Indonesia were committed to saving, and sent up to 70% of their income back to their families after covering basic expenses.

Hunters: Hunters mostly worked opportunistically alongside other employment activities, as the yield from python hunting varied significantly between seasons. Most (63%) believed their household income had remained constant or decreased over the past five years. For those whose income rose, this was generally because their children had entered the workforce and begun to contribute to household incomes. Despite the data we received, many hunters were unsure or could only provide a guess of their annual incomes. Many were unable to count, and spent income as soon as it was received, which made it difficult to calculate income over an entire year.

Only 36% of hunters had any savings, and most spend all their income on household living costs (including education). Some 43% of hunters had a debt, typically after financing housing or vehicles.

Natural capital

Hunters mostly gained a livelihood from pythons, but 60% also hunted monitor lizards (*Varanus salvator*), turtles (*Amyda cartilaginea*), wild boar (*Sus scrofa*) and civet (*Paradoxurus hermaphroditus*). People working in the python trade in Peninsular Malaysia depend heavily on natural capital. The land and forest surrounding their communities support the python populations on which they depend. Some 15% of hunters found their pythons exclusively on palm plantations. The remainder found pythons in forested areas (7%) or across a mix of natural environments including forests, palm plantations, rural villages and other agricultural lands (76%). Luckily, pythons are still very abundant throughout Peninsular Malaysia, but

ongoing sustainability is essential for people so heavily reliant on this form of natural capital (see Section 4.4.1 on conservation implications of trade).

Reliance on wildlife by people in Peninsular Malaysia is also directly linked with their access to land. Although hunters rely heavily on natural capital, almost none owned large areas of land (only a few acres in the vicinity of their homes). They must therefore venture onto private or state-owned land to carry out hunting activities. In many instances, plantation owners refuse hunters access to land for fear of theft. So while one form of natural capital is readily accessible and abundant (pythons), access to another form (property rights and tenure on which to hunt) restricts the ability of some trade participants from fully realizing their livelihood potential.

Impact of the python industry on livelihood assets

Households working in the python skin trade had varying levels of human, social, physical, financial and natural capital (depending on their role in the industry, their other income-earning activities and other inherent circumstances). The python trade has several impacts on these assets (see Table 8).

For example, python hunting, processing and tanning had contributed to advancing human capital among trade participants, who often passed knowledge of the trade on to their family and friends. Hunting wild animals can require specific skills and can pose certain risks (e.g. venomous snake bite). For this reason, many hunters (43%) worked in pairs or groups of 3–4, which helps to build social connections. The python trade has helped indigenous hunters retain local knowledge and cultural hunting practices.

The python trade has also helped participants afford physical assets such as housing, transport and food. For many (83% of facility managers,[26] 71% of employees and 28% of hunters), working in the python trade was the only source of household income and hence the main pathway through which livelihood assets could be strengthened. For other participants, working in the python trade alongside other seasonal or full-time occupations has contributed to financial resilience. Most respondents (71%) found the python trade to be 'very important' to their livelihood. The remaining 29% were predominantly hunters who opportunistically collected only a few pythons each year.

Table 8. Summary of impacts of the python skin trade in Peninsular Malaysia on livelihood assets

Impact on	Positive impacts	Negative impacts
Human capital	Python hunting, processing and tanning requires new skills and abilities, often passed on to other family or community members.	Specialized, physical skills required for python hunting and trade are not readily transferable to other industries.
Social capital	The trade has allowed indigenous communities to maintain cultural hunting practices.	
Physical capital	Trade participation enables households to meet basic needs such as housing, transport and food.	
Financial capital	Trade participation provides income to support living costs and build assets. Python trade alongside other seasonal or full-time occupations helps to build financial resilience. Employees at processing facilities are able to earn a wage higher than is possible in other low-skilled industries.	Trade participation has not provided financial stability for many poorer households due to the seasonal and of serendipitous nature of python hunting. For most employees and hunters, wages and revenues are well below the national average.
Natural capital	Hunting pythons has helped to manage burgeoning populations on established palm plantations. Python hunting ensures python populations and distributions are informally monitored. The python trade ensures forested areas maintain value particularly among indigenous communities that rely on these areas for their livelihoods.	Dependence on natural capital creates vulnerability, particularly from changes in seasonal conditions and environmental shocks such as drought or resource depletion.

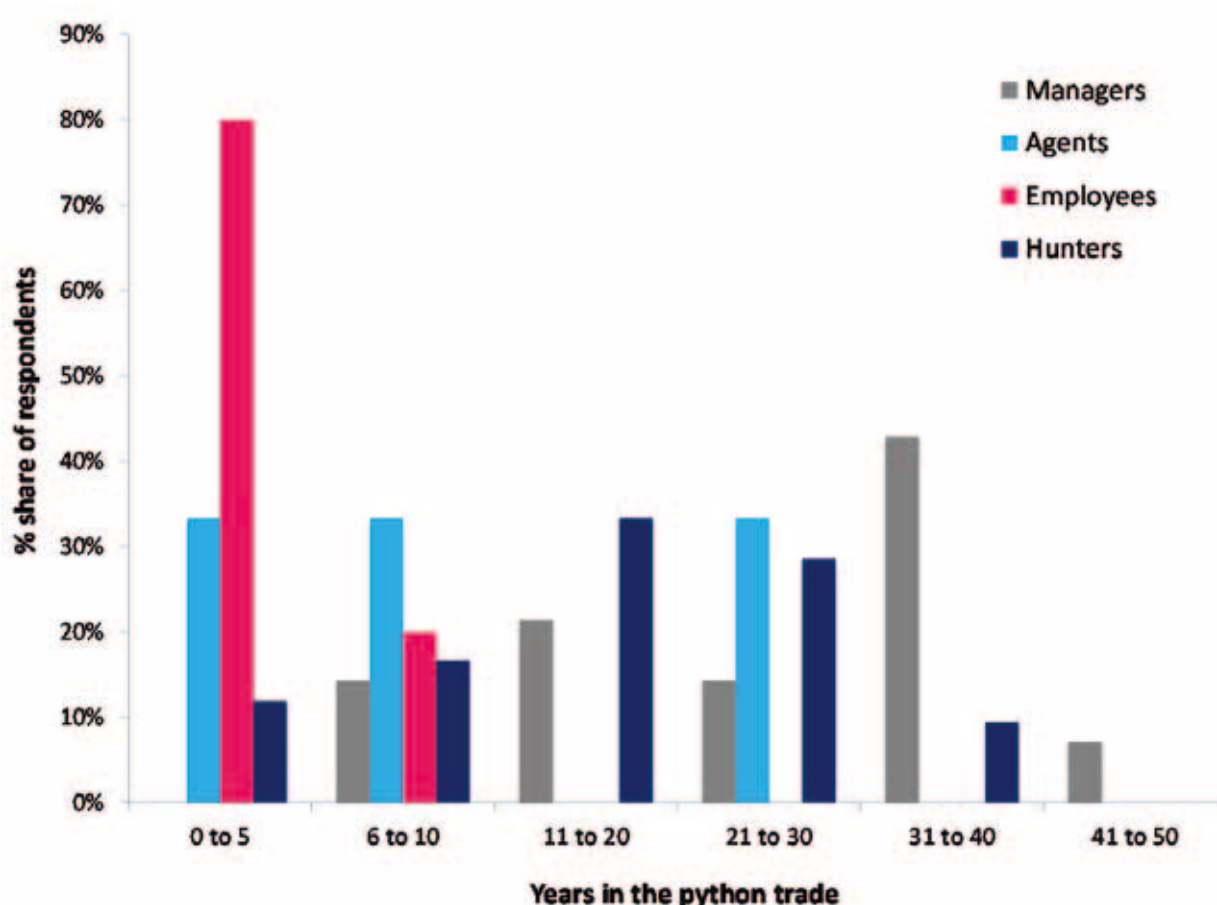*Source:* ITC survey.

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[26] Some of these owners and managers also processed other species at their facilities, but python was the main source of income.

4.3 Python harvesting as a livelihood strategy

Household respondents had participated in the python trade for a few months to 47 years, with the average household involved for 16 years. As a group, owners and managers had the most experience, averaging 25 years. Most of these participants were running second-or third-generation family businesses. Employees were typically new to the trade, with 94% working at python facilities for fewer than five years. In contrast, the majority of hunters had been in the trade for several decades, with an average of 19 years' hunting experience (see Figure 6).

The three main reasons for entering the python trade were: income diversification (or to meet living expenses; 35%), to continue the family business (28%), and for the opportunity to work (21%). Many employees had experienced difficulty finding work in other industries, and had been told about the python trade by friends currently working in the trade.

Figure 4. Number of years working in python skin trade in Peninsular Malaysia

Source: ITC survey

Relative importance of python trade activities

All except three facility owners and managers worked exclusively processing wildlife. One in four also had spouses working in the family business. The other 50% had no other source of household income and relied solely on the python trade. While most of their business was python processing, five managers also processed water monitors (*Varanus salvator)* and five processed water monitors as well as other reptiles.

Employees also worked full time in the python trade and did not participate in other income-earning activities. Employees' households were highly dependent on the trade, with only 35% having a spouse or parent also contributing to household income.

By contrast, all three agents and 68% of hunters combined python collecting with other income sources. Around one-third of hunters worked in oil palm plantations, while another third earned additional income from other business activities such as truck driving or rice cultivation (See Figure 7).

Figure 5. Livelihood strategies of python hunters in Peninsular Malaysia
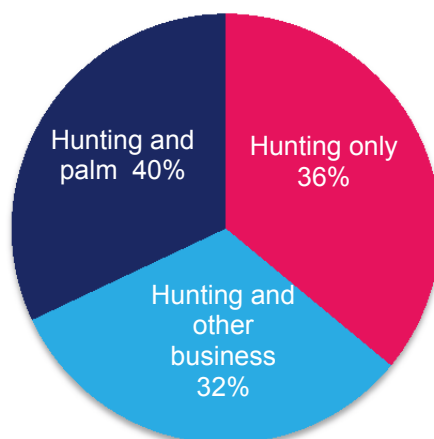
Source: ITC survey

Livelihood strategies of trade participants

Python facility managers, employees, agents and hunters have vastly different livelihoods, in part attributed to their income-earning activities and their outcomes. For example, many hunters were catching pythons to earn supplementary income to meet living expenses, while some managers ran large-scale, well-established family businesses with a number of employees. Annual income for trade participants can therefore vary from a few thousand US dollars to hundreds of thousands of dollars (see Table 8 and 9).

In this section, profiles of the four 'typical' trade participants are presented: a manager, an employee, an agent and a hunter. As financial data collected were largely incomplete, these profiles rely on both reported and imputed quantitative and qualitative information on business operations and returns in 2014.

Facility owner/manager

Of the participants, 15 were owners or co-managers of a python facility that processed, tanned or traded python skins. Small processing facilities with one to five employees (often family members) processed between 500 and 5,000 pythons in 2014. Owners of these facilities are typically 'all-rounders', participating in processing, business management and sales. In contrast, the largest processing facility had 30 employees, each with specialized skills and job responsibilities, and processed about 60,000 pythons a year. Most facilities directly exported air-dried raw skins, but some smaller facilities sold their skins to local tanneries or other clients.

Larger processing facilities employ agents who travel between states to purchase pythons from hunters in regional areas. They may also have more than 100 hunters working locally to supply pythons to the facility. Smaller facility managers may only have 5–10 hunters providing pythons on a regular basis, and some even participated in hunting themselves. Facility managers paid hunters based on the weight of their catch. Pythons are bought for $3–6 per kilogram, with the average python weighing 7–8 kg.[27] Hand-caught skins receive a higher price than net caught pythons or those with badly scarred skins.

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[27] Natusch et al., in press

Employees were often all-rounders. At larger processing facilities, however, specialized individuals were hired for processing, skin pinning, packaging and sales. Managers surveyed reported paying workers $250–370 a month. Facilities employing agents full time paid about $1,500 a month. Half of the managers surveyed also had family members working in the business.

Pythons are mainly sold for their skins, but processors also received a small return from the sale of meat and gall bladders. Facility managers reported paying $30 and $60 for skins, depending on the length and quality. Skins purchased were between 2.5 m and 7 m long.

Managers said the current market was poor and that the prices paid for pythons had decreased in the last two years. All managers had stockpiled skins as harvest had exceeded demand in recent years. Almost half (7/15) of managers said they were looking for new markets in order to expand.

Profiles for a typical large- and small-scale processing facility were examined to better understand the returns associated with the python trade in Malaysia. A large facility was assumed to process and sell 50,000 pythons a year and a small processor, 5,000 pythons. The main business costs were assumed to include python purchases, staff, rent (or facility repayments), utilities and maintenance. Note that these estimates are for the business rather than any individual owner, and that bigger businesses had several partners in ownership and management. Such a large processing business could earn almost $250,000 a year and a small processing business could earn up to $50,000 a year (see Tables 9 and 10).

Table 9. Example of an income statement for a large-scale processor of python skin trade in Peninsular Malaysia[28]

Sales	Total ($)
Skin sales (50,000 skins x 3 m x $17 per metre)	2,550,000
Meat and bone sales (50,000 snakes x 3 kg x $0.25 per kg)	37,500
Gall bladder sales (50,000 gall bladders x $0.5 each)	25,000
Expenses	Total (US$)
Pythons purchases (50,000 pythons x 8 kg x $5 per kg	2,000,000
Staff (25 staff x USS 300 a month x 12 months)	90,000
Agents (full time) (10 agents x $1,500 a month x 12 months)	180,000
Rent/Loans ($4,500 a month x 12 months)	54,000
Maintenance (utilities, vehicles, other) ($3,200 a month x 12 months)	38,400
TOTAL PROFIT (BEFORE TAX)	250,100
NET INCOME	187,575

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[28] *Malaysia's corporate tax rate is 25% for all businesses (Table 9&10) both tables based on ITC survey

Table 10. Example of an income statement for a small-scale processor of python skin trade in Peninsular Malaysia

Sales	Total ($)
Skin sales (5,000 skins x 3 m x $17 per metre)	255,000
Meat and bone sales (5,000 skins x 3 kg x $0.25 per kg)	3,750
Gall bladder sales (5,000 gall bladders x $0.5 each)	2,500
Expenses	Total ($)
Pythons purchases (5,000 pythons x 8 kg x $5 per kg	200,000
Staff (2 staff x $300 a month x 12 months)	7,200
Rent/Loans ($450 a month x 12 months)	5,400
Maintenance (utilities, vehicles, other) ($320 a month x 12 months)	2,880
TOTAL PROFIT (BEFORE TAX of 25%)	51,170
NET INCOME	38,377

Agents

Only three agents were surveyed as part of this study, affiliated with three different processing facilities. These agents collect up to 500 pythons a month from the hunters they visit on a weekly or monthly basis. Agents are typically hired by processing facilities to source pythons from hunters. Agents build relationships with individual hunters to maintain their business. Agents employed by a processing facility earned an average of $841 a month (or almost $10,100 a year) from python collection. One of the three agents was an independent who sold to multiple processing facilities, based on their price per python. This agent bought pythons for $1–2 less than the price paid directly by processing facilities.

Agents worked irregular hours collecting pythons alongside other income-earning activities, including working on oil palm plantations, driving trucks and working as part of other family businesses. But python collecting was the major source of income for all agents. All agents expected to be in the job long term as they found the work easy and the financial returns better than other available work.

Employees

Most of the facility managers surveyed employed additional staff. A total of 20 employees participated in this study, from four larger processing facilities, including five women. Employees surveyed were mostly involved in processing pythons and meat, and pinning skins to wooden boards for drying. Female workers surveyed worked to measure, count and pack dry skins. Two women also worked in office administration, processing sales and licences.

Employees mostly joined the python industry for a short time to earn money. With the exception of the office administrators, workers planned to stay in the industry for 2–4 years, saying it provided an opportunity for a stable, 'good income'. Two employees said the pay was better than other labouring or construction work. Nevertheless, while a quarter would recommend the job to friends, most would not recommend the industry and were working in the trade because they had no other work or simply due to personal circumstances.

Employees were paid an annual salary of between $3,305 and $4,406. Indonesian workers also received full board.

Hunters

Licences have been issued to hunt pythons in Peninsular Malaysia since the 1970s (see Box 2). In 2015, 948 people were licenced to hunt *P. reticulatus* in Peninsular Malaysia. In this study, we interviewed 42 hunters, each claiming to collect between seven and 5,000 pythons a year (see Figure 8). The median number of pythons collected per year was 250. In July 2015 (the month before the survey was conducted and the 'low season' for pythons), hunters captured a median of 20 pythons. However, these figures may not be representative of the actual catch of individual hunters.

Licensed python hunters undoubtedly receive snakes from friends or plantation workers, and thus effectively act as agents as well as hunters. Respondents may have been unwilling to disclose this information, because it suggests that not every individual who collects a snake in Peninsular Malaysia is licensed. Instead, many simply pass on (sell) snakes to licensed individuals. We strongly suspect that many more people are involved in the trade of pythons than is indicated by licence records. For example, annual capture of a similar number of pythons in neighbouring Indonesia is estimated to involve more than 100,000 individuals. In Malaysia, although only 50 pythons are allowed per licence, no restriction is placed on the number of licences that can be purchased by a single individual. This suggests that this system is suitable for capturing revenue through licence fees, but is limited in its effectiveness for determining useful sustainability indices such as catch per unit effort (CPUE).

Figure 6. Mean numbers of pythons captured each year by python hunters in Peninsular Malaysia
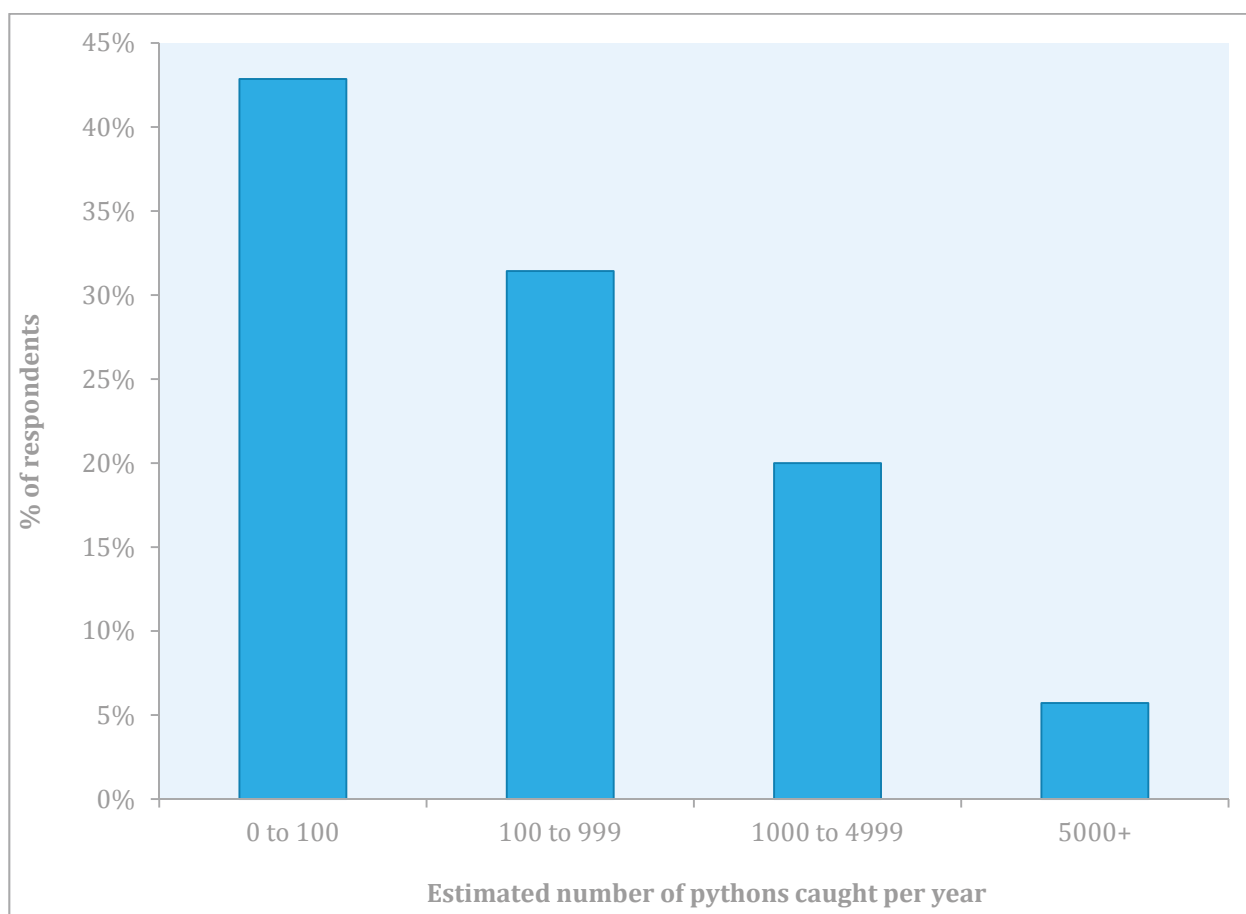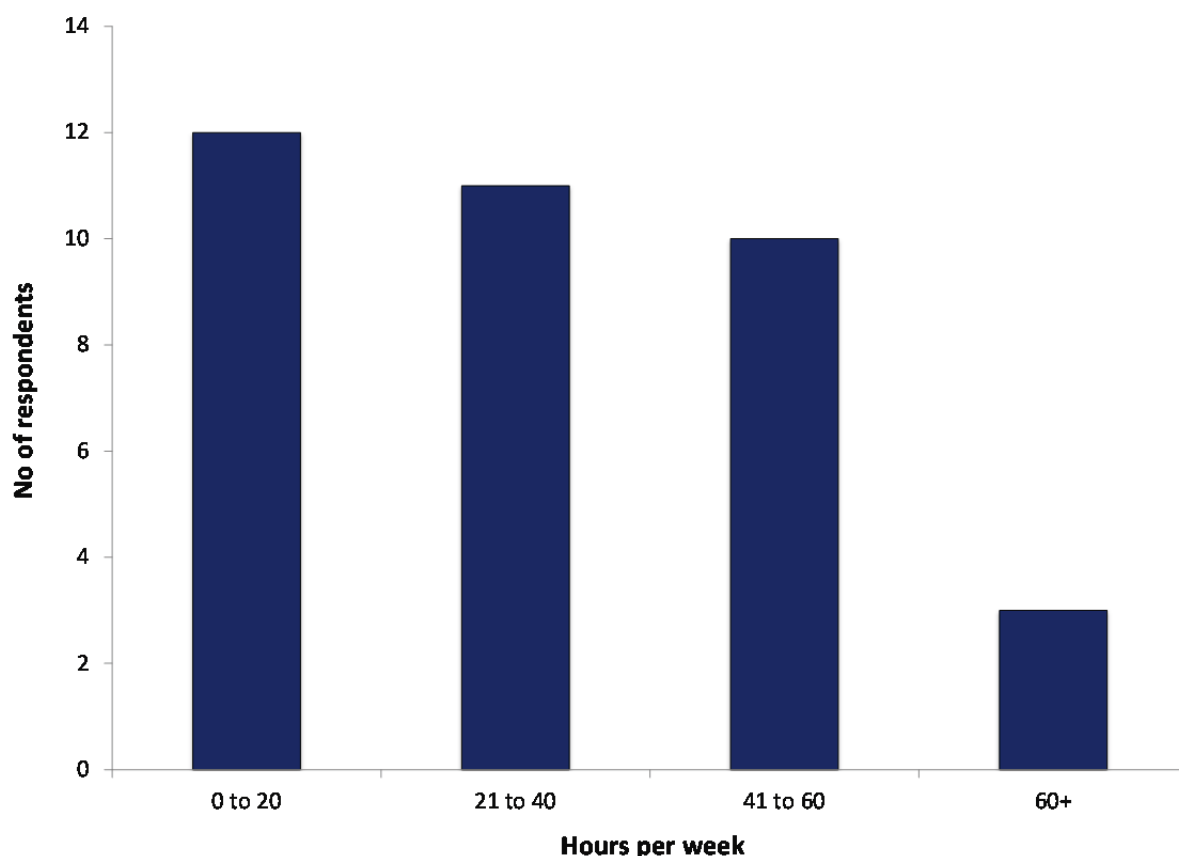

Source: ITC survey

Most hunters were well established and had been hunting for an average of 19 years. Only five had been hunting less than five years. The oldest hunter was 68 years old and had been hunting pythons for 40 years. Hunters worked in secondary forest and palm plantations. About one in three hunters also received calls from friends to collect pythons from their properties.

Hunters worked anywhere from four to 80 hours a week (see Figure 9). Those collecting snakes from friends in addition to hunting themselves were often professionals, whereas smaller-scale hunters worked part time or opportunistically. Two in three collected year-round, while a third only hunted during the rainy season, when pythons are most active. However, we suspect our survey methodology created sampling biases that skewed responses to this question. Informal conversations with most hunters revealed that those taking part in our survey had been identified as 'known' or prominent snake hunters. Nevertheless, people going about their daily activities capture a significant proportion of pythons opportunistically. These individuals may collect only one or two snakes each year, selling them either directly to local processing facilities or to friends with hunting licences. Despite being an important component of the python harvest in Malaysia, this demographic was underrepresented in our sample.

Figure 7. Mean number of python hunters' weekly working hours in Peninsular Malaysia

Source: **ITC survey**

Hunters had a range of techniques for catching pythons. About half (49%) used a combination of netting and hand-catching methods. Three hunters also reported using pinning sticks to aid with hand-catching methods. According to hunters, while nets can catch larger numbers of pythons, the skins are often damaged, reducing the price paid by the processing facilities. Actively searching for pythons is more difficult (fewer snakes are caught), but skins are better protected using this technique and the price is higher for unmarked skins (up to $2 more per kg).

Most hunters surveyed sell pythons directly to processing facilities rather than through a middleman. The facilities pay hunters between $3.60–4.90 per kilogram up to 10 kg, plus a bonus of $6–15 for larger pythons or high-quality skins. The main costs associated with python hunting are fuel and nets. On average, hunters spent $43 a month on fuel and $10 a month on nets (due to damaged or lost nets).

Profiles for a 'typical' large and small-scale hunter were estimated. A large-scale hunter was assumed to collect 500 pythons a year using a combination of active searching and nets, and a small-scale hunter was assumed to collect 50 pythons by hand. The large-scale hunter spent an estimated $750 a year on motorbike fuel and $125 on nets. The small-scale hunter was assumed to spend $360 and $40 on fuel and nets, respectively. Both hunters were estimated to incur annual motorbike maintenance costs of $50. Licence fees for most hunters are typically paid by the processing facilities to which they sell, as a bond of loyalty. Based on these estimates, a typical large and small-scale hunter could earn a potential $12,825 and $920, respectively.

Box 2: Hunting licensing in Peninsular Malaysia

Under the Wildlife Conservation Act 2010 [Act 716], hunters and traders must obtain a licence from PERHILITAN before any python-related activities take place. Hunters are required to obtain a hunting licence at the nearest state office. This licence is valid for one year, with a bag limit of 50 pythons and a levy of RM 2 (approximately $0.60) per python. If the bag limit has been reached, the hunters must surrender the licence and get a new one. Hunting can only be done between 7am-7pm and must be conducted within the respective state. Hunters are allowed to catch pythons by hand and/or using nets. However, no shooting or other destructive methods are permitted. There are no restrictions on the sizes of pythons that can be captured.

Traders who buy and sell pythons and their derivatives (e.g. gall bladders), and/or participate in processing activities, must obtain a business licence (RM 300.00; approx $100 per year) and/or a taxidermy licence (RM 200, or about $65 a year) from the PERHILITAN state office. All transactions including purchases, sales and their quantities must be logged, along with the details of transaction (e.g. hunter name and address) in PERHILITAN-issued logbooks that are submitted to the department annually. For the purpose of import/export, CITES permits can only be obtained at three PERHILITAN offices – Federal Territory of Kuala Lumpur, Pulau Pinang and Johor.

Figure 8. Relative importance of methods used by hunters to collect pythons in the wild in Peninsular Malaysia
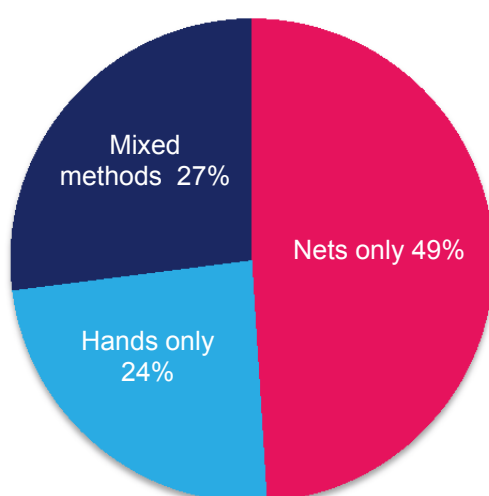
Source: ITC survey.

Table 11. Example annual income statement for a large-scale hunter participating in python skin trade in Peninsular Malaysia

	Large-scale hunter
Sales	Total ($)
Python sales (250 scarred pythons x $15) (250 good-quality pythons x 8 kg x $5)	13 750
Expenses	Total ($)
Fuel	750
Nets	125
Vehicle maintenance	50
NET INCOME	**12 825**

Source: ITC survey.

Table 12. Example annual income statement for a small-scale hunter participating in python skin trade in Peninsular Malaysia

	Small-scale hunter
Sales	Total ($)
Python sales (25 scarred pythons x $15) (25 good-quality skins x 8kg x $5)	1 370
Expenses	Total ($)
Fuel	360
Nets	40
Vehicle maintenance	50
NET INCOME	**920**

Source: ITC survey.

4.4 Livelihood outcomes of trade participation

Based on licence records, at least 1,000 households rely on the python skin trade in Peninsular Malaysia (although the number of people benefiting from the serendipitous capture of the occasional python is undoubtedly higher). Unsurprisingly, the ways that the trade enables and strengthens livelihood outcomes varies significantly among participants.

Socioeconomic outcomes

The python skin industry in Peninsular Malaysia contributes directly to employment, business and income-earning opportunities, and safety nets. Financial data available from survey respondents were largely incomplete. Nevertheless, based on information collated from trade participants (see Section 4.2), it is evident that the python trade provides households with significant earning potential to support their livelihoods.

As of 2014, the median salary in Peninsular Malaysia was $5,783 (RM 18,900) and the median household income was $16,836.[29] Managers, agents and large-scale hunters would mostly earn above this median. Small-scale hunters would mostly earn below the median salary from hunting and, as discussed earlier, generally supplement hunting with other casual or full-time employment. Employees typically rely solely on the python industry to support their livelihoods and can be classified as low-income earners. Perhaps for this reason, most low-paying processing roles were held by migrants.

Table 13. Estimated household income from participation in python skin trade in Peninsular Malaysia (by business type)

Business type	Approximate average annual income from participation ($)
Large-scale processing facility	250 100
Small-scale processing facility	51 170
Agent	10 000
Employee	4 000
Large-scale hunter	12 825
Small-scale hunter (part time)	920
Median salary in Malaysia[30]	5 783
Median household income Malaysia[31]	16 836

Source: ITC survey.

The main impact of the python trade on wellbeing in Peninsular Malaysia is through providing income for food, housing, utilities and other expenses. Secondly, it has given many households the opportunity to diversify income and thereby strengthen livelihood resilience. According to respondents, the returns from the python industry are higher then they could secure elsewhere. Many small-scale hunters explained that when other employment opportunities were scarce, they often relied on python hunting to see them and their families through bad times.

As with most industries, the earning capacity of individuals depends on a wide set of personal factors such as age, education, access to financial capital as well as external economic and social circumstances. For example, hunters claimed that their catch (and income) could be increased by thousands of dollars a year by investing additional time and by using nets.

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[29] Department of Statistics, 2015

[30] Department of Statistics Malaysia, 2015

[31] Department of Statistics Malaysia, 2015

External factors affecting the industry, such as market uncertainty, have had a significant impact on households in recent years (see Section 6). Furthermore, relying on wild resources creates additional uncertainty for hunters in particular, and for the industry more broadly. These external factors can lead to livelihood insecurity among households. These negative impacts of the python trade on livelihoods and wellbeing was made evident by managers and hunters in particular:

- **Managers**: All but two managers were heavily invested in the trade and unlikely to leave, despite recent problems in locating buyers. Most would not recommend the industry to others to avoid competition in an already difficult market. One manager said that 'no one wanted to work with snakes and killing' while another called the industry 'distasteful'. Only one in four owners wanted their children to continue the business, generally wanting 'better' or 'nicer' jobs for them. While traders can potentially earn high revenue from the trade, they must be willing to accept a high market volatility and uncertainty (see Chapter 6).

- **Hunters**: Only 30% of hunters would recommend the industry to family and friends, and a similar percentage would like their children to hunt pythons. The remainder believed the work was 'too hard' and 'dangerous' (mainly because of the risk of encountering venomous snakes) with no security/health benefits. Nevertheless, most hunters (65%) expect to continue in the industry for the next 10 years as they have established skills in python hunting and believed they could not get any other job without further education. Hunters who undertake other paid employment continue hunting, because it can be carried out flexibly alongside other work and it provides higher income than other local work available.

4.4.1 Conservation implications of trade

The python skin trade has several consequences for species and habitat conservation. Hunters generally had mixed views about the change in python populations over time, with approximately equal numbers claiming their catch rates had increased, decreased or remained unchanged in the past five years (see Figure 9). Many hunters probably provided answers based on their recent experiences, or did not keep accurate records of numbers captured. The opinions of processing-facility owners (who deal with far greater volumes of snakes, for much longer periods), would provide more robust indicators of the trends in python populations. Of the facility owners interviewed, all but two said the number of snakes harvested had increased (3/15) or stayed the same (10/15). The two that reported numbers collected had dropped cited reduced demand, and thus decreased hunting effort. However, processing-facility owners may also have a vested interest in claiming harvests are sustainable, highlighting the need for ongoing and independent monitoring of the numbers and body sizes of harvested snakes.

In summary, harvesting may result in localized declines in python density at specific sites, which is probably noticed by hunters. However, the mixed result in perceptions likely reflects the seasonal changes python populations undergo (and the varying spatial dynamics of hunter harvest areas), rather than long-term population declines across Peninsular Malaysia. Evidence suggests the development of a large-scale palm oil industry in Malaysia has benefited pythons, which are common in artificially constructed canals on the plantations and thrive on the high number of rats that feed on palm kernels.[32]

In keeping with this conclusion, most hunters said they captured pythons primarily on oil palm plantations, rather than in natural forest areas. Other lines of evidence can corroborate this result. A parallel study examining the biological attributes of harvested pythons revealed that the stomach contents of 3,027 Malaysian pythons (taken to processing facilities) consisted almost entirely of rice field rats and a range of domesticated animals (chickens, goats, dogs and cats) rather than more 'exotic' prey that would be expected in snakes collected from primary forests (Natusch, unpublished data).

What has happened to the size structure of python populations over time? Only 12% of hunters believed that python sizes had increased over the past five years, with most believing they had decreased (29%) or were unchanged (59%) (see Figure 9). Two long-term hunters noted that it has become more difficult to catch large snakes in recent years, and speculated that forest clearing had left big pythons with less large prey. Others believed that large pythons were mostly found in the forest, but high numbers of smaller

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[32] Shine et al., 1999; Natusch, unpublished data

pythons are found in palm plantations, which offer a 'productive breeding ground'. We suspect this interpretation is correct. The relative homogeneity of oil palm plantations compared to natural forest provides fewer hiding places for large pythons, which are detected by hunters more easily. But this is probably only true for giant pythons (bigger than 4 metres). Hunters confirmed this situation when the question was clarified, with several saying that the average size of snakes has remained the same, but giant snakes are less common. As with absolute numbers of snakes, however, direct measurements of snakes taken to processing facilities would provide much more accurate estimates of body-size changes than the perceptions of single hunters.

Figure 9. Perceptions of python hunters about whether the (a) number and (b) sizes of pythons collected over the past five years has changed in Peninsular Malaysia

a)

b)
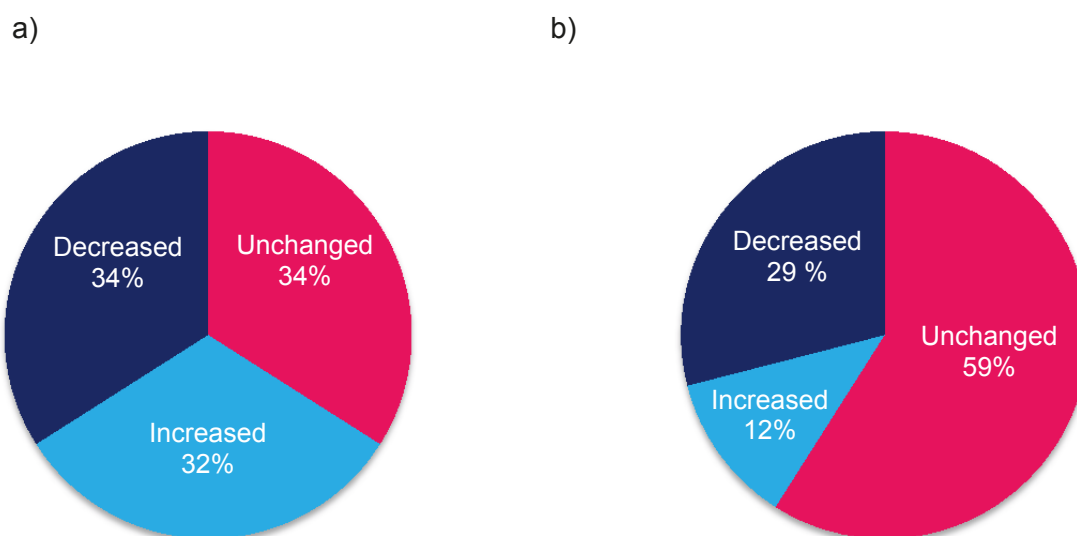
Source: ITC survey

Wild harvest of pythons may also provide some conservation benefits. Hunters can become resource guardians of forest areas, as they have an incentive to maintain the python populations on which their livelihoods depend. More than half of python hunters surveyed (57%) said they take specific actions to maintain a sustainable supply of python skins. A reported 31% rotate hunting areas and 10% only catch larger pythons. One hunter also said he does not catch gravid snakes. That being said, it is likely that many hunters have not considered the relationship between hunting and wild population levels, and consequently their livelihood security. Providing hunters with guidelines in this area could have both livelihood and conservation benefits.

So, is Peninsular Malaysia's harvest of reticulated pythons sustainable? For many species of snakes, this is a difficult question, and not one that can be answered given the types of data collected for this report. Nevertheless, despite nearly half a century of harvesting, reticulated pythons still remain abundant; suggesting a degree of sustainability has been achieved. But even if sustainability of the resource was compromised, it is implausible that harvesting will result in the extinction of pythons. For example, protected areas comprise 6% of Peninsular Malaysia's land area, and are inhabited by several endangered species far more susceptible to human disturbance than pythons (tigers *Panthera tigris* and Asian elephants *Elephas maximus*) (Aiken, 1994). Furthermore, no snake hunting is allowed in the entire state of Johor (15% of Peninsular Malaysia's land area). Thus, maintenance of healthy python populations in Malaysia relates primarily to ensuring commercial sustainability of the resource, rather than preventing biological extinction of the species.

How has the European Union ban on imports of python skins affected python populations in Peninsular Malaysia? Several hunters said that when the ban came into effect, people hunted more to recoup the resulting loss of income. Furthermore, although the European Union prohibited imports python skins,

pythons continued to be harvested and their skins sold to other markets. The ban therefore had a negligible effect on the number of pythons taken from the wild. That being said, a fundamental part of any transparent and successful trading system relies on the confidence each party has that the raw materials being purchased are being sourced sustainably. Therefore, Malaysia does need to implement robust, transparent and ongoing monitoring and management systems to improve the confidence of other parties that harvesting of pythons is sustainable.

When asked what they would do if Malaysia implemented a complete ban on python hunting, 90% of hunters (38/42) said such a step would significantly affect their livelihoods. However, only 48% (20/42) said it would have a significant impact on their wellbeing. These individuals suggested that they would have 'nothing else to do' or 'will not be able to survive'. The remainder said they would need to find alternative employment. This probably reflects the somewhat opportunistic nature of their participation in the trade.

By contrast, 94% of managers and business owners (14/15) said such a ban would 'ruin their lives', as they are heavily invested in the industry. Several trade participants said they would continue to hunt illegally, because of the threat pythons posed to livestock and children in village areas. When asked about the likelihood of a complete ban on python hunting, responses were mixed, but most predicted that it would be unlikely (see Figure 10). When asked why they thought it was unlikely, most respondents said that python populations were still very high, while others suggested that harvesting was necessary to prevent python populations becoming too large. Of those who considered a complete trade ban to be likely, most thought so because they believed the government had a perception that python populations were decreasing.

Figure 10. Perceptions of hunters and processing facility managers about the likelihood of a complete ban on python skin trade in Peninsular Malaysia
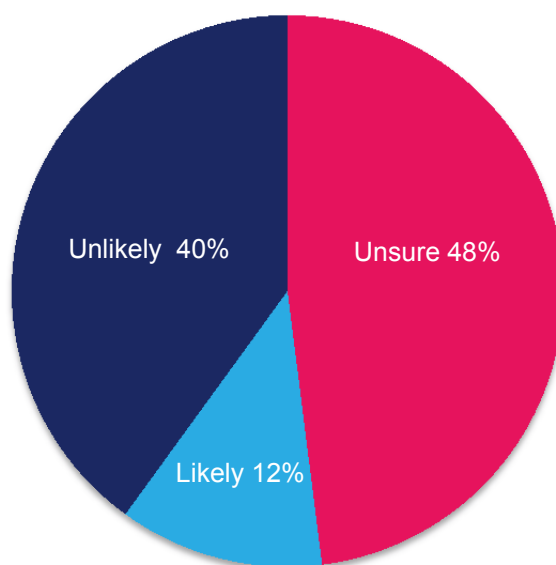
Source: ITC survey

Chapter 5: Challenges facing households in the python trade

Households that depend on the python trade face various challenges related to their markets and the broader community and environment. Like agriculture and other resource-based sectors, the python trade is characterized by a high degree of income volatility and uncertainty. Most of the workforce is self-employed, so workers have limited protection against fluctuations, which potentially contributes to livelihood insecurity. Small family-run processing facilities are responsible for all aspects of the business (including processing, management and sales). They bear a particularly high level of risk. Similarly, hunters with no other ongoing work can be significantly affected by market and environmental disruptions.

Indonesian workers weigh reticulated pythons brought to a processing facility by hunters in Peninsular Malaysia(@ Daniel Natusch)

Market challenges

According to survey respondents, prices paid for python skins have fallen in the past two years. Several exporters have had difficulty finding buyers and have expanded their stockpiles to prevent losing income by selling into a poor market. While prices paid to hunters have declined in some areas, most processing facilities continue to pay hunters well to maintain their supplier base. This has contributed to widespread stockpiling of thousands of skins and is unsustainable for these businesses in the longer term. At least one

facility (in Penang State) has reportedly shifted its business to seafood while waiting for the python trade to peak again.

The biggest challenge facing people participating in the python skin trade in Malaysia is the ban on imports of skins into European markets. The European Union is the top buyer of python skins, and Malaysia has been trading in a restricted and heavily distorted market (mainly to Asia) for more than a decade because of the ban. Long-time traders say their sale price dropped about 30% immediately after the ban was imposed. However, because adequate traceability systems are not in place, it is suspected that many python skins of Malaysian origin are imported by Singapore for resale into Europe.[33] As a result, fewer profits from the Malaysian industry are captured by Malaysian-owned businesses, workers and households. The ban thus poses a livelihood constraint on Malaysian households but, as discussed in Chapter 5, appears to have had little or no benefits for the sustainability of Malaysia's python harvest.

The establishment of the licensing system is one step the Malaysian Government has taken towards regaining access to the European market. Setting an export quota for the harvest of 162,000 skins at the national level and monitoring harvest through the provision of logbooks at the local level have vastly improved governance and knowledge about this trade. In addition to these improvements, for several years PERHILITAN has carried out intensive mark-recapture and population-monitoring studies to inform CITES that the trade is not detrimental to the survival of the species ('non-detriment findings'). The presentation of Malaysia's improved governance and trade-management structure, coupled with an ongoing sustainability-monitoring system, is envisioned to allay the concerns of the European Union SRG and potentially re-open access to that market.

Social and environmental challenges

Several challenges remain for the industry regarding health, safety and sustainability. Improvement in these areas can contribute to better livelihood outcomes for trade participants.

One in three hunters described python hunting as 'dangerous', due primarily to concerns about encountering venomous snakes (cobras) when hunting for pythons. There are no data on the number of workplace injuries for python hunters, so the impact of the perceived danger is uncertain. However, guidelines could be developed for hunters on safe practices in the field to help alleviate their concerns and improve household welfare. Health and safety is also a factor to consider for people working with pythons at processing facilities. For example, pythons are known intermediate hosts of the protozoan *Sarcocytis* parasite, of which *Sarcocystis nesbetti* has infected a number of people in Malaysia. However, no respondents in the survey raised this as a concern.

The interaction among agricultural practices, python prey abundance and livelihoods requires further investigation. Many hunters claimed that oil palm plantation managers' use poison to kill rats that consumed palm kernels in their plots resulted in low nummbers of pythons in those areas and occasionally direct mortality (through consumption of poisoned rats). Pythons are undoubtedly an effective biological control agent, and harvesting them from agricultural areas may result in a tradeoff between agricultural losses and the livelihood outcomes of python trade participants. Further research in this area may elucidate what level of balance is required.

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[33] Kasterine et al., 2012

Chapter 6: Implications for policy and capacity-building

Python hunting and trade in Peninsular Malaysia provide employment, income and livelihood opportunities to many regional households. The industry, despite being significantly hampered by reduced market access, continues to provide a viable business and income-diversification strategy for many families. Moreover, it provides low-skilled households with an opportunity to benefit financially from harvesting a species that would probably be harvested anyway (given its prevalence in palm forests, villages and other populated areas). The trade offers a way for indigenous Orang Asli communities to maintain their traditional practices while improving their social and economic wellbeing.

Steps to demonstrate the sustainability of the trade must urgently be taken to regain access to European markets. Beyond that, monitoring and traceability that can prove sustainability will also help Malaysia to become a leading and reputable global supplier of wild-harvested python skins, potentially adding significant value to the trade and improving the livelihoods of the households involved.

In terms of improving livelihood outcomes, the industry could benefit from actions to a) re-enter the European market; b) improve hunting safety and sustainability; c) strengthen domestic market linkages to reduce business and income risk.

- **Access to the European Union**: Demonstrating the sustainability of the trade to the European Commission is imperative for the future of the Malaysian industry. Without market access, the sector is likely to continue to decline and negatively impact household income and livelihoods.

- **Hunting safety and sustainability**: With relatively low levels of education and literacy, it is likely that few hunters have considered the impact of hunting on wild python populations. There is also significant diversity in hunting practices and widespread safety concerns. The existing licencing system offers an opportunity to provide guidelines to hunters on safety and sustainability to generalize best practice and potentially to certify pythons caught using sustainable practices.

- **Domestic market linkages**: Improving transparency and communications among exporters, processing facilities and hunters could improve business viability and reduce risk. Establishment of a national reptile-skin trade association would be a useful way to link existing operations and facilitate the dissemination of industry best-practice standards throughout Malaysia.

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