The Indonesia’s water monitor (*Varanus salvator*, Varanidae) trading

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Abstract. Indonesia's largest reptile export commodity is water monitor lizard, both in the form of skin and living animal. This paper provides an overview of the Indonesian water lizards exported, including the number of exported lizards and destination country within 1 decade. The export data of the lizards in 2005-2014 was obtained from Management Authority CITES Indonesia i.e. Konservasi Sumber Daya Hayati dan Ekosistem (KSDAE) of Indonesia. Supplementary data was obtained from the lizard importer from CITES. The number of exported water monitor lizards is 368,064 specimens, which consist of 1.70% of alive lizards and the remaining is skin of the lizard. The realization export number was lower (15.59%) than the quota export. Most of the lizards (99.82%) were caught in the wild. The export destination country for skin is Singapore and for alive animals is USA. Further the problem of Indonesia’s water lizards trade and efforts to solve it are discussed.

1. Introduction

Indonesia’s common water monitor is a complex and criptic species. This type include of *V. salvator macromaculatus*, *V. s. bivittatus*, *V. s. ziegleri*, *V. s. celebensis*, and *V. togianu* [1-3]. The water monitor is the highest traded reptile which is legal and regulated by Convention on International Trade Endangered Species of Wild Fauna and Flora (CITES) through annual quota system. In general, this spesies is exploited for its skin and as a pet [4].

The average annual export of water monitor lizard in the period of 1983-1999 was over 600,000 specimens/year [5]. Until now, this species is still exploited for export. The heavily exploited water monitor for many decades potentially declines its population. Subasli [6] said that population of *V. salvator* declined locally (Banten Province). However, *V. salvator* has ecological flexibility and high reproduction rate so they withstand such high rates harvest [7].

Previous study examined the dynamic of lizard trade before 2005 based on CITES Management Authority data in Indonesia and CITES baseline data [4, 5]. The study aims to explain the trade of Indonesia water monitor for one decade (2005-2014) using KSDAE database export.

2. Materials and methods

The KSDAE export lizard database between 2005-2014 was used in this study. The database consists of export quota and realization of *Varanus salvator*. In addition, we used the trading details of alive specimen and skin of all CITES listed water monitor lizard as comparison. They were downloaded from UNEP/WCMC (https://trade.cites.org) as a compiled Comparative Tabulation Table. The data contains import and export of skin and alive *Varanus salvator* from Indonesia between 2005-2014. Import data is preferred over export data because it is based on actual CITES permit used. Whilst the export data is based on issued CITES permits that some of which may be used [8].
3. Results and Discussion

3.1. The number of water monitor lizard exported

The number of water monitor lizard for commercial purposes between 2005-2014, is a total of 3,680,638 specimen. Export quota of the species was almost similar each year. The number of annual export realization is smaller than quota of the lizard exported (Figure 1), except in 2005. It means that in general the annual realization export did not exceed export quota.

However, Koch states that the official annual quota of 2008 for skin was exceeded by 6% and specimens from Sulawesi were not harvested [3]. This is not true, as he summed the total number of captured lizards per region in 2008. The quota of captured monitor lizard represents the maximum number of the wild specimens that can be captured in nature from natural habitats for domestic and / or exported use [9]. In addition, specimens from Sulawesi are also harvested [10].

Figure 1. The number of quota and realization of water monitor lizards exported annually as skin and alive animals for commercial purposes between 2005-2014

Exclusively exported water lizards are captured from the wild (99.98%), primarily for the skin, with a small number of captive breeding for alive exported lizards (Figure 2). Indonesia continuously exports water lizards annually in large numbers which raise the question of the sustainability of this species of exports.

Heavy harvesting may have an impact on the local population. Selective harvesting is known to occur in male water lizard in Sumatra to be used as leather industry. Exporters prefer small-sized lizards due to better skin quality (not thick, slightly scarred) [11] and lower transport costs [4]. Selective harvesting may have a negative impact on future population recruitment.

The common water monitor lizard population persists against intensive harvesting because it has characteristics such as ecological flexibility and high reproductive rate [7]. This ecological flexibility is revealed in the study of water lizard population in Kalimantan. The conversion of forests in Kalimantan into various designations such as settlements, oil palm plantations, agricultural land is
defined as increasing disturbance against wildlife in it, including water lizard. The existence of water lizard in the disturbed area was quite high. It is related to the low presence of dominant scavenger mammals, the Malay civet, as the competitor. This species allegedly occupying the niche of the Malay civet [12].

Figure 2. The number of water monitor lizard individuals that are exported in the annual portion of wild source, captivity and farming for commercial purposes between 2005-2014.

3.2. The country of water lizard importer
The number of exported water monitor lizards in the form of skin ranges from 247,264 to 444,600 with an average of 361,883 specimens (Figure 3). While the living water lizard exported ranged from up to 5,207-8,255 specimens with an average of 6,181. This indicates that Indonesia imports more raw or semi-finished materials.

Figure 3. The number of water lizards exported each year in the form of skin and alive animals for commercial purposes between 2005-2014.
Based on CITES import data, 26 countries are listed as water lizard importers between 2005-2014. The highest leather importing country is Singapore which is around 35.75% -70.01%, with an average of 57.69%. Singapore is known as a transit country of commerce, where purchased goods will be sold to various other countries. While the importer of living lizards is the United States with numbers ranging from 54.51%-81.63%, with an average of 68.35%. This shows that USA is the biggest market for water lizard as animal husbandry.

3.3. The trading problem and its solution effort

The trading problem of water lizard from Indonesia based on the latest CITES convention is related to trade that does not endanger the population in nature. The level of sustainable use determines sustainably trading. However, it is very difficult to determine whether the heavy exploitation has had an impact on the water-borne lizard population in nature. The absence of density data and the dynamics of water lizard population in the wild are the basis for determining the capture quota. Data collection is not easy but can be overcome by doing cooperation with related parties, such as with LIPI and colleges.

The capturing of water monitor lizard quota has been established so far for domestic and export use. Domestic lizards utilization in the country is mainly for a material consumption [13]. Nijman estimates the required water lizard for 13 restaurants in Java are as many as 50,000 specimens / year. However, data onto the real number of restaurants serving lizard meat and its consumption is not available so it is difficult to judge that the utilization in the country exceeds the set quota.

In this study, the export of lizards in 2005 exceeded the quota by 0.24% based on KSDAE export data and 11% based on CITES import data. In some cases, Indonesia has received CITES strikes due to excessive export quota. Good data handling is the key to avoid repetition of the same error [5].

The size of the monitor lizard population has been reported to decrease in some areas. The decline in the supply of water lizards in Banten is thought to indicate a declining population size [6]. Water lizard populations in Sungai Limau, Siak and Batam Center villages are thought to decrease due to habitat loss and local harvest (Setyawatiningsih, field observation 2013). Nevertheless, there is a location that is the habitat of monitor lizards in Desa Mempura, Siak regency, Riau which is preserved by not disturbing and taking lizards in the area. Preservation of lizard habitat is a concrete step in conservation of monitor lizards. In addition, it is necessary to assure the initiation to breed lizards in order to preserve this species in nature.

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