

## RESEARCH ARTICLE



# Visitors Support for Komodo Dragon Conservation Fund

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## Abstract

The designation of Komodo National Park as one of the New 7 Wonders in 2012 sparked increased tourism, resulting in growth in Labuan Bajo's hospitality sector, with low entry fees and stakeholders advocating for Komodo dragon conservation. Determining an appropriate entrance fee is crucial for park maintenance and Komodo dragon conservation. This study aims to analyze tourism trends, willingness to pay (WTP) for entrance fees, and willingness to contribute (WTC) to conservation funds. The analysis reveals a consistent rise in visitor numbers from 2015 to 2019, along with significant growth in non-tax revenue, hotel accommodation, and bed capacity from 2010 to 2019. Tourists exhibit strong support for Komodo conservation with a notable USD 25.573 in WTP for domestic visitors and 39.4 for foreign tourists. Respondents express readiness to contribute to conservation funds. Government agencies, local communities, and non-governmental organizations (NGOs) are favored to manage the conservation fund. The preservation of Komodo dragons has a positive impact on ecosystem balance and economic improvement from tourism.

Keywords: conservation, fund, komodo, WTP, WTC

## 1. Introduction

Tourism development can have a significant impact on physical infrastructure, which in turn shapes the qualitative aspects of tourism growth and visitor satisfaction [1]. Foreign tourists in Labuan Bajo typically spend around US\$1,066 per person [2,3], indicating substantial economic benefits to the local economy. The region boasts 26 tourist destinations outside of Komodo National Park, featuring a wide array of attractions that support its tourism industry [4,5]. Tourism has the potential to reduce environmentally destructive practices and positively contribute to the revitalization of poor areas, highlighting the importance of sustainable tourism practices for the long-term benefit of local communities and the environment [5]. Achieving a balance between tourism growth and its impacts is critical for sustainable development in Labuan Bajo, which may require extending the stay of tourists to increase their spending and drive economic contributions to local communities. The management of tourism funds and resources can be complex due to the fragmented nature of the sector, but involving stakeholders such as the government, local communities, and NGOs can ensure effective utilization of these funds for the benefit of the local community and the preservation of the natural environment [6].

Changes in tourism infrastructure can have a significant impact on physical development, influencing the qualitative aspects of tourism growth and subsequently affecting visitor satisfaction [7]. While physical development may potentially degrade wildlife habitats, it can also serve to acquire conservation funds, which are instrumental in revitalizing economically depressed environments [8].

Komodo dragons (*Varanus komodoensis*), the largest living lizards in the world, are native to a few Indonesian islands, including Komodo, Rinca, Flores, and Gili Motang. These unique creatures are listed as vulnerable by the International Union for Conservation of Nature (IUCN) due to their limited range and the various threats they face. The current population of Komodo dragons is estimated to be around 3,000 individuals, with the majority residing in Komodo National Park. Over the past few decades, several factors have triggered

changes in their population dynamics, including habitat loss, human encroachment, illegal hunting, and climate change [9].

The increasing popularity of Komodo National Park as a tourist destination has led to concerns about potential disturbances to the dragons' habitats due to business ventures such as hotels, resorts, and other tourism-related infrastructure. While these developments have the potential to disrupt the natural environment and threaten the Komodo dragon population, they can also play a pivotal role in conservation if managed responsibly. By adhering to conservation principles, these activities can generate significant funding and support for the preservation of the Komodo dragons and their habitats [10].

Concerns arise regarding potential disturbance to Komodo dragon habitats due to business ventures in Komodo National Park, yet if these activities adhere to conservation principles, they can indirectly support conservation efforts [11].

Willingness to pay (WTP) denotes the maximum amount an individual is prepared to expend, representing the margin between accepting a specific payment option and opting for an alternative expenditure. WTP serves as a gauge of the value individuals place on goods or services, including environmental enhancements or conservation efforts. It is subject to contextual influences, demographic variations, and may fluctuate over time, often represented as a range of prices. Within conservation contexts, WTP provides a monetary valuation of the benefits derived from conservation initiatives, commonly utilized in cost-benefit analyses. Understanding customers' WTP enables businesses to set prices at levels that optimize profits and customer satisfaction, elucidating the benefits of proposed policies such as environmental quality improvements [12].

WTP finds application in sustainable financing, fostering market-based conservation approaches in developing nations to mitigate ongoing biodiversity loss and preserve wildlife species. Numerous studies have employed contingent valuation methods to gauge WTP for conservation endeavors within protected areas, including national parks. This methodology entails evaluating the monetary amounts individuals are willing to allocate to conservation fees, which can serve as viable funding sources for sustainable development and conservation efforts. By comprehending the WTP of visitors and households towards biodiversity conservation, viable funding avenues for protected areas can be established, bolstering the sustainability of nature reserves and safeguarding wildlife species [13].

Utilizing WTP in sustainable financing supports the generation of funds for protected areas and the implementation of market-based conservation approaches crucial for mitigating biodiversity loss and safeguarding wildlife. This application facilitates the development of market-based conservation strategies in developing nations, to address ongoing biodiversity loss and preserve wildlife species [14].

## 2. Materials and Methods

The research was conducted in Labuan Bajo, West Manggarai Regency, Indonesia from March to June 2022 using descriptive analysis as the analysis technique. Descriptive analysis involves statistical methods that aim to present a picture or description of the research subject, depicted through frequency distribution tables, histograms, and pie charts. This approach describes and summarizes points to see patterns between variables.

Data on tourist visits were sourced from Komodo National Park (KNP), while data on the number of hotels, rooms, and beds were obtained from the Central Bureau of Statistics of West Manggarai Regency. The Willingness to Pay (WTP) method usually relies on the Contingent Valuation Method (CVM). In contrast, willingness to contribute (WTC) to conservation funds in this study refers to community support for conservation activities that also benefit local tourism. This was done by directly asking domestic and foreign tourists about their willingness to pay entrance fees and contribute to Komodo dragon conservation. The WTP and WTC analyses for entrance fees and conservation funds were based on questionnaires distributed to 65 domestic and 37 foreign tourists. The WTP and WTC values of each tourist in USD were calculated and multiplied by the Relative Frequency value, which represents the number of respondents willing to pay/contribute a certain

amount divided by the total respondents. The resulting total WTP and WTC values indicate the willingness to pay the entrance fee and contribute to the conservation fund as determined in this study.

We recommend separate approach for results and discussion. In separated approach, you present the results first, providing an objective description of your findings, and then follow with a separate discussion section where you interpret and discuss the implications of those findings.

### 3. Results and Discussion

In the period from 2015 to 2019 the number of tourists increased, although the Covid-19 pandemic caused a decline in tourism figures during 2020 and 2021. Notably, foreign tourist arrivals exceeded domestic tourist arrivals from 2015 to 2019. However, amid the pandemic, the trend shifted, with the number of foreign tourists decline compared to the number of domestic tourists during the same period (Figure 1).

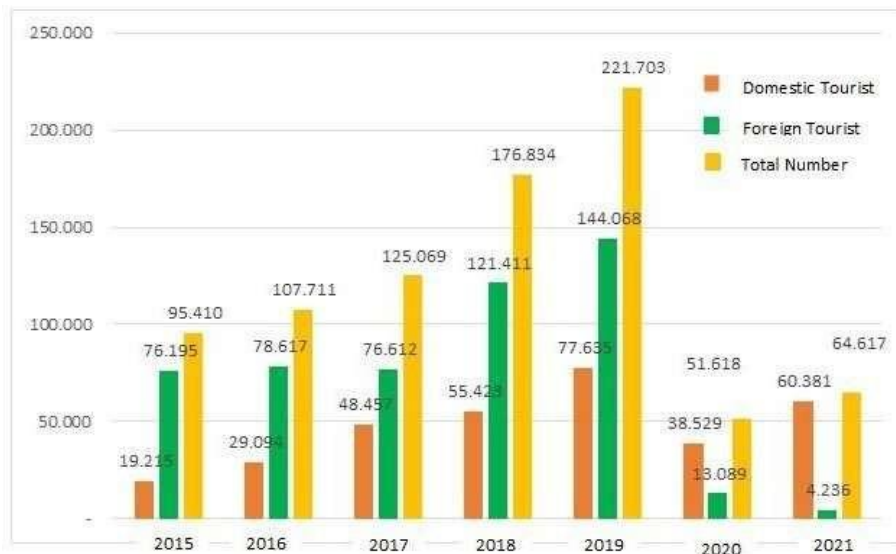


Figure 1. The total count of tourists visiting Komodo National Park (2015 -2021)

The Non-Tax State Revenue generated from tourists exhibited a consistent upward trajectory from 2010 to 2019, experiencing a downturn in 2020 and 2021 as a consequence of the Covid-19 pandemic. Notably, there was a significant surge in Non-Tax State Revenue since 2015, primarily attributed to the impact of the designation as one of the New 7 Wonders of Nature, which notably heightened the influx of foreign tourists (Figure 2).

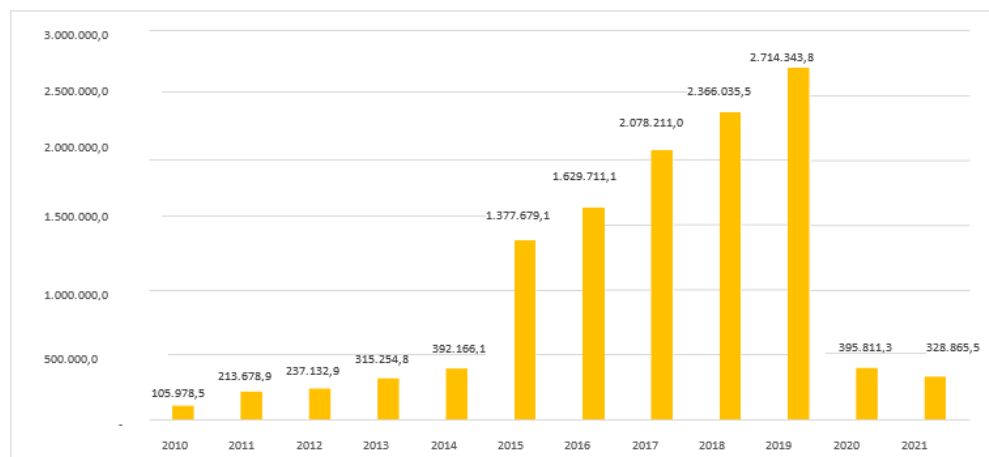


Figure 2. Non-tax revenue generated from tourists visiting KNP (USD)

Most foreign tourists expressed the opinion that the entrance ticket price to the area was relatively inexpensive, mirroring the sentiment of domestic tourists who also considered it to be very affordable. Conversely, only a minority of domestic tourists regarded the ticket prices as exorbitant, while a small fraction of foreign tourists indicated that they found the prices to be exceptionally low (Figure 3).



Figure 3. The viewpoint of participants regarding entrance fees

Many foreign tourists are of the opinion that management of conservation funds can be effectively handled by non-governmental organizations (NGOs), whereas domestic tourists exhibit greater trust in governmental management. Only a minority of respondents express confidence in independent stakeholder partnerships (Figure 4).



Figure 4. The confidence of participants in the administration of funds allocated for conservation.

The number of star and non-star hotels in Labuan Bajo has continued to increase since 2011 and has increased rapidly since 2018. In 2019 and 2020 it only increased slightly (Figure 5). The same increase in the number of accommodation rooms and beds (Figure 6)

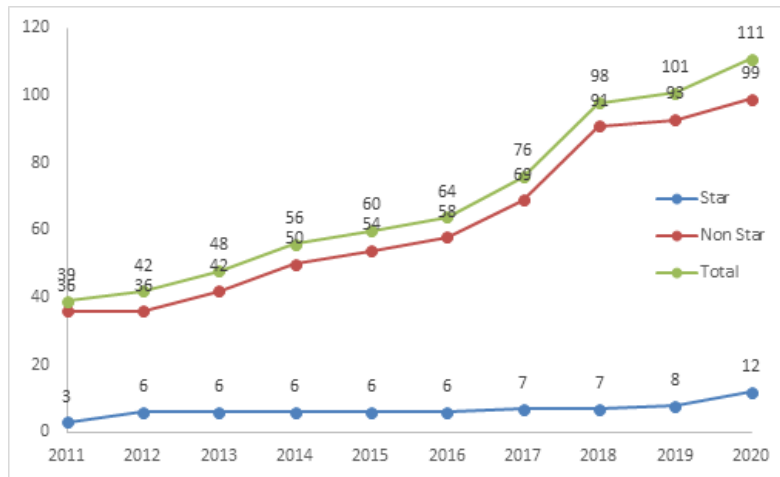


Figure 5. The count of both starred and unstarred hotels in Labuan Bajo (2011 – 2020) [13]

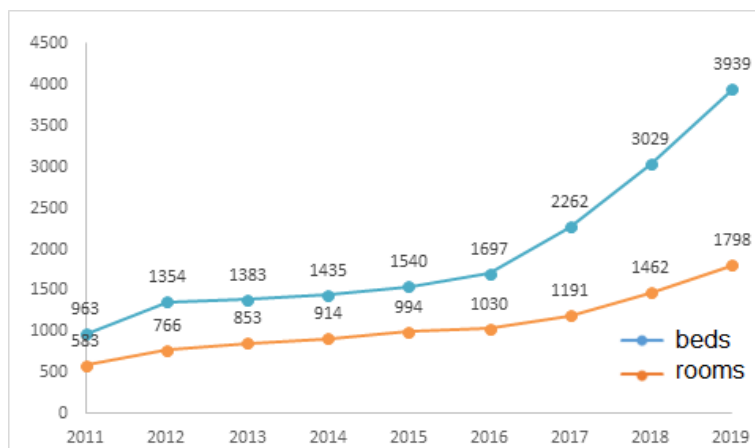


Figure 6. The quantity of rooms and beds available in Labuan Bajo (2011 – 2019) [13]

WTP entrance fee for domestic tourists were USD 25.573 and USD 39.4 for foreign tourists (table 1). From the total domestic tourist respondents who filled out the questionnaire regarding WTP of 53 people, 30 people were willing to pay USD 10.108 while for foreign tourists from 25 respondents as many as 18 people amounted to USD 21.6 (table 1).

Table 1. The assessed value of willingness to pay (WTP) for entrance tickets

Domestic Tourist				Foreign Tourist			
WTC USD	Frequency of Respondents	Relative Frequency	WTC Value USD	WTC USD	Frequency of Respondents	Relative Frequency	WTC Value USD
1.786	1	0.019	0.034	30	18	0.72	21.6
3.571	3	0.057	0.202	45	2	0.08	3.6
7.143	4	0.075	0.539	60	3	0.12	7.2
14.286	1	0.019	0.270	75	1	0.04	3
17.857	30	0.566	10.108	100	1	0.04	4
21.429	1	0.019	0.404				
35.714	8	0.151	5.391				
71.429	3	0.057	4.043				
100	1	0.019	1.887				
142.857	1	0.019	2.695				
	53	1.000	25.573		25	1.00	39.4

Domestic tourists were willing to contribute conservation fund an amount of IDR USD 4.918 for one visit while foreign tourist USD 7.541 (table 2). From a total of 65 respondents who

filled out the willingness to contribute to the conservation fund, 29 people were willing to contribute (WTC) 0.797 USD for one visit, while for foreign tourists from 37 people who filled out the willingness to contribute, 13 people were willing to contribute 1.054 USD (table 2).

**Table 2.** The contribution of each visitor's willingness to contribute (WTC) to the Komodo conservation funds for a single visit

Domestic Tourist				Foreign Tourist			
WTC USD	Frequency of Respondents	Relative Frequency	WTC Value USD	WTC USD	Frequency of Respondents	Relative Frequency	WTC Value USD
1.786	29	0.446	0.797	3	13	0.351	1.054
3.571	12	0.185	0.659	5	9	0.243	1.216
7.143	15	0.231	1.648	10	9	0.243	2.432
10.714	3	0.046	0.495	15	3	0.081	1.216
14.286	6	0.092	1.319	20	3	0.081	1.622
	65	1	4.918		37	1	7.541

Note: USD 1 = IDR 14.000

Domestic tourists are willing to donate conservation funds amounting to USD 23.297 per year while foreign tourists amount to USD 34.73 (table 3). Of the 65 domestic tourist respondents who filled out questions regarding WTC annually, 46 respondents were willing to contribute USD 10.11, while for foreign tourists out of 37 respondents, 23 respondents were willing to contribute WTC of USD 12.432 (table 3).

**Table 3.** The aggregate contribution of visitors' willingness to contribute (WTC) to the Komodo conservation funds over the course of one year.

Domestic Tourist				Foreign Tourist			
WTC (USD)	Frequency of Respondents	Relative Frequency	WTC Value (USD)	WTC (USD)	Frequency of Respondents	Relative Frequency	WTC Value (USD)
14.286	46	0.708	10.110	20	23	0.622	12.432
35.714	14	0.215	7.692	50	10	0.270	13.514
53.571	2	0.031	1.648	75	3	0.081	6.081
71.429	2	0.031	2.198	100	1	0.027	2.703
107.143	1	0.015	1.648	150	0	0	0
	65	1	23.297		37	1	34.730

Tourist visits to Komodo National Park have fluctuated in recent years, with an increase seen from 2015 to 2019, followed by a decline in 2020 and 2021 due to the COVID-19 pandemic (see figure 1). This decline in tourism has also had an impact on non-tax state revenue derived from tourism in the park. Adjusting the entrance fee to match tourists' willingness to pay is crucial. An increase in the entrance fee could increase state revenue, which in turn could be allocated to komodo dragon conservation efforts. The importance of komodo dragon conservation is underscored by the willingness of tourists to contribute to its conservation. Revenue trends since 2015, influenced by the designation as one of the New 7 Wonders of the World, initially saw an increase, but then declined due to the pandemic (figure 2). The surge in visitor numbers has driven an increase in the number of star and non-star hotels (figure 5), in addition to the expansion of rooms and beds (Figure 6), which is clear evidence of the impact of tourism on local development in Labuan Bajo.

Most foreign and domestic tourists find ticket prices to be quite affordable (figure 3). This suggests a potential rationale for revising the pricing structure of the national park entrance ticket. The Willingness to Pay (WTP) for entrance tickets is significantly higher among domestic tourists, at USD 25.57, and foreign tourists, at USD 39.4 (table 1), compared to the current admission prices of USD 0.357 (IDR 5,000) for domestic tourists and USD 10.71 (IDR 150,000) for foreign tourists. Given this disparity, adjusting the national park's entrance ticket price in alignment with tourists' willingness to pay could attract more visitors and generate increased revenue for Komodo dragon conservation. Indeed, ticket prices serve as

a vital source of funds that directly contribute to the funding of Komodo dragon conservation efforts.

Domestic tourists are willing to donate conservation funds of USD 4.86 and foreign tourists of USD 7.541 for one visit (table 2), while annually domestic tourists amount to USD 23.29 and foreign tourists amount to USD 34.7 (table 3). This data on willing to contribute conservation funds for one tourist, if applied, would be very useful for conservation.

The majority of tourists demonstrate willingness to contribute to conservation fees aimed at preserving endangered wildlife species for future generations [14]. To determine the appropriate conservation funding for West Flores Island, we can refer to the estimate provided by [15] for the Southeast Asian region, amounting to US\$ 509 per square kilometer per year. Considering the habitat area of Komodo dragons on West Flores Island, excluding Komodo National Park, which spans approximately 40,275 hectares or 402.75 square kilometers, the ideal annual funding for West Flores Island would amount to US\$ 204,999.75.

By assuming the number of visitors in 2021, we can project the potential conservation funds collected. Adjusting the entrance fee for Komodo National Park to align with tourists' willingness to pay becomes pertinent. Considering a proposed entrance fee of USD 25.57 (refer to table 1) and willingness to contribute of USD 4.86 (refer to table 2), resulting in a total payment of USD 30.43, and assuming an estimated 64,617 visitors in 2021 (refer to figure 1), the total conservation funds raised would approximate USD 1,966,295.31. This amount surpasses the ideal figure suggested by [15], which is USD 204,999.75.

The majority of foreign tourists prefer conservation fund management by NGOs, while domestic tourists trust governmental management more, with only a minority supporting independent stakeholder partnerships (refer to figure 4). Fund management, whether by the government or NGOs, should align with tourists' preferences and the specific requirements of conservation efforts in the area.

Conservation funds can support habitat restoration projects, anti-poaching efforts, and scientific research to monitor the health and numbers of Komodo dragons. Moreover, these funds can be used to educate local communities and visitors about the importance of preserving these unique creatures, fostering a sense of stewardship and promoting conservation-friendly behaviors. This multifaceted approach helps maintain the ecological balance, ensuring that the Komodo dragon population thrives in their natural habitat while continuing to attract tourists who contribute to the local economy.

#### 4. Conclusion

Understanding the costs associated with and public willingness to support Komodo dragon conservation is crucial for informing and facilitating conservation efforts. The Conservation Fund plays a pivotal role in decision-making processes within the realm of natural resource management. Additional research endeavors utilizing larger sample sizes are warranted to enhance the generalizability of the findings to a greater extent. Further exploration of Willingness to Pay modeling, incorporating a multitude of variables, is essential for advancing the quality of research outcomes.

#### Author Contributions

**AM:** Conceptualization, Methodology, Formal Analysis, Writing - Review & Editing; **EI:** Writing-original draft, Formal Analysis, Writing - Review & Editing; **MC:** Investigation, Formal Analysis; **ALA:** Investigation.

#### Conflicts of interest

There are no conflicts to declare.

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