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Government Valuers' Perception of the Current Practice of Ecosystem Service Valuation in Malaysia

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Abstract
The study explores Malaysian valuers' perception of ecosystem service valuation, focusing on the valuation approach, factors affecting ES value, and the provision of ES. The qualitative research design involved conducting interviews with experts in ecosystem service valuation to gain a deeper understanding of their perspectives and methods. This study offers crucial insights into the provision of valuation techniques for ES standards, serving as a guide for analyses and addressing current legal needs. This study will contribute to the existing body of knowledge and help practitioners who may use the study's findings in practical settings.

Keywords: Ecosystem Service; Valuation Method; Valuer; Economic Value

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1.0 Introduction

Ecosystem services (ES) conservation has no market value because most environmental goods are measured using economic value (Mamat et al., 2020). In other words, it has not been evaluated systematically based on the demand of the resources. The goal of the valuation method for ecosystem services (ES) is to demonstrate the monetary value of an environmental resource provides tangible economic benefits to people (Filho et al., 2022). By using an appropriate method of valuation, the issue of determining the price or economic value associated with natural resources and their environment can be resolved. Valuation involves interpreting techniques to assess environmental value, often using the Total Economic Value (TEV) framework. TEV is the product of a natural resource's use and non-use values, which are divided into direct use, indirect use, and option values. These categories estimate values differently and are not reliable depending on data availability and the type of ecosystem assessment being used. TEV (i.e., contribution to human welfare) of an ES is, as with any good or service, determined by its supply and demand. Natural scientists (e.g., ecologists, geographers, hydrologists) have mainly taken up the task of understanding and modeling the supply of ES. The features of the human beneficiaries of the ES (population, preferences, distance to resources, etc.) heavily influence the demand side. Economists have mainly embraced the understanding and modeling of the demand side. The economist's responsibility during the valuation process is to reconcile the ES

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values according to their experience, the accuracy of the data and procedures, and the market's current condition. The ES's value assessment is typically determined by the type of ES being valued (De Valck & Rolfe, 2022). Nevertheless, to be able to make this a reality, ES needs to go through 4 actions. First, an economic assessment of ES must determine how best to manage the world of scarcity, which means determining a fair trade-off between benefits and drawbacks is crucial (Dang et al., 2021). The valuation process defined by The Economics of Ecosystems and Biodiversity (TEEB) involves 4 levels: identifying, assessing the value, establishing, and providing new services (Wang et al., 2021).

However, according to International Valuation Standards Council, (2022) emphasizes the importance of understanding the purpose of valuation and whether intangible assets should be valued separately or grouped with other assets. The expansion of the intangible economy highlights the need for expanding asset valuation methods to capture both tangible and intangible assets more explicitly. Environment assets, with their unique features, are considered specialized public service assets, while real estate professionals must choose the right valuation method. Evaluating the significance of environmental assets is crucial for conservation planning, but more understanding is needed on how to value and appropriate techniques (Lee et al., 2022).

The main focus of this paper is to investigate the current practice of ES valuation based on values in Malaysia. As of now, prior research has yet to conceptually and empirically investigate an effective method for ES valuation, specifically in Malaysia (Mamat et al., 2020). This study will be further discussed with an emphasis on ES to ensure that the estimated value accurately reflects the economic value of ES; additional considerations must be made while valuing ES. ES is significant because it can integrate the environmental and development sectors and optimize the overall value that resource consumers obtain (Loomis et al., 2019).

2.0 Literature Review

2.1 Ecosystem Service Valuation

The term "ecosystem services" (ES) can be used to describe how human activity and the environment interact. It functions as a useful tool for evaluating how well natural reserve resource management is accomplishing the objectives of maximizing conservation efforts and attaining sustainable use (Rahmadyani et al., 2023). ES are valued differently from other properties due to limited markets and market prices. From this perspective, the rationale behind ecosystem valuation is to simplify socio-ecological relationships, highlight how decisions made by humans could alter the values of ecosystem services, and express these changes in values in terms of money or other comparable units so that they can be taken into account when making decisions that affect the public.

Market failures, imperfect markets, and absent markets are some of the problems that underlie an economic evaluation of ecosystem services (Azadi et al., 2021; Hermes et al., 2018). Decision makers' unfamiliarity with the terminology and tenets of ecosystem service valuation may worsen the lack of adoption of valuation outputs. As a result, when making daily decisions, the value of many ecosystem services needs to be more recognized and valued (Matthew et al., 2019). Therefore, allocating a value to what nature produces and a cost to what humanity destroys is critical.

Ecosystem service valuation is justified because natural resources are not valued at their full potential, and second, human-caused damage is not documented because it is typically regarded as res nullius (Filho et al., 2022). Best practices, such as having straightforward policy questions and strong stakeholder engagement from the outset of valuation studies, appropriate choice of valuation methodologies, and having the ability to effectively demonstrate causal links between drivers of ecosystem health, change, and resource users, should be followed for ecosystem service valuation to apply to decision makers (Lee et al., 2022).

The critical concept of welfare economics is that an environmental benefit's total economic value is determined by how it affects the well-being of the people who comprise society as shown in Fig. 1.

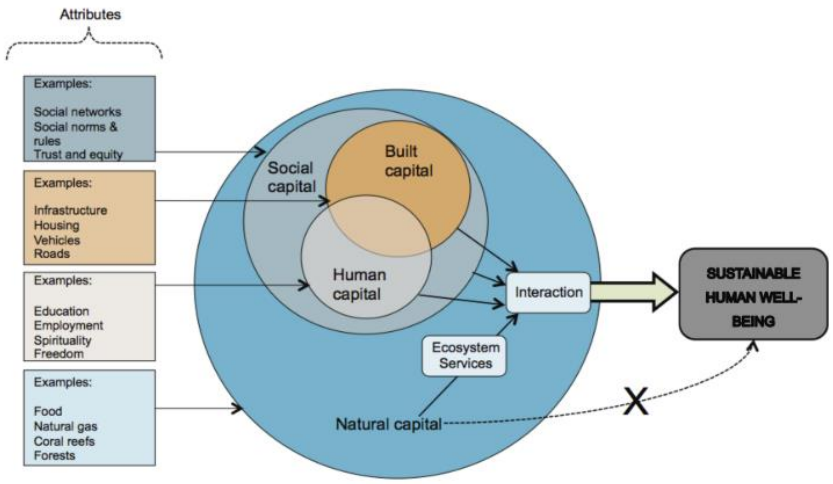

Fig. 1: Conceptual framework adapted that depicts the interaction between built, social human, and natural capital to influence human well-being *(Source: Adapted from* Rasheed, (2020)*)*

The fundamental tenet of economic valuation is shown in Fig. 2. The monetary evaluation of the overall economic value of an environmental benefit is, therefore, a crucial problem in policy decisions if society is to maximize the well-being of individuals. Given the variety of value theories, valuation exercises should ideally i) recognize the presence of different valuation methodologies and ii) be clear about the methodology employed and its underlying assumptions.

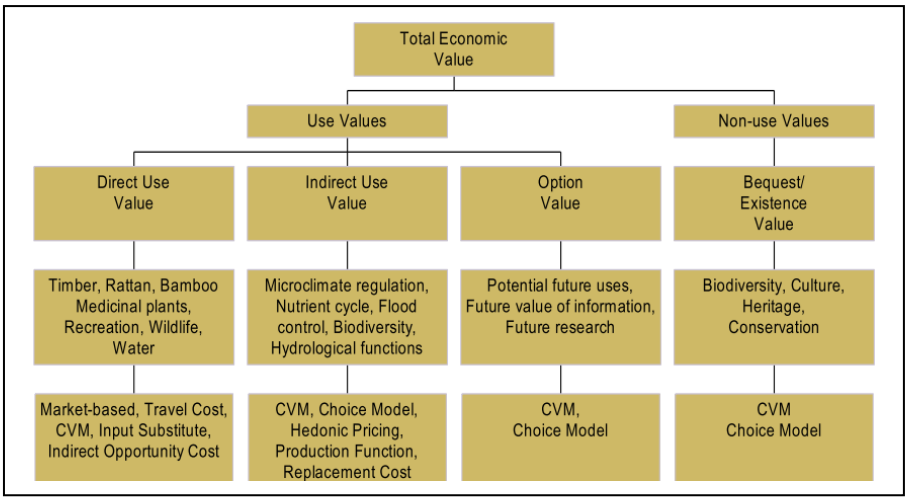

Fig. 2: Economic Valuation Method
(Source: Adapted from Cheng et al., 2019 and Ghani, 2017*)*

Use values are related to private or quasi-private goods, which typically have market prices. Sometimes, use values are separated into two groups: (a) Direct use value is concerned with the advantages derived from using ecosystem services directly. This kind of usage might be extractive, meaning it involves consumption (like food and raw resources), or it can be non-extractive, like the aesthetic benefits of landscapes. (b) Indirect usage values are typically linked to regulating services, considered public services typically not represented in market exchanges. Examples of these services include erosion prevention and air quality management.

Ecosystem non-use values do not involve the direct or indirect use of the ecosystem service. They represent the happiness people feel when they know that ecosystem services and biodiversity are preserved and that others can or will be able to enjoy them (Navrud & Strand, 2018). When non-use values are related to intra-generational equity problems, they are typically called existence values in the first case or bequest values regarding inter-generational equity.

Non-use values, tied to moral, religious, or artistic features, present more valuation issues than use values. They differ from other services in producing tangible things or conditions. These services are co-produced by people and ecosystems, with the total value category (TEV) representing the total of these value categories. Table 1 provides an overview of these relationships.

Table 1. Valuing ecosystem services through the TEV framework
(Source: Adapted from Pascual et al., 2012 *)*

Elements/ Category	Services	Direct Use	Indirect use	Option value	Non-use value
Provisioning Service	Includes: food; fibre and fuel; biochemicals; natural medicines, pharmaceuticals; fresh water supply	*	NA	*	NA
Regulating Service	Includes: air-quality regulation; climate regulation; water regulation; natural hazard regulation, carbon storage, nutrient recycling, micro-climatic functions etc.	NA	*	*	NA
Cultural Service	Includes: cultural heritage; recreation and tourism; aesthetic values	*	NA	*	*
Supporting/ Habitat Service	Includes: primary production; nutrient cycling; soil formation	Habitat services are valued through the other categories of ecosystem services			

Environmental benefits can be valuated using direct and indirect methods, including option value and stated preference methods. Option value methods involve monetary value without considering people's preferences, while stated preference methods use questionnaires and estimation exercises. Revealed preference methods involve travel costs, hedonic pricing, and averting behavior. Techniques include contingent valuation, contingent ranking, pairwise comparison, and allocation games.

The explanation will focus on the contingent valuation method (CVM) because this method is most widely used in valuing Ecosystem services (Bamwesigye et al., 2020). The CVM is the only technique that is capable of accounting for both the user and non-user values

(option, bequest, and existence values) for amenities, the amount of which cannot be determined by examining subject behavior (Ma et al., 2021). In CVM, respondents must provide their preferences for a specific environmental resource or status change by responding to questions regarding hypothetical options (Matthew et al., 2019). Because of this methodology's very nature, CVM has thus come under criticism from experimentalists in psychology and economics, whose growing area of study has been preference elicitation. Supporters of CVM have responded to this critique by focusing much more on a testing process that directly addresses issues of method reliability and validity. Table 2 lists the CVM's strengths and weaknesses.

Table 2. CVM Strength and Weakness

Author	Strength	Author	Weakness
(T. T. H. Lee & So, 2022)	CVM can provide reliable enough estimates to support not only administrative but also judicial decision processes	(Halkos et al., 2020)	These disadvantages concern the validity and reliability of the results the format of questions, the possible protest responses due to the nature of goods as well as the fact that the surveys are based on hypothetical scenarios constitute some limitations.
(Sakai & Uchida, 2013)	CVM is the only comprehensive method that can produce concrete estimates on the welfare of environmental programs, some of the antagonists' criticisms are also worth considering.	(Utsunomiya, 2018)	CVM is not usually applicable to appraising social benefits because reliable quantitative measures have not really been established
(Nunes, 2022)	CVM gives immediately a monetary assessment of respondents' preferences. CVM method is the only valuation technique that is capable of shedding light on the monetary valuation of the nonuse values CVM brings with it the advantage that environmental quality changes may be valued even if they have not yet occurred (exacta valuation). CVM offers a greater potential scope and flexibility than the revealed preference methods.	(Nunes, 2022)	The nature of the CVM application, in terms of policy choice appraisal, makes the value formulation problem more difficult relative to ordinary market decisions
(Richard & Ostensson, 2003)	CV is becoming an accepted tool, mainly since its potential practical value is so large that users are prepared to overlook its faults, and because it provides measures that can be used as a basis for decision-making in difficult circumstances.	(Richard & Ostensson, 2003)	CV is a controversial method that raises difficult issues, not only with respect to economic theory, but also from ethical, philosophical and psychological view-points.

2.2 Issues and Challenges in Valuing Ecosystem Service

Several issues and challenges exist in valuing ecosystem service (ES). These can be listed as methodology limitations, numerous limitations, bias on approach, ES valuation standard, and policy failure. The issues and challenges in valuing ES are shown in Table 3.

Table 3. Issues and Challenges in Valuing Ecosystem Service

No	Author	Ecosystem	Issues
		National	
1	Mamat et al., 2020	Natural area (forest & lake)	Not readily quantified because of the unavailable market price.
2	Hassin et al., 2020	wetland ecosystems	The interest to measure non-use or passive value is one of the reasons on the extensive use of CVM and the only way to capture non-use value is through a survey method.
3	Vianna et al., 2018	Marine-shark	Lack of standardized valuation studies become available, to implementation of management and conservation strategies
4	Abdulkarim, 2017	forest	Economic valuation enables us to make fair estimate for environmental services.
5	S. L. Lee et al., 2022	Mangrove Forest	Valuation practitioners may have limited understanding of the circumstances and realities of policy making.
6	Ghani, 2017	Ecosystem	Lack of public perception and awareness of ecosystem service
7	Arabamiry et al., 2013	Marine Park	The need a straight forward task, identification and qualification of marine and coastal ecosystems of goods and services.
8	Othman & Jafari, 2019	Urban Lake Recreation	In the absence of knowledge of the marginal cost of provision.
		International	
1	Filho et al., 2022	Marine	Economic theory and research fail to incorporate environmental value and disregard their economic impact on human welfare.
2	Bourguignon, 2015 Snäll et al., 2014	Ecosystem	Ecosystem services are not yet incorporated into decision-making through incentives and price signals.
3	Hermes et al., 2018	Recreational Ecosystem Service (RES)	The lack of market surrogates that can approximate the prices associated with these non-excludable goods.
4	Azadi et al., 2021	Ecosystem Service	The lack of or distorted markets for ecosystem services. As a result, estimated ecosystem service values will be skewed and will not provide reliable data on which to base policy decisions
5	Palola et al., 2022	Environmental	The single ontology/epistemology of neoclassical environmental economics, leading to a mis- or un-representation of other understandings of environmental value

2.3 Provision of the Valuation Method

The state government must assist the federal government in executing its powers under this article.
Article 94(1) states:

"The executive authority of the Federation extends to the conduct of research, the provision and maintenance of experimental and demonstration stations, the giving of advice and technical assistance to the Government of any State, and the provision of education, publicity, and demonstration for the inhabitants of any State, in respect of any of the matters concerning which the legislature of a State may make laws; and the agricultural and forestry officials of any State shall accept any professional advice given to the Government of that State under this Clause." Several laws, National Policies, and Projects related to economic valuation are shown in Table 4.

Table 4: List of Provision of Ecosystem Economic Valuation
(Source:Loc et al., (2020); Swangjang, (2018))

No	Law/ National Policies/Projects
1	Fisheries Act 1985 (Amended 1993)
2	Environmental Quality Act 1974
3	National Policy on the Environment 2002
4	National Policy on Climate Change 2010
5	Aichi Target 2020 & National Biodiversity Action Plan (NBAC)
6	The Economics of Ecosystems and Biodiversity (TEEB)
7	System of Environmental and Economic Accounting (SEEA)
8	Intergovernmental Panel on Biodiversity and Ecosystem Service (IPBES)
9	Integrated Coastal Zone Management (ICZM)
10	Integrated Lake Resources Management System (ILRM)
11	Integrated Water Resources Management (IWRM)

In Malaysia, several laws relating to the Convention on Biodiversity exist, but this sectoral approach often leads to duplication, conflict, and gaps in implementation. The laws, such as the Forestry Act, Conservation of Wildlife Act, National Parks Act, and the Environmental Quality Act (EQA), are enforced by various departments. A noticeable gap in the reporting and management of the ecosystem service.

3.0 Methodology

The snowball sampling method was employed to conduct in-depth interviews with experts in ecosystem service valuation fields, either online or face-to-face, to gather data. Three JPPH experts in cost-benefit analysis, valuation, and ES officers were interviewed (Junainah et al., 2015). The respondents stated that because their answers would be so individualized, they could not provide insightful responses to the questionnaire. As a result, the study decided to collect data via semi-structured interviews. Every interview session lasted 30 to 1 hour, and all the audio was digitally recorded. For this interview, a set of semi-structured questions was created. The purpose of the questionnaire was to serve as a guide throughout the interview. Following the interview, all the data were transcribed, line by line, and classified to fit into multiple categories according to the similarities and differences. Time constraints resulted in certain limitations for the current investigation. Only three respondents were selected for this study's purposes. Table 5 shows the respondents' profile.

Table 5: List of Provision of Ecosystem Economic Valuation

Respondent	Gender	Position	Working Experience	Attending the seminar on Es Valuation
1	Male	Senior Valuer	More than 10 years	No
2	Female	Penilai Daerah Kota Kinabalu	More than 10 years	Yes
3	Male	Penilai Daerah Sungai Petani	More than 10 years	Yes

4.0 Findings

All of the coded information that was deemed relevant and helpful has been gathered based on the interviews. They were then sorted into subcategories, following their patterns and similarities.

4.1 Current Methods and Their Weaknesses

Based on the findings, all the respondents agree that several approaches to valuing ES exist. They claim that the approach is chosen according to the purpose of valuation, although there are areas for improvement in applying the approach. One of the informants claimed that "There is no need to compare between the methods because each method functions for different purposes" (Respondent 2).

Besides that, one of the informants said there are several economic valuation challenges. "Political will, public perception and awareness, application and acceptance in public project analysis (using benefit transfers approach), full cost pricing or internalizing the externalities, green accounting on GDP-(system of integrated environment and economic accounting-2012; 1st version 1993),

application of standard ecosystem service-classification system-standard system used in SEEA of the UN, valuation standard and transdisciplinary approach" (Respondent 1).

In addition, the other informants also said that "Only 2 to 3 teams in Malaysia with specialists in ecosystem valuation consist of 15 staff". (Respondent 3).

4.2 Factors that Influence ES Value

There has been an improvement in the economic valuation of ecosystem services within the past 25 years. Improvements have been made to the ecological knowledge of these services and the monetary methods of valuations, particularly for the more difficult-to-measure cultural and regulatory services. Economic valuation is a valuable tool for estimating the effects of particular modifications on a particular environment. In the end, it can aid in the protection of ecosystems and biodiversity by helping to estimate the value of natural capital, which can be considered when making decisions about indicators, accounting systems, and policy.

As mentioned by (Respondent 1) "Feasible of ES difference for every ecosystem. If neglecting to include all the elements could lead to an undervaluation of some ecosystems" and "We are ignorant of the cultural and regulatory services considerations; hence, we are not accounting for them. We were not made aware of this situation. However, we acknowledge that considering the variables that affect ES levels is crucial" (Respondent 3). Additionally, "Benefit transfer is mostly used to regulate services (climate regulation), while the market price is primarily used to value the financial goods and services provided. Market prices for goods and services, such as food, fish, and lumber, are easily accessible and reasonably priced. Therefore, this approach helps determine the monetary value of providing services, particularly when data are limited" (Respondent 2).

4.3 Valuers' readiness for new innovative methods

Before 2009, most research concentrated on the monetary valuation of environmental services (ES). However, since then, there has been a shift in the trends of ES assessments in Malaysia. More studies are now using integrated approaches (economic valuation and mapping, assessments of human perception and mapping, economic valuation and other quantitative assessments), as well as alternative assessment approaches (ES mapping, modeling, assessments of human perception, and other quantitative assessments) (Dang et al., 2021).

Respondent 2 agrees that "Formulating a strong valuation approach that fits the local environment and can effectively communicate relevant data to decision-makers is one of the main recommendations for valuation practitioners." The view is supported with "We are open to accepting the newly proposed method, such as using an IT-like portal website." (Respondent 1) and Respondent 3 suggested "In the future, there will be more seminars and workshops on ES economic valuation and will collaborate with Indonesia".

4.4 Current legal provisions in economic valuation

On June 24, 1994, Malaysia became an adherent to the Convention on Biological Diversity. Several policy papers, including the 1998 National Policy on Biological Diversity (NPBD) and the recently introduced National Environment Policy, uphold Malaysia's commitment to biodiversity conservation. Since the Third Malaysia Plan period (1976–1980), Malaysia's five-year growth plan, known as the Malaysia Plan, has acknowledged the significance of environmental protection in development planning. The policy includes:

Firstly, "*Panduan Penilaian Ekonomi Ekosistem Marin*" (Respondent 1). "Apart from adopting the Fisheries Act 1985, Sabah also implemented the Sabah Fisheries Ordinance 1964" (Respondent 2) and "Guidelines on the economic valuation of the environment impact for EIA project" (Respondent 3).

The funding concluded that the respondents were aware of ES-related elements in valuation but struggled to focus due to a lack of technical expertise. They emphasized the importance of considering the valuation's aim when developing a successful strategy. This study presents results based on three themes: current methods, criticisms, factors to consider in ES valuation, and valuers' readiness to adopt a new innovative method. The respondents acknowledged the importance of considering the purpose of valuation in developing an effective approach, which may influence their acceptance of the new innovative method.

5.0 Discussion

Economic value is still in its infancy when used in emerging economies. Furthermore, using valuation methodologies in emerging economies presents substantial scientific, practical, and policy challenges. Many of these issues are a result of the specific political and socioeconomic circumstances that exist in developing nations, which may make a direct transfer of techniques inappropriate. Therefore, some modification of conventional methods may be needed to undertake high-quality valuation studies in emerging nations. Many of these issues are brought to light in the Viti et al., (2022) assessment of ES valuation in nations with limited resources. In this case, methodological, practical, and policy concerns receive particular emphasis. Although some research has matched findings to policy requirements, their impact on policy still seems minor. More evidence-based assessments, including trade-off analyses and validation supported by ecosystem modeling, are required in Malaysia to support decision-making better. Standardized policies that offer such evidence may be made more accessible with the help of comprehensive instructions on how to map and evaluate ecosystems and include an ecosystem framework in planning and decision-making processes. The ecosystem framework can be improved to better support decision-making by increasing stakeholder cooperation, increasing science-policy dialogues, increasing data accessibility, and boosting stakeholder engagement in ecosystem management.

6.0 Conclusion& Recommendations

Ecosystem Service (ES) undoubtedly contributes to a nation's economic success (Department of Fisheries Malaysia, 2023; Jabatan Taman Laut Malaysia, 2015) and highlights the significance of an efficient ES valuation technique. Before developing a practical approach, it is crucial to understand the state of the practice and the perspectives of people involved in the exercise. Therefore, the valuation of ES assets should come under scrutiny. Valuers need to understand and adopt the right and most suitable approach to valuing ES assets. Consequently, it is important to choose an approach that aligns with the goals and objectives for managing the ES and reflects the true value of the asset. Zin et al., (2019) supported that the goal of the valuation process is to estimate the best possible value for a specific property. For this reason, an ES valuation methodology is needed to quantify the value of ES assets by considering the tangible assets and the intangible elements, including overall asset use. The problem of finding the price or economic value attached to an environment and natural resources can be solved by adopting an appropriate method of valuation. Valuation is concerned with interpreting the methods for deriving empirical evaluation of environmental value. This paper will enrich the current body of knowledge and benefit practitioners who could apply the study's output to real practice.

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