

# Addressing Sustainability of Fresh Water Lake: The Ecosystem Valuation of Vellayani Lake in South India

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## Introduction

- Vellayani lake is the only fresh water lake in Thiruvananthapuram district in Kerala state of India
- This pristine lake is a source of potable water, is considered as sacred for religious functions, supports the people through livelihood generation and other life supporting functions
- However, lake is increasingly facing several anthropogenic stresses and the unsustainable use and over exploitation of the lake resulted in 54 per cent reduction area of water body from 1978 to 2011
- The major reason for the degradation of lake and the wetland loss is the lack of awareness on the ecological and economic value of the lake
- In this context, the present study attempts to estimate the Total Economic Value (TEV) of the Vellayani lake freshwater ecosystem

## Material & Methods

- Tools: Stakeholder and household survey
- Sampling: Stratified Random Sampling
- Sample size: 371
- Sample included fishermen, lotus collectors, duck rearers, lake visitors and local residents.



Fig 1. View of Vellayani lake

- TEV framework for the study included
  - The provisioning services:** provided by the lake are drinking water, fishing, duck rearing, lotus collection, irrigation, bathing and washing.
  - The regulating services:** are ground water recharge and stabilising micro climate.
  - The cultural services:** included cultural heritage and identity, spiritual and religious value, scenic beauty, recreational value, educational and scientific study.
  - The supporting service:** of the lake is biodiversity conservation.

Based on the ecosystem system services suitable valuation techniques were chosen.

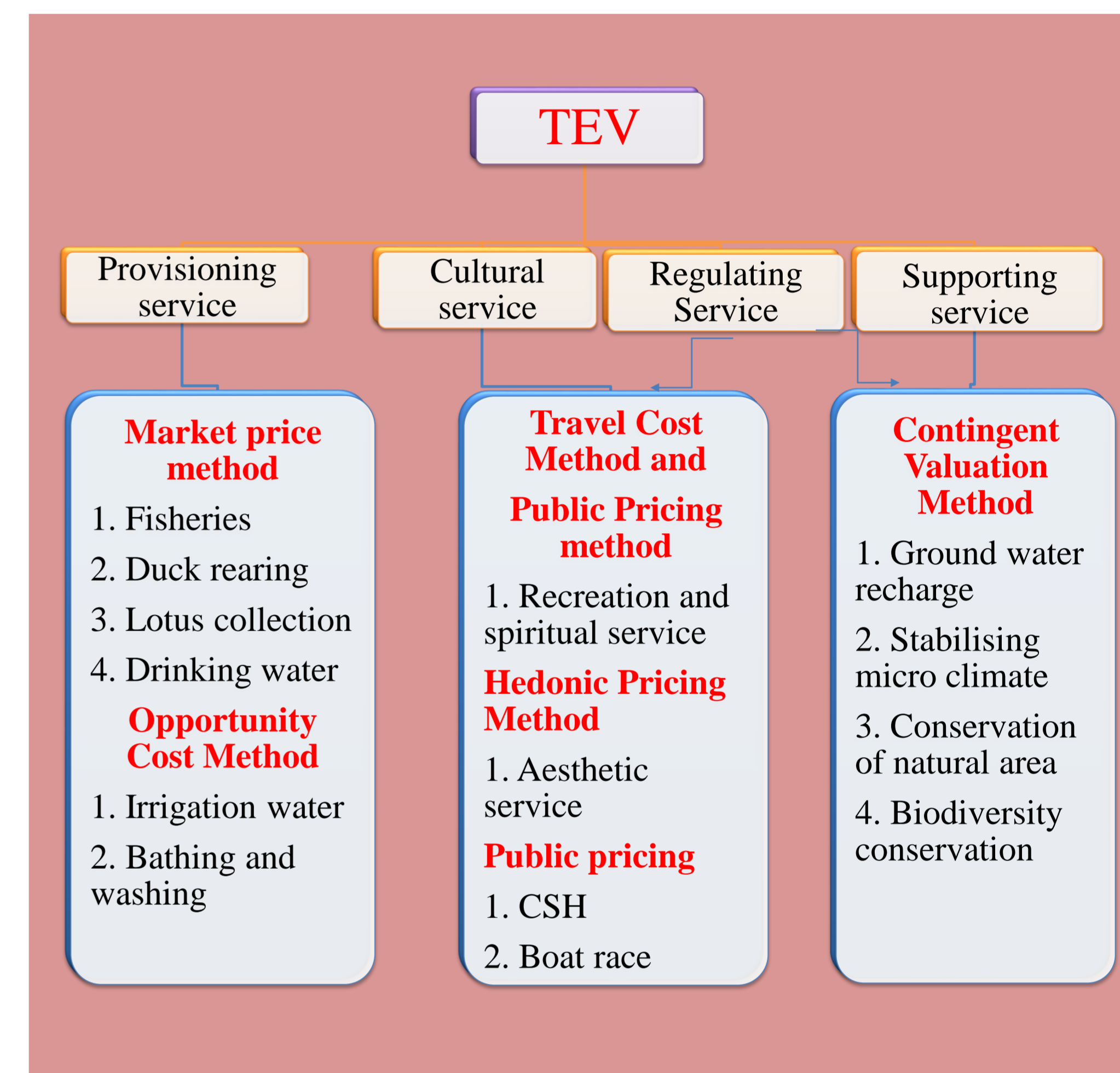


Fig 2.Vellayani lake valuation framework

## Results & Discussion

Components of TEV	Value US \$ million /year	Level of dependence (%)
Fishing	0.2	0.22
Lotus collection	0.05	0.05
Duck rearers	0.006	0
Drinking water	52.14	55.04
Irrigation	2.92	3.08
Bathing and washing	0.001	0
<b>Provisioning Services</b>	<b>55.32</b>	<b>58.39</b>
Centralised sports hostel	0.03	0.04
Ayyankali Boat race	0.01	0.01
Recreation	0.08	0.08
Aesthetic	38.88	41.04
<b>Cultural Services</b>	<b>39.00</b>	<b>41.17</b>
<b>Regulating and supporting function</b>	<b>0.41</b>	<b>0.43</b>
TEV	94.73	100

Table 1. TEV of Vellayani lake

- The provisioning ecosystem services of the lake contributed US \$ 55.32 million / year and is the major component in TEV. The provision of safe drinking water to near by area indicates the importance of lake in maintaining the health security of the people
- The cultural services which comes next in contribution US \$ 39 million of TEV reveals the emotional attachment towards the lake and their preference to occupy in houses near the lake
- Finally the regulating and supporting services US \$ 0.41 million reveals the role of the lake in maintaining a balanced ecosystem
- The TEV of the lake is US \$ 94.73 million

## Conclusion & Recommendations

- The TEV as indicated by the study revealed the need for conservation of lake for the benefits of the society now and in future
- As private property of the local residents also lies in the open water area of the lake, the enforcement of proper property rights by bringing the lake under a single management may be the prime policy towards the conservation of the lake
- The study suggests the formation of “Vellayani Lake Management Authority” with statutory powers with members from line departments and stakeholders for managing the lake
- It was indicated from the study that the drinking water is the most important provisioning service by the lake. So the economic intervention for the conservation of the lake may be done by introducing a cess of at least 0.01 US \$/ 70 litres to realize a minimum of US \$ 19.95 million per year for the lake conservation