Factors affecting people's preferences on lake function for sustainable management of Kandy Lake, Sri Lanka

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INTRODUCTION

Kandy Lake is an artificial lake built in 1807 besides the Temple of Tooth in Kandy City, which is one of the famous tourist spots in Sri Lanka as UNESCO world heritage. However, due to urban development and increase of tourists, severe pollution of the lake is recently concerned. In 2009, a massive die-off of fish was reported in Kandy Lake [1]. However, because of the symbolic nature of the lake, opinions of various stakeholders, including local residents and tourists, should be carefully reflected in making policies for lake management. Their thoughts and preferences on the lake management may vary dependent on characteristic of stakeholders, such local residents or tourists, generation, business, etc. In this study, we investigated people's preference on lake functions to reveal factors which affect deference in **importance level among people.** That would be useful for sustainable management of Kandy Lake with good consensus of people and for development of a better methodology of sustainability assessment on water environment.



View of Temple of Tooth from Kandy Lake

MATERIALS AND METHODS







Facts of Kandy City:

- Population: 125,400 (2011)
- > Annual precipitation: 1,840 mm
- Sewage treatment system is currently under planning.

Parameters:

 \succ TOC, DOC, TN, DN

 \succ NH₄-N, NO₂-N, NO₃-N, PO₄-P

Water Quality Surveys

Sampling points:

- ➤ Kandy Lake (L1 L8)
- > Inlet water channels (IN 1 IN4)
- > Outgoing canal (01 03)

Interview Surveys

Questionnaire:

Evaluate the importance levels of lake functions (Table1)

"very important", "moderately important", "a little important", "not important", or "no idea"

Respondents:

- \succ Local resident stakeholders (n=21) ※Participants of stakeholder meeting(SHM)
- \succ Lake-side walkers (n=45)



Table 1: Lake functions raised in the questionnaire

- Domestic water usage 11. Angling / recreational fishing Industrial water usage Boat and canoeing 12. Birds / Wild animals watching Use for irrigation 13. Fishing (for food) Place for education Flood control 15. Tourist spot Natural purification of wastewater and urban 16. Local Symbol / landmark drainage Place for event (festival, religious events) 17. Historical attraction Habitat of plants and animals Cultural spot 18.
- 8. 9. Swimming

- 19. Religious spot

Scene of interview

2.

3.

4

5.

6.

7.

Scene of SHM

Heavy metals by ICP-MS ➢ Mahaweli River (R1 − R3) > Total coliform, E.coli

Water amenity

Landscape / scenery

RESULTS AND DISCUSSION



Boat

Amenity

- Lake water was mainly **used for landscaping and watering** of plants in the Temple.
- **High NH₄-N and coliform** suggested contamination by wastewater from domestics and hotels at **IN1**, **IN3**, **O1-3** and **R1**.
- Lake is highly eutrophicated. Currently it did not cause severe problem, but seemed to <u>be at risk of harmful microalgae bloom</u> or oxygen depletion in the bottom layer.

CONCLUSIONS

Angling Angling ✓ Younger generation emphasized recreational functions like boating. Sri Lankan residents from outside of the lake basin put more importance on natural environment.

 \checkmark There was no significant trend based on frequency of the visit.

* We found that the lake was highly eutrophicated because of nutrients inflow by domestic wastewater. + High importance levels were observed in functions as a spot of religion, culture, history and tourism. The value is difference among varied stakeholder, so the communication and decision making among them are very important for the future Kandy lake.

References: [1] Kawakami T., Weragoda S.K., Attanayake M.A.M.S.L., Sakamoto M., Tafu M., Honoki H., Serikawa Y. (2011) J. Ecotechnol. Res., 16(2), 39-45.

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