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A study on the houseboat tourism on water environment and fish production in Kumarakom

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Abstract
Vembanad wetland is the largest wetland system in India which is the official site of the Ramsar convention on Wetlands. Human Intervention on the lake is severe which affects the function, structure and entire composition of the Vembanad wetland system. The paper focuses on the impact of house boat tourism on water environment and fish production in Vembanad Lake. The study conducted in the month of October, 2016.

Keywords: Vembanad Lake, wetland, water environment, fish production

1. Introduction
Vembanad wetland, the largest estuary spreads in Alappuzha, Kottayam and Ernakulum districts of Kerala. Vembanad lake is also the biggest freshwater lake in Kerala and the people around the area are largely dependent on it's for their livelihood. Vembanad Lake which is now receiving global attention because of its unique feature and characteristics [1]. The scientific beauty of the backwaters has also led to its being developed as a tourist destination. There has been a spectacular rise of tourism industry in Vembanad Lake in the past twenty years [2].

Backwater tourism emerged as the backbone of the tourism sector of Kerala state which leads to the tremendous increase of Houseboats in the shore of lake [3]. The houseboat industry is situated mostly in aellepy and kumarakom so that the study focused on kumarakom. The unrestricted operation of house boats is causing serious environmental impacts on the ecosystem, including the dumping of toilet waste, plastic and oil pollution in the water body [4]. The sudden exploser of tourism put pressure on the environment. Now, the number of houseboat in Vembanad Lake is uncontrolled that decreasing the carrying capacity of boat in the lake its upset the ecology of the backwater system. The present study focuses on the effect of houseboat tourism on water environment and fish production in kumarakom. The significance of the study is to understand adverse effect of the backwater tourism growth on Vembanad Lake and Livelihood of the area around the lake and to find out the recommendation for the sustainable development of backwater tourism in the region.

2. Methodology
2.1 Study area
The study area in Kumarakom village in Ettumanoor block on Kottayam district in Central Kerala. The study was carryout with special reference to Vembanad Lake and surrounding areas in Kumarakom village. The village sprawls over an area of 51.67 sq km, which is inclusive of 24.13 sq km of the lake. Methodology consists of site study, selection of method and selection of tool, conduct of study and analysis of data. The study was conducted at kumarakom because houseboat industry mostly at kumarakom. The data will be collected from people they lives around the Vembanad Lake. Two sets of questionnaire were prepared. One set will supply to local fisherman for collecting data. And the other supply to livelihood of people of the region depends on the activities related to the waterways.

2.2 Mode of study
2.2.1 Database Design
The primary data will be collected from people they lives around the Vembanad Lake and data collected from local fisherman also. Livelihood of people of the region depends on the

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activities related to the waterways. The secondary data will be collected from government records, other official records journals, textbooks and internet portals

2.2.2 Measurement Design
The data was collected by using questionnaire. Questions must be plain and simple malayalam, and it must be as short as possible. Two sets of questionnaire were prepared. Each questionnaire contain twenty questions. One set will supply to local fisherman for collecting data. And the other supply to livelihood of people of the region depends on the activities related to the waterways.

2.2.3 Sampling Design
The simple random sampling is used for the study. The total sample size is 60 and the samples were collected from the people lives around the area in the month of October 2 to October 29 2016.

2.2.4 Statistical design
Appropriate mathematical and statistical tool were used for analysis.

3. Analysis of the Data
Descriptive statistics such as mean and standard deviation were generated to provide an overview of the data. Data collected from the fisherman is recorded in table1. Analysis of the collected data is recoded in table 2. Data collected from the people live around the specified area of the lake is recorded in table 3. Table 4 showing the analysis of the data collected from the People live around the lake area.

Table 1: showing the sample data collected from fisherman.

Sl. No	Data Collected	Score	Sl. No	Data Collected	Score
1	Sample 1	41	16	Sample 16	49
2	Sample 2	49	17	Sample 17	47
3	Sample 3	48	18	Sample 18	38
4	Sample 4	50	19	Sample 19	44
5	Sample 5	30	20	Sample 20	47
6	Sample 6	38	21	Sample 21	36
7	Sample 7	44	22	Sample 22	34
8	Sample 8	48	23	Sample 23	48
9	Sample 9	42	24	Sample 24	36
10	Sample 10	48	25	Sample 25	49
11	Sample 11	40	26	Sample 26	48
12	Sample 12	45	27	Sample 27	34
13	Sample 13	48	28	Sample 28	30
14	Sample 14	47	29	Sample 29	49
15	Sample 15	48	30	Sample 30	38
	Total				1293

Table 2: showing analysis of data collected from fisherman

Variables	Number	Mean	SD	X+SD	X-SD
Data	30	43.1	3.11	46.21	39.89

It is observed from the table 2 that the mean score of the data is 43.1 and standard deviation is 3.11. The sum of the mean and standard deviation is 46.21 and the difference between mean and standard deviation is 39.89. The score higher than 46.21 means that number of houseboat tourism highly affect the fish production. The score less than 39.89 means that house boat tourism not affected the fish production and the score between the two scores means that its slightly affected the fish production.

Table 3: showing data collected from the people live around the lake

Sl. No	Data Collected	Score	Sl No	Data Collected	Score
1	Sample 1	47	16	Sample 16	48
2	Sample 2	47	17	Sample 17	47
3	Sample 3	47	18	Sample 18	40
4	Sample 4	48	19	Sample 19	40
5	Sample 5	30	20	Sample 20	25
6	Sample 6	49	21	Sample 21	40
7	Sample 7	40	22	Sample 22	40
8	Sample 8	48	23	Sample 23	48
9	Sample 9	47	24	Sample 24	40
10	Sample 10	48	25	Sample 25	49
11	Sample 11	40	26	Sample 26	48
12	Sample 12	48	27	Sample 27	26
13	Sample 13	48	28	Sample 28	24
14	Sample 14	47	29	Sample 29	49
15	Sample 15	48	30	Sample 30	47
	Total				1293

Table 4: showing the analysis of data collected from people live around the lake area

Variables	Number	Mean	SD	X+SD	X-SD
Data	30	43.1	3.11	46.21	39.89

It is observed from the table 4 that the mean score of the data is 43.1 and standard deviation is 3.11. The sum of the mean and standard deviation is 46.21 and the difference between mean and standard deviation is 39.89. The score higher than 46.21 means that water environment is highly affected by increase in number of houseboat tourism. The score less than 39.89 means that house boat tourism not affected the water environment and the score between the two scores means that it's slightly affected the water environment.

4. Result
From the study its shows that increase in number of houseboat in Vembanad Lake badly affected the fish and water environment. Figure 1 shows that the effect of house boat tourism on fish production. From the study 50% of people agree that the increase in number of houseboat highly affect the fish production. And 30% report that it not affect the fish production and 20% opinion that it slightly affect the fish production. Figure 2 shows the effect of houseboat tourism on water environment. From the study 63% of people opinion that it highly affected the water environment and 24% opinion that it slightly affected the water environment 13% opinion that it not affected the water environment.
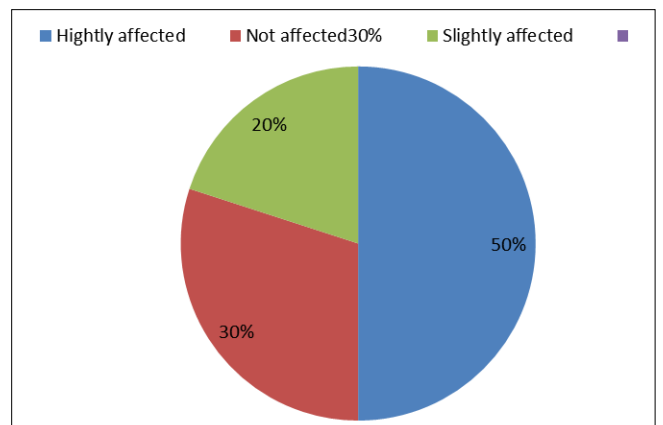

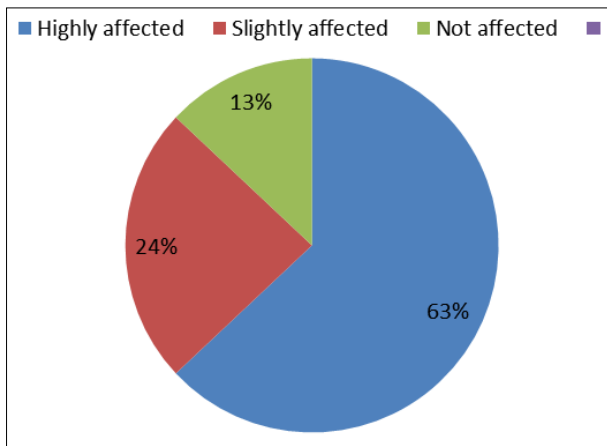**Fig 1:** Effect of House Boat Tourism on Fish Production

Fig 2: Effect of House Boat Tourism on Water Environment

5. Discussion

In Alappuzha and Kottayam districts the total number of registered houseboat number exceed 1000. This indicate the tremendous growth of house boat industry which is started 20 years back with 20 boats [1]. Houseboat discharge a total of 23, 0160 litter of waste water into Verbena lake per day, slowly killing the lake [5]. The overcrowding of houseboats is proving detrimental to the fishermen in the district with the pollution caused by them already destroying the huge fish wealth of Vembanad Lake [6]. Water quality in many parts of the lake become deteriorated. Nearly 260 million litter of trade effluents reach the lake daily from the industrial belt of Kerala [7]. Faecal coliform count up to 1800/100 ml has been reported in the lake [8]. The boom in the backwater tourism has accentuated the stress on the environment. Around 1, 80,000 tourist visit the vembanad wetland every year and 200 houseboat are operating in the lake [9]. Estimates shows that approximately 187 tonnes/day of solid wastes ultimately reach the lake [4]. Currently there are 507 registered houseboat in Alappuzha and Kottayam districts. 357 in Alappuzha and 150 in Kumarakom [2]. Besides the registered boat there is a large number of unregistered boats. Currently there are about 500 unregistered boats [10]. Houseboat tourism in the backwaters is one of the main tourist activities in kerala. Most tourist visit the Vembanad Lake and its two main destinations for houseboat tourism, especially Alappuzha and Kumarakom [11].

6. Conclusion

Due to human intervention and ever increasing pollution, the Vembanad Lake and associated wetlands are facing an acute environmental and ecological crisis. Decline in fishery, degradation of water quality are the major impacts on the wetland system. The decrease in the fish species due to the water pollution affects the people who earn through fishery. The increased number of number houseboats in lake adversely affected the lake ecosystem. Management strategies are recommended for conservation and management of welland system. Proper infrastructure has to be provided for solid and liquid wastes and sewage treatment plant has to be implemented in major boat jetty stations. Monitoring is also essential for evaluating the effectiveness of the measures adopted, based on which necessary changes have to be made. Awareness programmes has to be done to reduce the direct disposal of waste into the lake.

7. Reference

1. Safoora Beevi KH, Devadas V. Impact of tourism on Vembanadlake system in Alappuzha district. International journal of research. 2014; 1(5):542-551.
2. Corinne Kariagains, Narayan NC. Governance challenges in linking environmental sustainability to tourism: where is the houseboat industry in Kerala, India headed? NCCR trade regulation Swiss national center of competence in research. 2014; 1:1-29.
3. Rajan B, Varghese VM, Pradeep Kumar AP. Recreational boat carring capacity of Vembanadlake ecosystem, Kerala. South India. Environmental research engineering and management. 2011; 2(56):11-19.
4. Cooper C, Wanhill S. Tourism development: environmental and community issues. Developing indicators of sustainable tourism. 1998; 1:48-51.
5. Narayanan NC, Venot JP. Drivers of Change in Fragile Environments: Challenges to Governance in Indian Wetlands". Natural Resources Forum - A United Nations Sustainable Development Journal. 2009; 33:320-333.
6. Vijayakumar B. Tourism in Kerala–an Overview. Sustainable Development of Tourism in Kerala: Issues and Strategies, Thiruvananthapuram: International Centre for Kerala Studies, University of Kerala, Kariavattom. 2009; 1:5-20.
7. Anish B Baskaran, Seethu John. A study on backwater tourists preference relating to services offered with special reference to Kumarakom backwater tourism. KAAV International journal OF commerce, economics and business management. 2016; 3(2):136-144.
8. Remani KN, Jayakumar P, Jalaja TK. Environmental problems and management aspects of Vembanad kol wetland in south west coast of India. Nature environment and pollution technology. 2010; 9(2):257-254.
9. Joseph Candy, Ragunathan Rajesh. Impact of houseboat tourism in Kerala. International journal of advance engineering and research development. 2017; 4(7):222-232.
10. Padmakumar KG, Bindu L, Joseph N, Sreekumar B, Sunil G, Unnikrishnan N, *et al.* River Fish Inventory under Participatory Approaches: Meenachil Fish Count 2004. Environment and Ecology. 2006; 24(3):584-590.
11. Ravish Mathew, Anu Chandran R C. Backwater tourism: RT initiatives and socio-environmental dynamics. SCMS journal of Indian management. 2017; 1:113-127.