

Governance Challenges in Linking Environmental Sustainability to Tourism: Where is the Houseboat Industry in Kerala, India Headed?

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Abstract:

The focus of this paper is on governance, in particular on the linkage between investment in tourism and the environment in Vembanad Lake, an official site of the International Ramsar Convention on Wetlands. Tourism in houseboats and in resorts around the lake has grown remarkably in the past two decades. The aim of this case study is to examine the environmental regulations and challenges of implementation with a focus on houseboat tourism in Vembanad Lake. The empirical investigations are conducted in two destinations located in different parts of the lake. Data from the Kerala State Pollution Control Board show that the lake is under severe environmental stress due to biological (sewage), chemical (pesticides) and physical (plastic) pollutants. The methodology involves analysis of secondary environmental data and semi-structured interviews with various stakeholders. The problem of environmental degradation due to tourism is linked to boat owners' desire for short-term profit maximisation even though most of them are aware that the sustainability of the industry is linked to the environmental quality of the lake. Another problem is the lack of infrastructure.

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Introduction and context

There has been a spectacular rise of the tourism industry in Vembanad Lake, an official site of the International Ramsar Convention on Wetlands in Kerala, in the past twenty years. Houseboat tourism emerged as the backbone of the tourism industry of the state in addition to the many resorts, which have sprung up around the shores of the lake. The scenic beauty of Kerala has put it on the list of the National Geographic's fifty most beautiful places in the world to see.¹ The Vembanad Lake is part of the larger Vembanad-Kol wetland and the prime brackish water body of South India. It was acknowledged as a wetland of international importance under the Ramsar Convention in 2002 (the area is protected and consists of 1,591 km² – partly below sea level).² Shallow parts of the lake and its shores were converted into rice fields over the last century and consist of highly fertile parts of land (Narayanan, 2003). The Vembanad Lake was encroached upon and its shores were privatised for cultivation in the last century. Major reclamation work was done in the early 1940s with the consent of the state during the 'grow more food' campaign after the food shortages during the Second World War (Pillai and Panikar, 1965). Thus lake commons used for fishing were privatised and thus enclosed over time. In Vembanad (as part of a pattern followed in many Indian lakes like Chilika in Orissa State), the strong governmental support and the shift in policies that consisted in granting private entitlements for agricultural or other activities led to the gradual enclosure of common lands that were previously used according to customary rights by the local population (Narayanan and Venot, 2009).

Governance of the Vembanad Lake changed from the community to the state level. The rise of the tourism industry led to a shift in the sectors of employment. The so-called Kuttanad area – also known as the 'rice bowl of Kerala' employed many agricultural labourers in its rice fields.³ Many of the former farmers, agricultural labourers and fishermen now work on houseboats – some even own houseboats. This shift from the agricultural to the service sector was triggered by a shift in the attitudes towards and

¹ National Geographic, Editor's Letter: 50 Places of a Lifetime: http://intelligenttravel.nationalgeographic.com/2009/09/17/50_places_of_a_lifetime_1/. Retrieved on 30 May 2013.

² Various rivers originating in the Western Ghats flow into the lake, which is connected to the Arabian Sea through an estuary: the lake is under tidal influence and subject to seasonal fluctuations in salinity levels (Narayanan, 2003).

³ This is also a reason why the workers movement and communist party are still very strong in this region.

perception of traditional occupations like farming and manual labour on farms (Narayanan, 2003).

The basis of the study is the inter-linkage between investment in tourism and the environment in a local context. The environment in this context consists of a common pool resource (Ostrom, 1990), which is also an International Ramsar Site due to its wetland system. On the one hand tourism and the rise of the houseboat industry, with more than 1000 boats⁴, has led to job creation. But it also puts pressure on the environment. Even though the natural beauty was the original reason for attracting such investments. Although the government has drawn up regulations to mitigate these impacts, compliance is a major question mark. The waste from houseboats consists of solid waste (plastic, food, etc.), oil and sewage (including septic tank waste). The houseboat industry is situated mostly in Alleppey⁵ and Kumarakom. The Department of Tourism had planned to set up two official sewage treatment plants (STP) for the houseboats where they can empty their tanks. One was installed in Kumarakom in 2010. The other one was to be for Alleppey, where the majority of the houseboats are, but its implementation has been delayed.

This paper looks at the governance system, in particular at underlying conditions and the regulations regarding wastewater management in tourism, more specifically houseboat tourism in Vembanad Lake, and the reasons for implementation or non-compliance. In order to distinguish the factors that influence compliance or non-compliance, the two destinations Alleppey and Kumarakom have been chosen, as they are the two main destinations for houseboats on Vembanad Lake. Kollam, the third destination, is not covered by this study. The major assumption is that the problem of environmental degradation due to tourism arises because the houseboat owners are under pressure to maximise profits in the short term although many of them are aware that the sustainability of the industry is linked to the environmental quality of the lake. The problems are exacerbated by the lack of infrastructure. Therefore, the prevailing regulations in Kerala regarding wastewater management in the tourism sector, with a focus on houseboats, and the challenges of implementation or non-compliance are examined.

The methodology is a mix of secondary data analysis and primary field data collection involving interviews with key stakeholders and focus group discussions.

⁴ Mr Er. Vinothu, Port Officer in charge in Alleppey, interview in Alleppey on 23 February 2013.

⁵ Alleppey is also known as Alappuzha.

The article is organised as follows. After a section on the current state of research, theoretical background and methodology, the subsequent section focuses on the underlying conditions such as the economics of the houseboat industry, social and cultural aspects, and environmental implications. The next section examines legal structures, current measures and their implementation, and serves as a basis for the following analysis and discussion of factors leading to non-compliance. These consist of economic factors such as the lack of infrastructure; administrative and regulatory factors such as lack of control or monitoring; governance and common pool resources and lastly awareness and attitude. A section on persisting problems is followed by the concluding observations.

Tourism: the continuing story of non-compliance with regulations

‘Regulatory instruments provide the foundation of sustainability in tourism as in other industry sectors’ (Buckley 2012: 532). In both developed and developing countries, however, success is often constrained by poor implementation (Berry and Ladkin, 1997; Buckley, 2008; Buckley, 2011; Buckley, 2012; Dinica, 2009; Godfrey, 1995; Hall, 2010; Mycoo, 2006; Soteriou and Coccossis, 2010; Tosun, 2001; Wall, 1993; Warnken and Buckley, 1998; Zubair, Bowen and Elwin, 2010). ‘Tourism produces direct local impacts on air, water, soil and biota and indirect impacts from manufacture and transport of material items’ (Buckley, 2012: 532). Sustainability – efforts to sustain sustainability as well as the concept of sustainability – in mainstream tourism is not common, as most tourism companies apply only those practices that enhance profit or public relations (Buckley, 2012; Lane, 2009; Sheldon and Park, 2011; Weaver, 2009). ‘Improvements are driven principally by regulatory changes, often against political resistance and with poor implementation’ (Buckley, 2012: 534). Buckley and others mention that there is not much direct public request for sustainability in tourism and market measures are largely ineffective (Buckley, 2012; Budeanu, 2007; Miller et al., 2010; Weaver, 2009).

The tourism sector is poorly managed in many developing countries, despite its considerable economic and employment potential (FIAS, 2009: 13). ‘Even established destinations have not invested in harmonising appropriate policy, legislative and institutional frameworks to foster tourism growth, protect core assets and ensure equitable benefits for citizens’ (Global Development Solutions, 2007). To avoid government regulation, industry advocates promote self-regulation (Nunez, 2007).

Environmental policies, technologies and management measures can reduce the impacts of tourism (Buckley, 2009). Regarding water and tourism, Cole explains that a distinction between the consumptive and non-consumptive relationship between tourism and water is necessary (Cole, 2012: 1222). This paper does not look at the link between tourism and the impact of water scarcity on destinations, which has been discussed elsewhere (Cole, 2012; Gössling, 2001; Stonich, 1998), but at the wastewater management in tourist destinations.

There have been some studies on the houseboat industry in Kerala (Kokkranikal and Morrison, 2002; Mathen, 2012; Zacharias et al., 2008) and a lot of research covers non-compliance with regulations in the tourism sector. The importance of waste management is also very obvious in many tourist destinations such as the Backwaters, as waste is often very visible. Reasons for non-compliance in this particular area have not been much studied though. At first sight, tourism in the Backwaters takes place in what looks like a traditional common pool resource (Ostrom, 1990), from which its inhabitants have been making their livelihoods for centuries. Missing in Ostrom's theory are the aspects of power and endowments in the 'making' of a common. In an overtly politicised context like Kerala with a strong presence of the state, it is doubtful whether the traditional common pool resource (CPR) conceptual frameworks could be applied in the Vembanad context. This can be bridged by including political ecology as it examines power relations within and between social actors whilst looking at environment and society (Blakie and Brookfield, 1987; Peluso, 1992; Robbins, 2004; Schubert, 2005: 20). Political ecology is 'a confluence between ecologically rooted social science and the principles of political economy' (Peet and Watts, 1996: 6). Political economy is concerned about economic distribution conflicts, whilst political ecology deals with ecological distribution conflicts (Guha and Alier, 1997: 22, Narayanan, 2003: 42). Political ecology responds to the theoretical necessity to combine the analysis of land-use practice with the local and global political economy (Peet and Watts, 1996: 4; Narayanan, 2003: 15). The long-term perspective should be integrated with resource access and power – areas where conflicts of interests of the different stakeholders generate specific patterns of resource management (Zimmerer and Basset, 2003: 5). In this way, the 'capitalisation' of Vembanad by investments in houseboats and short-term profit maximisation strategies that affect the long-term sustainability of the environment, and thus the livelihoods of those dependent on the system, fits within the larger political ecology framework.

Methodology

The methodology is a mix of secondary data analysis and primary field data collection involving interviews with key stakeholders, focus group discussions and in-depth multiple interactions with a sample of informants selected from the first round of interviews. Environmental data from the Kerala State Pollution Control Board (KSPCB) and regulatory documents from the KSPCB and Department of Port, Government of Kerala, including the yearly reports (Water and Air Quality Directory) of the KSPCB 2009 and 2010, as well as a specific report on the Vembanad Lake (Project Water Quality Monitoring Vembanad Lake 2009-10) was reviewed. Regarding legal regulations, the following were the main documents examined: Environment (Protection) Act 1986, Central Water (Prevention and Control of Pollution) Act 1974, Environment (Protection) Rules, 1986 and Water (Prevention and Control of Pollution) Rules 1975 together with some others acts and regulations.

Groups of stakeholders were identified and semi-structured interviews with members of these groups were conducted, some of them with the aid of a translator. The interviews were recorded, translated and coded and used to support the analysis. The analysis is based on the comparison of the two sites Alleppey and Kumarakom.

The following groups of actors were identified:

Table 1: Stakeholder groups

Group of actors

Governmental entities (state level)	Pollution Control Board	Port Department	Tourism Department / DTPC ⁶	Panchayat ⁷ / municipality
Houseboat owners	Large-scale houseboat owners	Small-scale houseboat owners		
Houseboat owners & operators associations	All Kerala Houseboat Owners Association	All Kerala House Boat Owners and Operators Samithy	Kerala Houseboat Owners and Operators Association	Kerala Houseboat Operators and Owners Association

⁶ District Tourism Promotion Council

⁷ Panchayat is the official term for local self-government on village or small town level.

Houseboat workers	Houseboat workers Alleppey	Houseboat workers Kumarakom			
Tourism industry operators	Travel agents	Hotel industry			
Unions	INTUC ⁸	CITU ⁹	BMS ¹⁰		
Civil society	Kabani	GSGSK ¹¹	Fishermen Lake Protective Forum	ATREE ¹²	Kumarakom Nature Club
Academics	Regional Agricultural Research Station	Dept. of Community Medicine, Medical College, Alleppey			
Related industries	Bio-toilet distributors				

⁸ Indian National Trade Union Congress

⁹ Centre of Indian Trade Unions – attached to Communist Party of India (Marxist)

¹⁰ Bharatiya Mazdoor Sangh – affiliated to Bharatiya Janata Party (BJP)

¹¹ Gandhi Smaraka Grama Sevha Kendram

¹² Ashoka Trust for Research in Ecology and the Environment

Underlying conditions

In the following section, the underlying conditions of the general setting are discussed. They include economics of the houseboat industry, environmental implications, and social and cultural aspects.

Economics of the houseboat industry

Tourism in Kerala is a major economic activity and contributed 9% of the gross domestic product (GDP) in 2010–2011¹³ (State Planning Board, Economic Review, 2011: 237).¹⁴ The total revenue generated from tourism (direct and indirect) in Kerala during 2010 was Rs 17,348 crores (more than 3 billion US dollars) with an increase of 31.12% compared to the previous year (ibid.; Department of Tourism, 2011: 3). Tourism provides employment for 1 million people in Kerala and contributes Rs 1000 crores (Rs 10 billion or 182 million US dollars) every year to the investment pool of the economy (Vijayakumar, 2009: 5). The number of foreign tourists arriving in Kerala during 2010–2011 was 659,265, with an increase of 18.31% compared to the previous year.¹⁵ The number of domestic tourists arriving during the same period was 8,595,075, with an increase of 8.61% over the previous year (State Planning Board, Economic Review, 2011: 237).¹⁶ Regarding numbers of tourists to Indian states Kerala ranks 16th (domestic tourists) and 7th (foreign tourists) (Ministry of Tourism, 2011: 85). Houseboat tourism in the backwaters is one of the main tourist activities in Kerala. Most tourists visit the Vembanad Lake and its two main destinations for houseboat tourism, especially

¹³ The service sector in Kerala accounted for 69% of the gross state domestic product (GSDP) in 2011 – generated mainly from tourism and information technology – whereas the primary sector had a share of 11% and the secondary sector 20% at constant prices (2004–05). Regarding sectoral distribution, hotels and restaurants contributed 18.95% of the GSDP in 2010–2011 (State Planning Board, Economic Review 2011: 30–32).

¹⁴ Sreekumar et al. questioned the data of the State Planning Board regarding tourism in earlier years and made the point that, despite the concerted efforts of the government and the private sector, tourism is a rather inconsequential sector of the Kerala economy. They accused the bureaucracy and industry of portraying tourism as a major economic activity, when this was, in fact, the result of the success of a small interest group lobbying for unequal shares of subsidies and profits (Sreekumar and Parayil, 2002).

¹⁵ The number of foreign tourists arriving in India in 2010 amounted to 5.78 million, with a growth rate of 11.8% compared to 2009. This is more than the World Tourism Organization (UNWTO)'s projected growth rate of 5–6% for the world in 2010 (Ministry of Tourism, 2010: 19). According to the UNWTO, international tourist arrivals worldwide numbered 940 million in 2010 (UNWTO, 2011: 7).

¹⁶ The average length of a foreign tourist's stay is 16 days with an average expenditure per day of Rs 3600, the average stay of a domestic tourist is 6 days with an average expenditure per day of Rs 1800 (State Planning Board, Economic Review, 2011: 237).

Alleppey, the nucleus of the houseboat industry (population: 174,164, capital of Alleppey District¹⁷) or Kumarakom, the smaller second hub (population: 25,000, Kottayam District¹⁸). Most of the tourists coming to Kerala will spend at least one day on a houseboat, except the pilgrims, especially those going to Sabarimala where 40 to 50 million people visit the Ayyappa temple every year (Nair, 2012). Pilgrim tourists do not seem to be included in the official tourism statistics though.

Tourism brings 200,000 domestic tourists per year from all over India and 50,000 international tourists to Alleppey.¹⁹ Interestingly, domestic tourism in the houseboat industry has been increasing in the past ten years and it accounts for up to 70% of tourism in Alleppey's houseboat industry.²⁰ Currently there are 507 registered houseboats in Alleppey and Kottayam Districts, 357 in Alleppey and 150 in Kumarakom.²¹ In these two districts, which we focus on in our study there are also 436 motorboats, 66 speedboats 4 barges and 1 dredger – a total of 1014 registered boats (ibid.). Besides the registered boats there is a large number of unregistered boats. Currently there are about 500 unregistered houseboats.²² This high number of unregistered boats is also a result of the houseboat industry being a fast growing industry, which started off with only a few boats 20 years ago. It is an example of a new industry, which now faces regulatory challenges in the areas of security and pollution.

This rise in the houseboat industry, which now has more than 1000 boats, has led to employment generation: direct employment (around 4500 jobs, as at least three people – a captain, a guide/helper and a cook – work on each boat) and indirect employment (around 5000 jobs), which together amount to around 10,000 jobs.²³ Indirect employment includes suppliers of vegetables and fish; people engaged in washing, cleaning of the boats; taxi and auto rickshaw drivers, travel agents, and others.

The commissions for brokers of houseboats are high. Taxi drivers and auto rickshaw drivers get at least Rs 1000 per boat ride (overnight) or on an hourly basis they get Rs

¹⁷ Census of India 2011.

¹⁸ P G Damodaran, former Panchayat president Kumarakom.

¹⁹ Mr Pradeep, DTPC Secretary of Alleppey, interview in Ambalappuzha on 9 March 2013.

²⁰ Mr Sreekumar, Secretary All Kerala Houseboat Owners Association, interview in Alleppey on 20 March 2013.

²¹ Details of Inland Vessels Registered as per Kerala Inland Vessel Rules in Alappuzha Port, by the Port Office, Allapurzha, 1 February 2013.

²² Mr Er. Vinothu, Port Officer in charge in Alleppey, interview in Alleppey on 23 February 2013.

²³ Mr Sreekumar, Secretary All Kerala Houseboat Owners Association, interview in Alleppey on 20 March 2013.

500 for each hour they can arrange. The prices for houseboats vary depending on their size, the season and luxuriousness: a one-bedroom boat costs around Rs 5000 in Alleppey and Rs 6500 in Kumarakom for 24 hours, in peak season around Christmas the price can amount to Rs 20,000.²⁴ Brokers, who stand by the houseboat jetties waiting for tourists, get around Rs 4000 to 5000 for a two-bedroom boat for which a tourist pays Rs 19,000. Prices are generally higher in Kumarakom than in Alleppey.²⁵

Social and cultural aspects

While the economic benefits of tourism are employment income and foreign exchange, there are also negative socio-environmental impacts (Vijayakumar, 2009: 5). 'The tourism sector in Kerala has yet to institutionalize mechanisms for decentralized decision making, ensuring distributive justice and minimize leakages from tourism' (Vijayakumar, 2009: 3). Civil society organisations raise the criticism that houseboat tourism has impacts on the privacy and livelihood of people living in the backwaters. As people who live by the canals wash themselves and their clothes in the canals, the observation by tourists and the constant clicking of cameras is seen as an intrusion.²⁶ On the other hand many families benefit from tourism, as often at least one member of each family is involved in tourism directly or indirectly in Kumarakom, the surrounding villages and areas of Alleppey. Other problems mentioned by NGOs are the rise of fish prices and prostitution taking place on some houseboats.²⁷

Another interesting aspect is that the houseboat industry is open to all layers of society. The interviews revealed that it is not only the traditional feudal communities that are houseboat owners, but also members of lower castes own houseboats. This is possible because the government gives good conditions for loans. But small houseboat owners with one or two boats are under more pressure to pay back their loans and for them additional costs (for example of having to comply with stricter regulations) cause

²⁴ Mr Baiju, Joint Secretary Houseboat Owners and Operators Samithy, Owner Granma Tours interview in Alleppey on 28 February 2013.

²⁵ Mr Ajeesh, houseboat worker in Alleppey and Kumarakom and Responsible Tourism Guide in Kumarakom, 23 March 2013.

²⁶ Ms Sudha Soni, Project Manager Kabani, interview in Alleppey on 12 December 2012.

²⁷ Ibid.

financial difficulties.²⁸ Interestingly the big players, such as Lakes and Lagoons, Rainbow, and River Escapes, are often from Syrian Christian communities whereas the small players with one or two boats come from all layers of society, such as the Ezhava community, a few Dalits, Roman and Latin Catholics and a few Muslims. This also explains one of the splits in the All Kerala Houseboat Owners Association. The small-scale owners, whose issues are close to labour party topics and the communist party founded their own association to better meet their needs, the All Kerala Houseboat Owners and Operators Samithy.²⁹

Regarding the houseboat workers, the industry provides employment opportunities to the uneducated members of society from the villages around Alleppey and Kumarakom. Former agricultural labourers and fishermen now work as captains, cooks and helpers on the boats. Employment generation in this area is very much needed. Besides the current decline in agriculture, Alleppey experienced its first economic decline when the port lost its importance due to the dominance of the port in Cochin after the formation of the State of Kerala. The second decline happened when the coir industry started to decrease. Therefore the sustainable development of the houseboat industry is necessary to avoid a third downturn of the economy.³⁰

Environmental implications

‘Most of the natural resources used in tourism are either common or public property. Unplanned and reckless use of these resources with profit motive will ultimately bring home what is labelled as “The Tragedy of the Commons” (Vijayakumar, 2009: 3).

Regarding pollution by houseboats one has to distinguish between sewage from toilets, oil from the engines, plastic waste and food waste. The Kerala Pollution Control Board (KSPCB) makes regular monthly measurements of the water and air quality, which they publish in annual reports.³¹ There are ten measurement stations in and around the Vembanad Lake and they measure 34 parameters (Kerala State Pollution Control Board, 2010b: 23ff.).

²⁸ Mr Baiju, Joint Secretary Houseboat Owners and Operators Samithy, Owner Granma Tours, interview in Alleppey on 28 February 2013.

²⁹ Ibid.

³⁰ Mr K.G. Jagadeesan, General Secretary and CEO of Gandhi Smaraka Grama Sevha Kendram (GSGSK), interview in Alleppey on 13 December 2012.

³¹ Mr Eashodharan, District Officer in charge, Pollution Control Board Alleppey, interview in Alleppey on 23 February 2013.

Sewage can be measured by the number of coliform bacteria in the water. The KSPCB distinguishes between Total Coliform Organisms (TC) and Faecal Coliform (FC) MPN³² measured per 100 ml. The Ambient Water Quality Standards of the KSPCB define the permissible count of coliforms in the different types of water. The types range from A to E:

	Primary Water Quality Criteria for different inland water bodies classified to best designed use	Max. of total coliform organisms in MPN/100ml
A	Drinking water source without any conventional treatment but after disinfection	50 TC ³³ MPN/100 ml
B	Outdoor bathing organised	2500 FC ³⁴ MPN/100 ml
C	Drinking water source with conventional treatment followed by disinfection	5000 TC MPN/100ml
D	Propagation of wild life and fisheries	-
E	Irrigation, industrial cooling, controlled waste disposal	-

Source: Kerala State Pollution Control Board, 2009

	Total coliform organisms in MPN/100ml	Faecal coliform organisms in MPN/100ml
Average all measurement stations, December 2009	1012	744
Punnamada station, December 2009	1320	840
Punnamada station, average over one year (2009–2010)	1367	755

In December 2009 the average of all ten measurement stations shows a figure for total coliform bacteria MPN/100ml of 1012, and faecal coliform of 744 (ibid.). This is not alarming if the water is not used as drinking water. The Punnamada station by the houseboat jetty in Alleppey shows higher numbers: In December 2009, the counts were

³² Most Probable Number

³³ Total Coliform Organisms

³⁴ Faecal Coliform Organisms

1320 TC/100ml and 840 FC/100ml; and 1367 TC/100ml and 755 FC/100ml for the average over one year (April 2009 to March 2010). The average of total coliform bacteria is about 30% higher near the houseboat jetty than in the rest of the lake, whereas the count for faecal coliforms is only slightly higher. There is no data for the canals. The problem is that in the backwaters there is a shortage of drinking water and the government rations the water by only opening the taps at certain times each day.³⁵ Many people in the villages still use the lake water as drinking water³⁶ because there is poor access to drinking water (Planning Commission, Government of India, 2008). Some houseboat workers also admitted to using the lake water for cooking on the boats due to lack of infrastructure by the Alleppey boat jetty. The problem is that the main boat jetty in Alleppey has only one tap with insufficient water to supply several hundred boats, so although many boats buy bottled water for cooking, many use the lake water for the houseboat guests' showers. Also some houseboat owners admitted to emptying their sewage tanks into the lake or into the canals (mainly due to a lack of a proper STP near to Alleppey). This creates a hazard for the population living in the backwater by the canals, as well as for the tourists. Also it sheds light on the fact that the costs and benefits associated with environmental change, which is also caused by the tourism and houseboat industry, are 'distributed unequally among actors' (Byrant and Bailey, 1997: 28).

Dr Sairu Philip from the Department of Community Medicine of the Medical College in Alleppey mentioned that there are cases of cholera every four years. The municipality's medical system is well prepared for these cases and epidemics can be avoided. The cholera usually breaks out close to the Nehru Trophy Finishing Point,³⁷ the lowest point of the lake, which is also the location of the jetty and the main houseboat starting point. The drainage from the latrines of houses, hotels and houseboats, and flooding from the rivers, all flows to that area. If there are coliform bacteria in the water this is indicative of faecal pollution and the risk of waterborne disease is high.³⁸ With an increasing number

³⁵ The pathogen limit seems to be on the elevated side, compared to the levels set by the standards, in many of the wetland systems in the state. This leads to a situation of drinking water scarcity in many of the places where people are mainly dependent on the wetlands for their drinking water (Kerala State Council for Science, Technology and Environment, 2007: 118).

³⁶ Mr Sajeer Kumar, CITU Secretary Alleppey, interview in Alleppey on 23 February 2013.

³⁷ This is a boat race and one of the most popular annual sporting events in Kerala, conducted in Vembanad Lake. It is named after Jawaharlal Nehru, the first Prime Minister of India who inaugurated the race.

³⁸ The higher the number of coliform bacteria, the bigger is the risk of waterborne diseases, especially if the water is used for drinking or bathing. Other waterborne diseases endemic to the

of houseboats and no proper official STP in Alleppey yet, the sewage contamination of the lake is likely to increase with a concomitant hike in the coliform levels. There might not be a marked increase of diseases, but the risk potential rises.³⁹ Therefore health and hygiene standards are necessary and toilet waste should not be disposed of in the lake. As Dr Philip puts it, just because nothing, such as severe health problems, has happened so far does not imply that it could not happen in the future. As the recent boat accidents showed, there is a potential for risk when no clear standards are applied and monitored. Although the Community Medicine Department started training courses for the houseboat industry, the project could not be completed due lack of funds.⁴⁰

The Sabarimala pilgrim season from mid-November to mid-January is another important potential source of pollution as 40–50 million pilgrims visit the Ayyappa temple every year. The temple is located on the banks of the Pampa river, which flows into the Vembanad Lake. Counts of coliform bacteria are particularly high from January to March. This is the time when the salinity barrier⁴¹ is closed; it is the peak season for tourism and it is also the peak season for religious pilgrims (Sabarimala). Once the monsoon starts and the salinity barrier is opened the situation normalises and the problem is shifted to the ocean.

Plastic waste is very obvious in Alleppey and Kumarakom. And even if it is brought to the land, which most of the houseboat staff mentioned doing in the interviews, it is later often burnt, due to lack of alternative disposal facilities.⁴² This adds to the air pollution. A study (Padmakumar et al., 2006) by RARS⁴³ mentions the pollution from solid waste dumping, plastic waste, waste from tourist boats and oil spills, which pose a threat not

Kuttanad area due to faecal-oral contamination are acute diarrhoeal diseases, dysentery, worm infections and typhoid (Dr Sairu Philip, Associate Professor, Department of Community Medicine, T.D. Medical College, Allapuzha, interview on 28 February 2013 in Alleppey).

³⁹ Dr Sairu Philip, Associate Professor, Department of Community Medicine, T.D. Medical College, Allapuzha, interview on 28 February 2013 in Alleppey.

⁴⁰ Ibid.

⁴¹ The Thaner Mukkham Dam was built in 1956 to protect the rice fields from inundation with seawater. In order to justify the costs it was propagated that two crops of rice instead of one per year could now be grown. The closed salinity barrier has serious consequences for the biodiversity of the area as many aquatic organisms need seawater to breed (based on interview with Prof. Padmakumar on 24 February 2013).

⁴² Mr Ajeesh, houseboat worker in Alleppey and Kumarakom and Responsible Tourism Guide in Kumarakom, 23 March 2013.

⁴³ Regional Agricultural Research Station of the Kerala Agricultural University, based in Kumarakom. The RARS has been making monthly measurements in the lake for more than 20 years.

only to human beings but also to the biodiversity of the area. Due to the acid leachate from the dry paddy lands⁴⁴ and effluents from industries, the lake quality has been deteriorating very badly over the past ten years (Padmakumar, 2006: 589). Eutrophication is a serious problem due to pollution – a vicious cycle of de-oxygenation that affects the fish and other aquatic organisms. It is measured in terms of plant-plankton production and fixation of carbon in the water. In 2000 it was 80 milligrams carbon per cubic metre per hour. Now it is 200, i.e. 2.5 times more.⁴⁵ This situation is caused by sewage, agricultural residues and fertilisers,⁴⁶ as well as urban effluent. Prof. Padmakumar and his team found residues of around ten different pesticides in alarming concentrations in Vembanad Lake originating from the agricultural land, such as the rice fields in the Kuttanad area and plantations in the higher areas.⁴⁷ The Vembanad Lake is at the receiving end of five rivers and a lowland water body.⁴⁸ The Kuttanad area, which is located on the banks of Vembanad Lake, is also called ‘the rice bowl of Kerala’ due to its focus on agriculture. According to the KSPCB it consumes about 20,000 tons of fertilisers per year, in addition to a large amount of agrochemicals and pesticides (Kerala State Pollution Control Board, 2010b: 21). It is not possible to predict what the long-term implications of pesticides and chemicals in drinking water are when their concentrations are above the permissible limits.⁴⁹

‘Kochi city alone generates 2550 mld⁵⁰ of urban sewage that enters the Vembanad directly. Slaughterhouse wastes from the markets and hospital wastes also reach the system through the extensive network of canals in Kochi and through the rivers’ (Kerala

⁴⁴ Parcel of land used for rice cultivation.

⁴⁵ Prof. Padmakumar, Regional Agricultural Research Station (RARS), interview in Amballapurzha on 24 February 2013.

⁴⁶ Agricultural practices in the Kuttanad and Vembanad area are supported by the use of pesticides, insecticides, chemical and organic fertilisers; their residues enter the system and cause pollution and eutrophication. Modern aquaculture also uses many nutrients inducing changes in the ecosystem (State of the Environment Report 2007: 161).

⁴⁷ Prof. Padmakumar, Regional Agricultural Research Station (RARS), interview in Amballapurzha on 24 February 2013.

⁴⁸ The pollution of the wetland ecosystem in the state is considerable particularly in the Vembanad-Kol backwater system because of the various pollutants in the upstream area of Pamba, Achenkovil and Periyar rivers, which ultimately flow in to the Vembanad-Kol backwater system as well as various anthropogenic activities in the backwater area. The shallow water level in these rivers in the summer months also leads to saltwater intrusion, which makes the river water inapt for drinking and other uses like irrigation (Kerala State Council for Science, Technology and Environment, 2007: 118 and 161).

⁴⁹ Dr Philip’s survey showed that cancer incidence is slightly higher in the Kainakary area, but because of the lack of studies it cannot be said unequivocally that this is related to the pesticides (Department of Community Medicine, Alappuzha, 2009).

⁵⁰ million liters per day

State Council for Science, Technology and Environment, 2007: 148). Prof. Padmakumar explained that it is difficult to define what percentage of the pollution is caused by tourism, but that tourism has definitely added to the current pollution of the lake. Ten years ago, agriculture (which is decreasing), plantations, the effluents from towns were already there; only tourism has increased, according to him, especially houseboat tourism.⁵¹ The Report of the KSPCB of 2009–10 states that pollution in Punnamada (West of Pavilion) comes primarily from the houseboats (mainly due to oil leakage) as around 400 houseboats operate from this starting point for houseboat tourists (Kerala State Pollution Control Board, 2010b: 25). The KSPCB admitted though that pollution from houseboats is only a small percentage compared to domestic, industrial and agricultural pollution.⁵²

Legal structures and current measures

India is embedded in an international legal framework. Regarding the management of lakes such as Vembanad, the international Ramsar Convention on Wetlands, which India ratified in 1982, is relevant.⁵³ On this basis the Ministry of Environment and Forests notified the Wetland (Conservation and Management) Rules, 2010 under the Environment Protection Act, 1986. Issues related to the environment are regulated on a central (national) level; the states have regulatory agencies and are responsible for the implementation. Water is regulated on a central and a state level. Regarding wastewater management in Kerala's houseboat industry, the following central acts are relevant: Environment (Protection) Act, 1986 and Water (Prevention and Control of Pollution) Act, 1974. They are elaborated in the following rules: Environment (Protection) Rules, 1986; Water (Prevention and Control of Pollution) Rules, 1975 and Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008. At the Kerala State level, the following rules are relevant: Kerala Water (Prevention and Control of Pollution) Rules, 1976 and the Kerala Panchayat Raj (Issue of Licence to Dangerous and Offensive Trades and Factories) Rules, 1996. The Kerala Conservation of Paddy and Wetland Act, 2008 focuses on conservation of wetland, but does not cover water

⁵¹ Prof. Padmakumar, Regional Agricultural Research Station (RARS), interview in Amballapurzha on 24 February 2013.

⁵² Interview with the Pollution Control Board Alleppey on 23 February 2013 in Alleppey.

⁵³ http://www.ramsar.org/cda/en/ramsar-about-parties-parties/main/ramsar/1-36-123%5E23808_4000_0. Retrieved on 20 August 2013.

pollution thereof. The Kerala Inland Vessel Rules, 2010 are important regarding security of houseboats.

Generally speaking, legal structures pertinent to houseboat tourism in the backwaters consist of laws and regulations regarding the environment⁵⁴ (Sahasranaman, 2011) on the one hand, and security⁵⁵ on the other. A third branch consists of labour laws; but these are not relevant to obtaining the necessary permissions to operate in the houseboat industry. The KSPCB is responsible for the implementation of environmental aspects⁵⁶ and the Kerala Port Department is responsible for the implementation of security measures. The houseboat owners need to have a certificate from the KSPCB in order to get their final registration certificate from the Port Office.⁵⁷ Regarding wastewater management, it is mainly legislation administered by the Pollution Control Board that is relevant. Boards on the central and state level are responsible for the implementation. The Central Pollution Control Board coordinates the activities of the State Boards. Beyond the existence of such legal provisions, implementation and especially compliance, raises questions that are discussed in the next section.

⁵⁴ <http://www.keralapcb.org/home.aspx>. Retrieved on 12 May 2013.

⁵⁵ Kerala Ports, The Official Website of Kerala Ports, *Kerala Inland Vessel Rules, 2010*: <http://www.keralaports.gov.in/inlanddocument.htm>. Retrieved on 12 May 2013.

⁵⁶ Government of Kerala, The Official Web Portal of Government of Kerala, *Kerala State Pollution Control Board*:

http://www.kerala.gov.in/index.php?option=com_content&id=3372&Itemid=2438. Retrieved on 10 May 2013.

⁵⁷ After two boat tragedies with casualties, a commission decided to shift the overall control of houseboats from the Irrigation Department to the Port Department. In 2010 the Kerala Inland Vessel Rules 2010 were enacted. They build on the Inland Vessel Rules 1917 issued by the Central Government. At the time when they were published states having a rule were not obliged to adopt it. Therefore, up to 2010, the (Madras) Public Canals and Public Ferries Act and the Travancore Canal Act were in place in Kerala. These were suppressed in 2010 with a Gazette Notification in order to strengthen security aspects on houseboats. Regarding the Kerala Inland Vessel Rules 2010, the Government of Kerala (Coastal Shipping and Inland Navigation Department Notification) stated in 2010:

'In exercise of the powers conferred by section 19(1), 19 R, 29(1), 30, 30 A, 52(1), 53(1), 54 (1), 54(b) and 67(1) of the Inland Vessels Act, 1917 (Central Act 1 of 1917) and in supersession of the Travancore Public Canals and Public Ferries Rules, 1100 ME, issued under the Public Canals and Public Ferries Act, 1096, the Cochin Public Canals and Backwaters Navigation Rules, 1114 ME issued under the Cochin Public Canals and Backwaters Navigation Act, 1092 and the Canals and Public Ferries Rules, 1917 issued under the Canals and Public Ferries Act, 1890, to the extent they apply to mechanically propelled vessels and the Inland Vessels Survey and Registration (Kerala) Rules, 1999 issued under G.O.(P) No.1/99/CS&IND dated 5th June, 1999 and published as S.R.O. No. 503/99 in the Kerala Gazette Extraordinary No.1112 dated 5th June, 1999, the Government of Kerala hereby make the following rules, ...': in <http://www.keralaports.gov.in/inlanddocument.htm>. Retrieved on 10 May 2013.

Implementation of relevant laws and rules

Houseboats, major hotels and resorts are under the purview of the Water Act, 1974 and have to obtain a 'consent to establish' for establishing the industry and a 'consent to operate for discharging trade effluents and sewage' (Kerala State Pollution Control Board 2012: 13). A detailed list of relevant legal provisions and their implementation can be found in the Annex.

Many of the provisions laid down in the Environment Protection Act (EPA), 1986 (especially Ch. II Sec. 3) and the Environment Protection Rules (EPR), 1986 (Rule 3 and 3A, including Schedule I) are complied with such as laying down standards, collection of information, and monthly checks on the water quality of Vembanad Lake, which are published in a yearly report by the KSPCB. Regarding investigation and research, a study on pollution by houseboats has also been commissioned recently.⁵⁸ Inspections of premises and private effluent treatment plants (EPR, Rule 86) are conducted in Alleppey, the major hub of the houseboat industry. It is not possible to effectively control whether or not the houseboats are using the private tanks. A further problem is that the public STP in Alleppey was not yet in operation in 2013. In Kumarakom receipts by the public STP are controlled by the Port Office to make sure boats deposit their toilet waste in the STP and not in the lake. However, there is a lack of human resources in the Port Office and the KSPCB for the inspection of all boats. Many of the houseboat workers mentioned that there is no need to go to the STP if they use pellets or chemicals. As this is false, some information from the Port Department or the KSPCB would be necessary. Also it is not possible to control the bio-toilets for technical reasons. Therefore proper control of the wastewater being discharged by the houseboats is not feasible.⁵⁹ The measurement of primary water quality of bathing waters does not take place in the canals, even though many people use the canal water for washing, bathing and sometimes as drinking water. Some houseboat owners admitted to having discharged sewage into canals due to lack of a proper STP.

The Water Act, 1974 (Sec.17) describes the functions of the State Board. The following actions have been taken by the KSPCB: A study on houseboats has been commissioned by the KSPCB, monthly measurements are taking place and are used for annual reports by the KSPCB. Also training courses are being organised by the KSPCB,

⁵⁸ Mr Eashodharan, District Officer in charge Pollution Control Board Alleppey, interview in Alleppey on 23 February 2013.

⁵⁹ Ibid.

the Port Office and the Department of Tourism for houseboat workers and owners. Monthly samples (Water Act, Sec. 21) are taken in ten measurement stations in the lake, but it is not possible to take samples of the direct effluents of the bio-toilets. A certificate of the bio-toilet tank and treatment plant from KSPCB is necessary for houseboat owners to receive the overall licence from the Port Department (Sec. 25).

The overall objective of the EPA, which is the protection and improvement of the environment, and the overall objective of the Water Act, which is the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, are not being met as the lake is under severe environmental stress according to the KSPCB (2010b: 20). One reason is the 500 unregistered boats. The registration of houseboats is also hampered by the lack of human resources in the KSPCB and the Port Department. Regarding the restoring of the wholesomeness of the lake or the abatement of pollution, the lack of infrastructure is a big problem hampering the fulfilment of the legal requirements. The KSPCB and the Port Department have a process of control related to the yearly renewal of the licence for houseboats but its effectiveness is questionable.

The Wetland Rules, 2010 are central rules, which should be implemented by Kerala's Environment Department. This is not happening though. According to Dr V.S. Vijayan, one reason for non-implementation is that whilst drafting the rules, the authorities did not take into account the states and local stakeholders. The situation was different with the Kerala Conservation of Paddy Land and Wetland Act and Rules. Both, however, serve as a legal basis for cases, which can be brought to court regarding violation of the preservation of the environment in Vembanad Lake.⁶⁰ If the Wetland Rules were to be properly implemented, tourism would no longer be allowed in and around Vembanad Lake.

Discussion of factors leading to non-compliance

Based on information acquired from the semi-structured interviews several reasons for non-compliance with regulations can be defined: economic factors and lack of infrastructure; administrative and regulatory factors; governance and common pool resources; and awareness and attitude.

⁶⁰ Information provided by Dr V.S. Vijayan, former Chair of the Biodiversity Board in Kerala, 17 November 2013.

Economic factors and lack of infrastructure

The promotion of small locally owned enterprises is seen as a strategy for developing sustainability-oriented tourism by nurturing entrepreneurship (Lerner et al., 2001; Wanhill, 2000). Such stimulating effects have been noted with regard to small-scale houseboats and their support services (Kokkranikal et al., 2002). However, the economic situation of a houseboat owner seems to be very important in determining compliance with regulations. Small-scale houseboat owners with one or two boats are compelled to pursue short-term maximisation of profits due to the financial pressures of borrowing and this hampers compliance with environmental regulations. This is closely related to the lack of infrastructure (Mathen, 2012: 42), which is one of the main factors in non-compliance. This is in line with a political ecology perspective, which understands environmental problems as a consequence of certain forms of production (Narayanan, 2003: 333). As the houseboat industry has been growing fast in recent years – from 20 boats in 1980 and 100 boats in 2000 (Kokkranikal et al., 2002: 14), to more than 1000 boats in 2013,⁶¹ there is a lack of infrastructure and the systems still seem to be somewhat improvised. There is a difference regarding infrastructure between Kumarakom and Alleppey. Kumarakom has a boat jetty (at one of the four houseboat anchoring places) and an STP. In Alleppey the STP has yet to open and the infrastructure of the boat jetty is rather poor and lacks a proper water supply. The government has various plans for infrastructure development, which have not yet been implemented (Circuit Development Plan by Kerala's Department of Tourism, set up of a Committee,⁶² Kuttanad Development Plan). In Alleppey a proper jetty, an STP near the jetty, and a waste collection centre (segregating plastic and organic waste) are necessary. Kumarakom also needs proper waste collection centres at all the houseboat anchoring stations. A decentralised system of boarding and night stay is currently being discussed, which would help to better manage the system.⁶³ The STP in Kumarakom is too far away for boats from Alleppey to use and only allows boats from Kumarakom and the Kottayam District to empty their sewage. The boats from Alleppey would lose a one-day trip even if they were permitted to use the STP. There is an STP planned in R-block, in Kainakary Panchayat, but in 2013 the licence for electricity by the Panchayat has not

⁶¹ Mr Er. Vinothu, Port Officer in charge in Alleppey, interview in Alleppey on 23 February 2013.

⁶² Meeting on 25 February 2013 in Alleppey.

⁶³ U.V. Jose, Additional Director, Department of Tourism Kerala, interview in Trivandrum on 27 February 2013.

yet been granted. In Alleppey plans for an STP have existed for several years. The initial plan – land by the All Kerala Houseboat Owners Association, plant by Department of Tourism – failed due to opposition from various sides (claims that it was on paddy land, opposition by neighbouring hotels). The municipality does collect the plastic, but only irregularly and therefore people burn it; this seems to be the case in both Alleppey and Kumarakom.

Kumarakom and Alleppey both have a majority of local houseboat owners. Even though 90% of all investors in houseboats are from the region⁶⁴ implementation is not necessarily more successful. Rather it depends if investors are small-scale businesses under pressure to pay back loans or if they are large-scale businesses able to adopt a long-term perspective and having sufficient financial resources.

Administrative and regulatory factors

‘Environmental policies, management measures and technologies can reduce many tourism impacts’ (Buckley, 2012: 532). One of the main problems, however, is that there are more than 500 unregistered boats.⁶⁵ The officers in charge in the Port Office and the Pollution Control Board in Alleppey both mentioned the lack of human resources to properly control all the boats. Currently the Port Office has four engineers and the KSPCB Alleppey has four engineers responsible for issuing licences for a variety of activities, including all industries and houseboats, and ensuring compliance.⁶⁶ A scheme of financial incentives might help to improve compliance, which is also hampered by the lack of monitoring. Elinor Ostrom stresses that a good monitoring system is necessary for managing common pool resources (Ostrom, 1990 and 2010). An ideal solution would be to set up a system of monitoring for the houseboat industry by Houseboat Owners and Operators Associations and other ‘affected’ groups such as the fishermen or shell collectors. The Secretary of the All Kerala Houseboat Owners Association made it very clear that once the infrastructure is in place the Association will make its members

⁶⁴ Mr Eashodharan, District Officer in charge, Pollution Control Board Alleppey, interview in Alleppey on 23 February 2013.

⁶⁵ Mr Er. Vinothu, Port Officer in charge in Alleppey, interview in Alleppey on 23 February 2013.

⁶⁶ Mr Eashodharan, District Officer in charge, Pollution Control Board Alleppey, interview in Alleppey on 23 February 2013.

comply with the regulations.⁶⁷ There are, however, differences in interests between the large-scale operators and the small-scale operators.⁶⁸

The governmental agencies that are supposed to maintain natural resources such as lakes are often 'unable to do so due to a complex governance structure with overlapping jurisdictions, compounded by an evolving legislation' (D'Souza and Nagendra, 2011: 840). One example illustrating this is the overlapping responsibility regarding waste management in tourist sites by the Panchayat (Kumarakom)/municipality (Alleppey) and the Department of Tourism respectively through the District Tourism Promotion Council (DTPC). For better consistency and application of rules (especially after some accidents), the overall responsibility for houseboats was shifted from the Irrigation Department to the Port Department. Currently the Panchayat/municipality has no authority over houseboats. They collect building and professional taxes from hotels, but houseboats do not fall under their responsibility.⁶⁹ The luxury tax is collected by the Department of Tourism and the other taxes and fees are paid to the Department of Port and the Pollution Control Board. A shift in the responsibility for the tax collection to the Panchayat might make sense as they are the ones operating on the ground and taking care of waste management. This form of decentralisation of funds and proximity to implementation might make management and control more effective. The introduction of policies, laws and incentives can decrease or increase pollution, environmental protection or social equity, since the outcomes are often difficult to predict (Buckley, 2012: 530). Incentives could include acknowledgement by international sustainability initiatives and tax relief (such as the Responsible Tourism Initiative by the Department of Tourism of the Government of Kerala). Labels are a good incentive (Mathen, 2012: 42). The Responsible Tourism initiative is planning a new labelling scheme for houseboats. Currently there is an eco-friendly label awarded by the Department of Tourism (green palm certification).⁷⁰ Buckley is sceptical about self-regulation and eco-certification though. To improve social and environmental performance mainstreaming through government legislation is necessary (Buckley, 2012: 534).

⁶⁷ Mr Sreekumar, Secretary All Kerala Houseboat Owners Association, interview in Alleppey on 20 March 2013.

⁶⁸ This is also a reason why there were splits in the Houseboat Associations.

⁶⁹ Ms Danya, Panchayat President Kumarakom, interview in Kumarakom on 23 March 2013.

⁷⁰ <http://keralatourism.gov.in/classificationofhouseboats/Houseboat.htm>. Retrieved on 30 July 2013.

Governance and common pool resources

The shift from community management to state management is a change in governance, which often side-lines the fishermen and agricultural users who traditionally maintain the lakes (D'Souza and Nagendra, 2011: 840) although there never has been a system of governance where the communities came together to manage the Vembanad Lake. Tourism interferes with traditional activities such as fishing or lime shell collection as well as with the daily lives and livelihoods of people directly dependent on the lakes and canals for washing and domestic water needs. 'Urbanisation is one of the most significant drivers of global environmental change' (Grimm et al., 2008). This is especially important for developing countries where transformations due to urbanisation are often rapid and ill-planned (D'Souza and Nagendra, 2011: 840). The fast development of tourism and the houseboat industry in Vembanad Lake, which is only now becoming regulated, is such a case. Recent unprecedented urban growth has transformed a predominantly rural population to a mainly urban one (Baud et al. 2008). Besides the tourism industry, the usage of pesticides has strong impacts on the management and governance of natural ecosystems and their condition (D'Souza and Nagendra, 2011; Chakravarty-Kaul, 1990; Zérah, 2007). Vembanad Lake is not an urban lake but is located in a peri-urban area, touching Cochin and Alleppey. The conflicts arising around the lake occur between the traditional users who need the lake for their livelihoods, such as fishermen and people living by the lake, and farmers and the tourism industry, as well as other industries.

In a context where multiple agencies (Port Department, KSPCB and Panchayats/municipalities) and groups are involved in the management of the lake, accomplishing effective governance by involving several institutions working on various scales is crucial, especially as their 'jurisdictions, powers and scopes for action' often overlap (Ostrom, 2010; D'Souza and Nagendra, 2011). This is probably only partly the case in Vembanad Lake. The setting up of a nine-member committee by the State Government, which reflects the views of many of the stakeholders,⁷¹ is actually a good move in the current process of regulation of houseboats in Vembanad Lake, which is in line with the above-mentioned approach.⁷² Ideally, attention should be paid to traditional

⁷¹ U.V. Jose, Additional Director, Department of Tourism Kerala, interview in Trivandrum on 27 February 2013.

⁷² The high-level committee that was formed for the development of rules and regulations of the backwaters by the state government consists of nine members of high-level state government

and modern patterns of usage of a lake by local inhabitants from various backgrounds. To improve the management of the lake, close relationships between citizens and the government should be developed (D'Souza and Nagendra, 2011: 849). The setting up of a committee can be interpreted as an attempt of a collective-choice arrangement (Ostrom, 1990), as people who have to follow the operational rules are involved in designing and modifying them. Ideally other stakeholders such as fishermen would also be included and the rules would not only cover security aspects but also environmental ones. The challenge of how to handle the potentially conflicting interests of different stakeholders, such as the tourism industry on the one hand, and traditional stakeholders such as fishermen on the other, remains.

Political interference is another reason for non-compliance. If politicians stop implementation of law, this leads to great frustration among government officials and some of the houseboat owners. This topic goes beyond the scope of this study.

Awareness and attitude

Awareness and attitude are important as 'rules are useless unless the people affected know of their existence, expect others to monitor their behaviour with respect to these rules, and anticipate sanctions for non-conformance' (Ostrom, 1992: 20). It is difficult to determine whether non-compliance is more linked to awareness or to attitude. Kerala has a literacy rate of almost 90% and many awareness campaigns are organised by the Pollution Control Board, the District Tourism Promotion Council, the Port Department, unions and non-governmental organisations. On the other hand the people working on boats are mostly unskilled labourers. Some of the interviewees mentioned that it is not the awareness that is lacking, but the attitude that is the problem, as people are aware that it is not good to dispose of waste in the lake, but there is effort involved in not doing it. This can be described as a classical prisoner's dilemma: 'why should I spend more time and money if I am not sure others will do the same'. This is closely linked to the lack of infrastructure.

officials, is chaired by the Secretary of Tourism, and convened by the District Collector in Alleppey. The other members are the Director of Ports, Director of Tourism, District Collector Kottayam, District Collector Kollam, Government Secretary of Environment, Government Secretary of Law, and Government Secretary of Water Resources. The committee has met several times and has taken the views of the various stakeholders, such as the unions and houseboat owners associations, into account.

Many houseboat workers mentioned that the tourists often throw things in the water. Inhabitants of Kumarakom and Alleppey consider the pollution of the backwaters with rubbish and fuel from the boats as a problem (Sebastian et al., 2009: 13).⁷³

Power does not seem to be a significant reason for non-compliance; rather, it depends on the attitude of the actors. The Secretary of the All Kerala Houseboat Owners Association, for example, strongly supports a strict implementation of regulations.⁷⁴ So do some of the big players in the houseboat industry who use sustainability as a marketing tool (Kokkranikal et al., 2000: 16). Many of them have ties with international travel agencies. The international high-end tourists ask for standards regarding luxury and sustainability.⁷⁵ But this is no guarantee of compliance. Many of the small players understand the necessity of sustainability, but the lack of resources and infrastructure hinders their compliance.

Awareness regarding waste and pollution seems to be higher in Kumarakom than in Alleppey. This might be due to the STP in Kumarakom. Also Kumarakom has a history of active civil society movements with the Kumarakom Nature Club, which developed a charter for sustainable tourism in the 1990s and was determined by the Department of Tourism as an official site of the Kerala Responsible Tourism Initiative. A relatively active civil society and committed Panchayat can be seen as a reason for greater awareness and infrastructure, where one is linked to the other. The Panchayat president of Kumarakom mentioned the importance of an unpolluted environment for the long-term survival of tourism.⁷⁶

Factors, which have a positive relationship to compliance in Kumarakom, are the existing infrastructure and committed policy makers on the Panchayat (municipality) level, as well as an active civil society. Whereas, in Alleppey, basic facilities such as a boat jetty with good infrastructure and an official STP are still not operational, both exist in Kumarakom even though Kumarakom has many fewer houseboats (registered boats:

⁷³ Ms Sudha Soni, Project Manager Kabani, interview in Alleppey on 12 December 2012.

⁷⁴ Mr Sreekumar, Secretary All Kerala Houseboat Owners Association, interview in Alleppey on 20 March 2013.

⁷⁵ Mr Sunil, Manager Operations, River Escapes (Muthoot), interview in Alleppey on 9 March 2013.

⁷⁶ 'If the lake is not protected, then the result will be that there won't be any more tourism in the future. Therefore all steps should be taken to preserve the lake if we take the most immediate issues like plastic waste dumping by houseboats and the floating weed, which hampers sailing in the canals' (Ms Danya, Panchayat President Kumarakom, interview in Kumarakom on 23 March 2013).

150 in Kottayam District versus 357 in Alleppey District). The interviews showed that if there is an STP, people are at least aware of it and say that they are using it. A waste management system, which is properly managed is lacking in both places. Ideally tourism would support the building of waste management systems in Kumarakom and Alleppey as it supported the building of sewage treatment plants along the coasts of other countries (Müller, 2007: 119).

With agriculture and the related erection of the salinity barrier and the usage of pesticides on one side, and tourism on the other, as well as the increased pollution from households, the usage of the traditional common pool resource has changed. Where traditional systems used to work, as they were more in line with nature (e.g. rice cultivation was based on the tides, punts instead of motorboats), they are no longer functioning today as the lifestyle has changed. The usage of the common pool resource has changed through the emergence of recreational tourism and other industries.

Persisting problems

The houseboat industry very much polarises its supporters and criticsers. On the one hand it is a new industry, which has grown tremendously in the last 20 years and now has to be regulated mainly for environmental and security-related reasons (to avoid further boat accidents). This process inevitably leads to resistance, especially from small and medium players, for whom the costs related to the new regulations are a big burden. The reasons for lack of compliance include missing public infrastructure, lack of negative (control) and positive (incentives) regulations, and lack of a long-term vision on the part of the industry. A major challenge in operationalising any regulation is the presence of the 500 unregistered boats. More human resources in the KSPCB and Port Office in Alleppey would be necessary to properly implement the regulations for all boats. Proper checks and balances in the system are also needed to bring transparency and accountability to the system. One way is monitoring of these institutions through civic groups or concerned interest groups like the House Boat Owner's Associations or Fishermen's Associations.

The Vembanad Lake is not seen as a common pool resource by many of the houseboat owners and workers. This is partly because new industries such as tourism conflict with

traditional activities of a common pool resource. A fragmented system, which was partly managed by the communities, has become a state-managed system. Some houseboat owners have a long-term vision, but many just want to maximise their short-term profit. Therefore appropriate regulations and their proper implementation are crucial. The inclusion of the views of all stakeholders by the recently set up committee is an inclusive act, which should support the implementation of the new regulations. In general it can be said that not only do the houseboats pollute Vembanad Lake, but they generate additional pollution, which is unnecessary and can be avoided if the government improves the infrastructure. This would include additional boat jetties with STPs, a waste collection system and a system to avoid oil leakages into the water. The establishment of a sewage treatment plant in Alleppey as a first step, followed by plants in many other decentralised locations is key to avoiding the dumping of sewage by the houseboats in the lake and canals. This is particularly necessary for small-scale houseboat owners as they cannot afford to do a daytrip to the other end of the lake to use the STP and do not have the funds to establish a proper STP of their own.

The entry of the global tourism industry into the Vembanad Lake, the transformation and integration into a global economy lead to ecological issues relating to local resource management (Peet and Watts, 1996: 5; Narayanan, 2003: 39f.) such as the access to fresh water and a clean environment in the backwaters. The backwater area is a place that ideally would be managed as a common pool resource (Ostrom, 1990), but in reality it is not. It is best suited for a sustainable, soft tourism, which is long-lasting, draws on the destination character of the area and supports the traditional skills and activities whilst ensuring the long-term conservation of the environment (Vijayakumar, 2009: 7). There is a need to manage wetland tourism diligently through sound policies, planning and awareness-raising, basically by applying the principles of sustainable tourism.⁷⁷

The difference between Alleppey and Kumarakom is that there is better infrastructure in Kumarakom, which can be related to the greater awareness of the civil society and municipality, which have a long history and perhaps a better standing than in Alleppey.

⁷⁷ http://www.ramsar.org/cda/en/ramsar-pubs-tourism-wto/main/ramsar/1-30-570_4000_0_. Retrieved on 31 July 2013.

Concluding observations

The broader political ecological picture is the progressive 'capitalisation' of the Vembanad lake from the rice-centric economic interventions of the past two centuries (that encroached upon it and privatised it) to the tourism-related investments in land (resorts) and water (houseboats) that have triggered a dual process of environmental degradation and a livelihood crisis for those directly dependent on the wetland ecosystem. The recent shifts from the agricultural to the service sector were triggered by a swing in attitudes against traditional occupations like farming and manual labour on farms. The structural reasons explained by political ecology and its consequences are countered by the attraction of new employment opportunities and entrepreneurial avenues that have been opened up especially by the recent rise in tourism. The spectacular contribution of the houseboat industry to the local economy – and especially the significant amount of employment generated – makes it an irresistibly attractive proposition for investors as well as the local population. The adverse environmental and cultural consequences that are predicted by a minority of critics have not grown into a force that threatens the activity due to the economic incentives (both existing and possible) to the local population. The mismatch between short-term economic gains and long-term sustainability of the environment, and thus tourism activities, is due to the classical 'prisoner's dilemma' situation of competitive non-compliance. Thus the environmental degradation is continuing due to a lack of pollution abatement infrastructure and of compliance with the stringent legal criteria proclaimed in policy and legal documents. The regulatory and governance failure is attributed to administrative weaknesses like multiplicity of institutions, unrealistic mandates, shortage of human resources, lack of transparency and accountability and also to political reasons, such as rent-seeking and patronage. A mix of self-regulation (where the houseboat industry realises the long-term potential benefits of compliance) and efforts to bring transparency, accountability and participation into the governance system is the way out of the looming crisis that threatens the Vembanad ecosystem as well as the livelihoods of the population dependent on it.

This paper focused on the contribution of pollution by the houseboat industry and did not put much emphasis on other pollutants such as pesticides from agriculture, chemicals from other industries, and sewage from towns and villages around the lake. Future research could disaggregate and quantify the relative contribution of pollution by the

houseboat industry and its implications to get a better sense of proportion of the issues involved.

List of abbreviations

AKHBOA	All Kerala Houseboat Owners Association
CITU	Centre of Indian Trade Unions
CPR	Common Pool Resources
EPA	Environment (Protection) Act
EPR	Environment (Protection) Rules
KSPCB	Kerala State Pollution Control Board
MLD	Million Liters Per Day
MPN	Most Probable Number
STP	Sewage Treatment Plant

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Annex

Table 2: Relevant laws, rules and their implementation⁷⁸

Name	Level and Authority	Content	Assessment of Implementation
Environment (Protection) Act (EPA), 1986	Central Act/Implementation: State, by Kerala State Pollution Control Board (KSPCB)	An Act to provide for the protection and improvement of environment and the prevention of hazards to human beings, other living creatures, plants and property (preamble EPA).	Even though the EPA provides overall protection through measures such as laying down standards, collection of information, etc., no overall improvement of the environment is apparent. According to the KSPCB, the implementing authorities, the lake is under severe environmental stress. ⁷⁹
Environment (Protection) Act (EPA), 1986	Central Act/Implementation: State, by KSPCB	<p>EPA Ch.II Sec.3 describes the power of the Central Government to take measures to protect and improve the environment.</p> <p>Sec.3(2)(iii) lays down standards for the quality of the environment.</p> <hr/> <p>Sec.3(2)(iv) lays down standards for emission or discharge of environmental pollutants from various sources.</p> <hr/> <p>Sec.3(2)(ix) is about carrying out and sponsoring investigations and research relating to problems</p>	<p>Based on the existing standards monthly water quality measurements are taken and used for the annual reports by the KSPCB.</p> <hr/> <p>Study on houseboats and pollution of the Vembanad Lake has been</p>

⁷⁸ We would like to thank Advocate Preetha K.K. for her comments.

⁷⁹ Kerala State Pollution Control Board, 2010b: 20.

		<p>of environmental pollution.</p> <hr/> <p>Sec.3(2)(x): Inspection of premises, plant, equipment, machinery processes and giving directions by order for prevention, control and abatement of pollution.</p> <hr/> <p>Sec.3(2)(xi): Establishment or recognition of environmental laboratories.</p> <hr/> <p>Sec.3(2)(xii): Collection and dissemination of information related to environmental pollution.</p>	<p>commissioned by KSPCB.</p> <hr/> <p>Inspection of boats and private effluent treatment plants in Alleppey conducted by Port Office and KSPCB. Verification of sewage disposal receipts of STP in Kumarakom by Port Office. Lack of human resources for inspection of all boats. No inspection of bio-toilets (technically not possible).</p> <hr/> <p>KSPCB has its own laboratories.</p> <hr/> <p>Information could be improved with posters and other awareness campaigns.</p>
<p>Environment (Protection) Rules (EPR), 1986</p>	<p>Central Rules/Implementation: State, by KSPCB</p>	<p>Rule 3(1): Standards for protecting and improving the quality of the environment and preventing environmental pollution.</p> <hr/> <p>Rule 3A(i): The State Boards may specify more stringent standards for the relevant parameters with respect to specific industry or locations.</p> <hr/> <p>Rule 3A(ii) The State Board shall</p>	<p>Standards are applied and used for annual reports of measurements of water quality of Vembanad Lake by KSPCB.</p> <hr/> <p>The enforcement is only</p>

		while enforcing the specified standards follow the guidelines.	partial as there are 500 unregistered boats. ⁸⁰
Environment (Protection) Rules (EPR), 1986	Central Rules/Implementation: State, by KSPCB	Rule 3, Schedule-I(55) covers Common Effluent Treatment Plants (CETP): Note 2: For each CETP and its constituent units, the State Board will prescribe standards as per the local needs and conditions, which can be more stringent.	The CETP for Alleppey is not yet in use. In private effluent treatment plants effective control of usage is often not possible (technically and due to shortage of staff of KSPCB and Port Office).
Environment (Protection) Rules (EPR), 1986	Central Rules/Implementation: State, by KSPCB	Rule 3, Schedule-I(93): Primary Water Quality for Bathing Waters (water used for organised outdoor bathing).	No water quality measurement takes place in the canals, where inhabitants usually bathe themselves. Some boats discharge sewage in the canals.
Water (Prevention and Control of Pollution) Act, 1974	Central Act/Implementation: State, by KSPCB	Prevention and control of water pollution and the maintaining or restoring of wholesomeness of water (preamble Water Act).	Prevention and the restoring of wholesomeness is not given the priority that would be necessary (lack of infrastructure). Control of boats and water quality is done (except the unregistered boats).
Water (Prevention and Control of Pollution) Act, 1974	Central Act/Implementation: State, by KSPCB	Sec.17(1) describes the Functions of the State Board: Sec.17(1)(b): To advise the State Government on any matter concerning the prevention, control or abatement of water pollution. Sec.17(1)(c): To collect and disseminate information relating	 Monthly measurement and yearly reports are made by

⁸⁰ Mr Er. Vinothu, Port Officer in charge in Alleppey, interview in Alleppey on 23 February 2013.

		<p>to water pollution and the prevention, control and abatement thereof.</p> <hr/> <p>Sec.17(1)(d): To encourage, conduct and participate in investigations and research relating to problems of water pollution and the prevention, control or abatement thereof.</p> <hr/> <p>Sec.17(1)(e): To organise training of persons engaged in programmes relating to prevention, control or abatement of water pollution.</p> <hr/> <p>Sec.17(1)(f): To inspect sewage or trade effluents, works and plants for the treatment of sewage and trade effluents.</p> <hr/> <p>Sec.17(1)(g): Lay down, modify or annul effluent standards for the sewage and trade effluents and for the quality of receiving waters.</p> <hr/> <p>Sec.17(1)(h): To evolve economical and reliable methods of treatment of sewage and trade effluents.</p>	<p>the KSPCB.</p> <hr/> <p>Study on houseboats by KSPCB has been commissioned. Department of Tourism developed a Circuit Development Plan,⁸¹ which has been handed over to the Chief Minister.</p> <hr/> <p>Training courses are organised by the KSPCB, the Port Department and DTPC⁸² for houseboat workers and owners.</p> <hr/> <p>It is technically not possible to inspect the biotanks on the boats, nor their outflow. Private plants are inspected; effective control is not possible though.</p> <hr/> <p>Standards for lake quality exist, which are used by the KSPCB for their measurements and reports.</p> <hr/> <p>There is an STP run by the government (DTPC) in Kumarakom. In 2013 the STP in Alleppey was still not</p>
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⁸¹ Department of Tourism, 2010.

⁸² District Tourism Promotion Council

			in use.
Water (Prevention and Control of Pollution) Act, 1974	Central Act/Implementation: State, by KSPCB	Sec.21: Power to take samples of effluents and procedure to be followed in connection therewith.	Monthly samples are taken in ten measurement stations in the lake. It is not possible though to take samples of the direct effluents of the bio-toilets.
Water (Prevention and Control of Pollution) Act, 1974	Central Act/Implementation: State, by KSPCB	Sec.25(1): Restrictions on new outlets and new discharges: The establishment of an industry, operation or process, or any treatment or disposal system, which is likely to discharge sewage or trade effluents needs an application for consent of the KSPCB.	A certificate for the bio-toilet tank and treatment plant granted by KSPCB is necessary to get the overall houseboat licence from the Port Department.
Water (Prevention and Control of Pollution) Rules, 1975	Central Rules/Implementation: Central and State, by KSPCB	The Water (Prevention and Control of Pollution) Rules define the duties and powers of the Central Board and its Officers.	These rules focus mainly on the Central Board, which is outside the scope of this paper.
The Kerala Panchayat⁸³ Raj (Issue of Licence to Dangerous and Offensive Trades and Factories) Rules, 1996	Panchayat Rules/Implementation: Panchayat and KSPCB	Rule17: Machinery operated by electricity: The fee that may be charged for granting permission under section 233 for installing on an area of land, any machinery or manufacturing plant operated by electricity shall not exceed the maximum specified in Schedule III.	Implementation of the STP: electricity licence has to be given by the Panchayat. In 2013 this was pending for the STP in Alleppey District in R-Block by Kainakary Panchayat.
Kerala Water (Prevention and Control of	State Rules/Implementation:	Sec.21, Rule26 enables the Board to take for the purpose of analysis, samples of water from	Regular samples are taken by the KSPCB in ten different measurement sites

⁸³ Panchayat is the official term for local self-government on village or small town level.

Pollution) Rules, 1976	State, by Health Department and KSPCB	any stream or well or samples of sewage or trade effluent, which is passing from any plant or vessel or from or over any place into any such stream or well. Rule 27 requires that reports of the result of analysis on samples taken by the Board are sent for analysis and that the Board Analyst shall submit to the Board a report.	in Vembanad Lake. Regular reports are prepared and submitted by the officials of the KSPCB.
Kerala Conservation of Paddy and Wetland Act, 2008	State Act/Implementation: Revenue Department	An Act to conserve the paddy land and wetland and to restrict the conversion or reclamation thereof, in order to promote growth in the agricultural sector and to sustain the ecological system, in the State of Kerala (Introduction Paddy and Wetland Act).	This Act focuses on conservation and the restriction of conversion or reclamation of wetlands. It does not cover water pollution in the wetlands.
Wetland (Conservation and Management) Rules, 2010	Central Rules (based on international convention)/Implementation: State, by Department of Environment and Climate Change and Kerala Forests and Wildlife Department (if in forest area)	India is a signatory to the Ramsar Convention for the conservation and wise use of wetlands (preamble Wetland Rules).	Implementation by State Level Boards (Environment Department), which in practice is not enforced in Kerala. Serves as a legal basis for court cases. ⁸⁴

⁸⁴ Information provided by Dr V.S. Vijayan, former Chair of the Biodiversity Board in Kerala, 17 November 2013.

Wetland (Conservation and Management) Rules, 2010	Central Rules (based on international convention)/ Implementatio n: State, by Department of Environment and Climate Change and Kerala Forests and Wildlife Department (if in forest area)	<p>Rule 4(1)(iv): Prohibition of solid waste dumping.</p> <hr/> <p>Rule 4(1)(v): Prohibition of discharge of untreated wastes and effluents from industries.</p> <hr/> <p>Rule 4(1)(vii): Prohibition of any activity likely to have an adverse impact on the ecosystem.</p>	<p>Implementation by State Level Boards (Environment Department), which in practice is not enforced in Kerala, as waste dumping and discharge of untreated wastes and effluents (for example from houseboats) is happening.</p> <hr/> <p>If the Wetland Rules were to be enforced, tourism would not be allowed at and on the shores of the Vembanad Lake.</p>
Kerala Inland Vessel Rules (KIVR), 2010	State Act/Departme nt of Port	Rule 94: Prevention and containment of pollution of harbours, ports and waterways by oil, chemicals, hazardous cargo, etc.	Control of the certificate issued by the KSPCB for a bio-toilet and treatment facility of the houseboat by Port Department. This is a necessary condition for obtaining the consent to establish and consent to operate by the Port Department. Around 500 of the more than 1000 houseboats are according to the Port Department not registered.