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THE COMMUNITY PERCEPTION OF MANGROVE CULTURAL SERVICES IN XUAN THUY NATIONAL PARK VIETNAM

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Abstract

The need to save mangroves is growing, however, debasement has persisted for decades, because the processes of decision-making are inefficient, found solely on economic factors. This

study provides a tool for mangrove conservation and management to explore the socio-cultural values of mangrove ecosystem services through research in Xuan Thuy National Park, one of nine Ramsars in Vietnam, and also an area heavily affected by shrimp farming. 150 households were selected for an interview, 5 focus group discussions in 5 buffer zone communes, 10 in-depth interviews were carried out to find out the ecosystem services that mangroves provide, compared with literature review, and 3 cultural services listed by the local people as the characteristics of the mangroves here are lifestyle change, strengthening family relationship, implicit division of labor in the community. This proves that local people are ambassadors connecting the mangroves and the government. This finding suggests that the socio-cultural aspect of mangrove services should be deliberated by policymakers as a measure of great concern when facing the challenges of wetland ecosystem conservation.

Keywords

Wetland, Mangrove Forest, Ecosystem services, Xuan Thuy National Park.

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1. Introduction

Mangroves are wealthy, various, and complicated ecosystems, they are located in the interaction between land and sea, mangroves are important and valuable habitats in terms of adaptability, and they are distributed in 123 tropical and subtropical countries (Edward et al., 1997; Spalding et al., 2010). Every year, mangrove ecosystems provide around the US $1.6 billion, helping community's coastal livelihoods with crude stuff and nutriment, coastal security, soil corrosion restrain, water refining, maintenance of piscary, and carbon sequestration, entertainment, training, and investigation (Barbier et al., 2011; Costanza et al., 1997). Mangroves in addition supply ''non-stuff benefits that community gain through religious diversity, raise awareness, manifestation, pleasure and esthetical practice" (MEA, 2005).

Though mangroves play a very important role in culture, ecology, and economic value for local communities, the lawmaking has been gradually improved to protect mangroves globally, however, they are still devastated, over-exploited and declined significantly over the past decades (Giri et al., 2011). The rapid development of the coastal area has caused the loss of mangroves annually from 0.16 to 0.39% during the past 20 years (Hamilton & Casey, 2016). Significant in spacial extent damage of mangroves has downgraded and extremely segmented in

numerous sections worldwide dispersion (Giri et al., 2011; Hamilton & Casey, 2016), this could restrict to give goods for next generations (Barbier et al., 2011; Lee et al., 2014). Studies have shown that over-exploitation of timber and fuel in mangroves has resulted in a reduction in mangrove area by about 26%. (Valiela et al., 2001). Moreover, one – third of mangrove forests rated have been reduced due to shrimp-farming industry transformation (Ellison, 2008). One of the most significant root causes leading to a great decrease in mangrove areas is industrial shrimp farming (FAO, 2010). Vietnam's mangroves have declined during the past ten years (∼38%) or lost, predominantly determined by herbicides during the Vietnam War and later by the changeover to aquaculture and coastal development. However, the decrease of mangroves is getting slower due to regaining and protective cover plans (Kozhikkodan et al., 2019).

People have and will always be confronted with the decision of how to handle mangrove ecosystems for the future generation. This question comes from the fact that policymakers often focus on the economic aspects of mangroves, while their other ecosystem services are transferred to interchange purposes (Taylor et al., 2013). A dominant cause of clearing mangrove forests may come from some of the world's end-to-end wetlands have slight no worth merit (Mitsch and Gosselink, 1993), people have a limitation in understanding the function of mangroves in terms of providing goods, services, or ecology can be a key issue in this statement (Taylor et al., 2013). To have effective suggestions to improve the lives of people dependent on ecosystem services, it is necessary to observe local people's way of life and analyze their perception of ecosystem services (Adams et al., 2018).

The purpose of this study was to find out the community's perception of the recognition of ecosystem services from mangroves; the importance of mangrove ecosystem services in their life; the differences in cultural services of mangroves for conservation and development.

2. Literature Review

The relationship between ecosystem services and human behavior has been studied for a long time. Vitousek et al. (1997) have shown that the existence and provision of ecosystem services have promoted human behavior in minimizing biodiversity loss and maintaining the sustainability of ecosystem services.

Afonso et al. (2021) have shown a limitation in the awareness of mangrove benefits of people in Santomean communities, that is, they are only interested in direct services but lack regulating and supporting services provided by mangroves.

Research by Jay Mar et al. (2019) shows that fishermen are very aware of mangroves, which are the source of fish and other seafood in their lives. However, public awareness about the climate change mitigation function of mangroves is still low, this study also suggests that the government needs to invest more time and money to educate the community about blue carbon management.

Stanley et al. (2014) have studied the relationship between ecosystem services and human behavior, the results show that people perceive both feeling and verbally the direct and indirect ecosystem services. This has implications for shaping and regulating human behavior through ecosystem policy and management.

The cultural services of wetlands are defined as the non-physical benefits that people derive from wetland ecosystems, through spiritual enrichment, cognitive development, recreational experiences, or aesthetics (Martínez Pastur et al., 2016; MEA, 2005). The classification of cultural services is divided into cultural diversity, spiritual, religious values, knowledge systems, educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage values, entertainment, and ecotourism (MEA, 2005). Recently, a number of studies have evaluated cultural services according to classifications, and enriching categories, such as therapy, life-sustaining (Sherrouse et al., 2017), and sports services (Dai et al., 2019).

The assessment of cultural services of wetland ecosystems is still only in isolation, although there are studies assessing the relationship between people's perceptions and ecosystem services in general, however, cultural service is a very specific service among the four types of ecosystem services, it is necessary to further study the relationship of this service with the perception of the local community in order to propose better management policies.

3. Methods

We used both qualitative and quantitative research methods in this study to find out the perception of the local community on socio-cultural aspects of wetland ecosystem services. This

method was applied by Pacheco-Cortes and Morales-Salas (2018) when they implemented the study on students'perceptions about their learning process with the use of learning objects.

3.1. Study Site Description

The study was implemented in 5 buffer zone communes of Xuan Thuy National Park (NP): Giao Lac, Giao Xuan, Giao An, Giao Thien, Giao Hai from January to February 2021. (*Figure 1*).

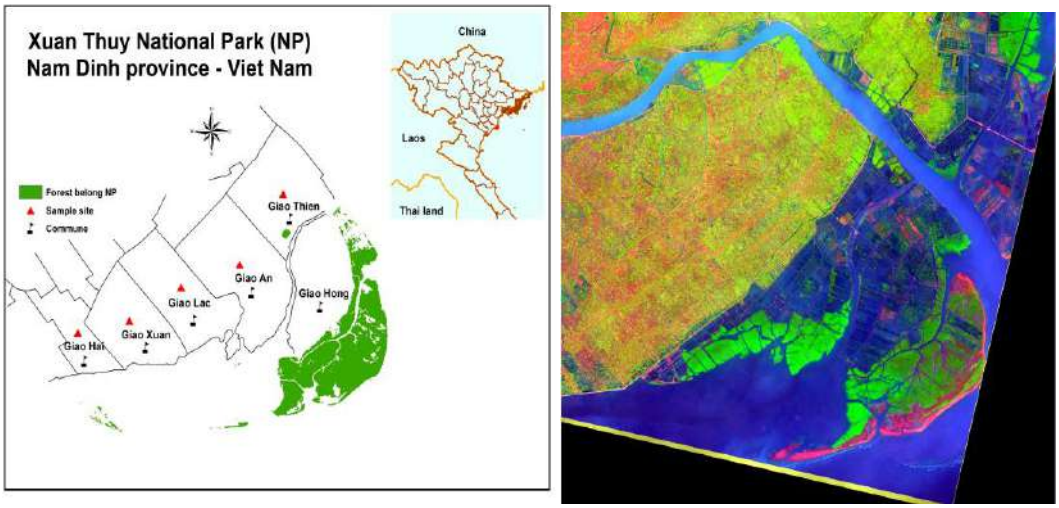

Figure 1: *The Study Site*

***(Source**: Xuan Thuy National Park and author's survey)*

Xuan Thuy National Park (NP) is situated in the south of the Red River Estuary, within the administrative boundaries of Giao Thuy district, Nam Dinh province, The North of Viet Nam. Xuan Thuy NP has a very convenient and important location with international significance as a Ramsar site and a world biosphere reserve. It is one of nine wetland areas in Vietnam that has been recognized as a world Ramsar site. The shrimp farms built in or around Xuan Thuy NP, the community livelihoods are interrupted directly by the mangrove ecosystem.

3.2. Data Collection

3.2.1. Household Survey

Before conducting interviews with households, the research team had a meeting with the Management Board of Xuan Thuy NP, and local authorities in the district to find out an overview of the socioeconomic of the people living in the surrounding the NP, which the research team selected 5 buffer zone communes of Xuan Thuy NP as study sites. Using a semi-structured questionnaire, a total of 150 mangrove-dependent households were surveyed. At least

30 questionnaires were asked for each commune to ensure statistical validity and were answered by the person with the most seniority in the household (Hue et al., 2018b). Questions focused on the mangrove ecosystem services used, people's dependence on them, change dynamics, and people's impact on mangrove ecosystem services. They also were requested to mark the points of each service from 0 to 5 (totally disagree to totally agree). The question "the meaning of mangrove forests for your life" was verified in the community and included in the research team's sample questionnaire, the question was asked to each interviewee, it was easy to understand and respondents can provide a lot of information. All answers were recorded by the interviewers.

3.2.2. Group Discussions

The community dependence on mangroves that obtained from the household survey was confirmed during the discussions of focus groups. We did five group discussions at commune levels, with an average of 8–10 participants in each group. The members of the group are selected based on their livelihood and dependence on the mangrove. Discussion groups were required to list and rate each ecosystem service of the mangroves, on a scale of 0-5, where 0=Strongly disagree, 5=Strongly agree, for example, "Mangroves are valuable thanks to their food providing". In addition, the research team also collected information on the daily livelihoods of local people associated with mangroves, and opinions on local mangrove management.

3.2.3. In-Depth Interviews with Key Leaders

Representatives of the National Park, Department of Agriculture and Rural Development, Department of Natural Resources and Environment, leaders of the People's Committees of 5 communes, and heads of villages were selected to conduct in-depth interviews. The main questions were asked in the interviews focused on the livelihoods of the community, the importance of mangroves to the local people, the programs and projects affecting the mangrove, and the change in mangroves in the last 10 years. A total of 10 staff members were consulted as key informants during the study. The main criteria for selecting informants were their knowledge of mangroves, and their dependence on and participation in mangrove management. Zainordin and Abidin (2017) also used this method to do a survey on sustainable urban transportation in Sarawak, Indonesia.

Field observation was implemented within two months we stayed with the villagers to get better apprehension of the community's culture as well as their behavior and habits (Hue et al., 2018a). We are also involved in informal speaks anywhere, anytime, and local church meetings. We especially observed the daily work of the fishing group to more identify the services provided by the mangrove forests. The field notes let us improve and clarify the responses from household surveys and in-deep interviews as well as group discussions.

3.3. Data Analysis

We used the IBM Statistical Package for Social Sciences (SPSS), version 20, and Microsoft Excel to sort and analyze. Both descriptive and statistical data analyses were performed. The calculation of sample means, standard errors, medians, minimum and maximum values, and frequency distributions was conducted.

4. Result and Discussion

Research on the perception of local communities on ecosystem services to investigate people's understanding of ecosystem services in general as well as cultural services in particular, and their importance of cultural services compared to other ecosystem services. All of the families selected for interview were directly or indirectly involved in the use of mangrove ecosystem services. They are the people who have lived here for a long time, attached to the change of the forest. Therefore, their opinion is very reliable. The acquired knowledge is also cross-checked through in-depth interviews, group discussions or field observations. Each of the researcher's comments was presented at a workshop with leaders of the province, district, 5 communes in the buffer zone and the national park to see if it is correct or need to be implemented. The results are shown as follows:

4.1. Background Information of Household Survey

Out of 150 respondents, 60 are male, accounting for 40%, and the rest are female. The women in the 5 communes who participated in the interview are very brave, they not only take care of the housework in the family but also know very well the business and economy in the family, they are the key people, keeping the money and taking care of the family, therefore, the data is very reliable. The ages of the interviewees ranged from 24 to 89 years old with a mean age of 48.5 years (*Table 1*). The largest age group represented is 41-50 years old with 28.5% of

respondents. This implies that the respondents have experienced various issues related to their own livelihood activities and in the community. Small family size (less than 4 people in the family) predominates (66.3%). Most of the respondents are owners, so they have a good understanding of the livelihood of their house as well as the disadvantages that their family is facing.

Table 1: *Background information of the respondents*

Social-Economic situation	Criterials	Frequency	Percentage (%)
Gender	Male	60	40
	Female	90	60
	21 – 30	10	6.4
	31 – 40	32	21.3
	41-50	43	28.5
	51-60	42	27.7
	Above 60	24	16.1
Number in the family	≤ 4	99	66.3
	5 – 7	43	28.9
	≥ 8	7	4.8
Relationship with owner	Owner	101	67.1
	Wife	28	18.5
	Husband	3	2.0
	Other	19	12.4
Years to stay in the commune (year)	Below 20	15	10.0
	21-30	19	12.4
	31-40	26	17.3
	41-50	28	18.9
	51-60	35	23.3
	Above 60	27	18.1

*(**Source**: author's survey)*

4.2. List of Mangrove Ecosystem Services That Local People Determined

From group discussions, household surveys, and field observation, 19 mangrove ecosystem services in Xuan Thuy National Park were pointed out by the local community: 8 regulating services, 1 providing service, 9 cultural service and 1 habitat service (*Table 2*).

Table 2: *List of mangrove ecosystem services in Xuan Thuy National Park*

Services	Depiction	Literature	Observation	respondents
Regulating Services				
Gas regulating	Balance of CO_2/O_2 in the atmospherical; equal of SO_2	X		
Climate regulation	Worldwide temperature, rain, biologic procedure that settle regional or world-wide climatic phenomena (greenhouse effect regulation)	X	X	X
Providing water	Keep water for reservoirs or dams	X	X	
Protect coastal	Breaking waves, protecting dykes	X	X	X
Regulating hydrologic	Regulating hydrologic flows, storing water for agricultural and aquacultural activities	X		
Contain erosion and keep deposit	Mangroves protect the soil, preventing the leaching of soil nutrients	X	X	X
Form the soil	Mangroves contribute to form the soil	X	X	X
Nutrient cycle	Mangroves consume nutrients found in the soil, and these nutrients will be released back into the environment via	X	X	X

Services	Depiction	Literature	Observation	respondents
	leaf, branch death and decay			
Energy dissipation	Remove and curb of extra nutrients (reduce contaminants)	X		
Pollination	Bee in the mangrove forest can transfer pollen grains from male anther of a flower to the female stigma	X	X	X
Biocontrol	Control pests: insects, mites, weeds and plant diseases using other organism	X		
Biodiversity regulation	Biological interactions between being and abiotic parts of ecosystems	X	X	X
Habitat Services				
Shelter	Home ground for birds to nest, rest and breed in some period time of a year	X	X	X
Provisioning Services				
Providing food	Provide food for local people: seafood	X	X	X
Primary production	The uptake of carbon dioxide or the output of oxygen	X		
Genetic resources	Supplying materials and biological products for drug production, keeping genetic resources for pest resistance	X		
Cultural Services				
Entertainment/Tourism	Tourism activities (fishing,	X	X	X

Services	Depiction	Literature	Observation	respondents
	boating, bird watching)			
Aesthetics	The scene from mangrove forest	X	X	X
Inspiration for the creation of poetry and art	Mangroves are motive and inspiration for artistic creations	X		
Spiritual	Many fisher folk, original people are scared of mangrove	X		
Maintaining indigenous ecological knowledge	The indigenous knowledge of local people relates to ecology of mangrove forest	X		
Science and environmental education	Wetland is the place which provides teaching knowledge and eniviormental education activities	X	X	X
Social connections are created and maintained	The relationships between people within/nearby a community or communities with the visitors are created and maintained	X	X	X
Personal satisfaction	People's satisfaction, pride, and sense of freedom when they live next to mangrove forest	X	X	X
Mental and physical relaxation	Increase psychological and emotional tension, relax and reduce stress, peace in mind	X	X	X

Services	Depiction	Literature	Observation	respondents
Change the lifestyle	They go fishing base on the water level		X	X
Division of labor in the commune	Some people in the village bought boats to carry ladies to collect seafood, then waited for them to finish catching, and brought them back, 50,000 VND per person, about 5-7 people in each boat.		X	X
Enhance family relationship	Many families bought a small boat, husband and wife go to collect seafood together.			X

***Source**: (MEA, 2005; Costanza et al., 1997; Edward B Barbier, 1997; Groot et al., 2002; Mcleod & Salm, 2006; Souza et al., 2017 and author's survey)*

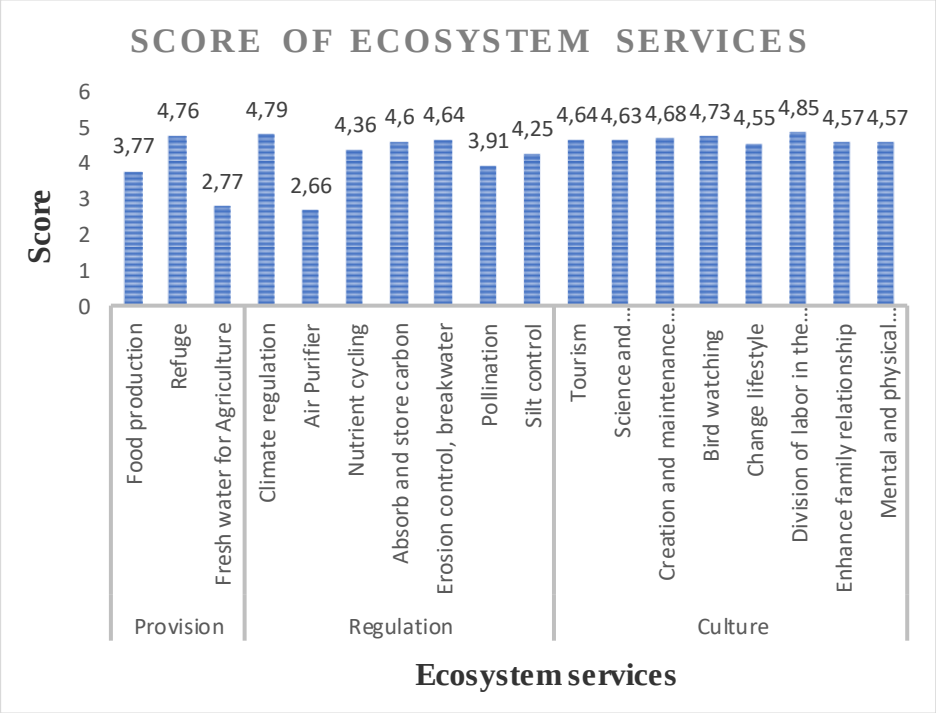

Figure 2: *Score of Ecosystem services*

***(Source**: author's survey)*

On a scale of 0 to 5, for the most part, mangrove ecosystem services in Xuan Thuy National Park were assessed by people with an average score of 4 to 5. The number of points answered by survey respondents for each type of ecosystem service is considered as a relative average, cultural services have the highest value among other ecosystem services. “Division of labor in the commune” (4,85), followed by regulation service of ‘‘climate regulation” (4.79), provision service of ‘‘refuge for species” (4,76), and watching birds is high scored in Xuan Thuy National Park (4,73), with the same scores, ‘‘erosion control and breakwater” (4.64) and ‘‘recreation/tourism” (4.64) (regulation and cultural services respectively), another regulation service followed: ‘‘absorb and store carbon” (4.60). Provision services of ‘‘fresh water for production” was the smallest service that people gave points (2,77) (*Figure 2*).

People in Xuan Thuy National Park especially appreciate the value of this regulatory service ‘‘regulation of climate and provision of refuge (i.e., habitat for infant shrimp and crab, as well as the place for bird coming)”, this explained why bird watching is famous in Xuan Thuy National Park. These days, the local people in the buffer zone of this Ramsar have received many educations and workshops conducted by non-government organizations in Vietnam to enhance their knowings about preservation problems. Such workshops have contributed to enhancing nearby people’s information about the significance of mangroves flow from a biological system point of view. The ecosystem service ‘‘food production” even though was not highly valued as other services, however, through field visiting, we recognized, that almost families in or around this Ramsar are using directly food from mangroves every day, they collect seafood from themselves or buy from the collectors.

4.3. Special Mangroves Services Locally Perceived

Cultural services are always highly appreciated and lively by group discussions, especially the division of labor in the village is very clear, some collect seafood from mangroves, boatmen, and traders, they have their phone numbers, when needed, just call, “each boat has its own USB drive in which there are familiar songs so that fishers can determine the direction to return to the boat, avoid entering the forest, going too far, getting lost". This is the creative work of the community. At night, following in the footsteps of fishermen, going into the forest, a thousand stars twinkling from the flashlights above each person's head and many funny sounds from boats waiting for the fishers, all create a fun scene”.

The ecosystem service ‘‘Recreation/tourism” was extremely weighted due to local people handling mangroves’ open-air activities such as relaxation, and social gatherings. This is explained by the evidence of some ladies amid the center bunch: ‘‘In every afternoon, around 4-6 PM, many local people come to near the mangrove forest to gossip and relax, they talk about their family, children, aquaculture as well as seafood collecting. “We do not like to be within the house and there is a place to go within the community, so everyone goes to the mangrove”. The same result was found in other wetland ecosystems such as De Wieden (Netherlands) where nearby entertainment was highlighted as a significant ecosystem service (Hein et al., 2006). In Xuan Thuy National Park, tourism facilities have existed recently. It is one way to secure the mangroves and increment local family earnings because it as of now occurred in other estuarine and coastal ecosystems (Barbier et al., 2011).

Amid casual talks, many local people confirmed that the community has considerable chances to grow ecotourism because Xuan Thuy National Park is seen in the migratory season of many endangered birds in the IUCN red list of threatened species, such as spoon-billed sandpiper, Nordmann's greenshank, black-faced spoonbill, this is explained why this area has attracted may bird watching enthusiast not only in Vietnam but in oversea. This all-encompassing opinion of mangroves carried by the local communities of the Xuan Thuy National Park connects ecosystem functions, services, and well-being, spotlighting the distinguished role of cultural services as other reports also underscore (Bell et al., 2015; Hsieh et al., 2015; Taylor et al., 2013; Thiagarajah et al., 2015). For example, Bell et al., (2015) declare that the recreational value of the maritime environment is useful for physical and mental health.

5. Conclusion

This study has partly reflected the importance of rating mangrove cultural values in the decision-making process and the importance of local people's percept of conservation policies. This study was conducted at the Xuan Thuy Ramsar site, a National Park whose wetlands have more cultural value compared to other national parks in Vietnam. The research has contributed to clarifying the theoretical framework and approach to quantifying the cultural value of ecosystem services. This research has special significance in mangrove conservation. The people living in the buffer zone of the Xuan Thuy National Park are seen as symbols of maintaining a strong

relationship between land and sea through a clear explanation of the natural cycles of flora and fauna, the change of mangroves over time, for the benefit of sustainable mangrove management, such knowledge as well as the close relationship with mangroves, whether intentional or unintentional, leads to the protection of their environment, as has been demonstrated in other conventional communities (Walters, 2004). All the same, the management policies of the government have not paid enough attention to the local people's understanding and awareness of mangroves. Severe mangrove degradation in coastal areas is due to the priority of policies on shrimp farming over sustainable management and exploitation of mangroves (Queiroz et al., 2013). As has been pointed out in other coastal wetlands, decision-making and policy-making need to incorporate the social value of ecosystem services (Taylor et al., 2013). Such an approach meets the United Nations Sustainable Development Goals in improving the lives of communities and contributing to the conservation of marine ecosystems (UN, 2015). Through this research, we see the interrelationships between social and natural systems as well as across many aspects of ecosystem services. Therefore, when policymakers on mangrove conservation and management need to pay attention to public awareness of mangroves, the rights and obligations of users of ecosystem services in conservation should be given due consideration.

Research limitation: This study was conducted during the prolonged period of the Covid-19 epidemic in Vietnam and around the world, therefore, there were no tourists visiting Xuan Thuy National Park, therefore, the method of stochastic assessment, interviewing tourists willing to pay (WTP) or willing to accept "WTA" in cultural service evaluation method cannot be performed. The study only focuses on the local communities, and managers but lacks tourists, this is also a suggestion for future research, applying all economic analysis methods to the evaluation of cultural services of the ecosystem.

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