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Chapter

Economic Value of Cultural Ecosystem Services in India: A Review

Muniyandi Balasubramanian

Abstract

Cultural ecosystem service (CES) is one of the important components in the ecosystem services framework which was designed by the Millennium Ecosystem Assessment. Cultural ecosystems services are the non-material benefits provides by various ecosystem services such as forest, wetland etc. CES is the vital contribution in the human well-being such as good physical and mental health. Further, CES is the major role in the Sustainable Development Goals (SDGs) for health and well-being. CES is still less primary investigation the economic literature especially in the Indian context link with the sustainable ecosystem management. Therefore, economic value of cultural ecosystem services is needed to study in the local level aspects. In the above mentioned context, this chapter is present the economic value of cultural ecosystem services in India. The main policy implication of the study is to design entry fee for many protected areas such as wildlife sanctuary, national park as well as sustainable environmental management for the present and future generation.

Keywords: Ecosystem Services, Travel Cost Method, Economics, India

1. Introduction

Cultural ecosystem services (CES) is non-material benefits provided by ecosystem services. Millennium Ecosystem Assessment [1–3] defined that "nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, cognitive development, reflection, recreation and aesthetic experiences". MEA has also classified such as cultural diversity, spiritual and religious values, knowledge systems, educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage value and recreation and ecotourism (See **Table 1**). Heretofore, most of the cultural ecosystem services have not been studied empirically at the local and national level. For example, there are a number of studies in tourism and recreational ecosystem services, Hermes et al., (2018), Fischer et al., (2018), Europe; Mayer et al., [4] Germany; Arslan et al. (2020), Turkey; Ribeiro et al., (2018), Brazil; Costanza et al. 1997, Global; Su, Li and Chen (2019); China. In India, there are a number of studies for example, Sinclair et al., (2018), tropical ramsar wetland; Balasubramanian [5] recreational value of two protected areas in Karnataka; Subramanian and Jana [6, 7] estimated the recreational value of some Indian

Cultural Ecosystem Services	Explanations
Cultural diversity	The diversity of ecosystems is one factor influencing the diversity of cultures
Spiritual and religious values	Many religions attach spiritual and religious values to ecosystems or their components
Knowledge systems	Ecosystems influence the types of knowledge systems developed by different cultures
Educational values	Ecosystems and their components and processes provide the basis for both formal and informal education in many societies
Inspiration	Ecosystems provide a rich source of inspiration for art, folklore, national symbols, architecture, and advertising
Aesthetic values	Many people find beauty or aesthetic value in various aspects of ecosystems, as reflected in the support for parks, "scenic drives" and the selection of housing locations.
Social relations	Ecosystems influence the types of social relations that are established in particular cultures.
Sense of place	Many people value the "sense of place" that is associated with recognized features of their environment, including aspects of the ecosystem.
Cultural heritage values	Many societies place high value on the maintenance of either historically important landscapes or culturally significant species
Recreation and ecotourism	People often choose where to spend their leisure time based in part on the characteristics of the natural or cultivated landscapes in a particular area.

Source: MEA [1].

Table 1.
Cultural ecosystem services and details.

cities; Badola et al. (2010) assessed the recreational value of Corbett tiger reserve, India; Ninan and Kontoleon (2016) estimated the value of recreational ecosystem services in the Nagarhole national park in Karnataka. Cultural ecosystem services have been vital role in the human well-being such as engagement with the nature positive physical and mental happiness (Bryce et al. 2016); cultural ecosystem services is the basic foundation for environment and human well-being [8]; CES has creative positive human well-being in the context of opportunity to express indigenous wish and needs [9]; cultural ecosystem services linking with human health and well-being [10]. Most of the cultural ecosystem services have been neglected from the day today decision making process [10]. A number of cultural ecosystem services have not been traded in the market, conceptual and methodological issues [11]. Although, CES is one of the most important ecosystem services protecting the ecosystem [12] through the religious and spiritual significance most the developing and developed countries [13]. The growing in attention in CES integrating into the decision making is an important for sustainable environmental management in the 21st century. Cultural ecosystem services are one of the important roles in the socio-economic and ecological aspects. CES is highlights three important aspects such as i) human well-being, ii) environmental or ecological decision making and iii) socio-ecological relation between human and nature [11]. CES is also reducing poverty through the engaging in the tourism and recreational services of many the developing countries, Bulte et al., (2008); Shuai et al., (2021); Gorden et al., (2010). CES is provide economic and employment opportunity to millions of people around the world.

1.1 Cultural ecosystem services and human well-being

CES is an important contribution to the human well-being through various aspects for example, Russell et al. [14–19] discussed cultural ecosystem services have been vital role to the human well-being such as learning capability, mental health, inspiration of imagination, subjective well-being, physical health and identity etc. in addition, there are strong relationship between human and nature through the four channels such as i) *knowing*, thinking about an ecosystem, ii) perceiving, remote interactions with ecosystem components; iii) interacting, physical, active, direct multisensory interactions with ecosystem component and iv) living within, everyday interactions with the ecosystem in which we live ([14]; 477). Generally, ecosystem services provide material and non-material benefits to human being. Further, provisioning ecosystem services has been strong association with human well-being, still cultural ecosystem services need more empirical analysis because benefits receiving as non-material (physical and mentally). Even though, there are number of studies has been investigated cultural ecosystem services and human well-being for example; Duraiappah [20]; Wang, Zhang and Chi [21]; Bryce et al., (2016); Leong et al., (2019); Bllock et al. (2018); Willis [22]; Yang et al. (2019); Kaltenborn et al. (2020). Environmental degradation has been highly impacts on human well-being through the various aspects for example land use and land cover changes; disservices has also impacts on marginalized group and indigenous people most of the developing countries [13]. Cultural ecosystem services are also one of the important tools for social relation in the world [20].

1.2 Economics of cultural ecosystem services

Provisioning ecosystem services has been highly studied and some services are traded in the market. Cultural ecosystem services have not been traded in the market because these services are not sold and bought in the market. However, cultural ecosystem services have been vital role in the context of generating income for local people, tourist guide, hospitality etc. through the outdoor recreation services. Cultural ecosystem services has been critical role in the day today economic activity of the millions of people for example **Figure 1** explained various type of CES changing in policy and behavior of local institution. For valuing CES could redesign parks entry fee for sustainable usage of recreational ecosystem services in the many developing and developed countries as well as behavioral changes for better environmental management at the local level. An improving economic well-being of the local, national and international level through the various aspects and finally valuing cultural ecosystem services has been one of the instruments of sustainable used of ecosystem goods and services for example, improving awareness among the various users of natural resources. There are a number of studies on valuing cultural ecosystem services especially recreational of parks, protected areas, wetlands and other ecosystem services at the local, national and international level. For example, value of cultural ecosystem services for various agriculture heritages in Chile was estimated at the US $ 40,361,120 through the contingent valuation method (Barrena et al. 2014); value of recreational ecosystem services was calculated at US $ 16.1–19.6 million for Popa Mountain National Park through the individual travel cost method (Zin et al. 2019). Recreational ecosystems services are one of the important components in the cultural ecosystem services. Most of the developing and developed countries have been much engaged in the tourism or recreational activities in their life. Heagney et al. (2010) calculated the value of tourism and recreational ecosystem services at AUD$ 3.3 billion per year of New South Wales in south-eastern Australia through the individual travel cost method.

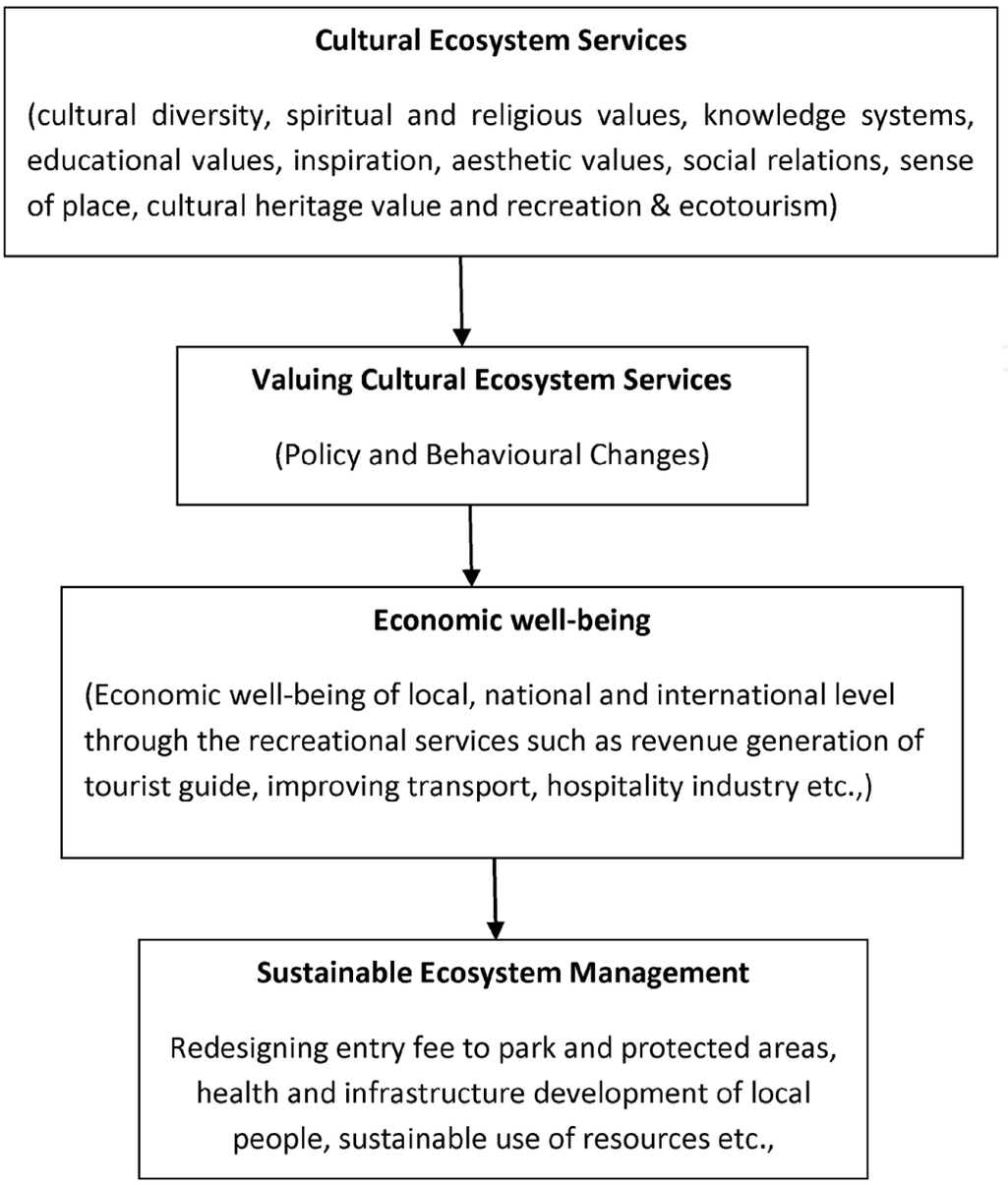


Figure 1.
Economic well-being of cultural ecosystem services. Source: Adapted from (Hirons et al., 2016).

Zandersen et al., (2009) estimated the value of recreational ecosystem services through meta-analysis of 26 studies from Europe. This study found that the consumer surplus were varied between euro 0.66 to 112 and the mean consumer surplus was calculated at 4.52 euro. Ezebilo [1] calculate the value of recreational ecosystem services for Sweden at US$16 per trip for forest areas. Nature based recreational ecosystem services of European Union was estimated at EUR 50 billion based on various environmental valuation method. Annual value of recreational ecosystem services provided by the Oku Aizu forest in Japan was calculated at US$ 27.07 million [23]. The value of recreational ecosystem services provided by urban green space at Santa Rosa, California was estimated at US$ 13.70 consumer surplus per trip to the site. Economic value of recreational ecosystem services provided by river Pajakkajoki had estimated at 40 to 144 euro per person annum. The value of recreation ecosystem services by national museum research centre of Altamira had estimated at 4.75 to 8 million euro per year based on individual travel cost method (Ortega et al., 2018). Estimated the value of recreational ecosystem services of national parks of Germany at 385.3 to 621.8 million euro per year [4].

National parks are vital contribution to economic well-being for example, total economic value of 11 Australian national parks had estimated at AUT $13.656 million [24]. Another study estimated by Neher et al. (2013) US$ 28.5 billion of 16 national parks in the US based on travel cost method. Therefore, recreational ecosystem service is the vital contribution to socio-economic and environmental well-being. However, the next section discuss about the economic value of recreational ecosystem services in India.

2. Economic value of recreational ecosystem services in India

According to Verma (2018) economic value of ecosystem services in India is emerging field of environmental economic subject. There are the number of studies has been investigated since 2000 in the various part of the country. Most of the studies have been focused on forest (68 studies), terrestrial wetlands (34 studies), marine, coastal wetland (19 studies) and other ecosystem services such as urban green space, agroecological ecosystem (25 studies). These figures are clearly shown that cultural ecosystem services are vital part in the economic valuation studies from various publications. Economic value of forest ecosystem services has been highly contribute compared than other ecosystem services for example Verma (2018) forest ecosystem services has contributed 1.7 percent in the total GDP in India. Cultural ecosystems services has been contributed nearly 26 percent in the total forest ecosystem services followed by 23 percent regulating and 15 percent supporting ecosystem services in Indian forest. Costal ecosystem services have been vital role in the economic and employment generation in India [25]. Valuation of cultural ecosystem services has been well recognized in India. Hence, there is lack of policy implication in the context of integrating in the state or national income accounts and designing entry fee for park, wildlife sanctuary and other protected areas in India. Most of the cultural services are free access or market failure due to poor environmental regulation. Therefore, degradation or environmental pollution is one of the important reasons for major environmental problem in India. However, there is lack of quantification of cultural ecosystem services at the local level due poor understanding among the local policy makers about the importance of cultural ecosystem services.

3. Materials and methods

The present study has developed a review of peer-reviewed journal articles on economic value of cultural ecosystem services. The recent review paper on cultural ecosystem services [13, 14, 20] provided a basic idea of the key terms. Reviews of literature were conducted during 1997 and 2021 using the web science core compilation of search term: 'ecosystem services' or 'cultural ecosystem services' or 'value of recreational services' or 'economic of cultural ecosystem services'. After title and abstract reading, 53 articles were considered this study, of which 22 were considered for data extraction after the full text reading. The categories of valuation methods, locations and authors with publication year were presented in the **Table 2**. Due to time constraints this paper has reviewed small number of research work on the value of cultural ecosystem services in India. In addition, due to heterogeneous literature based on various valuation methods and definition, a meta-analysis was not undertaken in the study.

Author and Year	Ecosystem Services	Location of the study area
Sinclair et al. 2018	Wetlands	Vembanad Lake, Kerala
[5]	Forest	Nandi Hills and Nagarhole National park
[6]	Green open space	Mumbai, Bangalore, Chennai
Ninan and Kontoeon	Forest	Nagarhole National Park
Sharma et al. 2020	Zoological park	New Delhi
Ghosh et al. 2016	Forest and wetland	Uttarakhand
[26]	Botanical Garden	Bangalore
[27]	Forest (tiger reserve)	Uttarakhand, Madhya Pradesh, Kerala, Assam, West Bengal and Rajasthan
Badola et al. 2010	Forest	Uttarakhand
[28]	Lake	Karnataka
Ramachandra et al. 2017	Forest	Karnataka
MoEFCC 2016	Forest	Karnataka
Gopal and Singh	Lake	Uttarakhand
IWRM	Lake	Uttarakhand
Rawat et al. 2005	Lake	Uttarakhand
Vengatachalam and Jayanthi 2015	Lake	Tamil Nadu
Costanza et al. 1997	Forest	Uttarakhand
Mukhopadhyay and da Costa 2015	Marine and costal	India
Gera et al. 2008	Forest	Uttarakhand
Kumar et al. 2018	Forest	Tamil Nadu
[29]	Forest	Karnataka
[26]	Forest	Karnataka

Table 2.
Details of the Ecosystem Services and study area.

4. Results and discussion

Of the 22 peer-reviewed articles included in this review on economic value of recreational ecosystem services in India; however there is the (12) studies on forest cultural ecosystem services various, (5) lake ecosystem services and each one from botanical garden, zoological park and marine ecosystem services parts of the country (**Figure 2**). While there is wide range of 9 states covered, the states with most publications are the Karnataka (9), Uttarakhand (8), Tamil Nadu (3) and Kerala (2). However, most the studies have used mixed methods both the qualitative and quantitative assessment for economic value of cultural ecosystem services in Karnataka. According to the Millennium Ecosystem Assessment [1] classified there are ten types of cultural ecosystem services see **Table 1**. Hence, most of the CES focused on recreational tourism ecosystem services in India. However, better understanding with cultural ecosystem services which is created good human

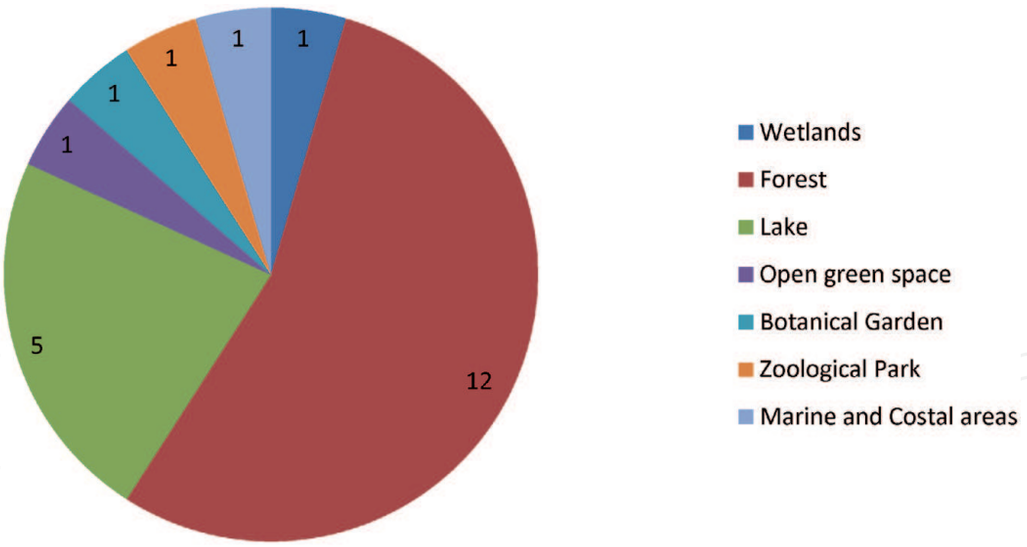


Figure 2.
Type of Ecosystem services and number of estimates. Source: Author estimates from various publications.

well-being [30, 31]. Therefore, need more studies on cultural value of ecosystem services. The present review is found that total economic value of 22 cultural ecosystem services at the US$ 1610 million in the 2020 (see **Figure 3**). Moreover, the value of forest related cultural ecosystems services is contributes more economic value at the US$ 657.51 million followed by marine and costal services US$ 720 and wetland land contribute US$205, open green space US$23 million and zoological park related cultural ecosystem services US$ 4.4 million (see **Figure 3**). Forest related cultural ecosystem services are vital role in the cultural ecosystems services for example, Karnataka has more than fifteen protected areas such as national park, wildlife sanctuary and tiger reserve. This present study is found that the value of recreational ecosystem services contribute at the US$ 434.6 million from Karnataka, US$ 6.705 million from Uttarakhand and Kerala US$ 205 million and other states have contributed few amounts in the total economic value of

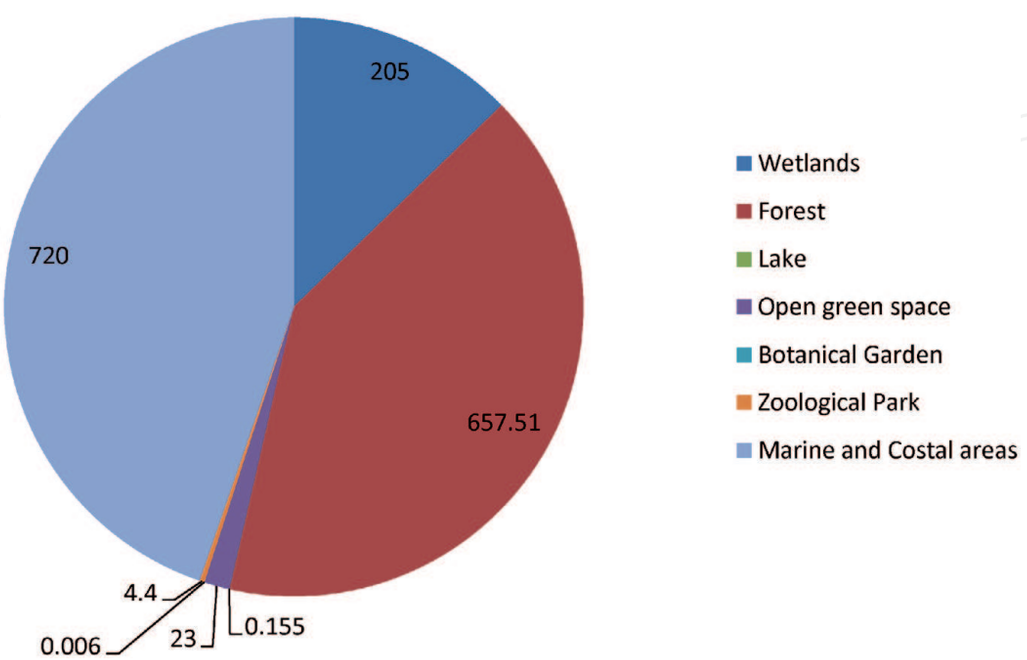


Figure 3.
Economic Value Recreational Ecosystem Services in India in US$ (2019–-2020). Source: Author estimates from various publications.

cultural ecosystem services. Moreover, this study is found that the value of two global biological diversity such as Western Ghats and eastern Himalayas. The total value of recreational ecosystem services is contributed by the Himalayas at the US$ 14.5 million and the Western Ghats the US$ 1,595.5 million based on 22 publications. There are number of cultural ecosystem services has been investigated in the Himalayas, due to lack of literature collection this study is included very few publication from the particular region. There are only four articles has published in the *Ecosystem Services* journal for example, Verma et al. [27] the value of cultural ecosystem services provided by the five tiger reserves at the US$ 13.8 million from (Corbett Tiger Reserve, Kanha Tiger Reserve, Kaziranga Tiger Reserve, Periyar Tiger Reserve and Sundarbans Tiger Reserve), followed by Ninan and Kontoleon (2016) had estimated the value of recreational ecosystem services at the US$ 0.41 million by Nagarhole national park in Karnataka. A few articles has published in Springer published such as environmentalist for example, Badola et al. (2010) estimated the economic value of recreational ecosystem services at the US$ 1.6 million by Corbett tiger reserve in Uttarakhand followed by Ramachandra et al. (2017) assessed the value of tourism and recreational services work has published the journal of Biodiversity (Routledge Taylor & Francis Group). In addition two working paper by research institutes such as wetland ecosystem services, (Vengatachalam and Jayanthi, 2015) and marine and coastal Mukhopadhyay and de Costa [25], followed by other refereed journal such as Aarthika Charche FPI Journal of Economics and Governance, Government of Karnataka on valuation of ecosystem services two protected areas [29] and Monograph on Economic value of ecosystem services by urban botanical garden estimated by [32].

Ecosystem services are very critical role in the human life [33]. The recent economics of biodiversity review by [34] indicates that the current economic and population growth is degrading and over exploiting natural capital in this century. In addition, the current economic models of growth are inessential form especially non-renewable natural resources. Further, Balvanera et al. [29] argues demographic pressures, climate change and lack of governance are the main reasons for most of the environmental degradation or pollution. MEA [1] has estimated that 60% of the global ecosystem services including provisioning, regulating and cultural services are degraded due to various socio, economic and political reasons. There is increasing understand strategies on better and sustainable environmental management through the cultural ecosystem services. Therefore, the present review is one of the tool for better understand between economy and cultural ecosystem services in the Indian context. There are a number of review work has been done in the cultural ecosystem services for example, cultural ecosystem services and human well-being [10; 35–37]. Although, very few economic review on economics of cultural ecosystem services for example, Hirons et al., [11]; Fish et al., (2016); Plieninger et al., (2013). In India, lack of economic value of cultural ecosystem services in the aspects of meta-review. There is some few studies review of economics value of regulating ecosystem services [32] and a new study on value of marine and coastal ecosystem services by Mukhopadhyay and de Costa [25]. However, increasing number of studies on economic of provisioning ecosystem services for example, Verma et al. [27]; Ninan and Kontoleon (2016); Balasubramanian [5, 29, 38, 39]; Dhyani and Dhyani [34, 40–43] but lack of review on economic value of cultural ecosystem services. In addition, there are a less in interdisciplinary analysis in the research. Therefore, the current review work mainly focusing on economic value of cultural ecosystem services especially recreational perspective. Moreover, cultural ecosystem services how relating with the human-well being research is totally missing in the literature in India. The recent study evaluated the relationship between cultural ecosystem services and human well-being of the two indigenous communities in India [9].

The value of cultural ecosystem services may help to local and indigenous communities through the traditional health treatment based on purely natural medicine as well as income and environmental conservation at the local level [5, 33]. The value of cultural ecosystem services may help to local policy markers on various aspects such as designing urban green infrastructure, revising the entry fee for the many urban parks and protected areas, cultural ecosystem services into integrating into economic decision making at the local level, achieving sustainable development goals especially better environmental management.

5. Conclusion

The main aim of the review is to understand the value of cultural ecosystem services for better management of protected areas, urban parks, marine and coastal areas and other tourism and recreational sites is the one hand and cultural ecosystem services has been vital role in the physical and mental human well-being. The results of the review work indicate that the lack of understanding on the relationship between ecosystem services and economic decision making at the local level due to less research on this area. The current environmental crisis such as loss of biodiversity and ecosystem services, climate related events such as disaster, floods, and droughts are the main cause of degrading the area of cultural ecosystem services in India. Therefore, the local policy makers when designing the policy for ecosystem services, they should understand the value of ecosystem services such provisioning, regulating and cultural services. In addition, cultural ecosystem services are the main role of the human well-being, MEA [1, 5, 26, 33, 44, 45]. Finally, in the academics and policy decision should give equal priority to all ecosystem services in the context of creating economic value to the nature.

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