



An Overview of Tourism on Dal Lake: A Spatial Analysis

Supratim Karmakar¹, Dhruba Jyoti Mudoi^{2*}, Subrata Dey³

¹ Assistant Professor, Department of Geography, Adamas University, Kolkata, West Bengal, India
² Research Scholar, Department of Geography, Visva-Bharati, Santiniketan, 731235, West Bengal, India

³ Post Graduation Student, Department of Geography, Adamas University, Kolkata, West Bengal, India

 OPEN ACCESS

Received: 11.10.2024

Accepted: 08.06.2025

Published: 22.06.2025

Citation: Karmakar S, Mudoi DJ, Dey S. (2025). An Overview of Tourism on Dal Lake: A Spatial Analysis. *Geographical Analysis*. 14(1): 9-14. <https://doi.org/10.53989/bu.ga.v14i1.24.176>

* **Corresponding author.**
dhrubamudoi2@gmail.com

Funding: None

Competing Interests: None

Copyright: © 2025 Karmakar et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Published By Bangalore University, Bengaluru, Karnataka

ISSN
Print: 2319-5371
Electronic: XXXX-XXXX

Abstract

Dal Lake is one of the most desired as well as popular visiting places among the tourists of India and abroad. The lake is situated in the heart of Srinagar City which is well connected with various parts of India. The natural elegance of the Himalayas makes the lake more attractive. This current paper is mainly focused on the spatial analysis of tourist spots over Dal Lake and the influx of tourists in the lake. Various statistical and cartographical methods like supervised classification of land use and land cover (LULC), and proximity analysis have been done to fulfil these objectives. The major data source of this study is collected from tourism department of Jammu and Kashmir. Primary data about the houseboat owners has been done by questionnaire survey. The paper finally tries to bring out the prospects of tourism development in Dal Lake in a sustainable way.

Keywords: Tourism; Lake; Houseboats; Buffer; Land use

1 Introduction

Popularly Jammu & Kashmir known as “Paradise on Earth” and the Union Territory is renowned for their natural beauty. The lofty Himalayan ranges, valleys, lakes, vegetation, snow covered mountains, Mughal gardens, religious monuments etc. makes the place prominent in the tourism aspect. Tourism industry is an integral part of revenue formation in Jammu & Kashmir and Dal Lake is a principal tourist spot among others. Srinagar is growing as a tourist hotspot in the Union Territory. By creating employment opportunities and accelerating sustainable development in the

form of GDP growth, tourism industry helps socio-economically the state government as well as the country's government⁽¹⁾. Tourists from different parts of the world visit there every month of the year. Because of its ideal location for tourist residences, Dal Lake attracts a large portion of tourists. Dal Lake can be referred to as the ‘Heart of Jammu & Kashmir’. Dal Lake is the most visited tourist place; frequency of both domestic and international tourists is very high in all seasons of the year. Houseboats, Shikara rides, floating markets, floating hotels, and lotus gardens make the lake beautiful and very important for the expansion of tourism. Depending on Dal

Lake, some other major industries are also growing faster. By observing, we can remark that Dal Lake is helping in the overall growth of Srinagar city. The lake is surrounded by many other tourist spots, such as Mughal Gardens, Botanical Garden, Shankaracharya Temple, Makhdoom Sahib, etc., which gradually increases the importance of Dal Lake as a place for better residence⁽²⁾.

2 Study Area

Dal Lake is a fresh water and urban lake situated in Srinagar, the summer capital of Jammu & Kashmir that lies between the Great Himalaya and Pir Panjal range. The geographical extension of the lake is $34^{\circ}5'$ to $34^{\circ}9'$ N latitude and $74^{\circ}49'$ to $74^{\circ}53'$ E longitudes (Figure 1). The lake can hold a total water of 15.45 million-meter cube which is a multi-drainage basin having an average altitude of 1583 m above mean sea level. It covers a total area of 24 sq. km, and the catchment area of the basin constitutes over 337 sq. km. The open water of Dal Lake occupies an area of 10.5 km.⁽³⁾ It is the subsequent largest freshwater lake in the Union Territory after Lake Wular. Because of the favorable location it emerges as the most visited tourist place in the Union Territory. The lake is divided into four basins viz. Bod Dal, Nagin, Gagriibal and Lokut Dal (also known as Rup Lank and Char Chinari). The average depth of water varies from 6 m to 2.5 m, it's deepest in Nagin Lake and shallowest at Gagriibal lake. Zabarwan Mountain, a subsidiary of the Himalayan range surrounds the lake on three sides⁽⁴⁾.

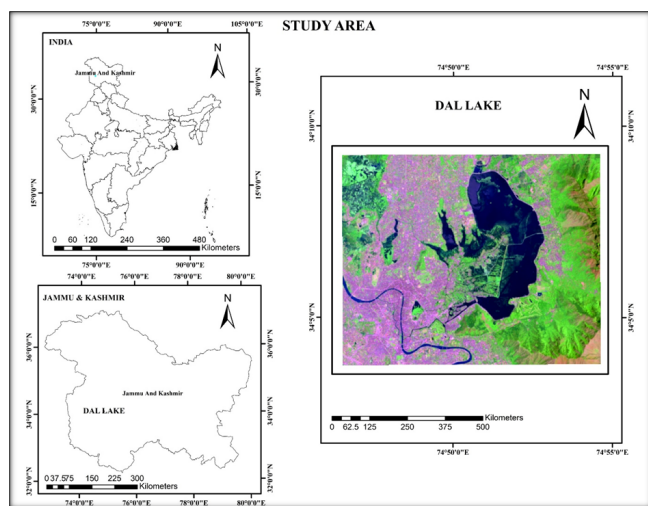


Fig. 1. Study Area

Dal Lake is very famous among the tourists for its Shikara ride. It also offers the facilities of house boats, floating markets, floating gardens, floating restaurant and some other recreational and basic facilities. Many of Bollywood film makers choose Dal Lake as film location because of its natural beauty which boosts up the economy of local

tourism. A major hotel industry is growing rapidly based on the lake tourism. Dal Lake is a source of important multistage components like drinking water, irrigation, fishery, agriculture, socioeconomic development and recreational facilities etc.⁽⁵⁾.

3 Objectives

The main objectives of the current research work are:

1. To give a brief overview of tourism based on Dal Lake along with its problems and prospects.
2. To analyse the spatial character of tourism on Dal Lake.

4 Methodology

The research work begins with a literature review on tourism with special reference to Dal Lake. The sources of literature are Google Scholar and Elsevier database. The secondary data has been augmented by Department of Tourism, Jammu and Kashmir. Primary data have been composed by interview technique about the occupancy of houseboats. A total of 127 houseboat owners have been interviewed. For mapping purposes, Landsat 9 image has been used. Supervised classification techniques have been used to categorize five major land use and land cover classes. For the demarcation of tourist spots, the Google Earth database has been used and proximity analysis has been done for the identification of high tourist gathering zones. Circular buffer areas of 100 meters, 300 meters, and 500 meters have been generated around the major tourist spots on Dal Lake.

5 Overview of tourism in Dal Lake

Dal Lake is a type of urban freshwater lake⁽³⁾ which is predominantly used for tourism. For the local people, Dal Lake is a major source of livelihood; permanent settlements have been observed in the lake, which totally depend on the tourism sector for their revenue generation. As earlier stated, the lake is divided into four basins; Nagin is a separate lake. In the middle of Bod Dal, there is a small island. The well decorated, colorful Shikara and the house boats are the identity of Dal Lake. At present, there are more than thousands of houseboats, which also offer the opportunity of lodging to tourists. Photography stations, vendor's boats, shops, floating ATMs, etc. are also available in the lake which fulfilling the basic necessities of the tourists. Dal has more than 30 ghats that offer shikara rides every day. The cost of a shikara ride starts at Rs. 770 and varies according to the duration of the ride; four people can ride at the same time in one shikara boat. The well-known shikara points are Meena Bazar, Nehru Park, Lokut Dal, Char Chinari, Sonn Laank, Hazratbal, and Vegetable Market. These houseboats are classified in various categories, such as Deluxe, A, B, C

and D by the department of tourism of J&K, In the same way, they have also categorized the houseboats that have been used for lodging on the basis of the services they provided⁽⁶⁾.

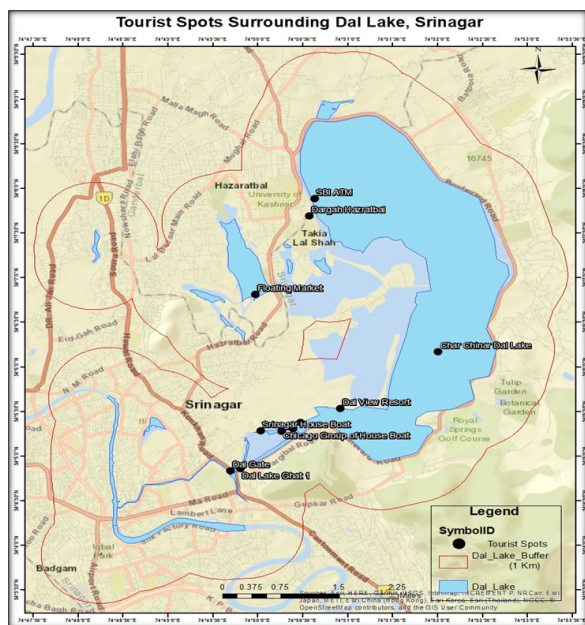


Fig. 2. Tourist Spots around Dal Lake (1 Km Buffer)

Apart of tourism activity, there have been a number of small, cultivated areas which are using for various type of cultivation. Lotus-seed, maize, tobacco, melons, potatoes, onions, radishes, eggplants, white beans, peaches etc. have been seen there and the cultivators of the lake are locally called as Mirbahri⁽⁷⁾. The lake is surrounded by built-up area and connected by proper well developed road network with other places. In the distance of one km, few other famous tourist spots also located such as Dargah Hazratbal, Tulip Garden, Botanical Garden, Iqbal Park which has been shown in Figure 2. Nishant Bagh, Shalimar Bagh, Indira Gandhi Memorial Tulip Garden, Hazratbal Shrine, Shankaracharya Temple, Jama Masjid Mosque are also located in the buffer area of the lake, consequently tourist prefers dal lake for accommodation from which they can explored the other places of Srinagar.

In the numbers of tourists, J&K secured the 3rd rank after Rajasthan and Kerala, scenic beauty plays a vital for attracting the tourists⁽⁴⁾. Dal Lake is one of the most visited places in J&K. Usually in terms of the number of tourists, it doesn't follow any similar trends between the domestic and foreign tourist flows, and it also undergoes a flexible tourist flow trend between the years. In 2005, it experienced the highest tourist flow, with a number of 247,078. Consequently, due to the COVID-19 pandemic in 2021, it experienced the lowest tourist flow with a number of only 2413, and foreign tourists were totally absent in that year. From the tear of 2002 to 2004

there were a rising tourist flow trends in case of both domestic and international tourist, it experiences a declining trend for the next three year for domestic tourist. On the contrary, international tourists continued to rise until 2007 (Table 1).

Table 1. Tourist Inflow in Dal Lake, Srinagar (1998 – 2023)

Year	Domestic Tourist	Foreign Tourist
1998	54732	5574
1999	77894	3104
2000	41734	4923
2001	26692	3808
2002	9868	1745
2003	72882	3583
2004	143238	12112
2005	234280	12792
2006	165151	13005
2007	146042	14745
2008	55104	6476
2009	63412	8754
2010	215463	11463
2011	154780	7541
2012	62475	5462
2013	52146	9875
2014	98764	12479
2015	56741	14503
2016	44125	4112
2017	101632	20156
2018	114530	6784
2019	98742	10875
2020	4127	1025
2021	2413	0
2022	35794	2241
2023	100236	18741

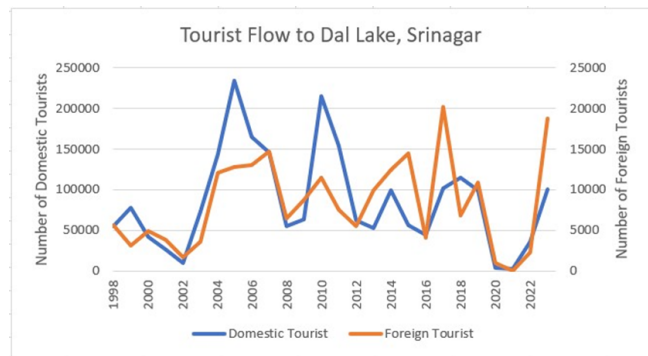
Source: Department of Tourism, Jammu and Kashmir, 2024

Houseboats or floating hotels are the key elements behind the booming tourism of Dal Lake; along with the service of accommodation they symbolize the Kashmir people's cultural legacy⁽⁸⁾. It has been found that the magnitude of tourist flow in Dal Lake is very high in between April to October. Due to the extreme cold climatic condition winter season is not favorable for the outsiders and hence small amount tourists visited there (Graph 1).

6 Spatial Impact of Tourism

The spatial analysis is based on the Land use and Land cover map of the 1-kilometre buffer surrounding the Dal Lake. From the LULC map, the areal extension of a particular category of usage of land can be defined (Figure 3).





Graph 1: Tourist Flow to Dal Lake, Srinagar

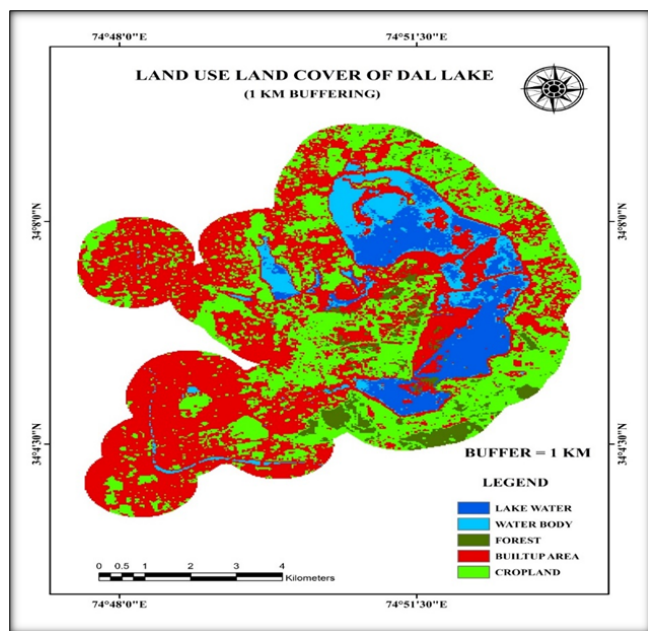


Fig. 3. Land use and Land cover around Dal Lake, 2024

Dal Lake shows the deep-water portion in the middle part of the lake which is nearer to the eastern side of the lake. The shallow water portion can be envisaged mainly in the northern portion. These shallow portions are filled with hydrophytes which come up almost to the surface water level. The deep-water portion is very much favourable for the ‘shikara’ (local boat) movements⁽⁹⁾. The shops, floating markets, house boats and floating gardens are mainly located in the shallow water portion⁽⁷⁾. As discussed in the earlier section, Dal Lake is surrounded by the roads and constructions, the LULC map depicts the same scenario. The amount of settlement around the 1-kilometre buffer area of Dal Lake covers the highest amount of area (Figure 3) Cropland or agricultural fields are the second largest land use category. Agriculture in Srinagar, particularly surrounding Dal Lake not only consists of crop production but orchards

of flowers, a variety of nuts, and fruits are the dominating types of produce here. The local climate and terrain character help to grow these types of items. Hilly terrain supports the growth of dense forests also. Here, within the 1-kilometer buffer of Dal Lake, dense forested areas can be found with an extension of 2.46 sq. km. Due to the development of tourism, tourist facilities growing day by day. As a result, the surroundings of Dal Lake are getting more built-up area. The natural vegetation part is losing its area and shrinking into small patches (Table 2).

Table 2. Land use and Land cover around Dal Lake, 2024

Land-Use Category	Area (in sq.Km.)	Percentage
Deep Water	6.072	9.352
Shallow Water	4.198	6.467
Built-Up	31.237	48.113
Forest	2.461	3.790
Cropland	20.955	32.276

Tourism works as a force behind the change in the pattern of LULC in and around Dal Lake. Dal Lake has some spots of tourist attractions in the water. The local boats gather to those particular points taking the tourists. Some of the major tourist points like Dal Gate, Char Chinar, Floating market along with some famous houseboats have been demarcated in the map of Dal Lake. There is an ATM within the Dal Lake which is an amenity to the tourists who want to do shopping in the floating markets and from the vendors who sell various local items.

These are the places where most of the tourists gather. A buffer Analysis has been done with 100 meters, 300 meters, and 500 meters around these major tourist attractions (Figure 4). The proximity of the tourist places made the buffers overlap in the southern section of the lake, near the Dal gate. From Dal Gate 1 up to Dal View Resort all the buffers of 500 meters overlap with each other. That denotes, due their proximity with each other, the pressure tourist arrival is high in this continuous area. The central location of Char Chinar makes this place quite isolated from the other places. Darga Hazratbal is located just near the ATM, the buffer these two spots overlap with each other.

7 Problems and Prospects

After having done all the detailed analysis of tourism based on Dal Lake, a few problems can be focused on. The constructions near Dal Lake are quite unscrupulous, as they are coming even in the 200-meter buffer (Figure 5). These kinds of constructions of hotels, shops, and other commercial centers will hamper the wetland ecosystem as well as pollute the water of the Dal Lake⁽¹⁰⁾. The chance of eutrophication is high in the lake when the anthropological impact is so high on the lake. The water quality is not quite up to

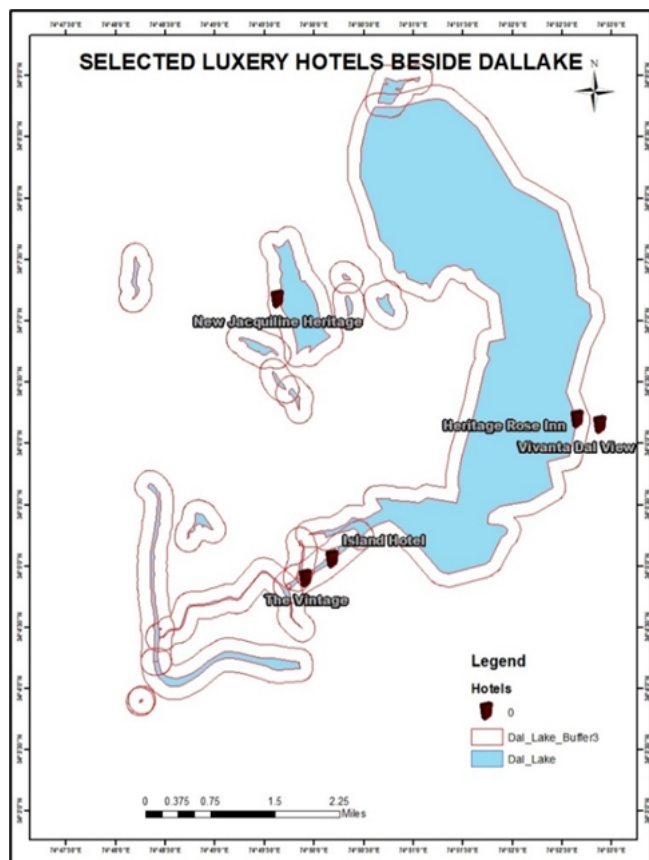


Fig. 5. Location of Hotels

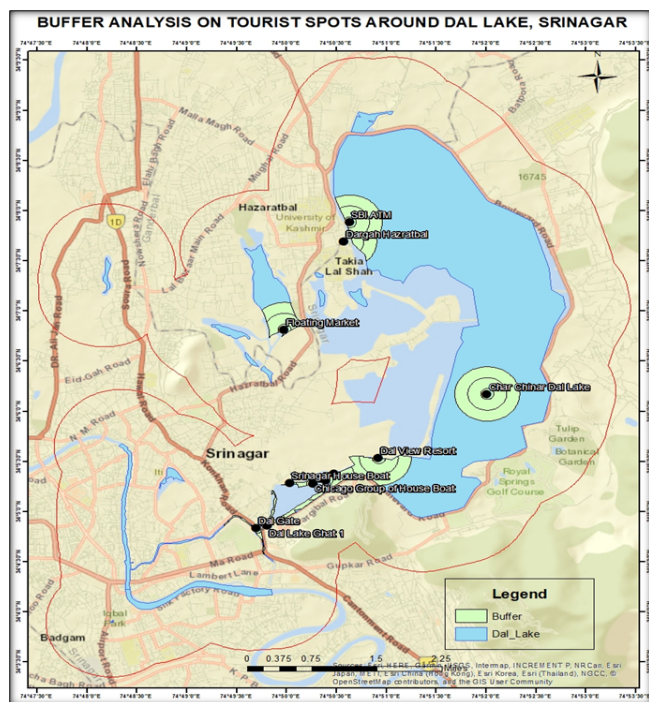


Fig. 4. Buffer Analysis

the mark⁽³⁾ for any sort of usage. Overutilization of the natural resources of Dal Lake has been done throughout the ages. The local communities of Hanjis are suffering as the outsiders are taking all the financial gains from the utilization of space commercially around Dal Lake⁽¹¹⁾. They are not getting a priority-based proper planning initiative for their development.

Dal Lake is one of the most profit-generating natural tourist spots⁽¹²⁾ in Jammu and Kashmir. The prospect of this tourist spot can be multiplied by proper land use and land cover planning. The constructions need to be stopped to a certain level, and the natural vegetation in and around them must not be destroyed enormously in the name of urbanization⁽¹³⁾. The government must initiate participatory planning for the progress and development of the local communities. It will not only bring financial profit but also preserve the rich cultural heritage of Kashmir.

8 Conclusion

The future of tourism in Dal Lake hinges on a balanced approach that integrates environmental conservation with sustainable development. By addressing current challenges and leveraging opportunities, Dal Lake can continue to be a premier tourist destination while preserving its natural and cultural heritage for future generations. The future of tourism in Dal Lake holds significant potential, contingent on the adoption of sustainable practices that balance environmental conservation with economic development. The collective effort of government bodies, local communities, and tourists is crucial in achieving this vision. With the right strategies and a commitment to sustainability, Dal Lake’s tourism sector can thrive, contributing to the region’s economic growth and environmental well-being.



References

- 1) Kaushal A, Awastthi S. Empirical Study on Tourist's Satisfaction towards Silk Route Tourism Sites at Jammu & Kashmir with special reference to Dal Lake. *Pacific Business Review International*. 2018;11(2):7–16. Available from: http://www.pbr.co.in/2018/2018_month/Aug/1.pdf.
- 2) Shah SA, Islam MS. Recreational benefits of wetlands: a survey on the Dal Lake in Jammu and Kashmir of India. *International Hospitality Review*. 2023;37(1):94–109. Available from: <https://www.emerald.com/insight/content/doi/10.1108/ihp-03-2021-0018/full/html>.
- 3) Kumar R, Parvaze S, Huda MB, Allaie SP. The changing water quality of lakes—a case study of Dal Lake, Kashmir Valley. *Environmental Monitoring and Assessment*. 2022;194:228. Available from: <https://dx.doi.org/10.1007/s10661-022-09869-x>.
- 4) Bhat RA, Mehmood MA, Dervash MA, Mushtaq N, Bhat JI, Dar GH. Current status of nutrient load in Dal Lake of Kashmir Himalaya. *Journal of Pharmacognosy and Phytochemistry*. 2017;6(6):165–169. Available from: <https://www.phytojournal.com/archives/2017.v6.i6.2076/current-status-of-nutrient-load-in-dal-lake-of-kashmir-himalaya>.
- 5) Mushatq B, Raina R, Yaseen T, Wanganeo A, Yousuf AR. Variations in the physico-chemical properties of Dal Lake, Srinagar, Kashmir. *African Journal of Environmental Science and Technology*. 2013;7(7):624–633. Available from: <https://www.ajol.info/index.php/ajest/article/view/93901>.
- 6) Shah SA. Tourism and lake sustainability: A case study of Dal Lake. *International Journal of Environmental Sciences*. 2012;1(4):230–234. Available from: <https://www.crdeepjournal.org/wp-content/uploads/2012/10/Vol.-144-IJES.doc.pdf>.
- 7) Mehraj D, Qureshi IH. Green Marketing and Sustainable Environment: A Case Study of Dal Lake in Jammu & Kashmir. *Elixir International Journal-Environment and Forestry*. 2016;94:40409–40413. Available from: https://www.researchgate.net/publication/352777061_Green_Marketing_and_Sustainable_Environment_A_Case_Study_of_Dal_Lake_in_Jammu_Kashmir.
- 8) Inayat U, Malik R, Abubakr A, Bhat BA, Jan S. Solid Waste Management-Mismanagement from Houseboats of Dal Lake: Assessing Strategies for Effective Waste Reduction and Resource Recovery. *International Journal of Environment, Agriculture and Biotechnology*. 2024;9(1):146–152. Available from: <https://doi.org/10.22161/ijeab>.
- 9) Amin A, Fazal S, Mujtaba A, Singh SK. Effects of Land Transformation on Water Quality of Dal Lake, Srinagar, India. *Journal of the Indian Society of Remote Sensing*. 2014;42(1):119–128. Available from: <https://dx.doi.org/10.1007/s12524-013-0297-9>.
- 10) Trisal CL. Ecology and conservation of Dal lake, Kashmir. *International Journal of Water Resources Development*. 1987;3:44–54. Available from: <https://dx.doi.org/10.1080/07900628708722332>.
- 11) Rather IA, Dar AQ. Assessing the impact of land use and land cover dynamics on water quality of Dal Lake, NW Himalaya, India. *Applied Water Science*. 2020;10(10):1–18. Available from: <https://dx.doi.org/10.1007/s13201-020-01300-5>.
- 12) Fazal S, Amin A. Hanjis activities and its impact on Dal Lake and its environs (a case study of Srinagar City, India). *Research Journal of Environmental and Earth Sciences*. 2012;4(5):511–524. Available from: [https://www.researchgate.net/publication/283360246_Hanjis_Activities_and_Its_Impact_on_Dal_Lake_and_Its_Environs_A_Case_Study_of_Srinagar_City_India#:~:text=Over%20dependency%20and%20over%20exploitation,in%20Srinagar%20city%20\(India\)](https://www.researchgate.net/publication/283360246_Hanjis_Activities_and_Its_Impact_on_Dal_Lake_and_Its_Environs_A_Case_Study_of_Srinagar_City_India#:~:text=Over%20dependency%20and%20over%20exploitation,in%20Srinagar%20city%20(India)).
- 13) Fazal S, Amin A. Boatmen and Status of Dal Lake and Its Environs: A Tale of Srinagar. *Environment and Urbanization ASIA*. 2013;4:73–92. Available from: <https://dx.doi.org/10.1177/0975425313477727>.