

# Social Appraisal of Wular - Asia's Biggest Fresh Water Lake

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## ABSTRACT

Kashmir valley universally known as paradise on earth, has been tantalizing the lovers of nature and tourists from far and wide. The Lake Wular freshwater ecosystem is located about 35 km North West of Srinagar and also harbours a rich biodiversity. Wular not only acts as a safety valve for the Kashmir valley against floods but is also a key factor in maintaining biodiversity, production of food, fodder and other commercially important wetland resources. The recent studies reveal that conversion of Wular Lake peripheral area into agricultural land, construction of houses for human settlement, plantation of some tree species and related developmental activities have endangered the existence of this freshwater body. In this paper, we discuss the importance of lakes in view of the ecology as well as tourism point of view. Finally, we report the present condition of Wular Lake and suggest ways of improving the quality of water and Wular lake environment.

**Keywords:** Wular lake, Kashmir, Environment, tourism, wetland, biodiversity

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There are several sources of history of Kashmir; the most important one is Rajatarangini (river/stream of kings) which is generally known as the work of Kalhana pandit (12<sup>th</sup> century A.D). Besides Rajatarangini, there are several Persian languages sources, some of which are regional histories of Kashmir. The Tariekh-e-Hasan by Pir Hasan Shah (19<sup>th</sup> century A.D), available in manuscript from Aligarh Muslim University, deserves special mention. This contains a full chapter on natural calamities, including Earthquakes. The existence of Wular is also the leading example mentioned below and the history is based on the earthquakes that give the birth of Wular lake (Fig. 1). Pir Hasan Shah, the author of "Tarikh-e-Hasan" records thirteen Earthquakes of Kashmir while dealing with the calamities of

Kashmir from earliest times to 15<sup>th</sup> of Shaban, 1320 H, (30<sup>th</sup> May, 1885 AD). According to him the first calamity of an earthquake occurred during the reign of Sundersan of Pandu dynasty, in 1250 BC. (dating is on the basis of historicity of Mahabarata) Pir Hasan states that: "Once upon a time, the town of Sindmat Nagar was situated in place of Ular Lake. The inhabitants of this place were punished on account of their misdeeds in the form of an earthquake, during this period of sundersan a devastating earthquake struck at night. The entire town was reduced to shambles. Cracks appeared on the surface of earth and from there water gushed out and the entire town was deluged, thus in the aforesaid manner there appeared Ular Nag (Wular Lake)." (Tarikh-e-Hasan, F.169b) One of the modern authorities in the

history of Kashmir, G.M. Sufi (1974) in his “Kashmir-Being a history of Kashmir” states that: ‘in the reign of Sundersana, twenty-second in the line (Pandu Dynasty), a great earthquake clove open the earth in the middle of the capital Samdhimat Nagar, and the whole city was submerged along with its king and Inhabitants. The site of the city is now occupied by the Volur (Wular) lake. “Sufi further informs that at that time Lava, chief of Laulaba (Modern lolab) on the north east side of Kashmir was the elected king of the region. The name of the Wular lake in history past was Mahapadmasana and according to the Legend the Naga Mahapadama resides in the lake and he converted the town Chandrapur into a lake to make it his abode. The Wular Lake in normal times covers an area of about 78 sq. miles. If the historical tradition is to be believed the MM intensity of this earthquake should have been around XII. Wular Lake, (in Bandipora district) with length of 16km, is situated 34 km northwest of Srinagar city at an altitude of 1580m above mean sea level. It is the largest freshwater lake within River Jhelum basin plays an important role in the hydrograph of the Kashmir valley by acting as a huge absorption basin for floodwaters (CMAP-2007). The Wular catchment lies between 34°122 24.673 and 34°362 26.263 N latitude, and its longitudinal extent is between 74°262 41.423 and 74°562 02.903 E and comprises of sloping hills of the Zanaskar ranges of the Western Himalaya on the North Eastern side and arable land in this catchment is used for agriculture purposes. The location of the lake is such that on the northern side, it is delineated by the Kishan Ganga watershed, and on the eastern side, it is separated by the drainage system of Sind River. The Pohru catchment forms its western boundary. The River Jhelum enters from southern side and passes through the Wular Lake. Wular Lake, an oxbow-type lake, is of fluvial origin located in the northwest of Kashmir about 55km from Srinagar city, being formed by the meandering of River Jhelum, which is the main feeding channel besides other tributaries (Shah and Pandit 2012). The lake with adjacent wetlands becomes an important habitat for the migratory birds and witness rich biodiversity in the area. Wular lake comprises best fish resources and is consumed almost all villages in the area. The resources like water chestnuts, fishes and fodder increase the revenue on basis of auctions of the resources obtained from the Wular. The

catchment of the lake supports coniferous forests, and alpine pastures adding to the natural beauty and biodiversity of the wetland area. Being important water body in the area with rich biodiversity gains an international importance under Ramsar convention in 1990. The area of lake as per topo sheets of 1911 was 217.8 sq km which includes 58 sq km of associated marshes. The area was reduced from 157.74 sq. km to 86.71 sq km during 1911 to 2007. Overall there was reduction in the lake area by 45% mainly due to conversion for agriculture (28%) and plantation (17%). Further associated marshes were reduced by 70% again due to conversions for agriculture and settlements. One fifth of the water holding capacity has been lost over last three decades due to siltation from degraded catchments and wetland conversions for agriculture and willow plantations.



Fig. 1: Snapshot of Wular Lake



Cattle fodder - Nymphaeae (khor)



Ningli plantation leading to reduction in lake area

Some other main negative factors effects the Wular Lake in context of its structure and function are as : (a) Direct discharge of solid and liquid wastes from

the settlements all along river Jhelum mainly from Srinagar city and other towns in the upstream area have led to degradation of water quality and health hazards to the communities living around the Wular Lake (b) Decrease in water levels and degradation of its quality has led to decline in fish and waterbird diversity, shifting of vegetational belts and drastic loss in productivity of some economically important species (c) Invasive species have proliferated leading to decline in native species particularly *Schizothorax* sp. and *Nelumbo* (d) Decline in resource base and limited opportunities for livelihood diversification have led to poverty and reduced quality of life of communities living around the lake and its catchments. The prevalence of poverty between 41% – 52% within these communities is quite high compared to the state average of 3.91% (e) Lack of well defined policy and regulatory mechanisms for integrated management has led to cross sectoral conflicts and overall degradation of wetland and its resources. Wular Lake the Ramsar site needs a management planning framework developed seeks a balance between ecosystem conservation and livelihood security to the communities. On the basis of management five components involves where a particular group should focus i.e. biodiversity conservation, ecotourism development, livelihood improvement and institutional development. Specific projects have been developed for each of the five components keeping objective into consideration for the development of the synecology and autecology of the lake to its best level.

## MATERIALS AND METHODS

The present study examined the Wular lake in the light of history and by field visits. To collect information about the Wular we surveyed areas and interviewed people surrounding the Wular lake. Finally, we present results on the basis of the data collected through our field visits and from previous studies (Kaul, 2007; Raina, 2014 etc.). The Wular Lake is responsible for support of huge population on its precious resources like water chestnuts, fishes, fodder, nadru and wood too. Keeping its resources into consideration, the present article focusses on social assessment of villages situated on the banks of the Wular lake, including household composition and population and their dependency on the lake.

## RESULTS AND DISCUSSION

Wular lake is situated in district Bandipora of Kashmir valley. Bandipora District is one among 22 Districts of Jammu & Kashmir State, India. Bandipora District Administrative head quarter is Bandipora. It is Located 47 KM South towards State capital Srinagar, Jammu. Bandipora District population is 385099. It is 14th Largest District in the State by population.

### Geography and Climate of Bandipora District

It is Located at Latitude-34.4, Longitude-74.6. Bandipora District is sharing border with Kargil District to the East. Bandipora District occupies an area of approximately 398 square kilometers. It's in the 1581 meters to 1578 meters elevation range. This District belongs to Northern India.

### Climate of Bandipora District

It is cold in summer also. Bandipora District summer highest day temperature is in between 8 °C to 34 °C. Average temperatures of January is 2 °C, February is 5 °C, March is 11 °C, April is 13 °C, May is 18 °C.

### Demographics of Bandipora District

Kashmiri is the Local Language here. Also People Speaks Hindi, Urdu. Bandipora District is divided into 5 Blocks, 63 Panchayats, 118 Villages. Gurez Block is the Smallest Block by population with 30144 populations. Bandipora Block is the Biggest Block by population with 135371 populations.

### Census 2011 of Bandipora District

Bandipora district Total population is 385099 according to census 2011. Males are 201517 and Females are 183582. Literate people are 254781 among total. Its total area is 398 sq km. It is the 14<sup>th</sup> largest district in the state by Population. But 15<sup>th</sup> Largest District in the state By Area. 552<sup>nd</sup> Largest District in the Country by Population. 21<sup>st</sup> highest District in the State By literacy rate. 580<sup>th</sup> highest District in the Country By literacy rate. Its literacy Rate is 57.82.

### Bandipora District Tourism

This district consists of hill stations and tourist

destination. It is famous for hill tourism, very cool and chilled weather with greenery.

### Bandipora Transport

District Headquarters Bandipora is well connected by road. Bandipora is about 47 KM by road to Srinagar, Jammu (Capital of Jammu & Kashmir).

### Villages that encompasses the periphery of Wular Lake

The villages situated on the bank of Wular lake are depicted in the form of a map in Fig. 2.

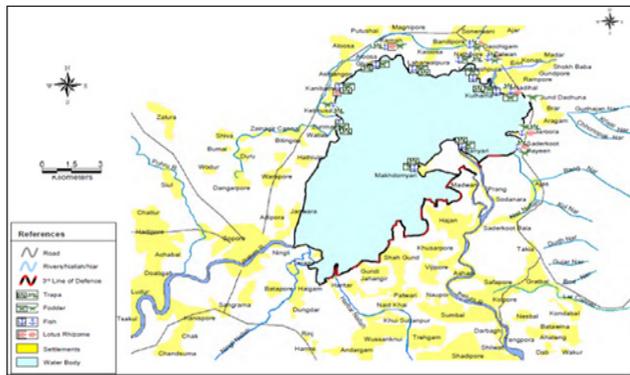


Fig. 2: Map showing the villages on Wular bank

The details of socio-economic status of different villages are discussed below:

### Hajin

Hajin is situated 15-20 km from district head quarter and 35 km away from State summer capital Srinagar Jammu and Kashmir. Hajin having 2300-2700 household which comprises the 22000-25000 population of the area, people in emergency utilizing Community health centre verily, but the good news is that (150 bedded newly under construction hospital) will be functional soon. In Hajin area there are 9 government Middle schools including 1 private. In the same area there exists Govt. High school that are also 2 in no's (including 1 pvt.), and having one Govt. Higher Secondary school. Where a number of students obtain knowledge about the subjects based on school curriculum. Hajin has also one Govt. poly technical college for advance skill course. There are almost 26 Anganwadi centres in the area. Being advanced in context of knowledge and literacy there are almost 20-30% Govt. employee in the Hajin area.

And having Literacy rate i.e., 60-70%. The meager amount of population is depending on Wular i.e. the animal grazing only. Few responses from the locals that the water chestnut is also obtained from the Wular lake area too.

### Khusarpora

Khusarpora is a village in Hajin Block in Bandipora District of Jammu & Kashmir State, India. It is located 17 km towards South from District headquarters Bandipora. 35 km from State capital Srinagar, Jammu and Kashmir. Before Khusarpora, people called it Sidkhund, as it got its name when a renowned personality before a long ago came here by calling a person and the same person ignores his call and by that time the area is called as khusarpora, it is about 2.5 km away from Centre Hajin market (Gh Nabi war/ ward member, 9596460702), Mohd Ashraf Ganie village head. There are 60 household in the Khusarpora village and comprises of 350-400 population of the area. The area having only One Govt. middle school others goes to nearby or adjacent villages like Shah Gund and Vijpora. Almost 60-65% of People depend on Wular in context of water chestnut, animal grazing, fishing, and making /obtaining charcoal from Wular. Poaching is at the peak. People depend upon Agriculture too because the villages having agricultural land where different crops are to be cultivated especially Paddy etc. Almost 100 quintals water chestnut is extracted from Wular annually, by which the economy of the area is boosted.

### Shahgund

Shahgund is a village in Hajin Block in Bandipora district of Jammu & Kashmir State, India. It is located 18 km towards South from District headquarters Bandipora and 34 km from State capital Srinagar, Jammu and Kashmir. The village Shahgund is 2 km from Hajin market, having 1200 household comprise the Population of approx. 9000-12000. From here the Nigli can be reached by shahgund via sopore. The Occupation mostly depends upon labour, carpenter, and having 30% fruit growers, and meager amount of govt employee which collectively fillips the economy of the village Shahgund. The same village depends upon Wular by exploring the resources of the lake viz approximately 500 quintal water chestnut

is obtained from the Wular Catchment annually by utilizing special equipment. The local people use wood of the Wular plants for Fuel wood/ and shelter too from Wular plant nurseries. Fish both Punjabi and Kashmiri almost 20 quintals / year are to be caught by cast or by angling ways. However the most important thing that in the Wular is the presence of migratory birds same can be killed illegally (Poaching) water birds unlimited by the common people having gun license.

### **Haritar / Kanyari**

Kanyari village is 8-9 km from the Centre Hajin market and same distance away from sopore but the population living on the periphery of the Wular Lake. Kanyari being the poorest village on Wular bank. People are living on Log supported huts, people having less assess to Govt. departments too, and the same village effected more in September 2014 floods. Community is too weak in development, there is laking of resources too only one primary school is present inside the community, and students after passed the 5<sup>th</sup> grade goes to Shahgund for further studies 6-7 km from Naidkhai Sumbal. The area is having 8-10% literacy rate and there is almost 250 house hold. In the village kanyari, having 1500 population. The area being hanji community, that is why there is less linkages/connection to outside communities in context of labour so they totally depend almost 90% on Wular in context of obtaining water chest nuts, fishes, coal /wood for shelter, animal grazing, fodder etc.

### **Gundi- Jehangir**

Gund Jehangir is the village having least connection with Wular, lies between the Kanyari and Shahgund, 6 km from Hajin and 5 km from Naidkhai Sumbal, To some extent, it is developed than Kanyari and Shahgund, the household capacity of the village Guind Jehangir as per the knowledge gained inside the area is 600-700 household which raises the population about 5000-5500. One dispensary is also available. There is more involvement of school going children's towards education. Education is almost good rather than the adjoining areas and raises 60% literacy rate , most of the population are educated and are busy in fruit business, however the community have below poverty line people whom depend other

ways, like labour and assessing Wular upto 5-15% in context of fishes, water chestnuts and wood for fuel wood and shelter plus animal grazing is too done on the resources of the Wular lake. Common masses of the area also used agricultural activities by obtaining different crops from the field.

### **Badd Gund (Island)**

Badd is called island because the area lies on the land surrounded by water of Jhelum, the river Jhelum here makes Y shape and on right wing goes towards thee Saud Nor and on left wing goes via Paribal. For connectivity there is a small metallic foot bridge that connects or becomes the mean of communication to the area with adjacent villages towards market and approaches too. The area is about 1 km from Hajin market and about 22 km from district headquarter. The area having 60-70 households comprises 300-350 population in the area. The Govt Middle school is one in number with one primary school and one Anganwadi centre. In case of emergency people used the Hajin community health centre for treatment which is almost 2- 2.5 km away. 20-30% is the literacy rate of the area, Economy is least depend on agriculture present here in Badd Gund, as per reports there is meager amount of Govt. employees in the village i.e. 1-2%, and the area depends upon 50-60% on the Wular in way of water chest nuts, fishes and grazing of animals, wood for coal, and shelter.

### **Saud Nour**

Sadunara is a village in Hajin Block in Bandipora District of Jammu & Kashmir State, India. It is located 16 KM towards South from District headquarters Bandipora. 34 KM from State capital Srinagar, Jammu and Kashmir. The area is about 4 km away from hajin market and having 550- 600 households which gains 5000-6000 population of the village, in this village there is one number of Govt. high school and one number of Govt. primary school. Two number of middle schools i.e. Govt. middle school including one private middle school. Dispensary is one in no. but meager assessed by the local community. In case of emergency the local area goes to community health centre Hajin for treatment. However the Literacy rate of the area is almost 40-50%, there are almost 5-10% government employees, now the dependency on Wular is 30% by utilizing

Wular resources like Water chestnuts, fishing, sand extraction from Jhelum (here Jhelum comes in 2<sup>nd</sup> line category i.e. too linked to Wular catchment), Animal grazing and coal i.e. used wood from the Wular catchment for fire wood and shelter.

### **Parebal / Rkh Hajin**

Parebal is a village in Hajin Block in Bandipora District of Jammu & Kashmir State, India. It is located 21 km towards South from District headquarters Bandipora and 33 KM from state capital Srinagar, Jammu and Kashmir. The area is having 200 households with 800-1000 population. There are 2 middle schools in the village Parebal. During the time of emergency the Hospital assessed to community health centre Hajin because there is no dispensary available in the area. Literacy rate is 50-55% and Government employees are almost 3-5%. Wular dependency is around 50% in the form of animal grazing, fishing and water chest nuts. The youths are engaged in extraction of sand from the nearby area of river Jhelum threatening sliding in the banks of river Jhelum.

### **Malik Pora**

Malik Pora is just 3 km from the Hajin market comprising of 80 households with population of 400-500. It has one dispensary but least assessed by local community. Literacy rate is 40-50%. There is one Government middle school and Anganwadi centre in the village. The Wular is economically used for collection of water chestnut, animal grazing, wood and fodder.

### **Mugdamyari**

Mugdamyari is a village in Hajin Block in Bandipora District of Jammu & Kashmir State, India. It is located 27 km towards south from District headquarters Bandipora. 45 km from state capital Srinagar, Jammu and Kashmir. The village is having 350-400 household and leads 1500-1600 population. Dispensary is available but has less utility due to unavailability of Doctor, however in case of emergency, patients could reach and avail benefit from the community health centre Hajin which is almost 10 km from the concerned village. There was one Government primary, middle and high school each. The literacy rate is 40- 45%, and the area is

totally depend upon Wular for resources such as water chestnut, fishes, animal grazing, wood and fodder. Poaching is done, in higher amounts, i.e. killing of migratory birds in the areas. Cast net is used for catching the fishes.

### **Banyari Garbi / Chrangz pora**

The population of the area depends upon the house hold which is almost 550-615. and comprises of the population of the area which is about 3000-3500 Middle school 1 in no. can be seen inside the village, consequently there are two primary schools in the area and the literacy rate is about 10-20%. Health care facility is nil and best can be assessed by reaching Community health centre Hajin especially when there is an emergency. Mostly the people are in search of daily labor for economic support. Almost 80-90% people of the area depend upon the Wular Lake by utilizing water Chestnut, wood for fuel/firewood, fodder, animal grazing etc.

### **Bakshibal**

Bakshibal is the village in Bandipora district just 25 km from the district headquarters and 46 km from the state summer capital Srinagar, Jammu and Kashmir. The total household are about 100 increased the 400-500 population in the area. Coming to education point of view, one Primary school is present in the village Bakshibal. 5-8% is the literacy rate, labor work is maximum. 85-90% people depend upon Wular lake resources. There is no health centre or dispensary, in case of emergency the people face hard time to reach to main health centre Hajin which is almost 8-10 km from the village centre.

### **Prang (Gund)**

Gund Prang is a village in Hajin Block in Bandipora District of Jammu & Kashmir State, India. It is located 16 KM towards South from District headquarters Bandipora, 34 km from State capital Srinagar, Jammu and Kashmir. The area is having 200-250 house hold total in the village and increased the population about 1800-2000 population in total. People do agricultural activities and 6-8% of the people are working in the Government sector as employee. Least number of people (10-20%) dependent on Wular for resources.

### **Madwan**

Madwan is situated on the bank of river Jehlum. It is located in north of District Bandipora, 40 km away from Capital Srinagar. There are four primary schools, one middle and one High school. Madwan has recently received Nayabat. There is a NTPHC health centre under construction. There are three Anganwadi centres running. Madwan is a village in Hajin Block in Bandipora District of Jammu & Kashmir State, India. Carpet weaving is the major activity along with agriculture. 45-60% of population dependent upon Wular for resources.

### **Suderkote Bala**

Sader kote Bala is a village in Hajin Block in Bandipora District, located 16 km towards South from District headquarters Bandipora and 34 km from State capital Srinagar. The population is 8000 with 1200 households. The Literacy rate is 30-38% and 70-80% are doing labor activity. Very few are employed in government sector. People of the area dependent on Wular for animal grazing and wood.

### **Suderkoot Payeen**

Sader kote Payen is a village in Hajin Block in Bandipora District, located 16 km towards South from district headquarter Bandipora and 37 km from State capital Srinagar. Population is 2700-3200 and households are 500-550. The literacy rate is 30-40% Dispensary is available for the patients but least assessed. Maximum population is dependent upon Wular for water chestnuts, charcoal, wood, animal grazing etc.

### **Chandergeer**

Chandergeer is located at 16 km towards south from district headquarters Bandipora and 34 km from state capital Srinagar. The population is 3700-4000 with 600-650 households and literacy rate of 20-25%. Dispensary is not available however 3 Anganwadi centres existed. People are also engaged in some kind of agricultural activities. 50-60 % of the local population of the area is dependent upon Wular for resources.

### **Kathpora**

Kathpora is present in Hajin block of Bandipora

district and is 35 km from Srinagar. There are 300-350 households with total 1600. The Literacy rate of the area is 55-65%. The resident are dependent upon Wular for animal grazing.

### **Vijpara**

Vijpara is a Village in Hajin Block in Bandipora District located 16 km towards South and 34 km from State capital Srinagar. The area is having 300-370 households with population of about 1800-2000. One Government high school four middle schools and two Anganwadi centres are available. Literacy rate is 60-70% with 15-20% involved in Government jobs. 15% of population is dependent upon Wular for animal grazing. The low caste and below poverty line people also obtained water chestnut and charcoal from Wular catchment.

### **Ashtangoo**

Ashtingoo is a village in Bandipora Block in Bandipora District of Jammu & Kashmir State, India. There are 1500 households with population of 9000. There are two primary schools and one middle school. Literacy rate is 30%. 40% of households dependent upon Wular for animal grazing, fishing, charcoal etc.

### **Kema**

Kema is a village in Bandipora block located 3 km towards South from district headquarters Bandipora and 49 km from State capital Srinagar. There are 250 households with population of 3300. There is one Government primary and one middle school available. The literacy rate is 30%. The public health care facilities are absent. 40% of the population is depending upon Wular for various resources.

### **Kanbach**

Kanbach is the village in Bandipora district with population of 1820 comprising 400 households. There is only 1 public primary and one middle school. Literacy rate is 20%. Medical facilities are not available. Mostly Hanji community dependent upon Wular for fishes, water chestnuts, animal grazing and fuel wood.

### **Kehnusa**

Kehnusa is a village located 5 km towards South from district headquarters Bandipora and 52 km from State capital Srinagar. There are 1200 households with population of 5200. There are five primary schools and five middle schools alongwith one private school. The Literacy rate is 42%. 45% of population depends upon Wular Lake for various resources.

### **Laharwalpore**

The area is very weak in context of development because people in this village prefer doing labor activity rather than gaining education. There are 1800 households with population of 1800. Literacy rate is 30%. There is a dispensary available in the area. 95% of population depending upon Wular for various resources. A teen aged youth namely Bilal Ahmad received Green Ambassador Award from central Government at Delhi for collection of plastic from Wular lake and selling of solid waste.

### **Kulhama**

There are 225 households with population of 960. There is one public primary school, one middle school and two Aganwadi centres. The Literacy rate is 25%. Dispensary is available but least assessed by the local community. 45% of the people dependent upon Wular for resources. Agricultural activity is also done in the area.

### **Watlab**

Watlab is present in the spore zone and is linked with Wular lake. There are 900 households with 2800 population. There are two public primary and one middle school. Literacy rate is 30%. Most of the people dependent upon labor for financial support. More than half of the population dependent upon Wular lake directly or indirectly.

### **CONCLUSION**

Wular, which was designated as a wetland of international Importance under Ramsar Convention in 1990, is one of the largest freshwater lakes in Asia and the largest flood basin of Kashmir. Thousands of Kashmiris are living on the fringes of water bodies, dependent for their livelihood upon

fishing, collection of water chestnut and fodder. However, with the shrinking of water bodies due to encroachment and in depth siltation, the livelihoods of people are at stake. Earlier a fisherman could catch up to 15 kg of fish in a single day but now catches even 5 kg in a day is considered more than enough. Likewise yield of fish, fodder and chestnut collected from the lake has also diminished abysmally. Earlier, a person could collect a boatful of chestnuts, about 60 kg in a few hours but these days 20 kg is the maximum a person can get now, despite toiling the whole day. According to a study by Wetland International, 32,000 families including 2,300 fisher households living on Wular's shores for livelihood. Scientists of Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir analyzed that Kashmir's water bodies such as Wular, Mansbal, Dal lakes and Jhelum have served the people as sources of livelihood and ecological security. The major causes of decline in resources are encroachment of water bodies, siltation and pollution. According to revenue records, Wular is spread over an area of 130 sq. km but has undergone massive siltation, encroachment and pollution in recent years. The Jammu & Kashmir government has charted out a program carried out by the state government's Wular Conservation and Management Authority (WUCMA) for the conservation of the lake. The government needs to start an extensive afforestation program in the catchment areas of River Jhelum's tributaries (Jhelum feeds the Wular Lake) immediately. It is concluded that a harmonious relationship needs to be developed between the humans and nature and all the stakeholders must be encouraged to participate evocatively in identifying and resolving critical problems associated with the lake.

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