

# Wetland as a source of Sustainable livelihood -A case study of Mansar Wetland, J & K- India

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## ABSTRACT

Since the evolution of mankind on this earth, water bodies act as a source of attraction for human settlement due to diverse facilities provided by it. The facilities like habitat, food, connectivity, strategic importance etc. provided by water bodies attracted human being in the past to settle near it. The wetlands in India play an important role in human life due to their scenic beauty and ecological importance. The Mansar wetland in Jammu and Kashmir has its own importance in terms of livelihood and sustainability for the inhabitants residing nearby. Despite being a source of pilgrimage as well as other type of tourism due to its religious and scenic beauty, this wetland also has its ecological importance due to its diverse flora and fauna. The influx of tourist for different purposes makes it a good source of income for many local inhabitants. The economic importance of wetland attracts many people from nearby to settle near the wetland. Looking at the multifarious benefits and importance of the wetland, the present study has been done to find out the dependence of local for their livelihood; efforts of various agencies to develop the tourism structure, and the present problems prevailing there. The present study is primarily based on primary sources of data and collected data was assessed to draw the conclusion based on identified objectives.

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## Introduction

Wetlands are lands transitional between terrestrial and aquatic systems where an oversupply of water for all or part of the year results in distinct wetland communities (Clarkson and Ausseil, 2013). There are many different types of wetland. These include areas of marsh, fen, peat land and shallow water bodies. Most are natural but some are human made, and they can be permanent or seasonal. The water in wetlands can be flowing or static, and can be fresh, brackish or saline. Marine water that does not exceed 6 meters depth at low tide is also classed as a wetland, and many river estuaries are globally significant wetlands.

Wetland functions and thus values have the potential to last for a very long time. Modern agriculture or industrial: commercial activities are generally unsustainable and resource-depleting (soil loss; use of fossil fuels) so the lifetime of these human-based alternatives is short-lived (Mitsch & Gosselink, 2000). As elsewhere the wetlands play an important role in the economic, socio-cultural and religious activities of the people in Jammu and Kashmir. They are also the source of tourist as they provide the scenic beauty and the best source of adventurous tourism. The influx of tourist in these areas provides the source of livelihood for many peoples in this area by providing employment as well as other source of income. Considered as a holy site from mythological period, Mansar wetland shares the sanctity and legacy of Mansarovar and is socially and culturally very important. It owes its origin to Mahabharata period. Besides, wetland also provides an important habitat and breeding ground for fishes and other aquatic life. Numerous migratory birds visit the wetland during winters. Many cultures do live in and among wetlands

and use them for daily subsistence the production of food and fiber (Mitsch & Gosselink, 2000).

Wetlands also attract diverse recreational and ecotourism activities, generating significant incomes that benefit local communities and national economies (Ramsar 2009g). The scenic beauty and religious place make Mansar Wetland an important place for tourism. Many tourists from different part of the country visit this place. Due to various tourism activities like boating, religious ceremonies many local inhabitants involvement make it a good source of livelihood. Many people from nearest areas settled down near wetland as they involve in many activities for their livelihood. The wetland provides the scenic beauty as well as has its importance for aesthetic value, the people living near the wetland mainly depend on the resources and these are dynamics in nature. The forest area has been cleared down for agriculture as the main occupation of the people living near the wetland is agriculture beside other secondary activity. As stated above, subsistence-based economies focus on the hunting, fishing, gathering, and trapping of local resources. The predominant identifying trait of such economies is their dynamic adaptive nature, which changes over time and in accordance with fluctuations in the annual and seasonal resource base (Ellanna and wheeler, 1989). Ramsar gives its definition of wise use of wetlands: "Wise use of wetlands is the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development." This pair of wetlands was declared as Ramsar sites on 08/11/2005 owing to the compliance of criteria 2, 3 & 4 as Wetland supports globally threatened ecological communities.

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It also supports populations of animal/plant species important for maintaining biological diversity and provides refuge to wildlife during adverse condition. (National Wetland Atlas, 2013) It is found that the wetland provides employment to lot of people as the people open many shops, commercial outlets near the wetland due to increase in number of tourist. The lack of connectivity hinders the pace of development in Mansar as in rainy season there are blockage of road as a results of landslides and the condition of road get deteriorated. The study has been done to find out the dependence of local inhabitants on wetland for livelihood.

### Benefits from Wetland

The wetland provides many benefits to people living nearby it as well as other communities who depend directly or indirectly on it. The delineation of benefits according to mode is an attempt to understand more clearly. The Direct Use Values (DUV) are the benefits derived from fish, agriculture, fuel wood, recreation, transport, wildlife harvesting, peat/energy, vegetable oils, dyes, fruits, The Indirect Use Value (IUV) are the indirect benefits derived from the wetlands functions like nutrient retention, flood control, storm protection, groundwater recharge, external ecosystem support, micro-climatic stabilization, shoreline stabilization, etc. The Option Value (OV) in which an individual derives benefits from ensuring that a resource will be available for future use (Alain Lambert, 2003).

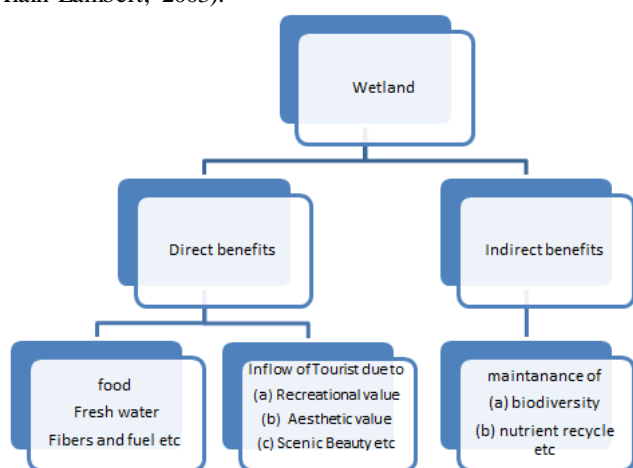


Fig 1. Benefits of wetland.

### Objectives

- To study the inflow of tourists in the study area.
- To access the economic significance of Mansar Wetland.
- To examine the dependency of local inhabitants for the livelihood.

### Methodology

In order to study the dependence of people on wetland for their livelihood, primary survey has been conducted to analyse the change in income generation for last few years. In order to collect primary data, a well designed questionnaire is prepared. The data has been collected randomly by using simple random sampling method. A total of 30 respondents residing nearby the lake were interviewed in detail. The change in settlement pattern is assessed by taking the two time period Google imagery and by using cartographic techniques. For which a fringe of 1.5km is taken from the centre of the wetland. The fringe is divided into three sectors by drawing circles of radius 500m, 1000m and 1500m from the centre of wetland so that the assessment/distributional pattern of

settlement according to increase in distance from the wetland is well observed. The secondary data has been collected from Mansar Development Authority and J & K Tourism Department. The collected data then tabulated and analysed by using the statistical techniques. The correlation between monthly rainfall distribution and tourist inflow is calculated with the help of Spearman Correlation method.

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

The monthly deviation in number of tourist from average is find out with the help of standard deviation method by taking the formula

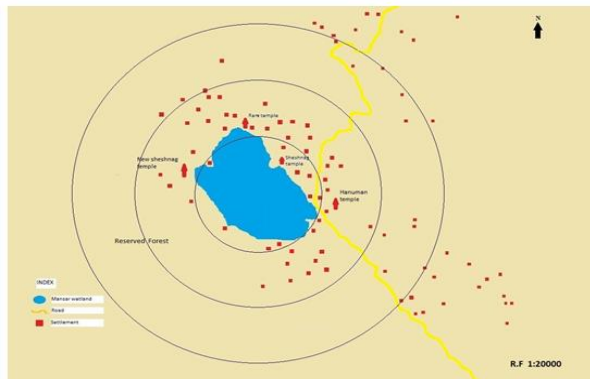
$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}, \text{ where } \mu = \frac{1}{N} \sum_{i=1}^N x_i.$$

### Study Area

Located between the forest covered hills, Mansar Wetland is about 62Kms from Jammu city. Its length is 2.5 kms and width is 1.5 kms. Wetland Mansar, revered for being the seat of Sheshnag, is a sub-tropical, beautiful, Natural wetland located between 75° 5'11.5" to 75° 5'12.5" E longitude and 32° 40'58.25" to 32° 40'59.25" N latitude at an elevation of 665 meters in the east of Jammu city. The wetland is a sub-oval shaped, closed lacustrine system with no surface channels flowing into it. The wetland receives freshwater from the subterranean springs and surface run-off. The wetland is surrounded by 700-800m tall hills forming an evergreen canopy of diverse plant species. The history of both the wetlands Surinsar and Mansar goes back to the period of Mahabharata. In keeping view of the importance of place both religious and tourism point, there is an influx of lot of tourist from all over the country. The tourism department holds boating fun for visitors on the water of Mansar Wetland. Known for flora and fauna, the wetland is visited by a number of seasonal birds, tortoise and fishes of different species. The area has a wild life Sanctuary with animals including Spotted Deer, Neelgai and water birds such as Cranes and Ducks among others.

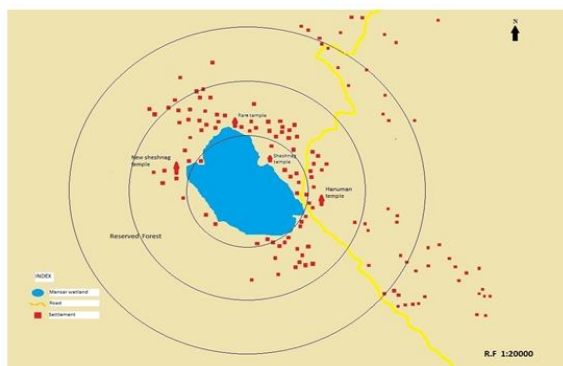


Fig 2. Location map of study area.



Source: Google earth imagery, 2005.

**Fig 3. Mansar Wetland: Sector wise settlement pattern-2005.**



Source: Google earth imagery, 2015.

**Fig 4. Mansar Wetland: sector wise settlement pattern-2015.**

The above maps clearly show the settlement near the Mansar wetland in two different time periods i.e. 2005 and 2015. From image we clearly analyse the change in settlement pattern near the wetland. The above map demonstrates the settlement pattern according to distance. Within the 500 metres the settlement is not scarce as there are some lands which are under the control of various government authorities i.e. forest land, Mansar development authority and revenue land. The settlement is dense in second zone i.e. 500 to 1000meters. The presence of agriculture land and land for construction purposes are the main reason for the settlement. The next zone attracts settlement due the presence of road and other facilities like forests for livelihood and agricultural land. It is found that many people settle near the wetland as it provides various source of income. Many people from nearby areas migrate and construct houses and other commercial

outlets. From the change in settlement, we clearly depict the importance of wetland for the local inhabitants.

**Table 1. Distribution of tourist inflow in different months in Mansar wetland, 2015.**

S.No.	Months	Tourist inflow (x)	Percentage	(x- μ)
1	January	28123	8.20	-453
2	February	28645	8.30	69
3	March	29567	8.62	991
4	April	31457	9.17	2881
5	May	32458	9.46	3882
6	June	38564	11.24	9988
7	July	22384	6.52	-6192
8	August	16784	4.89	-11792
9	September	24345	7.09	-4231
10	October	28456	8.29	-120
11	November	29456	8.58	880
12	December	32679	9.5	4103
	Total	342918	100	Σμ= 0

Source: J&k Tourism Department, 2015

Average tourist per month ( $\mu$ )  $\frac{342918}{12} = 28576$

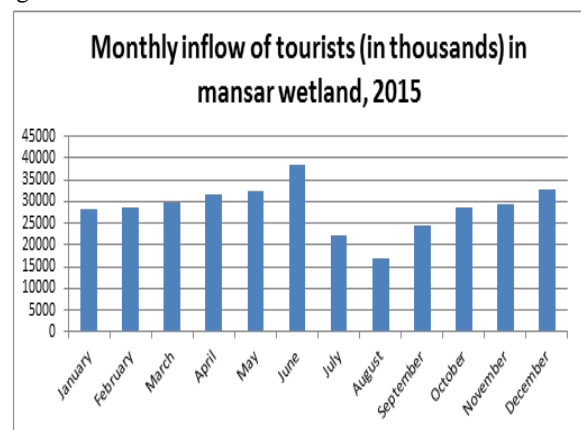
Now Standard Deviation ( $\sigma$ )

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}, \text{ where } \mu = \frac{1}{N} \sum_{i=1}^N x_i.$$

= 5287

The deviation in tourist inflow from mean value is 5287

This value clearly reflects the deviation which is mainly due to change in number of tourist inflow in different months.



Source: J&K Tourism Department, 2015

**Fig 5. Month-wise distribution of tourists in Mansar Wetland, 2015.**

**Table 2. Distribution of rainfall and tourist inflow in different months in Mansar Wetland, 2015.**

S.No.	Months	Tourist inflow (x)	Rainfall (mm)	Rank (R1)	Rank (R2)	D= R1-R2	D <sup>2</sup>
1	January	28123	52.9	4	6	-2	4
2	February	28645	79.0	6	8	-2	4
3	March	29567	74.9	8	7	1	1
4	April	31457	47.1	9	5	4	16
5	May	32458	34.8	10	3	7	49
6	June	38564	87.3	12	9	3	9
7	July	22384	371.5	2	12	-10	100
8	August	16784	370.2	1	11	-10	100
9	September	24345	140.9	3	10	-7	49
10	October	28456	25.1	5	2	3	9
11	November	29456	10.1	7	1	6	36
12	December	32679	38.3	11	4	7	49
	Total	342918					Σd <sup>2</sup> =426

Source: J&K Tourism Department, 2015

The above table reveals the month wise distribution of tourist and variation in tourist inflow in different months. The highest number of tourist inflow in this area is mainly in the month of April, May and June. The reason behind the high number is dry season which make connectivity somewhat easier as compare to rainy season and mainly summer vacations in Jammu as well as in adjoining states. In July, August and September the inflow of tourist is minimum as the rains make the roads more prone to landslides and sometime the roads are cut down by heavy rock slides.

#### Rainfall and tourist inflow Relationship

Rainfall is an important factor in tourists' decision making and also influences the successful operation of tourism businesses. Variations in rainfall can lead to large changes in tourism demand. The temporal variation of tourist arrivals in Mansar Wetland and its relationship with rainfall is shown in table below.

Spearman correlation ( $\rho$ )

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

$$= -0.50$$

The negative correlation value clearly reflects the negative relation between rainfall distribution and tourist inflow. In rainy months like July and August the rainfall is 371 mm and the tourist inflow is lowest i.e. 16784. The high rainfall dilapidate the road condition and make accessibility very tough in these months. The lack of proper accommodation in these areas adds more problems for tourists. These reasons become the cause for low tourist inflow in rainy months.

**Table 3. Nature of work and number of local inhabitants engaged in different works.**

S.No	Nature of work	No. Of persons engaged
1	Photography	10-15
2	Boating	15-20
3	Kiosks keeper	15-20
4	Shops keeping	50-60
5	Flour selling for fish feeding	15-20
6	Labourer in various developmental works	25-30
7	Technical works like electrician, plumber etc	5-6
8	Gardening	15-20
9	Other miscellaneous activities like camel riding, parking maintenance etc	10-12
10	Job in tourism sector and Mansar development authority	6
	Total	160-180 persons

Source: Based on field survey, 2015

The table interprets the dependence of local inhabitants on the Mansar wetland. The increase in tourist inflow and initiatives of Mansar development authorities like construction of youth hostel, Improvement of lightening system, Construction of tourism infrastructure centre etc make many people dependence on this wetland as for their livelihood. The construction of various buildings and other things involves many local inhabitants as labourer and carpenters. The opening of shops near the wetland gives the employment to about 50-60 peoples that mainly depend directly and indirectly on tourist who visited wetland. Some people engaged in photography, boating, gardening, flour

selling etc these people depend on the tourist for their livelihood.

#### Distribution of various developments works undergoing at mansar under mansar development authority in 2015-2016.

1. Improvement of lightening system at Mansar.
2. Construction of tourism infrastructure centre.
3. Upgradation of parks around Mansar wetland by providing and fixing of swings, play-stations etc
4. Construction of Solid waste management system.
5. Facelifting and beautification of wetland.
6. Construction of youth hostel.

#### Pressure on Mansar Wetland

Wetlands are under heavy pressure. Despite the increasing recognition of the need to conserve wetlands, they are continuously degraded. One main reason is that wetlands throughout the world are considered by many to be of little or no value, or even at times to be of negative value. This lack of awareness of the value of conserved wetlands and their subsequent low priority in the decision-making process has resulted in the destruction or substantial modification of wetlands, causing an unrecognized social cost (Turner et.al, 2000) Wetlands can be used for growing staple subsistence crops, as well as more lucrative crops, such as vegetables. The continuation cultivation of land around the wetland to overexploitation of land and use of fertilizers also degrade the water quality of wetland.

Many livestock keepers depend on them as a source of water for their animals; reeds and other plants are a source of fodder.

They provide a reliable supply of water for irrigated crops, like paddy etc areas, wetlands are often the only source of moisture.

Mansar Wetland has religious importance as people of Hindu religion perform many rituals in this wetland. Lack of proper disposal of waste also leads to degradation of wetland as many non bio-degradable materials get accumulated along the wetland.

#### Government Policies for development of Mansar Wetland.

Apart from these funds, the government has granted the rights to Mansar Development Authority to outsource the shops and outlets for income. The maintenance of wetland and other recreation activities are under the supervision of Jammu and Kashmir tourism department. The tourism development corporation has built many restaurants and hotels which act as source of income for the government. The various food items that are served in these restaurants are of local cuisine.

**Table 4. Annual disbursal of funds for Mansar wetland.**

Financial years	Budget (lakhs)
2013-14	125.12
2014-15	134.56
2015-16	140
2016-17	230 (proposed)

Source: Mansar Development Authority, 2015

The state government allocate Rs 125.12 lakh during the financial year 2013-2014 to the Mansar Development Authority for various developmental works. , In 2014-2015 the budget increased to 134.56 lakh the allocation increased every year as the inflow of tourist increased. The funds allocated during 2015-2016 are Rs 140 lakh. The area has a great potential for tourism. In order to attract more tourists the authority provides various facilities like accommodation, restaurants, recreational parks around wetland, boating service etc., so that maximum revenue should be generate.

**Table 5. Income generated from Mansar wetland.**

S.No	Nature of work	No. of persons engaged	Income per person per day in rupees	Total income per day (no. of persons engaged x income per day) in rupees
1	Photography	8-10	300	2400-3000
2	Boating	10-12	400	4000-4800
3	Kiosks keeper	15-20	500	7500-10000
4	Shops keeping	45-50	1500	67500-75000
5	Flour selling for fish feeding	15-20	200	3000-4000
6	Labourer in various developmental works	18-20	300	5400-6000
7	Technical works like electrician, plumber etc	5-6	400	2000-2400
8	Gardening	8-10	250	2000-2500
9	Other miscellaneous activities like camel riding, parking maintenance etc	10-12	500	5000-6000
10	Job in tourism sector and mansar development authority	6	500-600	3000-3600
	Total	140-160 persons		101,800-117,300

Source: Based on field survey, 2015

Average income generated per day = Rs.110, 000

Income generated per tourist  
per day =  $\frac{\text{Average Income generated per day}}{\text{No. of tourist per day}}$

$$= \frac{110,000}{950}$$

$$= \text{Rs. 115}$$

The dependence of people on different nature of work makes their livelihood easier as wetland provide sound source of income. The local people prefer nearby opportunities of job as it make maximum earning and also security of job due to continuous tourist inflow and various developmental activities by the concerned departments. The various developmental activities absorb persons from all spheres i.e. technical field, Labourers, service etc. The adjustment of people in various spheres makes their livelihood smoother.

#### **Facilities provided to local inhabitants by various concerned authorities**

1. Bathing and washing Ghats are provided with proper facilities for the convenience of local people.
2. For irrigation purposes, wetland water is used by local people.
3. The local distribution of water is done by public health engineering and they pump water from wetland.
4. The Hindus use one of the ghat is for cremation purposes as according to Hindu mythology cremation is done near the water.

The Mansar wetland is well known for its scenic beauty and also for its aesthetic value. The wetland is one of the best sites for pilgrimage tourism and is only 62 km from the winter capital of the state. Despite of its nearness, the inflow of tourist is not as much as this place deserve. The survey was conducted in order to find the lapse for less tourism attraction inspite of its scenic beauty and aesthetic value. Almost every official and people living near the wetland accepts that lack of good road connectivity is the main cause of low tourism inflow. The road connectivity to Mansar Wetland is in dilapidated condition and poses serious threat to commuters. The road is prone to landslides as in many areas it has steep curves and steep slopes. In rainy season the condition of road gets worse and water get filled in potholes and provide serious problems to tourists.

#### **Conclusion**

The Mansar wetland located in the shiwaliks provides the best scenic beauty for the tourist. It is also popular for the aesthetic value. There is inflow of tourist from all over India throughout the year. Though tourist visit this beautiful wetland throughout the year but their number slightly increase in summer season. The rise in tourist inflow in summer season is mainly due to pleasant weather and good connectivity, which attract local tourists as well as tourists from other parts of the country. The inflow of tourist in three summer months collectively contribute about 30 per cent of total tourist throughout the year while in rainy season the number start declining due to bad connectivity. In rainy season the road connectivity deteriorate due to landslides and various other problems due to which tourist number declined. The various activities related to tourism involve many people in different nature of work. About 160-180 people engaged in different works like boating, photography, gardening, shop-keeping, marketing etc the total income generated per day from Mansar wetland from all above activities is about Rs.1,10,000. The average number of tourist per month is 28576. After analysis we came to conclusion that the per tourist contribution per day is Rs.115. There are many initiatives taken by the government to further develop this area which involves lightening of parks, Construction of youth hostels etc. The main problem which tourist faced in Mansar are bad road connectivity, Lack of accommodation facilities etc. The wetland also provides water to local inhabitants for drinking purposes as well as for other purposes. The wetland water is also used for irrigation in dry season in nearest agricultural fields mainly by using pumps, electric motors etc. The increase in inflow of tourist also lead to deterioration of wetlands due to dumping of garbage near the wetlands which sometimes have bad impact on the wetland ecosystem.

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