

Environmentally Destructive Tourism: A Case Study of Pushkar Valley



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Abstract

In light of growing concern about environment and rising activism, questions are being raised about ecological degradation of Pushkar Valley. The Pushkar Valley, once known for its rose cultivation, green hilly tracks, water bodies and sand dunes, is quickly losing out to modern urban living. Due to massive increase in population approx. 46.3% decadal growth rate, both legal and illegal construction and indiscriminate use of water bodies have taken a toll on the flora and fauna of the holy town. The last five decades have damaged the local ecosystem as the green cover gave way to human settlements in Pushkar. Several species of plants mentioned in the memoirs of Mughal Emperor Jahangir are nowhere to be found. If the settlement continues to grow in the hilly areas at this speed, the city will soon face the wrath of Mother Earth. The study analyzes the impact of Tourism on the ecology of Pushkar Valley which includes impact on Water Resources, Forest Resources and Sand-Dunes.

Keywords: Urbanization, Tourism, Sand Dunes, Land Use, Ecology, Slums, Population.

Introduction

Pushkar is one of the major pilgrimage centers in India with over 500 temples in and around the town, the most sacred being the Brahma Temple. This holy town is situated around the sacred Pushkar Sarovar (Lake) and is set among the Aravalli mountains. Water quality in the lake has been deteriorating gradually, primarily due to uncontrolled flow of sewage and waste water, and disposal of solid waste in the catchment drains. Apart from this, regular offerings of flower and bone-ash have caused the water quality to deteriorate further.

The sand dunes of Pushkar have been 'stolen' for construction activities. "Every night, you can see tractors queuing up after dark to carry sand from the dunes. Some dunes have completely disappeared, while others have become reduced in size. The disappearance of sand dunes has posed serious environmental challenges. Sand Dunes attract wildlife and support flora and fauna of the place. Several species are essential part of the food chain here.

The disappearance of sand dunes has caused an imbalance in the food chain. Air circulation creates different types of sand dunes formations, but legal and illegal constructions around the city have created 'stationary' dunes that become lifeless after a period of time. The hotel in Motisar and Devnagar has also contributed to damaging the region's ecology. There are reports that many resorts are deliberately created 'stationary' sand dunes by dripping water into them. These hotels and resorts carry out commercial activities like dance, dinner and tent accommodations that require stationary dunes. The sand stolen from Pushkar's 'Mela Ground' can be traced to several resorts that have created artificial sand dunes. Most of these hotels are owned by political leaders, liquor mafia and other influential persons. There is indiscriminate use of groundwater by resorts and hotels that have swimming pools or artificial water bodies on the premises. Though locals raised objections several times, the authorities have failed to act against violations. The scarcity of water has reduced the green cover, which has ultimately affected the fauna. Around 40% of the migratory birds have stopped coming to the city. The hills that were once home to exotic species of bears and monkeys have been exploited.

Methodology

The main task of the methodology is to find out the present status of land use and also the misuse and over-exploitation of resources in the Pushkar Valley. For the following we used the Remote Sensing Satellite

IRS 6, Sensor – LISS 4. The Tourist data was analyzed using geographical tools, tables and diagrams.

Objective of the Study

The aim of the study is to analyze the changing land-use and impact of tourist activity on the Pushkar Valley.

Review of Literature

Tourism and Urbanization has emerged as one of the most challenging issues. A variety of approaches has been observed in the various works. It seems pretend here to review some past work related to the subject and study.

Sarda, Har Bilas (2010 edition) has labored strenuously and has done his work in the highest spirit of reverence and affection for his beloved city. He has given the location of Pushkar, mentioned about the sanctity of Pushkar antiquity of Pushkar, its origin, history, envious and settlement.

Tod, Jones (2015 Edition) has written about the physical features of Pushkar, 1) Ratnagiri Hill of Genes (on which Savitiri Mata Temple is located), 2) In the North is Nilagiri Mountain (Blue Mountain), 3) East is Kulchtragir and on the West is soonachuri (Golden). He has also mentioned about the origin and religious history of Pushkar.

Sharma, Smita, Yadav, Rajesh Kr. Saini, yashoda, Shweta (2011), in their article they examined water quality status of Pushkar Lake as Primary Data for sustainable development. They have proved the ecosystem of Pushkarlake has changed which has resulted in the loss of biodiversity, siltation, eutrophication and toxic centrifugation, congestion of area around the lake, uncontrolled flow of sewage and waste water, regular offerings of flower and bone ash. They have suggested proper regulation, development of proper drainage system, proper town planning and development of feudal lines as to meet the water shortage.

Mathur (1999) throw light on the issues of misuse of Tourist potential by tourist in Pushkar which was due to lack of state’s interest. A number of ways to check the environmental degradation have been suggested besides the ways to strike harmony between tourism and ecology in studied area.

Poonia Anamika (2011) point out that Rajasthan has immense tourism potential and tourism is increasing all the time. She finds that the increase in tourist arrival is not leading to the increase in tourism services. She advocated the same with examples of main tourist destination of Rajasthan and advocates for the better policy and planning to sustain tourism industry.

Study Area

Geographically, Pushkar Valley lies in Central Arravali Region and occupies an important place on the cultural map of state of Rajasthan. The study area is stretched between the parallels of 26°23’N to 26°43’30’N and meridian of 74°22’E to 74°44’15’E. It covers an area of 444.65 sq.km and is inhabited by 21626 persons as in Census 2011. Geographical Area lies between two parallel Arravali ranges stretched from North to South. The One of the range is known as Nag Hill (Snake

Mountain) which is 28 km. long and another range is called as BandiGhati Hill or Nand Hill which is 38 km long. In the North these two ranges join together while the southern part is wide open known as Pushkar Gap.

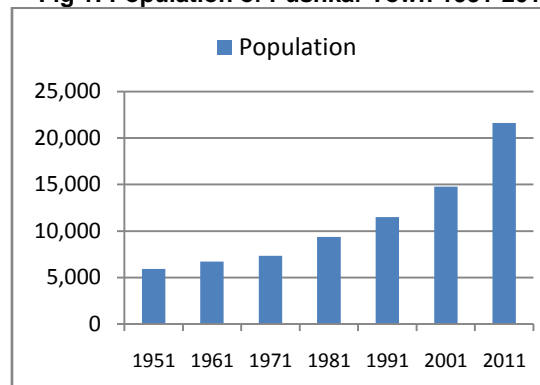
Demographic Structure

Table 1: Decadal Population Growth of Pushkar Town

Year	Population	Avg. Decadal Growth	Decadal Growth Rate (%)
1951	5,934	-	
1961	6,703	769	13.0
1971	7,341	638	9.5
1981	9,368	2,027	27.6
1991	11,506	2,138	22.8
2001	14,789	3,283	28.5
2011	21626	6837	46.3

Source: Census 2011

Fig 1: Population of Pushkar Town 1951-2011



The demographic structure clearly indicates massive growth of population in 2011. As the population increased the demands of basic supplies increases which resulted in urban sprawl. Gradually the land which was used for agriculture and plantation were now converted to residential and commercial activities to meet the demands of growing population. This development was not planned and as a result there was a negative effect on the valley.

Due to unplanned growth of town and misuse of natural resources viz. Groundwater, changing land-use, clearing of forest cover, stabilizing sand dunes for resorts and other activities there is a rapid destruction in the Pushkar Valley which resulted in loss of natural habitat.

Tourism Industry

Pushkar is a pilgrimage center of national importance, with the only known temple of Lord Brahma in the country. There is a steady flow of pilgrims throughout the year to Pushkar, which is among the five principal places of Hindu pilgrimage. It is, however transformed into a bustling fair-ground in the month of Kartik (October-November) when the annual Pushkar Fair is held, when lakhs of pilgrims throng to Pushkar for a dip in the holy lake, which is considered very auspicious. It is also the venue of an internationally known cattle fair, held in conjuncture with the religious fair, which is being patronized by the Government of Rajasthan on the occasion of Kartik Purnima during the month of November.

Table 2: Growth of Tourism in Pushkar

Year	Indian Tourist	Foreign Tourist
2004	1065703	43980
2005	1587300	61307
2006	1762700	73573
2007	1768240	76959
2008	1820090	86030
2009	1745040	75155
2010	1965382	79682
2011	2032020	69891
2012	2323050	70766
2013	2659720	62353

Source: Department of Tourism, Rajasthan

The sharp decline in foreign tourist in 2009 was because of drying up of Pushkar Lake. As Indians consider this as a Holy place there number remains almost same, but for foreigners this is just a recreational spot. As a result, they visit Pushkar for its scenic beauty, old charm and heritage values. Tourism has brought along construction of houses, resorts, Hotels, motels, tourist villages and other infrastructure for tourists which have inequitably encroached on previously on open spaces, i.e. natural landscape viz.

agricultural and pastoral land and have disturbed to a large extent the catchment area of Pushkar Lake.

Seasonality of tourist inflow is a critical issue for Pushkar. Huge inflows of tourists in a short time period places tremendous pressure on civic amenities and other available infrastructure. It will also not be viable to create such huge capacities in basic services such as water supply, sanitation and other services, as it would lie underutilized for large part of the year. Thus Pushkar needs to find viable via-media options that would ensure that the Fair does not cause undue stress on the town infrastructure, while at the sametime is viable for setting up and providing quality services to its visitors.

Bio-Chemical Analysis of Pushkar Lake

In the analysis of Pushkar Lake we studied the change in temperature, pH, Biological Oxygen Demand (BOD), Dissolved Oxygen (DO), and Alkalinity of the Pushkar Lake by taking samples from four different Ghats.

The Lake is continuously supplied with fresh water and still its acidity and alkalinity comes back to same before and after Pushkar Fair, which shows that there is constant inflow of waste water into the lake. As the nearby urban development increased over time so does the turbidity of the lake.

Table 3: Bio-Chemical Analysis of Pushkar Lake

Parameter	Jaipur Ghat		Gau Ghat		Brahma Ghat		Saptarishi Ghat	
	1989-90	2016-17	1989-90	2016-17	1989-90	2016-17	1989-90	2016-17
Temp. Range	15°-40°	16°-35°	15°-38°	16°-40°	15°-39°	15°-41°	15°-40°	14°-35°
pH	7.1	7.92	7.8	8.01	7.35	7.65	7.18	7.77
DO	5.28	5.25	5.31	5.39	5.09	5.19	5.15	5.07
BOD	4.3	4.45	4.4	4.45	3.9	4.15	3.85	4.65
Total Alkalinity	117	131	108	125	110	140	115	135

Result

Temperature Range

The overall temperature of the lake has increased which indicates that there is decomposition of waste materials in the lake which release heat (exothermic reactions). This is maximum in Jaipur Ghat and Brahma Ghat where people do bathing and ashes offering.

pH

The pH value has increased to an alarming amount specially in GauGhat which is prominently used for bathing purposes. Due to use of soap in the Lake its pH value is increasing thus making it more basic.

Dissolved Oxygen (DO)

The amount of dissolved oxygen remains the same which clearly shows that even there is influx of fresh water in the lake its turbidity remains the same.

Biological Oxygen Demand (BOD)

The biological oxygen demand has been increased maximum in SaptarishiGhat because it is been used for ashes offerings thus more organic decomposition needs more oxygen.

Alkalinity

This has also been maximum where regular ashes offerings were been practiced. Also in Brahma Ghat where bathing and Prayers (Arti) is been done.

Groundwater Depletion

Historically Pushkar valley had a high groundwater table, benchmarked at 14.1 feet below ground level (BGL) in 1966 (Sharma n.d.). It dropped dramatically to 75 feet BGL by 2004 (DPR 2008). Data from the NASA groundwater sensing satellite GRACE indicated that this severe depletion took place despite close to normal annual rainfall.

In Pushkar Valley, the depletion was attributed to excessive withdrawals for the railways, for water supply to the neighboring town of Ajmer, for the cultivation of high water consumption crops, like roses and for tourism related expansions, like hotels, restaurants, swimming pools, gardens, etc.

Floral and Faunal Impact

The various kinds of pollution with loss of natural landscape and agricultural and pastoral lands are responsible for the disappearance of local flora and fauna of Pushkar valley. In 2015 a 24 hour wildlife Census was held by the Forest Department under which there was no sighting of Panthers or Bears which were once present in the Pushkar Valley. Indian Panthers are native to Mewar region and at present no panthers spotted in the area.

The Forest cover is the most affected scenario in the Pushkar Valley. As compared to 1991 it has been declined by over 60%.The forest were first cleared for agricultural purposes until around 2005, which were later on converted in farm houses, resorts

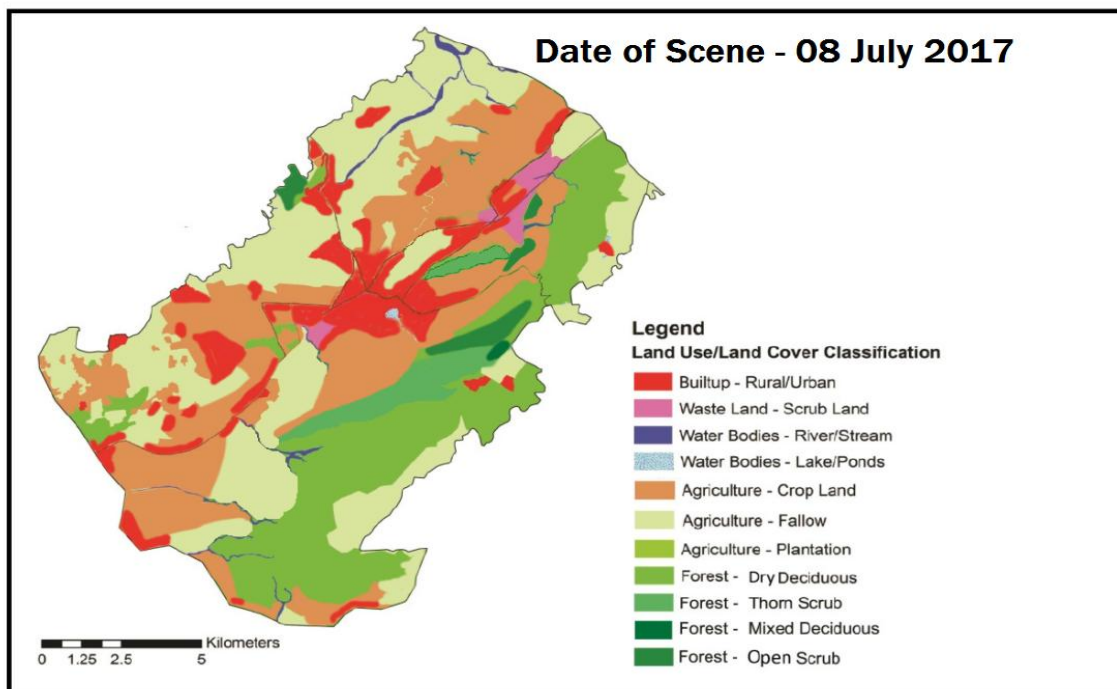
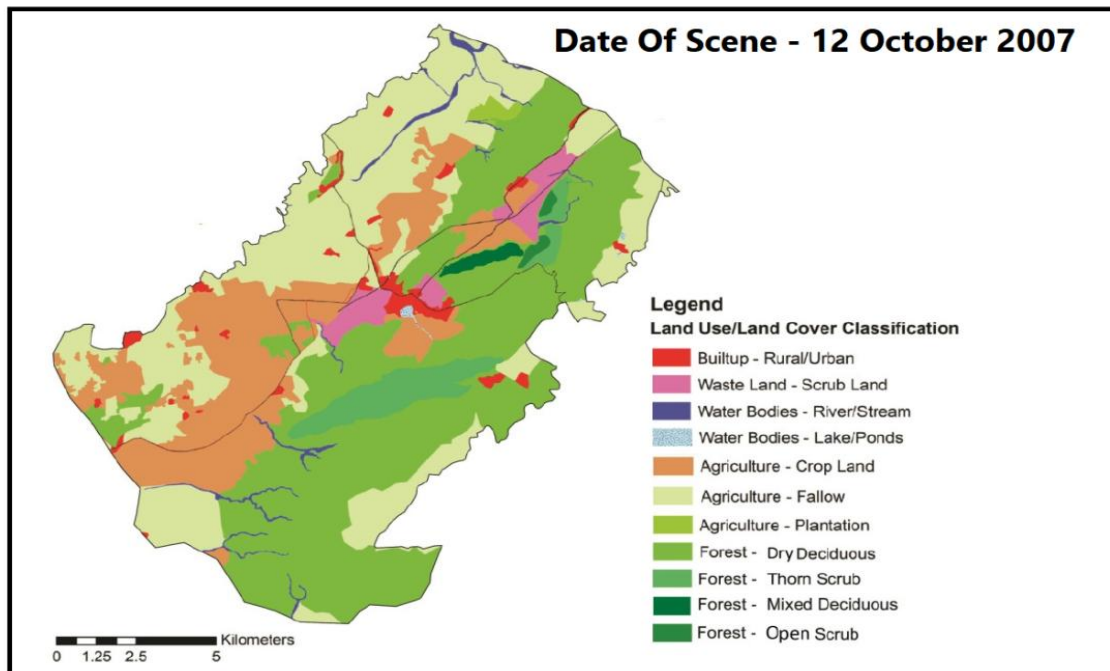
and other commercial purposes for economic benefits.

In today's date the forest area has just remain in the upper slopes of Nag Pahar and HathiKhera regions because the construction is not possible there. If the continuous exploitation continues the natural lush green will soon be vanish from the valley.

Changing Land Use

The study clearly shows how forest land and agricultural land which was once used for Plantation is now transformed into Agricultural Crop Land and Fallow Lands or otherwise into Resorts and other commercial activities.

Fig 2: Land Use Land Cover of Pushkar Valley



Source:

Satellite - IRS 6, Sensor - LISS 4
SOI Mapsheet No. - 45J/6, 45J/7, 45J/10 & 45J/11

Table 4: Land-Use Classification of Pushkar

Land Use	Land Use 1991		Land Use 2016	
	Area (Acres)	%	Area (Acres)	%
Residential	50	20.2	273	23.8
Commercial	114	46.2	600	52.3
Public	16	6.5	32	2.8
Government	2.5	1.0	7	0.6
Recreation	8.5	3.4	15	1.3
Transport	56	22.7	220	19.2
Total Municipal Area	247	100	1147	100

Source: Pushkar Municipal Board

Analysis

Most of the land use has been taken up by residential or commercial purpose. Due to massive increase in population and tourism inflow a large number of houses, resorts and hotels have been constructed which is been done by clearing the forest land and stabilization of sand dunes. All these conversions led to loss of natural scenic beauty and lush green Pushkar Valley. It is now been merely a tourism spot and hub of recreational activities instead of being a place full of biodiversity and ecological hub.

Urban Sprawl

The large population growth and tourists there is a massive growth in urban development. Illegal constructions rather it be resorts or other recreational activities. This has taken a toll on the natural land of the valley.

Fig 3: Map Showing Construction over Sand Dunes



The Base Map Is Google Earth Image of Pushkar Valley (Dated- 14/12/2001)

The Red Circles Show the newly constructed Resorts, Hotels and Other Buildings till 2017

As seen in map the area which was covered with sand dunes in 2001 are now been converted for resorts and urban development. The legal and illegal constructions around the city have created 'stationary' dunes that become lifeless after a period of time. The Ananta Resort has been constructed in the catchment area of the feeder of the lake, Similarly Green Valley resort is constructed over a sand dune which clearly

contributes to damaging the region's ecology. There are reports that many resorts are deliberately created 'stationary' sand dunes by dripping water into them. These hotels and resorts carry out commercial activities like dance, dinner and tent accommodations that require stationary dunes.

Slums

In the temple town of Pushkar, one-third of the urban poor families live in slums and settlements which are all located on the periphery of the town. In all there are seven slums in Pushkar, where 325 households live

Fig 4: Map of Slums in Pushkar Town



Slums are maked in Red

Table 5: Slums in Pushkar

Slum Name	No. of Households
Harian Basti	44
Sansi Basti	26
Ambedkar Colony	57
Santoshi Mata Colony	87
Slum behind High school	77
Behind Ramdham	20
Navak Colony	14
Total slum Households	325

Source: Municipal Board, Pushkar

Key Issues

1. The drinking water supplies in the slums are not adequate and even the hours of supply poses difficulty. Most of the slums get supply in the early morning hours for an hour, however there is daily supply. However, the main constraint is either non availability of authorized taps or inadequate number of taps.
2. Across the slums, where ever the drains have been constructed they are open and not covered, and in some areas there is no proper drainage. Few households have constructed toilets, however, open defecation is common practice. Public toilets are also limited to few areas.
3. Garbage disposal is another major issue for the urban poor, as the current mechanisms are not adequate.

Fig 5: The Main Problems in Day to Day Life of Pushkar Town



Open drains in heritage walk area

Unhygienic condition of existing toilets



Cloth covering over the streets disturbing the elevation of historic facades.

1. The large number of hotels in and around the ghats further burdens the existing limited urban services. Congestion of areas, in and around the lake, have caused complex problems of restricting natural drainage into the lake. Further the inter-mixing of sewage with storm water deteriorates the quality of water draining into the lake during the monsoons.
2. Lack of organized parking facility, it leading to roadside parking and congestion along the Streets. This is also leading to spurt in informal activities along the roadside.
3. The new construction is in sharp contrast to the traditional character, thus destroying the townscape. This reflects absolute lack of urban design element. The new developments in the town clearly shows lack of effective development controls.
4. The unique urban morphology of Pushkar which primarily comprised of temples, ghats, ashrams is presently endangered by the rapid emergence of roof top restaurants along the main commercial spine of the town from Brahma Temple to Rangji Temple, structures which are unsympathetic to the townscape.
5. Pushkar Lake is continuously shrinking in size reducing the storage capacity of the lake. The

reduction of the water in the lake, apart from the high silting, is also due to leaching of lake water due to significant reduction in ground water level.

Conclusion

1. Improve circulation system, through upgradation and strengthening of town linkages. Upgrading should be undertaken to extend, refurbish and enhance the roads, for all arterial roads and town roads. Improvement of linkages and facilities at Tourist destination - It is recommended to upgrade and enhance all roads connecting to major tourist and religious locations, in a phased manner.
2. Restricting Vehicular access in the Demarcated Heritage Precincts - Pushkar Town has grown around the lake, and is dense with narrow streets. To conserve the heritage and sanctity of the Town, it is recommended to completely pedestrianize the proposed heritage precincts areas around the Lake. Provision of Parking Area-Key to success of the above recommendation, are the efforts for the provision of alternate parking facilities, at locations in proximity to proposed heritage precincts and tourist destinations.
3. To improve regional linkages, through provision of new roads - Road widening and strengthening

can provide success to a certain extent in increasing the area under roads, but are limited to certain commercial corridors and critical link roads only. Road network strengthening is recommended through capacity augmentation of new network, primarily in peripheral developing areas and to address the issue of incomplete linkages. It is proposed to augment the road network, to improve connectivity and accessibility of the town, to adjoining cities.

4. Improving Traffic and Transport facilities - Citing the growth in tourism and religious significance of the town, it is recommended to strengthen the transport facilities, through improvement and expansion of Bus Stands.

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