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Panel Title: Governance of Land-Water Dynamics

Paper No. 449

Title: Polycentrism in Water Governance of Mansagar lake

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Abstract

The land-water dynamics in the Mansagar lake governance highlight the polycentricism when observed through the presence of several recurring social-ecological events and disturbances taking place at different levels simultaneously. A normative presumption in this polycentric governance is that under certain conditions of collective action, the sustainability of the lake is improved. This presumption did two things at Mansagar, one it made the actors (organizations here) remain in the collective game through an agreement and second at the same time collectively the actors choose to calibrate the very notion of sustainability of the lake. The land-water dynamics played a crucial role in the collective game of calibrating the Mansagar lake sustainability since a lake without water is a land parcel that has a direct high economic value. The improvement in the ecological performance of the lake is a matter of perception in the collective game. Similarly, the performance of the organizations in the collective action depends on the way they approached the governance and the lake sustainability problems. In this paper, we focus on the collective action situation. In other words, we present the conditions under which the collective action took place which includes, communication, vision setting, compliance, collaboration, coordination in management, conflict resolution, co-valuation, choice, control over decision making, control over implementing. The functioning of these conditions helped us understand the formal and informal rules between the organizations, first towards the consensually agreed (desired) lake improvement and second the understated land-water dynamics. The research design includes: open-ended interviews of the officials from the involved organization which were conducted to capture the collective action performance; perception survey of the local people to capture the ecological performance of the lake, and the historical and collective agreement data are analyzed to capture the change in the land-water composition of the lake. The Social-Ecological System (SES) framework developed by Elinor Ostrom (2009) is applied to document the lake ecosystem, interactions between the governing organizations and commoners and preferred outcome (value) towards sustaining the land and water of the lake. We conclude with food for thought: how do the

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conditions that facilitate collective action also challenges the same? What will it take to make the land-water dynamics dominated by the water, unlike the current situation? Did the collective action decision lead to the real ecological improvement of the lake or is the improvement a consensual perception of the actors? Through this study, we bring in some operational strategies in the lake governance in India pertaining to the collective action and the land-water dynamics that we believe could help the governing organizations to endure the values of urban lakes in India.

Keywords: Polycentric, urban lake, governance, collective action, Mansagar, sustainability

1. Background

The multi-tier Social-Ecological Systems (SES) framework, developed by Elinor Ostrom, is a nested metaphysical framework. It is used to analyze the Mansagar lake governance particularly focusing on the collective action of the actors and the ecological performance of the lake. The study focuses on the 'how' and 'what' within the various re-occurring situations to understand the effect of collective decision on the lake sustenance. A normative presumption in this polycentric governance is that under certain conditions of collective action, the sustainability of the lake is improved.

Collective action $\xrightarrow{\text{leads to}}$ Lake Sustenance

In India, while the surface water is public, and the current focus of water management is it; the ground water belongs to the owner of the land that 'contains' it or from where it is extracted. Ironically, with almost no control over the extraction, the groundwater extraction has increased from 10-20 cubic kilometres per year in 1950 to 240-260 cubic kilometres per year in 2009 (PTI 2017). In the current institutional setup of India, the governance of lake is collectively decided by multiple organizations that are involved at various stages such as the urban development authority, the water resource management, the revenue department, the irrigation department etc. Thus, the actors and the governing mechanisms form the constitutional, collective and/or operation levels of action for this study. Governing mechanisms that are used involve interactions such as financing, monitoring, evaluation, sanctioning, administration, technical support, information, use/ abuse, feedback and more.

The 'what' involves a finding of the sustainability of the lake. Collective action refers to the construction/ constellation/ configuration/ composition/ network/ structure of multiple actors with multiple facets who network together in multiple actions (functions) at multiple levels and use multiple governing mechanisms (regulations, strategies, instruments and resources) in order to produce certain outcome/s such as sustainability of the lake (adapted from Bressers and Kuks, 2009; Ostrom, 2010; McGinnis, 2011). Here, the actors are the organizations those who govern and individuals those who are governed in the process. The organisations are identified linked to the specific lake maintenance activities to understand the collective action situation. Sustainability of lakes for this study adopts the basic understanding of the physical existence of lake (land & water) and maintenance of its productivity & biodiversity for an unlimited era of time. It establishes that the lake's sustainability is seen as a core objective of the government and actors involved in the collective action.

The paper is divided into five sections including the background. In the following, the urban setting of the Mansagar Lake is described first. It is followed by the research methodology and analysis

of the collective action situation in Mansagar lake governance using the SES framework. The paper concludes with a discussion on the dilemma of lake development and lake conservation as an approach to foresee any improvisation in and around the lake. It questions the disconnect and the dilemma between water management and lake development. Amidst the various approaches, the objective of lake for tourism becomes the guiding governance factor. The nestedness between the scales and levels of lake governance is evident in the case study.

2. Urban Setting of Mansagar Lake

The Mansagar Lake is a man-made lake, located in the north end of the city of Jaipur in the state of Rajasthan, India. It abuts a tourist route and is situated between Amer hills to the north, Nahargarh hills to the west and Kilangarh hills in the east. The city of Jaipur is the state capital and thus a major hub for commerce and trade in western India which has influenced the growth to the city. The life span of Mansagar lake can be distributed in the 3 phases of which the initial two phases are about its history and deterioration and the third phase is about its current stage which helps us here to understand the land-water relation to its ecological performance.



Figure 01: Setout location of Mansagar lake

Until the 1940s the British rulers of India let the Royal family of Jaipur possess the property and management rights for Mansagar lake under which they permitted public usage of the water. In

the 1950s the Government of India took over the property and development rights and made the governance polycentric and the whole system complex as they distributed the land and water rights to different organisations viz., Archaeological Survey of India, Jaipur Development Authority (JDA), Jaipur Municipal Corporation (JMC), the State Irrigation Department and the State Fisheries Department.

By 1962, the lake was seen as a potential solution for wastewater discharge because of various generic social and ecological factors and so the Jaipur administration diverted the walled city sewage to the lake through the drains Brahampuri nallah and Nagtalai nallah. Due to the lack of clarity of property and development rights and the beneficiary organisation/s resulted in no resistance by any organisation to the decision of wastewater discharge. By 1975, the lake had become the city's primary wastewater and solid waste disposal site resulting in eutrophication, excess surface algae growth making it unfit for use including fishing and irrigation. This impacted on the organizational roles of the property and development rights of the lake as a whole resulting in complex polycentric governance.

In the 1980s under the Master Plan of Jaipur city (Vardhan, 2013) about 100 acres of land to the south of the Mansagar lake was demarcated for tourism development. This land was previously being used by the local community for farming, cattle grazing, dumping waste, sports and other activities. Its official demarcation for tourism has given rise to conflicts regarding the land area, development rights, property rights, operational rules and financial resources. By 2000, large amount of deforestation was witnessed due to the increased development with unplanned infrastructure support resulting in heavy silting in the lake. This silting resulted in reduction of water retaining capacity of the lake and loss of biodiversity.

3. Research Approach

The study aims to methodologically understand collective common actions/decisions for a common resource. The study analyses the key characteristics that are effective in the governance and sustainability of Mansagar lake and digs deeper into the collective functioning of the organizations towards the restoration of the lake and assess the ecological condition of the same. The inquiries and investigation follow a logical sequence such as,

- Which organisations are involved in the restoration activities of the lake, involves categorical identification of the actors (organisations) involved in collective action;
- How do organisations work collectively in the restoration activities of the lake, involves mapping of the actions by the actors with each other and towards the lake;
- What activities are carried out in the ecological restoration of Mansagar involves finding about the detail activities carried out by the action either individually or collectively. Implicit in the inquiries is the normative assumption that good input may lead to better outcome, in other words,
- *Collective action (CA) → (leads to) → Sustainable Lake (IL)* where, *collective action* refers to a collective agreement between network of multiple organisations from multiple levels to collectively work towards sustainability of urban lake; and *sustainability* refers to the physical existence of a lake over time. The ecological performance of the lake, 'if improving' or 'ensuring existence' over time is used as proxy of sustainability and is measured through the land mass, water quantity, and water quality of the lake over time.

- What is the perception of the ecological condition of the lake and the restoration activities involves questionnaire survey among the local people asking them about the physical lake and the organisational performance through the indicators.
- What are the opportunities and challenges among the organisations in the collective action situation involves interviews of the local officials asking them about the collective agreement and arrangement of activities between the organisations and their influence on the physical lake.

The analysis is structured in accordance to the SES framework through the main variables in figure 02. The governing organisations taking or not acting to provide and/or maintain the preferred value from the lake are the primary analytical variables. The governing mechanisms are higher order secondary variables and important in explaining (or predicting) why certain outcomes (like sustaining value) are reached or not. The lake system is the secondary analytical variable and is characterized by the physical-ecological aspects of the lake. They are dependent variables. The total value is the control variable and descriptive in nature. The urban settings and the related developments are descriptive contextual variables. They are the independent variables. The entry to the action situation is from the expected outcome set by the study (and organisations) like, the collective action performance of the actors and the ecological performance of the lake. The rectangular boxes denote the building blocks. The solid arrow is the direct link and the dotted arrow is the feedback. The feedback paths link the outcomes back to the variables, thus denoting a dynamic overall system (McGinnis and Ostrom, 2011).

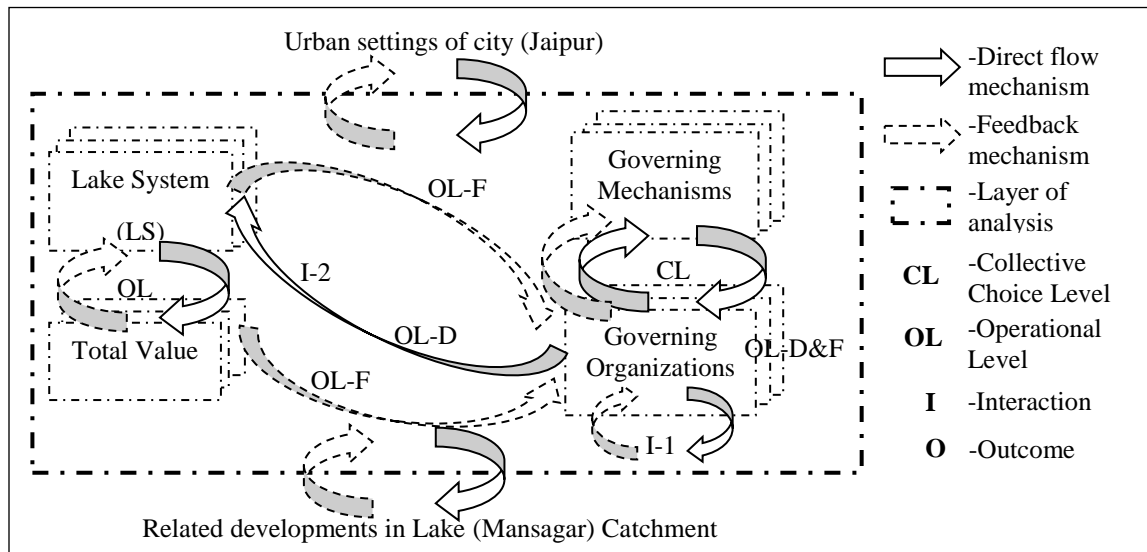


Figure 02: Conceptual framework for analysing Mansagar
 Source: adapted from McGinnis and Ostrom, 2011

4. Collective Action in Mansagar Lake

The head of the State of Rajasthan (the then Chief Minister) in 2001 initiated the ‘Ecological Restoration of Mansagar’ in order to improve the recreation and tourism at Mansagar through the local planning organisation namely, JDA and JMC. This reflected the financial importance of the land associated with the lake. Under the implication of this initiative, several organisations came to a collective agreement to find an optimal solution for the restoration of the lake. The Ministry

of Tourism was appointed as the nodal organisation for overseeing the restoration plan while JDA was appointed as the nodal organisation for implementing the restoration. The Ministry of Tourism appointed the Infrastructure and Finance Services, Delhi to find a solution for the restoration. A 'Detailed Project Report of Mansagar Restoration' (PDCOR, 2001) was created by the JDA, JMC and PDCOR limited jointly which helped the Government of Rajasthan to get financial aid from the Ministry of Environment and Forest through the National River Conservation Directorate. In 2004, under the implementation of the Detailed Project Report private organisations were invited

to get involved in the restoration process with the incentive of developing and benefitting from the vacant land.

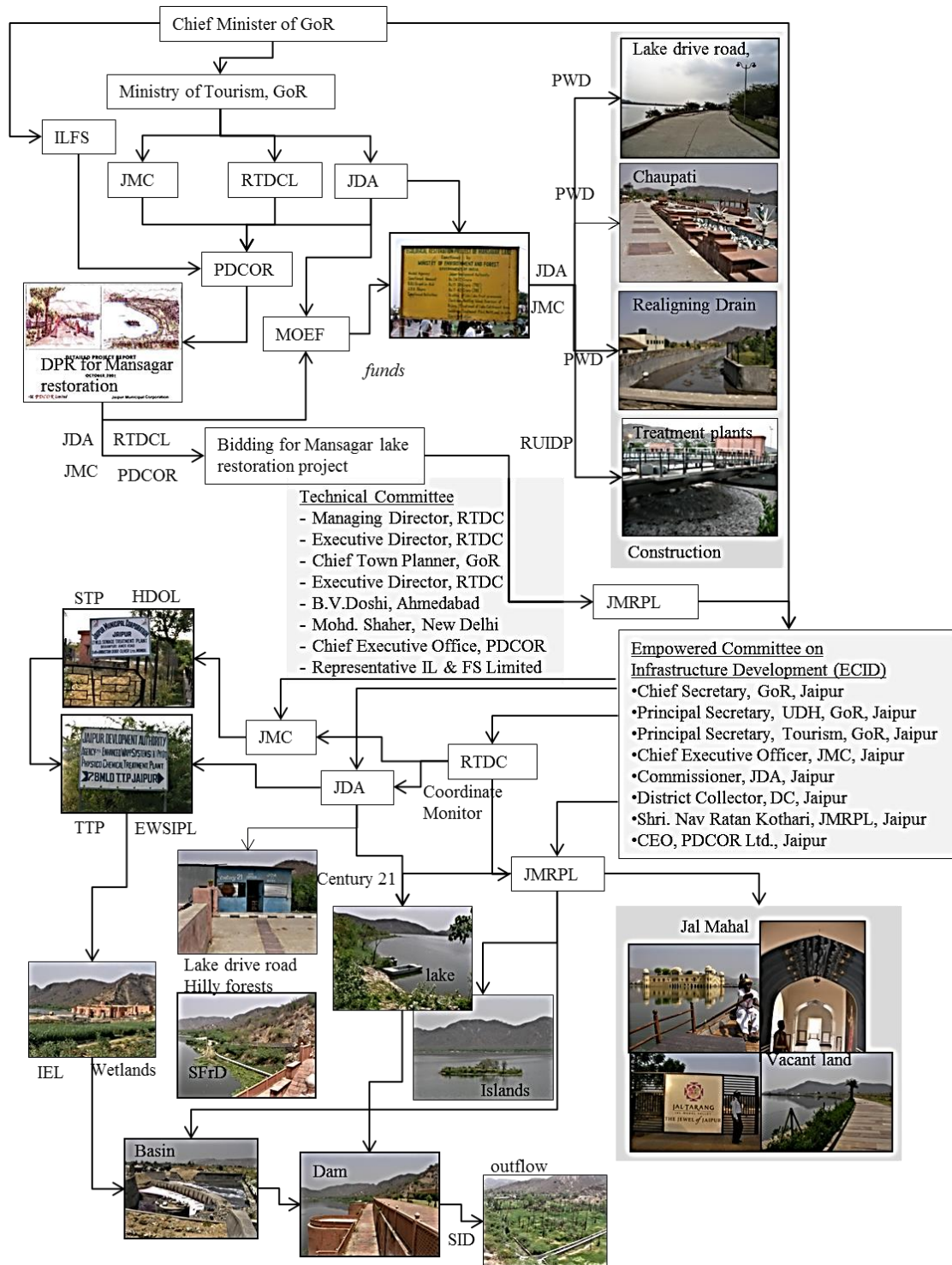


Figure 03: Collective action situation at Mansagar Lake

A Mumbai based private business organisation viz., Jal Mahal Resorts Private Ltd. was awarded the responsibility of implementation of the restoration. An Empowered Committee on Infrastructure Development was created under which JDA, JMC and Rajasthan Tourism Development Corporation Limited were the nodal organisations. The initiative 'Ecological Restoration of Mansagar' was renamed to 'Jal Mahal Tourism Development' which was within the subsidiary body of the Rajasthan Tourism Development Corporation Limited while the Empowered Committee on Infrastructure Development committee was renamed as Jal Mahal Tourism Development Corporation Limited. The Empowered Committee on Infrastructure Development organisations are the primary unit of analysis to understand the functioning, opportunities and challenges of the collective action situation.

The development and maintenance of the lake and its shores were mainly divided among the key Local Governments, the JDA and JMC, and the Jal Mahal Resorts Private Ltd was assigned the duty of conserving the Jal Mahal and the development of the vacant land for tourism and recreation which were believed to be linked to the overall restoration of Mansagar. The Ministry of Environment and Forest facilitated and supported the Mansagar Lake Restoration Plan (MLRP) by an arrangement of 70:30 funding ratio. While the 70% was meant for initiative the restoration activities, the remaining 30% were meant for long term maintenance of the restoration done. This 30% was hoped to be generated by the State Government and the local governments which they planned to do by leasing the vacant land and receiving a lease income annually. The proposed MLRP were linked to the property rights and development rights of around the lake, Jal Mahal and the vacant land. Thus, there were three simultaneous leases that were proposed for a period of 99 years which became a debate in the current lake governance and judiciary.

The Jal Mahal Resorts Private Ltd was expected to maintain the lake collectively with JDA and JMC in which it was expected to conserve and develop Jal Mahal with its own cost and make it accessible for local people without any fees. The Jal Mahal Resorts Private Ltd also agreed to develop the vacant land for tourism and recreational facilities and make a portion of it accessible for the local people with/without any fees being charged. But Jal Mahal Resorts Private Ltd was supposed to pay a lease amount to Jal Mahal Tourism Development Corporation Limited (maintained by a third party) for the usage of the vacant land. This amount will be used by the JMC and the JDA for the maintenance of drains, lake and its promenade. Thus, the usage of the vacant land was an incentive to lure the private organisation in partnership as per the MLRP.

The Empowered Committee on Infrastructure Development through the MLRP aimed to work towards four main goals viz., restore the lake, restoration of Jal Mahal, development of lakefront facilities and maintenance of public facilities (PDCOR,2001 and RSPCB,2010). The different restoration activities together with the collective action arrangement characterised the current lake governance of Mansagar. The collective arrangement was operational to a certain extent as an opportunity to realise the MLRP but also faced several challenges at the operational level.

The logic of collective action amongst the Empowered Committee on Infrastructure Development organisations was underpinned with several social-ecological event and disturbances (Cox, 2010) taking place at different levels simultaneously over time. The collective action is a nested situation of multiple levels (Ostrom, 2005; Kiser and Ostrom, 1982) of organisations and regulations and

strategies as shown in Figure 04. At the operational level, first Mansagar was in complete deteriorated condition and a key reason being realised by the Empowered Committee on Infrastructure Development was the uncoordinated activities of the different organisations. However, the multiple delegations also led to a loss of accountability and accuracy in the work.

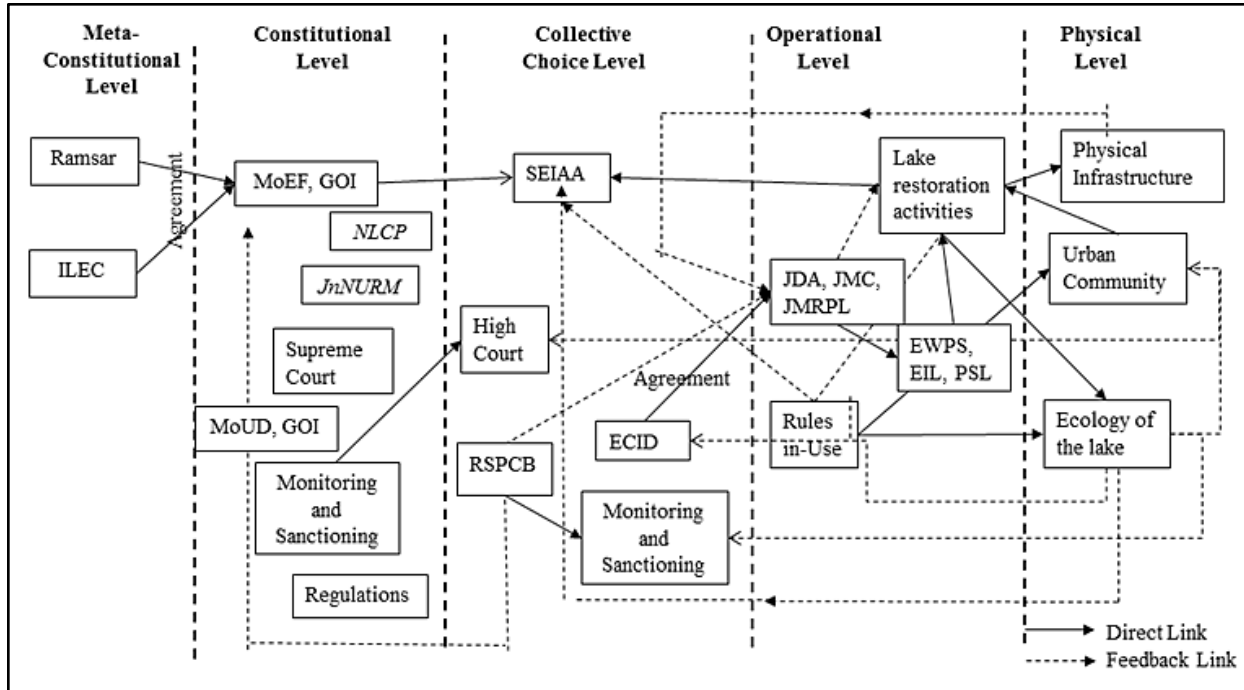


Figure 04: The lake governance in Rajasthan

5. Vital relation of land-water

Before the lake restoration initiative, Mansagar was never a tourist destination but the same was planned to achieve through the conservation of Jal Mahal, securing regular water in the lake and developing lake promenade. The local people associated with the lake initially due to daily activities like fishing, farming, drinking, bathing etc. which were later changed to tourism and experiencing the recreational facilities of the lake promenade. This change in values that were aimed in the MLRP are explicit at the collective choice level whereas the land development and water management are implicit at the operational level. From the ecological aspects of the lake, it is found that:

- the land development affects the sustainability of the land encompassing the lake and;
- the wastewater management affects the sustainability of the water in the lake.

Sustaining the lake over time is understood by ensuring the existence of well-maintained land area of the lake. The characteristics of the lake catchment area and the lake are diagnosed to understand the collective actions influence on the water quality and quantity of the lake. The characteristics of the land management (lake and lake shores) influence the land encompassing it and is seen that with every initiative undertaken in and around the Mansagar lake has resulted in the systematic reduction of the lake area. The delineation of the new lake boundary happens with the reclamation of land from the lake during the desilting and deepening of the lake. Delineation of the lake

boundary and desilting over the years have resulted in the presence of two main roads on the south and west, several government buildings like police academy and army base.

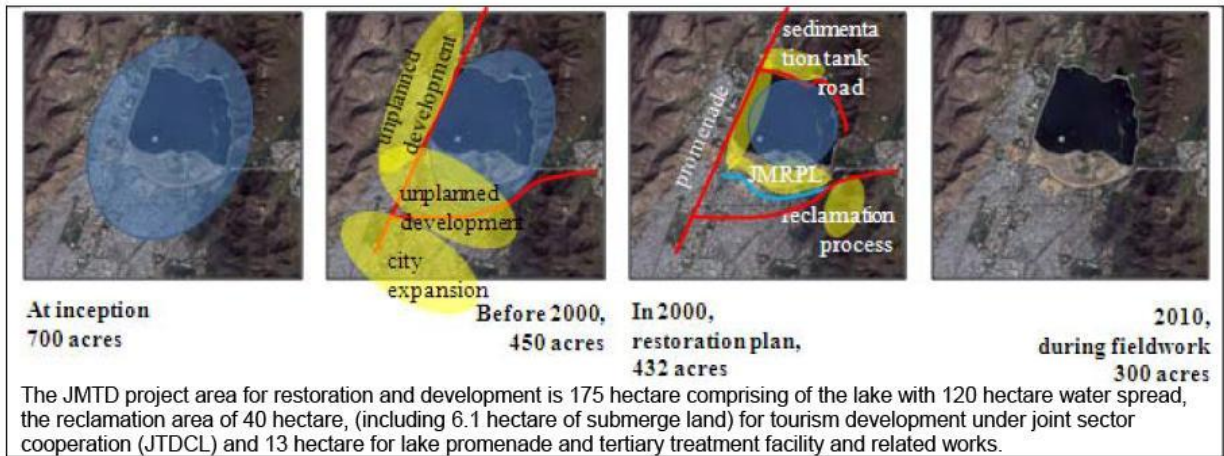


Figure 05: Simulation of land dynamics in Mansagar over time

The current delineation offers a proposal of plaza and stepped embankment in the west, a lake drive road, a number of sedimentation tanks, a new outflow gate and an artificial wetlands. The decisions to delineate new boundaries and to reclaim particular land areas involve systematic process of property rights, lobbying, technological and funding resources etc apart from the ecological considerations of the lake. Certain concerns regarding the property rights and use of the vacant land were witnessed between the local community and the Empowered Committee on Infrastructure Development but none were witnessed on the land to be acquired for the use of facilities like promenade, lake drive road, artificial wetlands while both the actions resulted in reduction of total area covered by the lake. Also, the catchment area that is divided in three sub-catchments areas is around 23.5sq.kms (PDCOR & JMC,2001) and plays a vital role in determining the role of water and land within the restoration plan. The first sub-catchment is through Brahmapuri nala flowing in the lake from the south-west corner. It gross area of this sub-catchment is 8.20sq.kms of which 25% is urbanised (RSPCB, 2010). A large number of industries (dyeing, carpentry, tannery, etc) are located in this area of which 75 industries discharge untreated wastewater into Brahmapuri which eventually reach the lake via the secondary and tertiary water treatment plants.

The second sub-catchment in the south-east end through the Nagtalai and consists of an area of 6.80sq.kms of which 3.31sq. kms is covered with forest. Most of the remaining area is unplanned and informal development with no proper infrastructure and thus the rainwater carries heavy silts. The third sub-catchment area are the hills in the north, west and east of the lake that covers an area of 8.50sq.kms of which 4.87sq.kms is covered by forest. Though the west side is developed into residential, hotels, shops etc, most of it is unplanned development with poor provision of infrastructure. In the MLRP, the full tank level has been set at 98 mts. with the full tank capacity of the lake at 2.5mcm (PDCOR & JMC, 2001). RSPCB (2010) recommended a full tank level of 99mts. after desilting of the lake with the full tank capacity as 3.13mcm (Sharma, 2007). The volume, water spread area and the depth, have been weighed against the demands of the lake on the lake shore for development in order to maintain the lake ecosystem. The RSPCB data has been used by the DBS and Sharma in the PIL to argue that the lake water level decided in the MLRP is

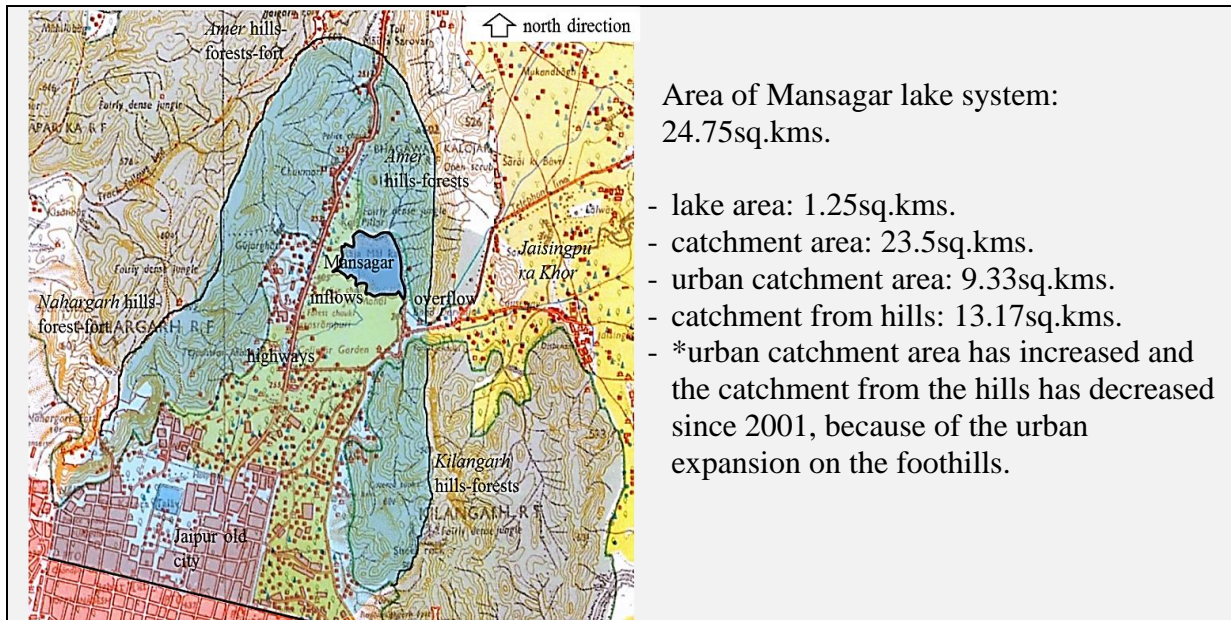


Figure 06: Upstream & Downstream area of Mansagar

inappropriate (Jain, 2011). The petitioners added that the process of deciding the desired water level and the full tank level involved lobbying activities for claiming more land for development in the vacant land. Jal Mahal Resorts Private Ltd. & PDCOR officials in response claim that the full tank level was determined on the primary decision to ensure year round water in the lake and avoid the flooding in the surroundings and to discharge to the downstream. The conflict concerns the inclusion of vacant land in the 100 acres plan of MLRP as it is not completely supported by scientific and technical evidence. It is claimed that the vacant land has been created due to the dumping of the soil from the process of desilting and deepening the lake further elevating the level of road from the full tank level.

The Mansagar dam on the east side of the lake is historically of great importance and helps maintain the desired water level in the lake. The control of the dam is with the State Irrigation Department (Water Resource Department). The Water Resource Department holds independent rights to the dam and the lake water in spite of not being a member of Empowered Committee on Infrastructure Development and thus is not directly involved in the MLRP. Due to conflicts between Water Resource Department and JMC-JDA-Jal Mahal Resorts Private Ltd. a common understanding of the desired water level and the full tank level has never been achieved thus affecting the upstream and downstream areas.

Sustaining a lake over the period of time demands presence of certain quality and quantity of water in the lake. The water containing capacity of the lake is determined by the land area comprising the lake and the average water depth in the lake. The current water quality of Mansagar is below category D as per the Central Pollution Control Board standards of water based on use which is the minimum requirement to be developed for recreational activities. where as for additional activities like hotel on the vacant land and access to the lake through the plaza or the proposed embankment, a minimum of class B was quality is recommended (RSPCB, 2010). Based on the lake classification, Mansagar has been through the four phases of lifecycle prior to the current restoration process: oligotrophic, mesotrophic, eutrophic and dystrophic. with the little

improvements, the current state of the lake can be classified as mesotrophic which however, remains uncondusive to a healthy lake ecosystem. Sustaining water quantity is crucial in ensuring the existence of the lake and therefore round the year availability of water has been mandated in the MLRP. Currently, there is year-round water in the lake due to the regular inflow of treated and untreated wastewater along with regular deposit of silts. Though the presence of sufficient water quantity will not guarantee any improvement in water quality, but decrease in water quantity will certainly lead to deterioration in water quality.

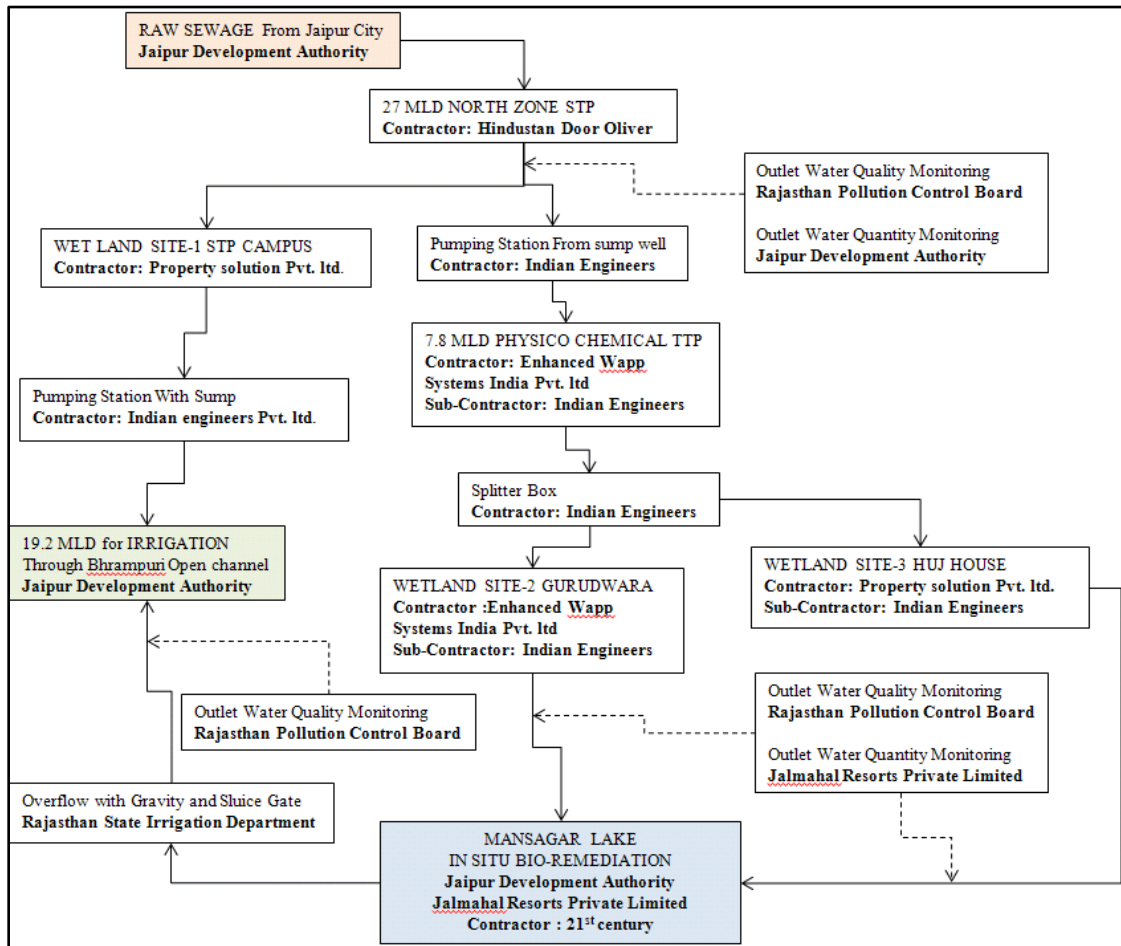


Figure 07: Organizations involved in collective action to ensure water into Mansagar

In a collective action situation, action of each actor is linked to the actions of other actors and together they are linked to the performance of the lake. It was found that poor maintenance of the sewerage treatment plants negatively impacted on the trust and reciprocity of actions amongst the actors and to the poor quality of lake water.

6. Discussion

Lake governance in India is caught in a dilemma between water management and lake development with is understood here as a cyclic process. Since the Water Resource Department which oversees the water management is not a part of the Empowered Committee on Infrastructure

Development, there is no clarity/motivation to restore/maintain the water quality and quantity in the Mansagar restoration. Besides, the Water Resource Department has not set any water quality standard for the urban lakes. The Mansagar restoration approach is motivated in directing the lake as an alternative use public asset rather than focusing on the lake ecosystem development and maintenance. The approach towards the lake restoration questions the organisations involved in the collective action for their interest in lake development vis-a-vis lake conservation.

The research allowed a micro-level understanding of the nestedness between the scales and levels of interaction between the ecological and social diversity within and outside the SES which made governing and sustaining as well as studying SES very complex. Sustaining water quantity is linked to the land encompassing the lake. Both these activities create a dilemma with respect to overall sustainability since the former results in increase in the water but the later results in reduction of the lake area. it can be said that the preference of one value over the other made a difference as explained in figure 07. The lake restoration driven by the aim of tourism development and the operation strategy to achieve tourism was considered as the lake conservation approach. But would the resultant have been different had the restoration approach considered the lakeshores to be protected using ecosystem-based approach and not reclaim the land from the lake is something that could be considered for future lake governance.

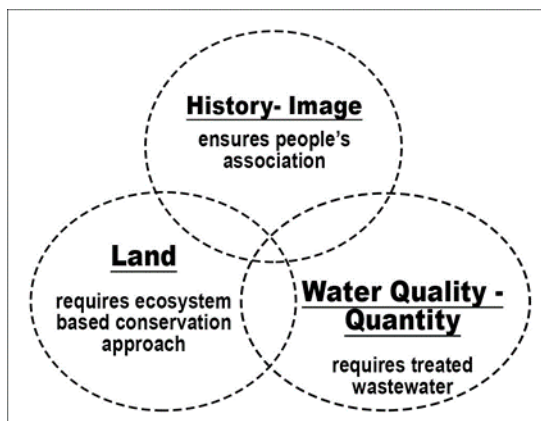


Figure 08: Overlap of the Preferred Value

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Abbreviations

- JDA- Jaipur Development Authority
- JMC- Jaipur Municipal Corporation
- JMTD - Jal Mahal Tourism Development
- MLRP- Mansagar Lake Restoration Plan
- PDCOR- Project Development Company of Rajasthan
- RSPCB- Rajasthan State Pollution Control Board Department
- SES- Social-Ecological Systems framework