JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

REJUVENATION OF A STATIC WATER BODY

A Case Study of Anasagar Lake, Rajasthan and Cheonggyecheon, Seoul, Korea

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Abstract: *The motive of this research paper to Lessening pollution, improving the lake's water quality, and creating habitat that supports the largest number of aquatic species should all be goals of restoration efforts. In any case, they are now just useful as a sink for solid waste and wastewater. Systemic violations and malfunctions continue to undermine waterbodies' health. More and more, it is becoming clear that failing to fix the water bodies in the medium to long term will have significant implications on urban improvement. City planners purposely ignored these water bodies and allowed them to deteriorate while being aware of their significance for the environment, society, and the economy. These bodies of water are now overgrown and polluted with trash and sewage. Unplanned urbanization has left a significant section of the region surrounding the lakes covered in impervious surfaces. To clean up the city's central environment. to start balancing the development of the old and modern city parts. to give many people real-world environmental experience.*

Keywords - Rejuvenation, waterbodies, urbanization

INTRODUCTION

Waterbodies are essential to the development of metropolitan areas. They can be used for a variety of things, including domestic purposes, wastewater weakening, environmental administrations, managing green spaces, biodiversity, and controlling temperature. In any event, they have already reduced to serving as a sink for wastewater and solid garbage. The health of waterbodies continues to be harmed by systemic violations and breakdowns. It is becoming more and more obvious that failure to repair the water bodies in the medium to long run will have important recommendations on urban improvement.

Throughout history, whether permanent or not, water bodies have been crucial to the advancement of civilisation. lakes, rivers, and other bodies of water. pond. Wetlands support human life and offer crucial ecosystem services. They add to the beauty of our natural landscape and protect our limited water supplies. Large and small bodies of freshwater and saltwater have various differences from one another. They range in size from the largest, the ocean, to smaller ones, such little streams. Puddles and other minor, transient water features are typically excluded from this category by geographers.

STATIC WATER BODIES

In addition to enhancing the aesthetics of the environment, hydrostatic spaces also offer space for recreational activities, serve as habitats for plants and fauna, and influence the microclimate. In addition to improving the physical and socioeconomic environment, they are crucial for maintaining urban ecosystems. Development initiatives near still waters frequently disregard water protection and continue with other projects. Therefore, maintaining, preserving, and rejuvenating such static waterbodies in metropolitan environments is crucial. Pooled water, or lentic water, typically originates from lakes and ponds. Lake, ponds, etc.are the examples of the static ones.

NON-STATIC WATER BODIES

The still water area not only enhances the aesthetics of the landscape, but also provides space for leisure activities, is a habitat for flora and fauna, and affects microclimate. They are important for maintaining urban ecosystems, and the presence of all forms of water improves the physical and socio-economic environment. Development projects along stagnant waters often ignore water protection and move on to other developments. Therefore, the conservation, conservation, and rejuvenation of such static water bodies in urban areas is an important aspect. Lentic water is mainly water that flows from lakes and ponds. Ocean, rivers and streams are some of the non-static water bodies.

GLOBAL AND INDIAN CONTEXT OF WATER BODIES

Since 1960, the world's per capita freshwater supply has declined by 55%. By 2030, global water demand is expected to increase by 50%. Global water use has increased by approximately 1% each year since the 1980s, due to a combination of population growth, socio-economic

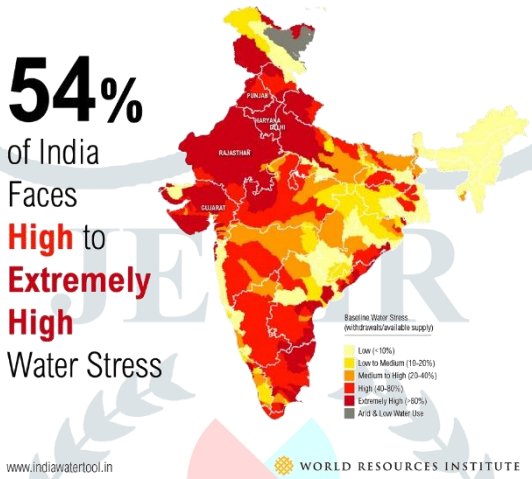
development and changing consumption patterns (UN World Water Development Report, 2018). Global water demand is expected to continue to grow at a similar rate until 2050, primarily due to increased demand in the United States. This is a 20 to 30 percent increase over current water usage. industrial and domestic sectors.

India has approximately 757,060 wetlands with an estimated total wetland area of 15.3 million hectares. This is almost 4.7 percent of the wetlands of India, which is the country's total geographic area. The entire country was evaluated, with a total of 201,503 wetlands identified and mapped on a 1: 50,000 scale (SAC, 2011). 60% of irrigation in countries comes from dug wells and pipe wells (highest in Punjab, Haryana, Rajasthan, UP, Gujarat and Tamil nadu), lowering groundwater levels and drying aquifers. .. Over the years, surface water use has declined and groundwater use for irrigation has steadily increased.

Supply vs Demand

The map below illustrates the competition between businesses, farms, and residents for surface water in rivers, lakes, streams, and shallow groundwater. The red and dark red zones are used heavily or extremely heavily, meaning that more than 40% of the annual available surface water is used each year. More than half of India's population faces high to extreme water stress, affecting nearly 600 million people.

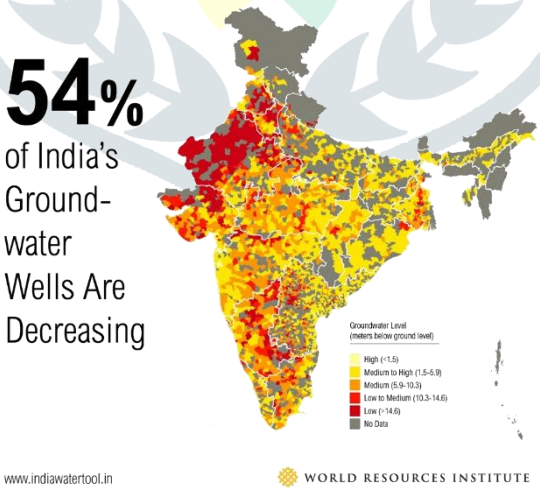
Note, in particular, the region of extreme stress covering the northwest, Indian basin. The states of Punjab and Haryana produce 50% of the national government's rice supply and 85% of the wheat stock. These two plants need a lot of water.



Ground water decreasing

Groundwater levels are falling across India. Of the 4,000 wells mined in the tool, 54% have declined over the past seven years, with 16% dropping more than a meter per year Farmers in arid regions or areas with erratic rainfall depend heavily on groundwater for irrigation. The government subsidizes farmers' electric pumps and doesn't limit the amount of groundwater they can tap, creating a pervasive pattern of excessive water use and overloaded electricity grids.

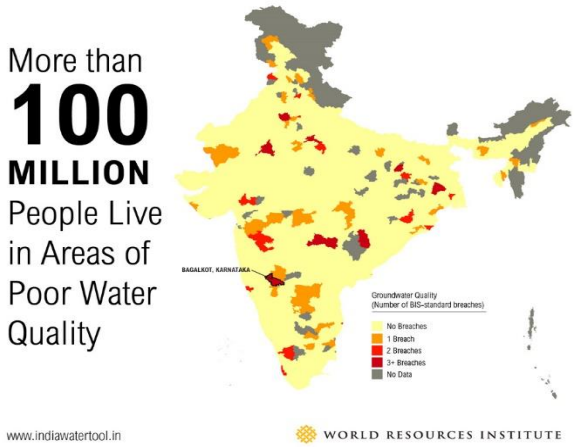
Northwest India once again stands out as highly vulnerable. Of the 550 wells surveyed in the area, 58% had reduced groundwater levels. Northeast India has its own groundwater challenges. In Meghalaya, groundwater resources are low, creating tension with water-intensive coal mining.



POOR WATER QUALITY

The Indian Water Tool measures water quality against limits set by the Bureau of Indian Standards (BIS). Surface and groundwater quality is below average in many areas. Of the 632 underground water quality areas measured by the tool, only 59 exceed the BIS limit. Drinking water is considered unsafe if certain levels of contaminants exceed BIS limits. The yellow and red areas below indicate where chlorine, fluoride, iron, arsenic, nitrates, and / or electrical conductivity exceed national standards.

These districts are very populous. In 2011, 131 million people lived in areas where at least one pollutant exceeded national safety standards, and more than 20 million people lived in eight areas where at least three pollutants exceeded safety limits. Bagalkot is the most polluted, with five of the six groundwater quality indicators at dangerous levels (only arsenic is below government-recommended concentration levels).



PROBLEM STATEMENT

At the moment, India's lakes and wetlands are in varied degrees of environmental deterioration and are in a terrible state. Although city planners were aware of the importance of these water bodies for the environment, society, and the economy, they purposefully ignored them and let them deteriorate. These bodies of water are now overgrown and polluted with trash and sewage. Unplanned urbanisation has resulted in the impermeable surfaces covering a large portion of the area surrounding the lakes.

As a result, sewage and effluents are filling up urban water bodies rather than rains. Urban lakes, formerly the urban environment's sponges, are now dangers that become choked even with little rain and overflow into blocked canals with heavy rain, creating flooding in the city. The loss of these urban sponges is what has made droughts and floods more painful and severe (Churning Still Water, 2012).

Considering the present bleak water scenario of Indian cities, today we need our urban lakes and wetlands more than ever

WATER BODY REJUVENATION

In the past, initiatives to revitalise waterbodies holistically have taken into account a variety of factors, including catchment area development, economic activity dependent on the waterbody, and social and cultural care of water bodies.

The Indian government has just turned this approaching water management catastrophe into one of its top priorities. To take use of the synergies of many disciplines and subject skills, the recently established Ministry of Jal Shakti has combined various water-related departments. A combination of centralised and decentralised approaches are being used to solve water security.

NEED AND AIM OF THE STUDY

India's water resources are currently experiencing varied degrees of environmental degradation. The majority of these water bodies were destroyed as a result of urbanisation that ignored ecological issues. Many of the water bodies are now encroached upon and overflow with trash and sewage.

Issues caused by the deterioration of aquatic bodies:

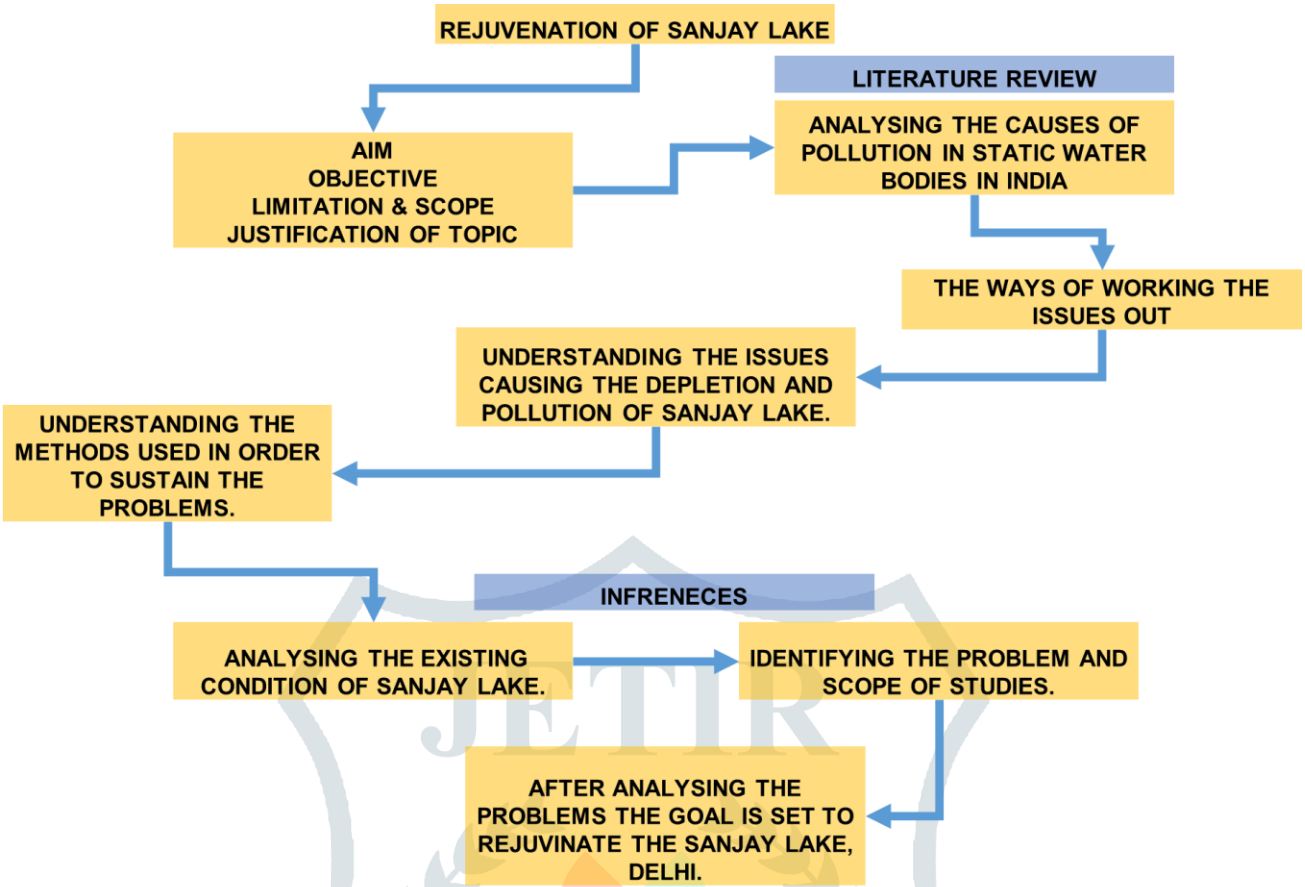
Water shortages; groundwater recharge zone losses; aesthetic and recreational space losses; flooding in urban areas; and loss of water supply resources.

To formulate strategies for planning to rejuvenate the lake with the case study of Sanjay Lake.

SCOPE AND LIMITATIONS

- Finding out the possibilities of water quality improvement.
- Finding the possible ways of protecting natural basin of the lake.
- Studying the scope of urban development along the Sanjay lake.
- Study focused on built up structures and habitant along the Sanjay lake.

METHODOLOGY



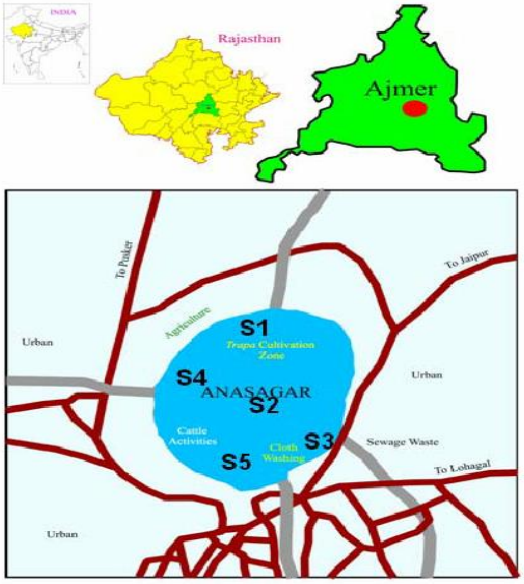
STUDY 1: ANASAGAR LAKE

An manmade lake called Anasagar Lake is located in the Rajasthani city of Ajmer. Ajmer has a semi-arid climate with a dry, scorching summer and a chilly winter. Ajmer's average temperature varies from 3°C (minimum) to 22°C (maximum) in the winter and from 25°C (minimum) to 47°C (maximum) in the summer. About 500 mm of rain falls on average in the city. The lake was created by King Anaji Chauhan between the years of 1135 and 1150 AD by building a dam across the Luni River, and it was first used to furnish drinking water. Currently, boating, fishing, and pleasure are all done on the lake. A significant volume of untreated waste water from the neighbourhood is dumped into the lake. When the water recedes, agriculture is practised in lake areas often. The overflow from lake reaches Khanpura Pond where it is used for irrigation.

CHARACTERISTICS	DESCRIPTION
Geographic location	26°25'N-26°29'N(Latitude) 74°38'E-74°42'E (Longitude)
Location in Ajmer	North-West of Ajmer, Rajasthan
Lake type	Artificial lake, constructed by damming over Luni River
Lake water spread area	0.97 sq km to 1.87 sq km
Highest flood level	485.305 m above MSL (as revised in 2013)
Catchment area	53 sq km (gross), 20 sq km (intercepted by Lake Foysagar), 5 sq km (built up area)
Topography of lake catchment area	Steep to gentle slope with low vegetal cover
Storage capacity of lake	5.68 Million Cum (at HFL)
Lake circumference	7.3 km (at HFL)
Source of water in lake	Rainfall runoff and overflow from Lake Foysagar through Bandi River
Depth	4.4 m
Overflow arrangements	Four overflow gates (size 1.2m X 1.8m)

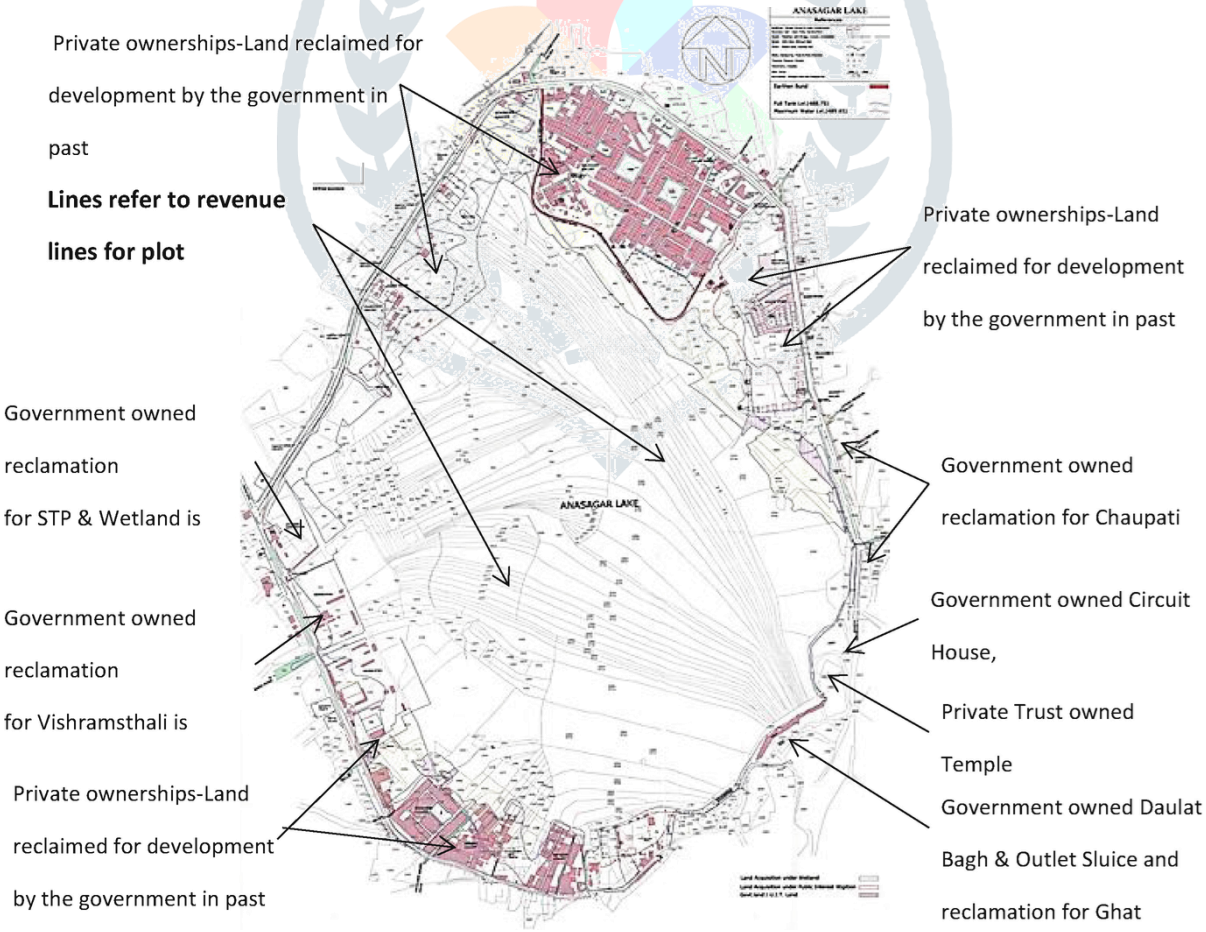
(Source: Detailed Project Report, 2007: Lake rejuvenation project, Anasagar Lake, Ajmer and Nagar Nigam: 2013, Land use details in Anasagar Lake catchment)

LOCATION OF ANASAGAR LAKE



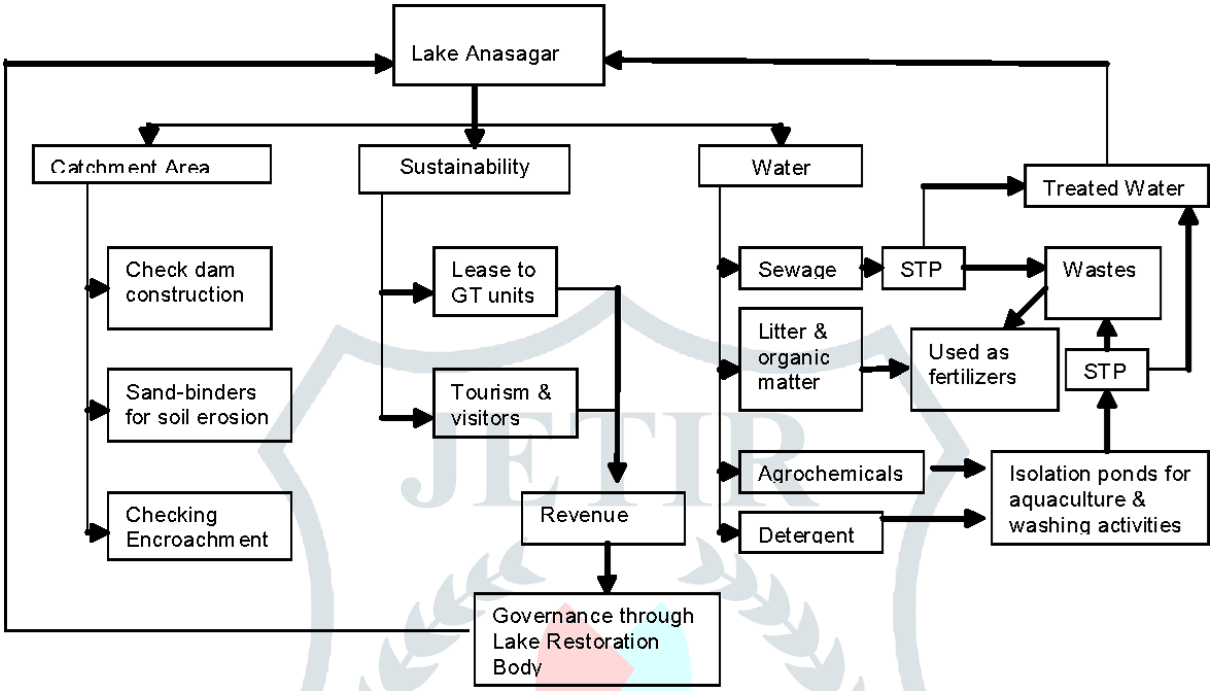
ANALYSIS

Fish frequently die both in the summer and the winter. Summertime sees a regular evolution of bad gases in the lake region, which has made living miserable in the neighbouring residential neighbourhoods. Large amounts of solid waste and silt have clogged the storm water drains, and frequent flooding as a result of this is typical throughout the rainy season. The lake coastline is not protected, and human meddling and encroachment are evident throughout the lake region. Storm water drains allow untreated waste water to enter the lake, and this amount has grown as the population has grown. The lake's water transparency has diminished over time, and lakeside vegetation has grown. In the lake watershed, the area of bare ground has steadily increased while the area of forest has steadily decreased. Lake catchment activities that are caused by people have grown over time. The activities of bathing and washing in the lake have grown over time and are especially noticeable during the Pushkar fair. With time, the variety and quantity of migrating birds at Anasagar Lake have declined.



ADAPTIVE MANAGEMENT TO SUSTAIN ANASAGAR LAKE

To reduce pollution, sewage treatment plants (STPs) must be established to handle sewage and waste water from lake catchment areas. Activities such as bathing, washing, idol immersion, and feeding fish in lakes should all be severely forbidden. It should be encouraged to use idols manufactured of organically biodegradable materials rather than natural ones. Private landowners continue to exploit the region beneath the lake for unsustainable farming operations, small-scale manufacturing, and laundry services. The municipal government should act quickly to purchase this privately held land To stop human-induced activities like illegal building, encroachments, the use of organ chlorine pesticides in agricultural practises, and illegal fishing that are to blame for the degradation of lake environments, strict enforcement of rules and regulations as well as environmental laws is required. The use of organic insecticides, fertilisers, and agricultural techniques should be encouraged among the farmers. It would lessen the amount of dangerous and harmful compounds and nutrient load entering the lake.



An outline of Integrated Plan Restoration of of Anasagar Lake

STUDY 2: CHEONGGYECHEON, SEOUL, KOREA

The third monarch, the son of the Cho Sun dynasty's founder, opened CheongGyeCheon (cheon meaning stream), a natural stream 10.92 km in length, to pass the bustling city's centre and drain into the Han-river roughly 600 years ago. An 8.4 km long stream called Cheonggyecheon flows from west to east through the heart of Seoul before reaching Jungnangcheon, which joins the Han River and drains into the Yellow Sea. Roads were constructed in Cheonggyecheon during the administration of Park Chung-hee. Over it, a raised roadway was constructed in 1968.

Google Earth map showing the stream Cheonggyecheon

OBJECTIVES OF THE PROJECT

To help revive downtown Seoul's historical and cultural landmarks. to restore the environment in the city's centre. to begin balancing the growth of the ancient and new city sections. to provide millions of folks practical environmental experience.

APPROACH

Following are the approaches to revive the lake:

- Environmental And Economic Development
- Enhancing Aesthetic Quality
- Stakeholders Involvement
- Preserving Biodiversity
- Lake Water Recharge
- Waste Water Treatment
- Maximizing The Benefits Of Lake
- Minimizing The Impact Of Human Activities
- Lake Management
- Managing Ecosystem

CONCLUSION

Restoration activities ought to lessen pollution, enhance the quality of the lake's water, and provide habitat that supports the greatest amount of aquatic life. Gaps in the current rejuvenation path are I lack of understanding of functional aspects of a lake – ecological, hydrological and remediation aspects in addition to recreation services; (ii) the focus of lake rejuvenation is only to utilise the allocated funds (activities matching the allocated funds have been proposed and implemented) without any scientific evaluation of the lake and the need assessment; (iii) not decontaminating the lake – partial removal of contaminated silt (accumulated over a period); (iv) reuse of contaminated silt – shoreline stabilisation, creation of 'islands'.

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