

Harnessing the ECONOMIC POTENTIAL of a RIVER



2532538/2022/KPMG Section Pr-26/2/2020-TECH3 NMCG-NATIONAL MISSION FOR CLEAN GANGA

2532538/2022/KPMG Section Pr-26/2/2020-TECH3 NMCG-NATIONAL MISSION FOR CLEAN GANGA

RIVER





Title

Harnessing the ECONOMIC POTENTIAL of a RIVER

Publisher

National Institute of Urban Affairs (NIUA), Ministry of Housing & Urban Affairs, GoI
National Mission for Clean Ganga (NMCG), Ministry of Jal Shakti, GoI

Acknowledgements

Divyasha Arora, Nikita Madan, Jyoti Verma, Victor R. Shinde,
Anirudh Soni, Banibrata Choudhury, Ishleen Kaur, Lovlesh Sharma, Manju R. Kanchan, Rahul
Sachdeva, Sahil Bhardwaj, Uday Bhonde, Vishakha Jha (NIUA team)

Disclaimer

This document is a compilation of various works. Original references may be studied along with this document.

Neither the authors nor NIUA or NMCG accept any legal liability for the accuracy of inferences drawn from the material contained herein or for any consequences arising from the use of this material. Material from this publication may be reproduced with due acknowledgement to NIUA and NMCG.

Graphics, Illustrations and Images

The images within the document have been picked from the original citations.

Year of Publication

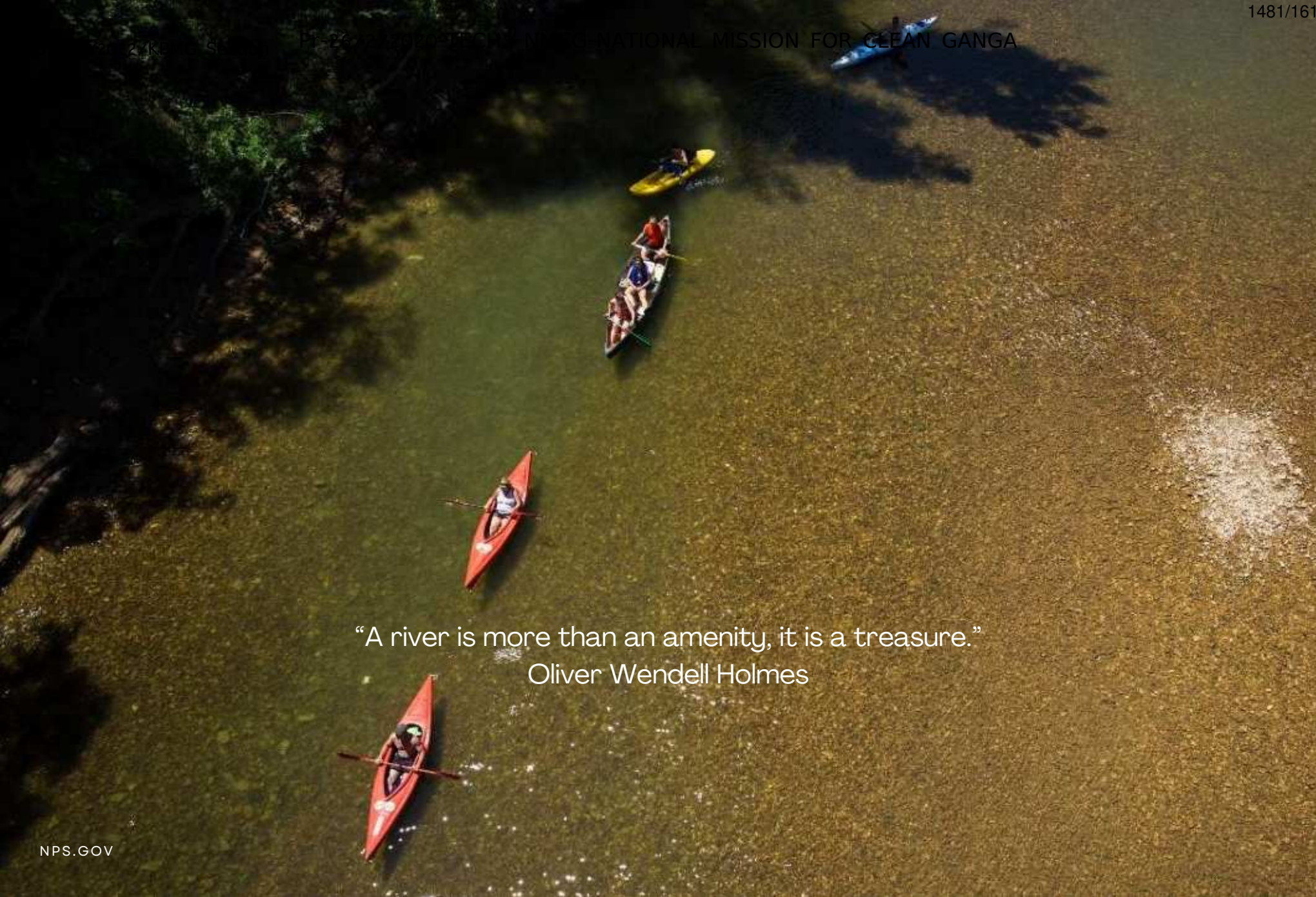
2022





CONTENT

- 1 Urban Riverfront Biodiversity Park
- 2 Light and Sound Show
- 3 Floating Markets
- 4 River Theatre
- 5 Wellness Retreats
- 6 Water Adventure Retreats
- 7 Plants for Profit
- 8 River Sanctuary
- 9 Waterfront Development
- 10 Cultural Park

An aerial photograph of a river with five kayakers. The kayakers are in a yellow, a white, a red, and two other kayakers. The river is surrounded by dense green trees on the left bank. The water is a mix of green and brown, indicating some sediment or algae. The kayakers are moving from the top left towards the bottom right of the frame.

“A river is more than an amenity, it is a treasure.”
Oliver Wendell Holmes

INTRODUCTION

In addition to the plethora of ecological benefits offered by river ecosystems, rivers also have the potential for delivering a wide range of economic benefits. Since time immemorial, rivers have been generating economy by serving as a source of fresh water, supplying water for irrigation, promoting water tourism, supporting navigation and providing livelihood opportunities. Additionally, the ecosystem services provided by a river system also have immense intangible economic benefits associated with them. In fact, it is safe to say that rivers can directly help cities progress up the economic ladder.

This knowledge product is a compilation of river-related activities from across the world, that have helped in leveraging the economic potential of the river ecosystems.

1

...

URBAN RIVERFRONT BIODIVERSITY PARK



RIVERFRONT BIODIVERSITY PARK, SABARMATI, AHMEDABAD, INDIA

Urban forestry is the new thrust area to increase the green cover in the city and enhance the livability in the neighbourhoods and provide the city with much-needed green spaces and respite from the densely built environment. The Biodiversity Park and the Miyawaki plantation along with other parks & gardens at Sabarmati Riverfront have increased the green cover of the city. It consists of a variety of native, fruit-bearing trees along with many endangered species.

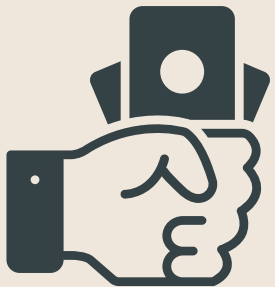
The 9-hectare Biodiversity Park serves as an ideal alternative habitat for migratory and resident bird species and has come up at the edge of Vasna Barrage and near to Ambedkar Bridge. It has more than 5000 trees, including some endangered species. This Biodiversity Park gives the citizens a space to find solitude away from the humdrum of city life.

The park also houses 35 species of birds, including native and migratory birds ones, such as boot-headed eagle, egrets, ibis, white-throated kingfisher, purple swamphen and sparrows.

SABARMATIRIVERFRONT.COM



ECONOMIC ACTIVITIES



Ticketed entry

- Birdwatching
- Nature trails
- Educational Trips

Ticket Rates (INR):

Adult (Above 12 years): 20

Child (Age 3-12 years): 10

Senior Citizen (Above 60 years): 10

School Tour: 1

Park Timings : 07:00 to 17:00 hrs



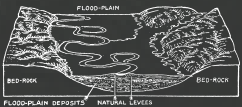
Indirect economic benefits

- Acts as a natural sewage treatment system
- Gene reserves
- Provides health, recreational, psychological, and social benefits
- Reduces water runoff and soil erosion by breaking rainfall and holding soil
- Improves air quality



IMPLEMENTABILITY OF THE PROJECT

ESSENTIAL REQUIREMENTS

      	Identification of area and landholding rights	Identifying appropriate area on the river bank that holds the potential of a benefitting impact on the city
	Water quality assessment of the water body	The water in the body should be free from heavy metals and toxins to support the park's healthy growth of flora and fauna.
	Ecological Expertise	The scientific method of successfully flourishing a forest includes preliminary typology research, choosing native species and maintenance. This would demand ecological expertise.
	Control on encroachments	The area should be made free from encroachments in a socially responsible manner
	Educational and Research tie ups	It would be useful to tie up with schools and universities for educational and research trips. This could be done on a membership model.
	Maintenance and tour guiding collaborations with the local communities	The local communities should be taken on board for the operation and maintenance of the park. Furthermore, training local communities for ecological guidance will be helpful in aiding livelihoods and skill development.

2a

...

LIGHT AND SOUND SHOW — ON WATER —



WINGS OF TIME, SENTOSA, SINGAPORE

The light and sound show offers awe-inspiring 3D projections, lasers, robotic water fountains and pyrotechnics, which can be viewed against a majestic backdrop of the sea on a huge water screen. The show is interwoven into a 20-minute-long contemporary storyline that is bound to entertain and amaze the audience.

Wings of Time is the world's first permanent night show set in the sea. Combining state-of-the-art effects with contemporary storytelling and live audience engagement, it offers a high-value unique entertainment experience for local and overseas guests.

The concept was brought together by a team of 150 professionals, engaged over a period of two years. Their intent was to conceptualise and develop a multi-sensory experience.



TIMINGS

7:40 PM & 8:40 PM every day

TICKET

\$15 (INR 754) for normal seats and up to \$23 (INR 1153) for premium seats.

Wings of Time captivated over 75,000 local and international guests in its first month of operations.



2b

<https://www.sentosa.com.sg/en/things-to-do/attractions/magical-shores/>

M A G I C A L S H O R E S , S E N T O S A

Sentosa Development Corporation, has a long-term vision of revitalizing the island as a nighttime destination for not only the tourists, but for the local residents to repeatedly visit the island to appreciate the evening stroll.

Singapore's first-ever permanent interactive land art exhibition "Magical Shores" began on January 23, 2020. Magical Shores is a multi-ocular experience at dusk that brings the shore of Siloso beach alive with opulent light, projection and sounds. Spanning across Siloso Beach, Magical Shores is an outdoor, interactive, light-and-sound spectacle that encompasses four unique experiences – Nocturnal Awakening, Rising Tides, Force of Nature and The Last Dance.

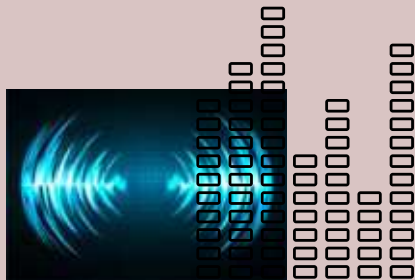
MAGICAL SHORES
TAKES PLACE
DAILY FROM 7:30
PM TO 10:30 PM.

IN 15-MINUTE
CYCLES

Magical Shores spans 400 meters of Sentosa's Siloso Beach, turning it into an immersive, multi-sensory experience of AI-operated lights and sounds which elevate the beauty of the surrounding natural environment. <https://www.moshimoshi-nippon.jp/>

Economic Activities

The economic potential lies in the ticketed entry to the light and sound shows as well as in making the experience more holistic with the setting up of food and drink options. This can also hold immense potential for small and local businesses to come in front and gain from the footfall.



Ticketed entry to the shows

₹ ₹ ₹



Food stalls

₹ ₹

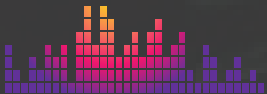


Local business stalls

₹ ₹

IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS AND IMPORTANT CONSIDERATIONS

     	Environmental Impact Assessment	It is crucial to analyze the impact of lights and sounds in the stretch. Since artificial light and sound systems will be installed, the impact of the show's intensity, frequency and duration on the existing flora and fauna should be minimized. This would need Environmental Impact Assessment.
	Identification of a suitable stretch	Identifying an appropriate stretch on the River bank that can support technical setup. Rough and fast-flowing water might not be able to hold such configurations.
	Weather assessment	The weather conditions should be conducive to outdoor shows on the river banks
	Accessibility	The show area should be easily accessible to maximize reasonable footfall
	Technical collaborations	Technical collaborations are elementary for the success of such a project. Innovation and creativity in terms of light, sound and water play will enhance the value of such shows,
	Script and artist collaborations	A creative storyline that holds the interest of the public and the presence of live actors during the play to enhance the show's value should be tapped.

3



www.outlookindia.com/photos/photoessay/kashmirs-floating-market/

FLOATING MARKET, DAL, KASHMIR, INDIA

Dal Lake's picturesque floating gardens and market are not just a tourist attraction but also a vital lifeline for the locals.

The area's markets, shops, mosques, houseboats and floating vegetable gardens provide a means of livelihood to many people in Srinagar and the neighbouring towns. At the crack of dawn, scores of boats carrying fresh produce — flowers, vegetables, spices, and more — gather at a specific spot in the lake that has come to be known as the floating market.

The morning trade ritual at Dal is at least a century old. Many of the vendors here are the fourth generation in their family business. The Dal wetland is conducive to growing several kinds of vegetables — tomatoes, brinjals, cucumbers, water chestnuts, and lotus stems abound.

The vegetables from the floating markets usually attract customers as they are organic, fresh and tasty. Besides vegetables and flowers, handicrafts and saffron is sold here.

WWW.NEWS18.COM





www.news18.com

Reasons for Success

- The Floating vegetable market in Srinagar is the social fabric of Dal Lake. It developed organically and is culturally unique and strong.
- This market provides trade to farmers, fruit and vegetable retailers, small business owners and shikara owners. It is an interdependent market system that caters both to the locals as well as tourists.
- Besides the economic trade of products and goods, access to the floating market is ticketed for tourists by shikara boats.

Crucial Considerations

- The Floating Vegetable Market, Srinagar is a completely unorganised and unofficial market. These markets have over the year polluted the lake which has affected cultivation, trade and tourist footfall.
- Flooding events and heavy rainfall have previously disrupted the market. Hence, climate change resilience and mitigation measures become crucial.

www.thehindubusinessline.com/blink/shoot/floating-markets-in-kashmir-before-sunrise/article25332887.ece/photo/1/

On average, this market was believed to do a transaction worth **10 to 20 lakh rupees every morning.**

Access to the floating market is ticketed for tourists by shikara boats at Rs 600.

Economic Activities



Organic farming + wholesale trading of produce



Retail trading of produce



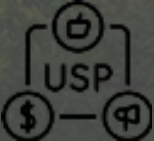
Shawl and Jewellery businesses along the floating markets



Shikara rides

IMPLEMENTABILITY OF THE PROJECT

SOME REQUIREMENTS AND IMPORTANT CONSIDERATIONS

     	Environmental Impact Assessment	The impact of the regular use of the waterbody for trade-related activities should be carefully analysed and the plan of implementation should follow such analysis to keep the load on the water body under control.
	Identifying cultural USP	A strong cultural USP is central to the success of this project
	Creation of a social network	A direct interdependency between the farmers, traders, boat owners, buyers and tourists will ensure strength in the flow of goods, services and incomes.
	Climate resilience	To make the markets flood, cyclone, and drought resilient, measures must be taken to prevent and mitigate such events. Climate-smart techniques and infrastructure should be used.
	Monitoring and cleanliness of the water body	Polluted and toxic stretches will cause losses in terms of tourist appeal, buyer satisfaction and farmer's output. Hence community must be made stakeholders in the maintenance of the waterbody.
	Traditional boats	Traditional boats with enhanced functionality should be opted.

4

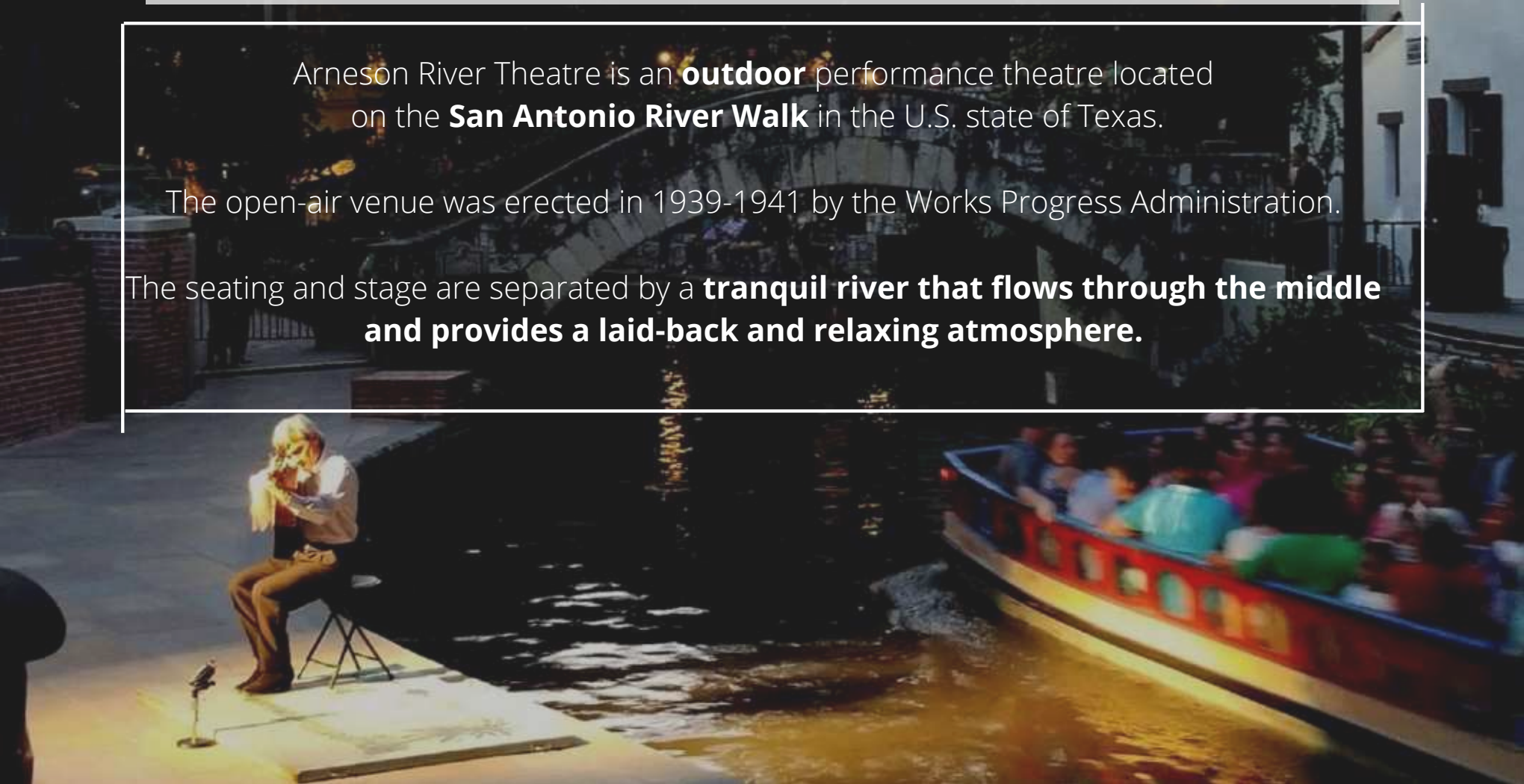


1. ARNESON RIVER THEATRE, TEXAS, US

Arneson River Theatre is an **outdoor** performance theatre located on the **San Antonio River Walk** in the U.S. state of Texas.

The open-air venue was erected in 1939-1941 by the Works Progress Administration.

The seating and stage are separated by a **tranquil river that flows through the middle and provides a laid-back and relaxing atmosphere.**





The stage is on the north side of the river; the audience sits on the grass-covered steps on the south side, which **can hold over 800 people** on 13 rows of seats. A nearby stone bridge is often made part of the performance space.



The theatre continues to be used throughout the year for a wide variety of performances, averaging over 200 each year, including **folkloric groups, festivals, music concerts, plays, dance, opera, and even weddings.**



Above and behind the seating area is La Villita Historic Arts Village, a restoration of San Antonio's oldest residential neighbourhood, today filled with **artisan shops, galleries, and restaurants.**

2. THE RIVER THEATRE, CHICAGO, ILLINOIS, US

The River Theatre was conceived as a space where Chicago's streetscape folds down to the river in a smooth and dynamic way. It offers itself as a unique setting, treating downtown visitors to an unexpected place of both quiet reflection and dynamic excitement



Trees are integrated into the staircase with a custom design.

This room links the streets to the river's edge, through a grand set of dynamic steps that support staged events and watching the theatre of the river.



Long-term tree health is supported project-wide with structural paving systems to enable appropriate soil volumes and irrigation using reclaimed stormwater

A fully-accessible geometric path is the central circulation feature in the River Theatre



Economic Activities

The economic potential lies in the ticketed entry to the theatre shows as well as in making the experience more holistic by setting up food and drink options. This can also hold immense potential for small and local businesses to come in front and gain from the footfall. The venue can also be rented for private events.



Ticketed entry to performance
₹₹



**Renting to the public for
wedding and parties**
₹₹₹



Cafes and Resaurants
₹₹



Boating
₹₹



Artisan shops and galleries
₹₹

IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS AND IMPORTANT CONSIDERATIONS

     	Environmental Impact Assessment	Impact assessment on the river/ stream and its ecosystem with regular footfall should be analysed. Efforts should be made to neutralise this impact.
	Good Water Quality Of The River	The water should be of clean, uncontaminated and clear.
	Appropriate Width of the River/ channel	To maximise the visual and audio experience the distance between the stage and audience seating ie., the width of the river stream should be accounted.
	Suitable Temperature for Outdoor Seating	The weather should be pleasant for outdoor gatherings. In areas of heat and rainfall, shading can be done.
	Collaboration With Artist Groups	Theatre, music, dance, and Broadway groups should get an inviting deal to perform
	High Aesthetic Value	The developed area should have a pleasing, creative, and thematic appeal.

5



WELLNESS RETREATS IN & AROUND RISHIKESH, INDIA



Guided nature walks: Guided walks are done in silence, allowing people to practice breath and body awareness, as well as becoming aware of the sounds, smells and feel surroundings.

Ganga riverwalk, waterfall walk, ritual bathing in mother Ganga, walk to Him river and garden tours are popular examples.



Ritual Bathing in Mother Ganga: Participants are taken to peaceful and cleaner stretches of the river Ganga for bathing



Meditation: Participants join together in a ritual on the banks of Ganga near the ashram and are guided to meditate on the banks of the river



Riverside cafes: Riverside cafes and restaurants are popular amongst participants



Yoga: Yoga sessions are conducted on the banks of the river



Creative classes: Creative classes like art, theatre acting trainings and music rehearsals are held on the banks of the river

Economic Activities

The economic potential lies in the various combinations of retreat packages as well as in making the experience more holistic by setting up food and drink options. This can also hold immense potential for artisan shops and galleries to be set and gain from the footfall. Artists, trainers, homestay owners, and camping companies have good economic potential.



Retreat Packages

₹₹₹



Separately Paid Sessions

₹₹



Cafes and Restaurants

₹₹



Eco - friendly camps /homestays



₹₹



Artisan shops and galleries.

₹

IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS AND IMPORTANT CONSIDERATIONS

     	Environmental Impact Assessment	The impact of regular access to the riverside by groups of people needs to be analysed. Activities should be planned within the bearing capacity of the landscape.
	Good Water Quality Of The River	The water should be clear, clean and unpolluted to be accessed by participants.
	Calmer Stretch Of The River	Such retreats are possible in calmer stretches of the river where the water flows more swiftly. This gives a relaxing element to the setting.
	Land ownership and Infrastructural Agreements	Land ownership and Infrastructural Agreements for setting up of camps and hotels.
	Eco- friendly construction	Cafes, restaurants, hotels, resorts, studios and wellness spas should use eco-friendly techniques and materials if constructed on the floodplain. This will give a dual benefit of adding to the natural element of the retreat.
	Collaborating with Wellness Experts	The value of a retreat centre moves around the quality of training and wellness expertise it offers.

6





sicilygreenadventures.com. www.sicily-adventure.it

1 RIVER TREKKING IN THE ALCANTARA GORGES, ITALY

Water trekking is an exciting walk against the current, in the cold water of the Alcantara river. Guides explain the historical and scientific characteristics of this corner of Sicily.

COST
INR 3,19,000 per person

Some key features:

- Duration 2 Hours
- Geological, historical and naturalistic information is shared
- Technical equipment and waterproof overalls are provided
- Entry ticket is charged for the Alcantara river park

www.tourmyindia.com

2 WHITE RIVER RAFTING IN RISHIKESH, INDIA

Rishikesh, the rafting capital of India, is arguably the best destination for rafting in India. The turquoise waters of the Ganges render immense scope for rafting here.

COST
4 Rafting Routes:
9 kms, 16 kms, 26 kms, 35 kms
INR 600 - INR 2500 per person

River rafting season in Rishikesh begins sometime around the 2nd week of September every year when the licenses of all operators are renewed after the monsoons.

Economic Activities

The economic potential lies in the various combinations of retreat packages as well as in making the experience more holistic with the setting up of food and drink options. This can also hold immense potential for artisan shops and galleries to be set and gain from the footfall. Sports trainers, guides, homestay owners, and camping companies have good economic potential.



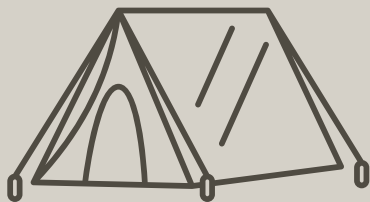
Riverside camping, river rafting,
hiking,

₹ ₹ ₹ ₹



Cafes and Resaurants

₹ ₹



Eco - friendly camps /homestays

₹ ₹

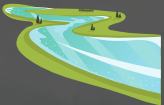


Artisan shops and galleries.

₹

IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS AND IMPORTANT CONSIDERATIONS

     	Suitable Stretch of River	Identify suitable stretches of river for the congruent level of difficulty for the sport, considering the weather fluctuations, the flow of water, rocks and boulders etc.
	License to operate adventure activities	The adventure activities can only be conducted after the proper renewal of the operating licence by the State tourism board and the State forest department.
	Safety Protocols in place	Ensure to follow all safety protocols like having licensed guides, good quality equipment and a safety kayaker
	First Aid	A proper medical facility must be available with the rafting trips.
	Skilled Guides	Only skilled and experienced guides with a high level of rafting techniques, rescue life-saving techniques, first aid, and ability to communicate clearly are allowed to supervise the activity.
	Cleanliness at all times	Ensure that the river is not polluted in any manner and that the cleanliness of the river is maintained at all times.

7

...

PLANTS FOR PROFIT



WATER HYACINTH PRODUCTS, PHILIPPINES, INDONESIA AND INDIA

- Water hyacinth has been choking many water bodies in the country, causing serious ecological and economic problems.
- Removing these invasive species has proved futile since they come back almost immediately.
- Researchers are trying to find economic use so that these problem plants become a resource for income generation.
- Apart from generating local level employment and value-added products, it will also increase the state's revenue through lake tourism, water transportation and fisheries.
- In 2015, more than 50 handicraft groups in Thailand focused solely on water hyacinth products. Each group has its own network of members, which vary in size, ranging from 20 to more than 600 villagers per group. This simply means that thousands of villagers in Thailand rely on water hyacinth for their income.





1



2

1. Disposable plates made out of water hyacinth pulp.

2. As a readily available resource, water hyacinth has been used in several small cottage industries in the Philippines, Indonesia and India for paper, rope, baskets, mats, shoes, sandals, bags, wallets, vases, etc.

Key impacts of the project



ChaWha Skin
SMOOTH

Water hyacinth
+ Vinyl leather

Flexibility: Medium
Smooth: High
Softness: High
Durability: High
Coating: Yes

Nature-Friendly: Low



ChaWha Skin
FLEX

Water hyacinth
+ Fabric

Flexibility: High
Smooth: Medium
Softness: Medium
Durability: Low
Coating: No

Nature-Friendly: Medium



ChaWha Skin
TOUGH

Pure multi-layered
water hyacinth

Flexibility: Low
Smooth: Low
Softness: Low
Durability: Medium
Coating: Yes

Nature-Friendly: Best

Natural:

Exploits the natural waste
Encourages the use of an
unwanted natural resource
Reduces the amount of
invasive weed

Cultural:

Preserves Thai authentic arts
of local communities
Promotes Thai craftsmanship
reputation through exquisite
handmade products with
unique looks

Economical:

Creates jobs for local villagers
Improves the local economy
Generates income for those
under-employed and seasonal
workers

Social:

Unites bonds of neighborhoods
Creates positive atmosphere
among local villagers
Strengthens the sense of
community

Ban-Aoy handicraft group's new material development with water hyacinth

PROCESS OF UTILIZATION OF THE WEED

Semi-industrial uses and household articles



Natural Heat / Sun Drying

Water hyacinth stem is fibrous and filled with water content. In order to transform those stems into usable material for handicrafts, they have to be dried first.



Sulphur Baking / Chemical coating

After being sun-dried, water hyacinth stems could be enhanced in appearance and property chemically by Sulphur.



Coloring / Tinting

Natural golden brown is the colour that dried water hyacinth fibre tends to have. Quickly boiled in hot boiling water and mixed with the selected dye, it could yield some colourful water hyacinth stems, which leads to even more beautiful creations.



Machinery

Only a few machines are included in the production processes: rolling machines and cutting machines. Both machines are used in preparing dried water hyacinth stems, for making them flat and of uniform length, making them easier to weave and yield more beautiful results.



Hand Weaving / 3D Weaving

Thousands of water hyacinth products here are made by hand weaving. Water hyacinth stem is tough yet flexible and can be woven into any form according to moulds.



Sewing / Needlework

After successfully weaving, the products could go through the sewing process to match them up with the fabric of choice. This process is basically needlework which could be done by both hand and sewing machine.

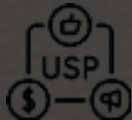


Finishing / Varnish Coating

By applying a few thin coats of varnish oil on water hyacinth fibre, such products would have a more shiny finish which would preserve the appearance longer as well as provide more anti-fungal properties.

IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS AND IMPORTANT CONSIDERATIONS

     	Integrated Environmental Assessment and reporting (IEA)	IEA to ascertain the cause-effect linkages of human and natural action on the environment and, in turn, the resultant environmental change in the state of the environment and human development.
	Identifying a Suitable stretch	A suitable stretch which is invaded by such species that needs removal.
	Cultural usp + marketing	Techniques/weaves/prints that are unique to the community/area that can give these products a USP. Investment in smart marketing of the eco-friendly, socially impactful products in the market.
	Conservation of native species	..
	Ecological Expertise	Ecological expertise on the lifecycle, use and maintenance of the plants in respect to other species.
	Capacity Building	Training the community on the sourcing, production, sales and marketing methods of the products.

8



NATIONAL CHAMBAL SANCTUARY

RAJASTHAN, UTTAR PRADESH, AND
MADHYA PRADESH

One of India's most pristine and celebrated sanctuaries, the National Chambal Sanctuary was established to protect the Chambal river system which is home to some critically endangered, vulnerable animals, and hundreds of migratory and local birds.

It falls under the jurisdiction of Rajasthan, Uttar Pradesh and Madhya Pradesh, and is administered by the Department of Forest in Madhya Pradesh.

The National Chambal Sanctuary is famous for the critically endangered crocodile gharial (for which it was formed); along with the vulnerable Ganges dolphins; and rare turtle species of India, like the crowned river turtle, Indian narrow-headed soft-shell turtle, and three-striped roof turtle.

Ganges river dolphin



Gharial crocodile



Red crowned roof turtle



Great crested grebe





dholpurpalace.com

BOAT SAFARI

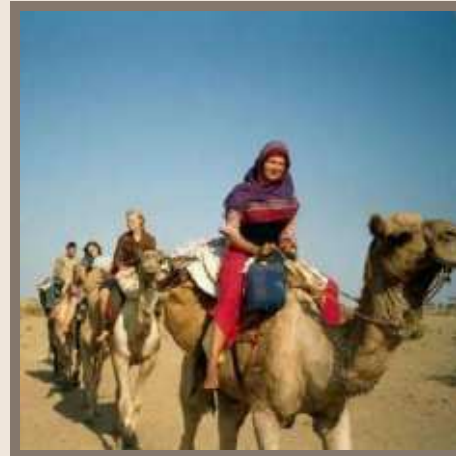
Around 400 km of the Chambal River is within the sanctuary area, and this can be toured via boat. Boat safaris can be taken with a driver who also shows the different species that are present in the water and on the banks as well.



travelsiteindia.com

JEEP SAFARI

A good way to see these animals and be safe at the same time is to go on a jeep safari. The sanctuary provides jeeps and a forest guides, who drive and show take visitors to specific locations inside the sanctuary premises.



indianholiday.com

CAMEL SAFARI

The ravines of Chambal have many secrets within that are not explored by many; camel rides into those ravines are a perfect way to unfold these secrets. The camel carries visitors into those forgotten trails that lead into Ater in Rajasthan.

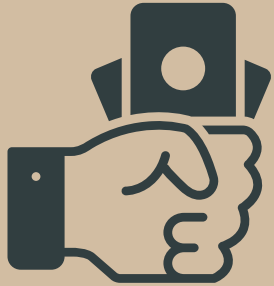


dholpurpalace.com

RIVER RAFTING

Trained guides take the visitors on a raft and give a tour of the ravines and the beautiful creatures that can be seen throughout the ride. A lot of rapids on the Chambal River make this rafting journey special.

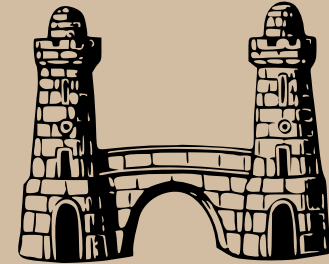
Economic Activities



Entry to the sanctuary



camel safari, jeep safari, boating, rafting



Entry to nearby forts



Traditional and local businesses



Camps and hotels



Restaurants and cafes

IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS AND IMPORTANT CONSIDERATIONS

     	Environmental Impact Assessment	The analysis of the environmental consequences of proposed development projects to identify and plan for appropriate measures to reduce adverse impacts, if any.
	Ecological Expertise	How animals and plants inhabit the environment, and report on the likely impact of any proposed developments.
	License to operate adventure activities	The adventure activities can only be conducted after the proper renewal of the operating licence by the State tourism board and the State forest department.
	Maintenance and tour guiding collaborations with the local communities	The local communities should be taken on board for the operation and maintenance of the park. Furthermore, training local communities for ecological guidance will be helpful in aiding livelihoods and skill development.
	Educational and Research Tie ups	It would be useful to tie up with schools and universities for educational and research trips. This could be done on a membership model.
	Cleanliness at all times	Ensure that the river is not polluted in any manner and that the cleanliness of the river is maintained at all times.

9

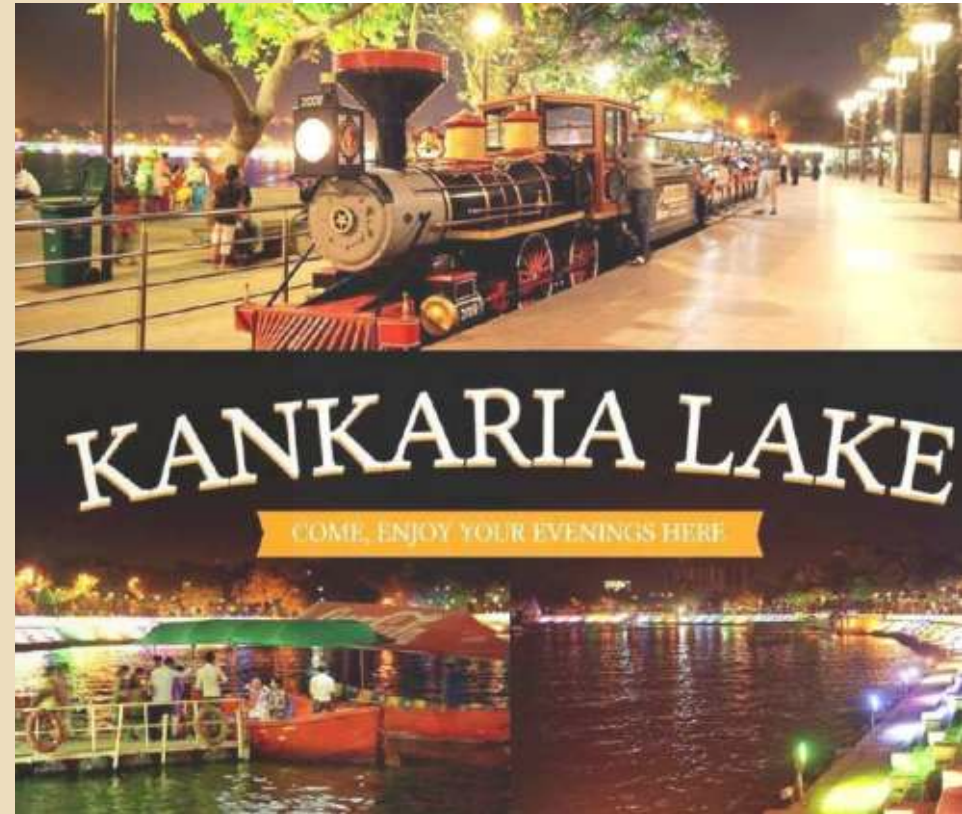


KANKARIA LAKE FRONT, AHMEDABAD, INDIA

- Kankaria Lake Front represents a **rejuvenated pedestrianized urban space in East Ahmedabad** and offers its visitor's a variety of entertainment options for people of all age limits
- In the past, due to negligence, Kankaria lake dried up and became dirty thereby rendering it useless.

AMC adopted a model of service delivery of various recreational activities through in-house planning and capacity building combined with use of capable and experienced private sector players in a phased manner.

- The project was completed in 2008 at the cost of Rs. 360 million.
- As a result of the project, **a chaotic spot has been converted into a well-organised recreational zone** through a planned approach. Further the project demonstrated a useful model for the incorporation of project-affected people, like the food vendors, into the project.





The entry fee for adults is Rs.25 per person, Rs.10 per person for children and Re.1 per person if it's an educational trip for school children. There is free entry for senior citizens and children below 3 years of age as well as for joggers. However, the joggers are restricted to a free entry area between 4:00 am to 8:00 am



On average, an adult on entering (₹25) and availing such activities- Toy train (₹25), Hot air balloon (₹300), Zorbing (₹100), Zoo (₹20), speed boat (₹130), Butterfly Park (₹10), kids city (₹50) pays ₹660 to the park.

An overall average cost per person per visit, considering all age groups, is ₹500

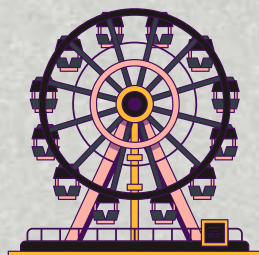
The average daily footfall is 35,000 people (2012)

Economic Activities



Entry Fee

₹



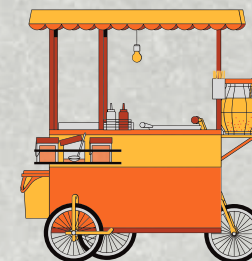
Theme Parks

₹₹



Kids City

₹



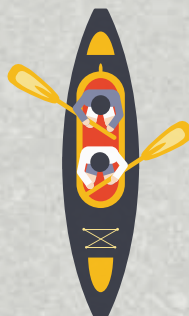
Food stalls

₹



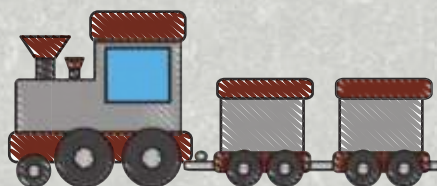
Segway

₹



Boating

₹₹



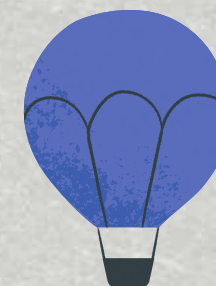
Toy Train

₹



Zorbing

₹



Hot air balloon

₹₹

IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS

	Environment Impact Assessment	Analyze the environmental consequences of proposed development projects to identify and plan for appropriate measures to reduce adverse impacts, if any.
	Water quality assessment of the water body	The water in the body should be free from solid waste, heavy metals and toxins, to promote public access
	Rejuvenation and Restoration of the water body	The water should be of clean, uncontaminated and clear to promote public access
	Land ownership and Infrastructural Agreements	Land ownership and Infrastructural Agreements for setting up of the riverfront.
	Optimising the accessibility to the water body	The water body needs to be made accessible from multiple locations, in order to enhance its public use
	Developing eco-friendly front	Waterfronts should be developed in sensitisation to the river floodplain. This pertains to the architectural design, materials used concretisation done.

10



EXPO CULTURAL PARK- SHANGHAI

The EXPO Cultural Park is located in the Houtan area of the Pudong District in Shanghai. As a visual focal point from the west bank of the Huangpu River, this land has evolved over the decades: from natural wetland to farmland with an expansive canal system for irrigation to a base for heavy industry. The opening of the Shanghai EXPO 2010, the largest World Exposition in history, represents yet another new chapter of the site's history. The EXPO focused on the concept of "Better City—Better Life," and symbolized the beginning of the site's post-industrial rebirth. After the EXPO, many of the pavilions were demolished, while a portion of the site was converted to active recreational programming.

The park celebrates the unique ecological, cultural, and innovative contexts of the site's history and will be the largest riverfront green space in the City Center.

SASAKI.COM



DESIGN LOGIC

Houtan used to be a brownfield area. The soil and groundwater were contaminated by the steel industry's heavy metals and organic solvents. The tidal movement of the Huangpu River forced contaminants between the soil and groundwater.

The design scheme uses a series of phytoremediation strategies to treat contaminations, including soil remediation, groundwater remediation, stormwater management, and sewage treatment. The brownfield remediation strategy includes six steps- measure the contamination level and location, excavate and remove the heavily contaminated soil, stack the less contaminated soil, recycle and reuse the construction waste, pile up the less contaminated soil and cap it with the clean soil, then excavate the moats, plant the hyperaccumulator plants and harvest regularly, pump out the water from the moats for specific treatment when the contamination level is high.

Groundwater remediation - to prevent contaminants in the groundwater from diffusing into the Huangpu River, direct the groundwater into the marsh to be cleaned by hyperaccumulators and benthonic animals, meeting the quality standards for non-drinking water.

Sewage treatment - Greenhouse treatment followed by discharge into the marsh for further filtration. Treated water outflow is used for park irrigation and new building's toilet flushing.

Stormwater Management - Collects park runoff and the first flush rainwater from the pump station, directing it into the rain gardens and constructed wetlands to filter.

It also helps leach contaminants out of the groundwater, practicing the "sponge city" idea.



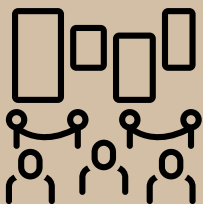
ECONOMIC ACTIVITIES



Entry Ticket to the park



Restaurants and cafes



Ticketed entry to
events



Booking charges for
events

The park provides diverse activity spaces, reflecting a culture of social equity and openness. Seasonal events and featured programs make it a 24*7 destination

The park is built as an EXPO Forest in a broad sense, corresponding to the country pavilion locations during the EXPO. The inspiration corridor of the park provides platforms for exhibiting and communicating creative ideas. By adding multiple layers of platform space to the existing industrial structure, the Iron-Age Showroom is proposed to be Shanghai's most featured fashion stage and exhibition place for large-scale art installations.



IMPLEMENTABILITY OF THE PROJECT

REQUIREMENTS AND IMPORTANT CONSIDERATIONS

    	Integrated Environmental Assessment and reporting (IEA)	IEA to ascertain the cause-effect linkages of human and natural action on the environment and, in turn, the resultant environmental change in the state of the environment and human development.
	Environmental Impact Assessment	To determine the social, economic, and environmental impacts of such a project in order to determine the necessary migratory measures.
	Land ownership and Infrastructural Agreements	Land ownership and Infrastructural Agreements for constructing/ renovating the wetland/ floodplain.
	Nature based solutions	As in this case study, native hyperaccumulators and benthonic animals are used for the remediation and treatment of water. Further, the construction of the premises should also adopt sustainable measures and contribute to minimising emissions.
	Conducive opportunities for cultural events and exhibitions	The logistics of organising events, shows, and exhibitions should be attractive. The themes and events should be scheduled for maximum utility of the premise.

2532538/2022/KPMG Section Pr-26/2/2020-TECH3 NMCG-NATIONAL MISSION FOR CLEAN GANGA



**Water and Environment Vertical
National Institute of Urban Affairs**

1st Floor, Core 4B,
India Habitat Centre, Lodhi Road,
New Delhi - 110003, India
(+91-11) 24643284/ 24617517 (ext. 214)
urvers@niua.org



National Mission for Clean Ganga

Ministry of Jal Shakti, Government of India
1st Floor, Major Dhyan Chand National Stadium,
India Gate, New Delhi - 110002, India
(+91-11) 23072900-901
admn.nmcg@nic.in

