



## **Student Thesis Competition- Season 2** *Re-imagining Urban Rivers*



# Table of Contents

- 1. **INTRODUCTION** ----- 1
- 2. **GRAND FINALE - IIT BHU** ----- 2
- 3. **KEY HIGHLIGHTS OF STUDENT PRESENTATIONS** ----- 4
- 4. **JURY** ----- 6
- 5. **WINNERS** ----- 7
- 6. **SPECIAL SESSIONS** ----- 9
- 7. **REMARKS BY EMINENT GUESTS** ----- 10
- 8. **ANNEXURE - 1** ----- 12
- 9. **ANNEXURE - 2** ----- 14
- 10. **ANNEXURE - 3** ----- 15

## 1. INTRODUCTION

Sponsored Thesis Competition on 'Re-imagining Urban Rivers' is a joint initiative of the National Institute of Urban Affairs (NIUA) and the National Mission for Clean Ganga (NMCG), which aims at capacity building of the students towards river sensitive planning and development in the Indian cities. Under this initiative, 20 undergraduate and postgraduate students across the country are being supported through mentorship as well as financial assistance. These students were working on different urban river stretches across the country.

The purpose of this sponsored thesis competition was to invite students to take up their academic thesis projects on the five different themes of the competition i.e. river pollution, rejuvenating water bodies, creating a vibrant river zone, generating river related economy and engaging citizens in river management activities. The competition aspires to provide students with an opportunity to design blue sky and innovative solutions for re-imagining the outlook and management of rivers that flow through Indian cities.



The competition was open for all the students pursuing bachelors or Masters in any discipline. Following are the eligibility criteria applicable to both categories of participants.

- (i) Students are undertaking or will undertake a mandatory thesis/research project as part of their academic curriculum.
- (ii) The mandatory thesis/research project is at least a semester-long (4-6 months) between January and June.
- (iii) The topic of the thesis/research project fits the themes of the competition
- (iv) The student has (or will have) a supervisor assigned by their Schools/Institutes for guiding the student during the duration of the thesis/project.



10 entries from each category {i.e., Undergraduate (UG) and Post Graduate (PG)} were selected. All selected students received a grant of INR 50,000 each to undertake the activities associated with the thesis/research project. All selected students received a special Certificate of Meritorious Achievement issued by NMCG and NIUA, subject to successful completion and submission of the thesis/research project. All selected students were invited to participate in a two-day workshop in Delhi before they started their thesis. During the workshop, they had an opportunity to interact with several experts in the domain to help them fine-tune their proposals. All selected students were invited to Varanasi for the final presentation in front of a panel of eminent jury members. The top three projects(in each category), as assessed by the jury panel were recognized and awarded. NIUA and NMCG will facilitate the development of projects that have a high potential for implementation.

## 2. GRAND FINALE AT IIT - BHU



NIUA in collaboration with IIT-BHU organised the STC season -2 finale in IIT -BHU, Varanasi on 28th and 29th July 2022. This two day event contained presentations by the students, IIT Faculties, NIUA Water and Environment team, launch of E-Gov Magazine and launch of STC-Season-3. Major focus of the event was the presentation by the students where they presented their thesis work in front of a panel of esteemed jury members. The students were given 15 minutes each, 10 minutes for the presentation and 5 minutes for the question- answer round. The students were then marked accordingly. 28th July was dedicated to the UG students and 29th July for the PG students of the respective fields.

The objective of this competition was to bring different minds of different fields together under one roof and expose them to different perspectives, thoughts and ideas which would help them grow professionally as well as personally.



Sl.	Category	Student	Institute
1	UG	Akriti Jaiswal	SPA Bhopal
2	UG	Daman Dogra	SPA Bhopal
3	UG	Dhaval Mistry	Academy of Architecture, Mumbai
4	UG	Sanika Upasani	Dr. Bhanuben Nanavati College of Architecture, Pune
5	UG	Mohini Vikas Bhosekar	Dr. Bhanuben Nanavati College of Architecture, Pune
6	UG	Mubashir Arshid	NIT Srinagar
7	UG	Radhika Garg	Apeejay Institute of Technology-
8	UG	Rupal Srivastava	SPA Delhi
9	UG	Sabnekar Sai Sharan	Vignana Bharathi Institute of Technology
10	UG	Ujjawal Singh	SPA Bhopal
11	PG	Abhishek Kailash Burkuley	IIT Kharagpur
12	PG	Arunima K T	NIT Calicut
13	PG	Karpagavalli S	IIT Kharagpur
14	PG	Madhavi Gajre	IIRS Dehradun



15	PG	Mrignayani Chandra	Amy University, Noida
16	PG	Pranav Varshney	SPA Delhi
17	PG	Preetikrishna Panda	XIM University, Bhubaneswar
18	PG	Rajarshi	Faculty of Architecture and Planning (FOAP), AKTU Lucknow
19	PG	Shakchi Singh	SPA Delhi
20	PG	Shivalika Arora	SVNIT Surat

### 3. KEY HIGHLIGHTS OF STUDENT PRESENTATIONS

**Planning for an Ephemeral city:  
A case of Prayagraj**  
**Akriti Jaiswal**

**Revitalisation of Urban Livelihood through  
WaTOD:  
A case of river Jhelum**  
**Daman Dogra**

**Cleaning rivers can start from Drains  
and Nallahs through a 'modular' waste  
to incentive system: A case of Mumbai**  
**Dhaval Mistry**

**Pragati Setu – linking the river Vincharna, residents  
of Shinde Wasti and Sautada village**  
**Mohini Bhosekar**

**Engaging the tribal nomads and  
indigenous people of Pahalgam in  
managing river:  
A case of River Lidder**  
**Mubashir Arshad**





Reconnecting with the river through riverfront development:  
A case of River Yamuna



Radhika Garg

Planning to mitigate wastewater flow effects on the river:  
A case of River Yamuna



Rupal Srivastava

Using Machine Learning to develop a Water Quality Monitoring System



Sabnekar Sai Sharan

METAMORPHOSIS: Ecological restoration of quarries for Adaptive Reuse: A case of ARAI stone quarry, Pune



Sanika Upasani

River Engagement Credit System- Re-imagining citizen engagement, river economy and livelihood dependency: A case of Kanpur



Ujjawal Singh

Strategies for Riverfront Development: through Nature-based solutions: A case of River Kham, Aurangabad



Abhishek Burkuley

Strategic spatial planning based on Ecosystem Services: A case of Cauvery Basin



Arunima KT

Blue-Green Infrastructure planning for Sustainable Development: A case of Tirunelveli



Karpagavalli S

Spatio-Temporal flood dynamics and its impact on river morphological changes: A case of River Kosi



Madhavi Gajre

Integration of spatial technology and citizen participation for nature-based remediation of a river: A case of River Hooghly



Mrignayani Chandra




Reinventing the lost trilogy of ponds, natural drains and ground water.  
A case of Shekha Jheel, Aligarh




Pranav Varshney

Integrated eco-sensitive approach to generate river-related economy:  
A case of River Gomti, Lucknow




Rajarshi

Planning for river-sensitive development in cities by focusing on 'all' the rivers: A case of Rivers Varuna and Asi, Varanasi



Shakchi Singh

Prioritising 'Urban Drivers' responsible for pollution through policy framework and effective community engagement:  
A case of River Ganga, Kanpur



Shivalika Arora

Integrating Urban River Management into city's Master Plan:  
Master Plan of city of Cuttack



Preetikrishna Panda

#### 4. JURY



Shri Rajiv Ranjan Mishra, **Chief Technical Advisor National Institute of Urban Affairs** and Former Director General National Mission for Clean Ganga.



Prof Gaurav Raheja, **Head of Architecture and Planning, IIT Roorkee.**



Prof Amrita Dwivedi, **Assistant Professor, Department of Humanistic Studies IIT (BHU).**







Sh. S Vishwanath, **Founder and Director of *Biome Environmental Solutions***.



## 5. WINNERS (UG)



# Congratulations Winners

STUDENT THESIS COMPETITION (SEASON 2)

### UNDER GRADUATE CATEGORY

**1**



Rupal Srivastava

Ujjawal Singh

**2**



Mohini Bhosekar and Mubashir Arshid

**3**



Mohini Bhosekar and Mubashir Arshid





Under Undergraduate category Ms. Rupal was awarded the first prize. She presented her work with effective data while also considering the practical problems of Indian cities. Mr. Ujjawal was awarded the second position. His focus area was citizenship engagement and generating economy through the rivers. There was a tie for the third position. Ms. Mohini and Mr. Mubashir Arshid were placed third in the competition.

## WINNERS (PG)



Under Post-Graduate category, Ms. Arunima KT was awarded the first prize. She presented her work on "**Strategic spatial planning based on Ecosystem service assessment- a case of Cauvery Watershed region**". In spite of having a very wide study area, she did a tremendous job and finished first in her category. Ms. Karpagavalli S was awarded the second position. Her focus area was "**Blue-Green Infrastructure Planning for a sustainable development – An opportunity for Tirunelveli**". She was awarded the second position. Ms. Shakchi Singh presented her work on "**Water Quality Monitoring System Using Machine Learning Technique**" and finished third in the competition.

## 6. SPECIAL SESSIONS



**Prof Rana P.B. Singh** delivered a presentation titled '*Benaras ki Kahaani*' where he talked about the rich cultural heritage of the ancient city of Varanasi. Much of his presentation focused on the influence of the holy river Ganga on the origin and evolution of the city, its riverfront, ghats, ancient kunds and waterbodies, temples etc and their intrinsic relationships. He stressed on the importance of utilizing and conserving the rich cultural heritage of the city.



Mr. Rahul Sachdeva and Dr. Uday Bhonde delivered a session on Managing Urban Rivers. Mr. Rahul Sachdeva set the context of the discussion with an interactive discussion based on mentimeter quiz. The questions were basically focused on water security related issues. Dr. Uday Bhonde then presented various works of the Water & Environment Vertical at NIUA. NIUA has prepared an Urban River Management Plan (URMP) Framework and conducted the pilot implementation of the framework in the city of Kanpur. Other cities like Auranbagad, Ayodhya, Moradabad and Bareilly are being supported in preparing their Urban River Management Plans. Also, NIUA has developed a guideline for Mainstreaming River Management in a Master Plan. A framework for Comprehensive Water Management has been prepared by NIUA and the same is being applied for the cities of Udaipur and Varanasi. Apart from these, the team is also working on preparation of dashboards and digital tools (e.g. Digital Waterwall, Urban Waterbody Diagnostic Tool).



## 7. REMARKS BY EMINENT GUESTS



Shri Hitesh Vaidya, Director NIUA delivered his welcome remarks during which he highlighted the fact that NIUA is continuously working towards bridging the gap between academia and practice by nurturing young talents.

Prof Pramod Kumar Jain, Director Indian Institute of Technology Varanasi, in his remarks said that the competition on ‘Re-imagining Urban Rivers’ will help strengthening both urban as well as rural India.



Shri G. Asok Kumar, Director General National Mission for Clean Ganga congratulated the finalists through a video message. He also mentioned that a new theme on ‘Managing Riverine Biodiversity’ has been added to the season 3 of the competition. He also highlighted the importance of various emerging aspects such as the economic importance of the river, reuse of treated wastewater, Fecal Sludge Management etc and the need for action research on these aspects.



Ms. D. Thara, Additional Secretary, Ministry of Housing and Urban Affairs, Government of India, virtually delivered her motivational address in which she urged the students to study various innovative technologies for river management. She also stressed on the need of sensitization of people towards river related issues, reimagining the riverfront as a beautiful public space by incorporating recreational elements, naturalization of river edges through creation of green buffers, understanding the surface water groundwater interaction and aquifer recharge etc.



Shri Durga Shanker Mishra, Chief Secretary, Govt of Uttar Pradesh, in his inspirational address mentioned that the competition emerged as part of different activities taken up under the Hon'ble Prime Minister shared his vision for the river sensitive urban development during the Meeting of the National Ganga Council in Kanpur in 2019. He highlighted the importance of water conservation in totality, especially the conservation of waterbodies and also mentioned that as part of the Azadi ka Amrit Mahotsav, the whole country is working towards developing Amrit Sarovar and Amrit Van. He urged the students to address different scales of waterbodies (rivers, lakes, ponds, wetlands etc) in their research works. In this context he also mentioned that the recent initiatives of Ministry towards making the cities water plus is also helping them improving the quality of their rivers, citing the example of Indore.



Shri Mishra also announced the winners of this competition and felicitated them. Season 3 of the competition was also launched by him.

# Annexures



## 7. ANNEXURE - 1 AGENDA OF THE COMPETITION

TIME	SESSION DETAILS	MODERATOR
10:00-10:10	Welcome Address and Context Setting	Mr. Lovlesh Sharma, <i>NIUA</i>
10:10-10:25	Special Address	Prof. Rajesh Kumar, <i>HoD, Department of Architecture, Planning and Design (DoAPD), IIT (BHU)</i>
10:25-10:30	Structure and Rules for Finale	Mr. Anirudh Soni, <i>NIUA</i>
10:30-11:30	4 (Bachelors Students') Thesis Presentations (10+5 = 15 mins. each)	Jury
11:30-11:45	Tea-Break	
11:45-13:15	6 (Bachelors Students') Thesis Presentations (10+5 = 15 mins. each)	Jury
13:15-14:15	Lunch	
14:15-14:30	Energiser	Ms. Ishleen Kaur & Ms. Shilpi Chakraborty, <i>NIUA</i>
14:30-15:30	Session by IIT BHU	<i>Department of Architecture, Planning and Design (DoAPD)</i>
15:30-15:45	Tea-Break	
15:45-16:45	Session on Managing Urban Rivers	Dr. Uday Bhone & Mr. Rahul Sachdeva, <i>NIUA</i>
16:45-17:00	Reflections from Jury	

STUDENT THESIS COMPETITION SEASON 2

JULY 28, 2022



## DAY 2

# FINALE RE-IMAGINING URBAN RIVERS

28-29TH JULY, '22  
PROGRAMME AGENDA

VENUE: ANNIE BESANT LECTURE THEATRE,  
IIT (BHU), VARANASI

**STUDENT THESIS COMPETITION SEASON 2**

JULY 29, 2022

### TIME

### SESSION DETAILS

### MODERATOR

09:50-09:55

Instructions for Day 2

Ms. Manju R. Kanchan,  
*NIUA*

09:55-11:10

5 (Masters' Students') Thesis  
Presentations  
(10+5 = 15 mins. each)

Jury

11:10-11:25

Tea-Break

11:25-12:40

5 (Masters' Students') Thesis  
Presentations  
(10+5 = 15 mins. each)

Jury

12:40-13:40

Lunch

13:40-13:55

Energiser

Ms. Ishleen Kaur &  
Ms. Shilpi Chakraborty,  
*NIUA*

13:55-14:30

Benaras ki Kahaani

Dr. Rana P.B. Singh,  
*Retd. Prof. Geography  
(Cultural Heritage) BHU*

14:30-14:45

Expert Comments

Jury

14:45-15:15

Words of Wisdom

Sh. Rajiv Ranjan Mishra,  
*Chief Technical Advisor, NIUA*

15:15-15:30

Prize Distribution  
STC S-2 Internal Informal Events

15:30-15:45

Tea-Break

16:00-17:45

**AWARD CEREMONY**



## 8. ANNEXURE - 2

### PRIZE DISTRIBUTION CEREMONY



### FINALE

## Student Thesis Competition, Season-2

### 'RE-IMAGINING URBAN RIVERS'

Annie Besant Lecture Theatre,  
IIT (BHU), Varanasi

**AWARD CEREMONY**

Agenda

 **Setting the context (5 minutes)**  
Sh. Lovlesh Sharma, Senior Water and Infrastructure Specialist, National Institute of Urban Affairs

.....

 **Welcome remarks (5 minutes)**  
Sh. Hitesh Vaidya, Director, National Institute of Urban Affairs

 **Welcome remarks (5 minutes)**  
Prof. Pramod Kumar Jain, Director, IIT-BHU (tbc)

 **Remarks (5 minutes)**  
Sh. Deepak Agarwal, Divisional Commissioner, Varanasi (tbc)

.....

 **Elevator pitch by thesis students (25 minutes)**  
One minute per student

.....

 **Motivational address (5 minutes)**  
Sh. G Asok Kumar, Director General, National Mission for Clean Ganga

 **Motivational address (5 minutes)** (virtually)  
Ms. D Thara, Additional Secretary, Ministry of Housing and Urban Affairs, Govt. of India

 **Felicitation of jury members (5 minutes)** (virtually)  
Sh. Durga Shanker Mishra, Chief Secretary, UP Govt.

.....

**Launch of Urban India (special edition) (5 minutes)**  
All Dignitaries

**Launch of eGov Magazine (5 minutes)**  
All Dignitaries

 **Launch of season-3 of the Student Thesis Competition on "Re-imagining Urban Rivers" (5 minutes)**  
Sh. Durga Shanker Mishra, Chief Secretary, UP Govt.

.....

 **Inspirational address (20 minutes)**  
Sh. Durga Shanker Mishra, Chief Secretary, UP Govt.

**Announcement of the winners of season 2 & awards distribution (10 minutes)**  
Sh. Durga Shanker Mishra, Sh. Hitesh Vaidya

 **Vote of Thanks (5 minutes)**  
Prof. Rajesh Kumar, Head, Dept. of Architecture, Planning and Design, IIT-BHU

.....

04:00 P.M to 05:50 P.M, 29 July 2022, Friday







9. ANNEXURE - 3  
PROJECT POSTERS

**SPONSORED THESIS PROJECT  
COMPETITION ON  
"RE-IMAGINING URBAN  
RIVERS"**

नदी के रूप में सादगी है,  
नदी के धुन में सत्संग है।  
नदी के स्नान में पवित्रता है,  
नदी के ध्यान में मन मलंग है।

**January to February**

**March to June**

**July to September**

**October to December**

**Total GDP Contribution**

2018

₹16.91 lakh crore

42.673 million jobs  
8.1% of its total employment.

9%

4 out of 5 most frequently visited places had religious significance

**Challenges**

Authorities	River	Human
<ul style="list-style-type: none"> <li>Less time for Preparation</li> <li>Protection of ghats from fluctuating water level</li> <li>Covid-19</li> <li>Transmitted disease</li> <li>Disposal of Waste during the Main bath.</li> <li>Crowd Management during Main Bathing days</li> <li>Disaster Management</li> <li>Restoring the Floodplain</li> </ul>	<ul style="list-style-type: none"> <li>Dumping of garbage in open places</li> <li>500-1000 packets of milk are dumped into the river</li> <li>So many unwashed bodies, of course, add even more contaminants to the water.</li> </ul>	<ul style="list-style-type: none"> <li>People risk hepatitis, typhoid, cholera, amoebic dysentery, other waterborne diseases, and various skin afflictions.</li> <li>Disobeying the covid protocols during mass gatherings can affect the health of vulnerable people.</li> </ul>

**Proposal**

**Carrying Capacity Parameter**

Floodplain Carrying Capacity	Physical Carrying Capacity	Infrastructure Carrying Capacity
Floodplain Management Score	Citizen Engagement Score	Wastewater reuse Score

**PLANNING FOR SUSTAINABLE RELIGIOUS TOURISM: A CASE OF PRAYAGRAJ**

**STUDENT NAME: AKRITI JAISWAL  
COURSE NAME: BACHELOR OF PLANNING (B.PLAN)**

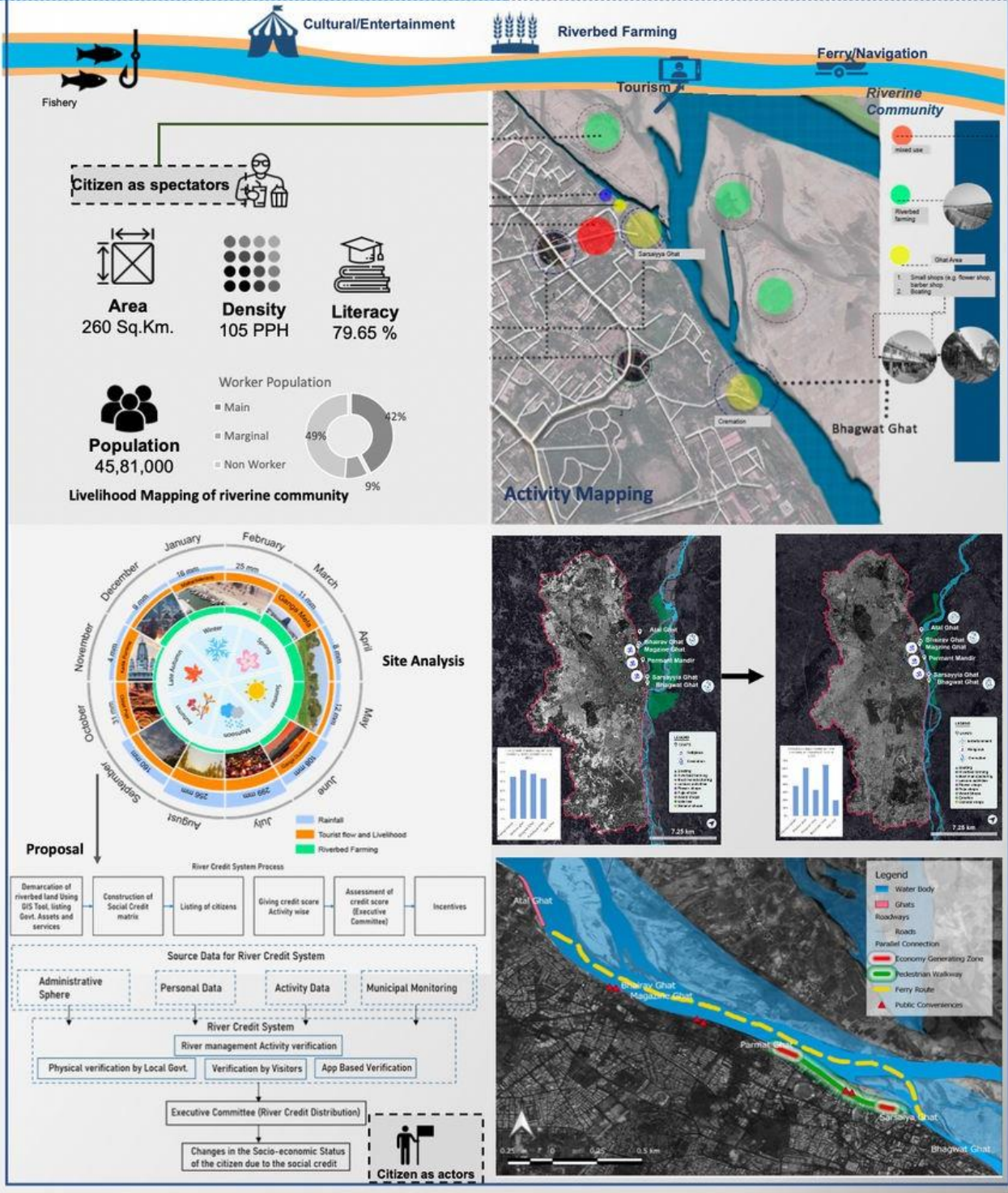


Season -2

## Sponsored Thesis Project Competition on "Re-imagining Urban Rivers"

Citizen Engagement in River Management and Economy: A case study of Kanpur, India.

Student Name: Ujjawal Singh  
Course Discipline: B.Plan.





Section -2

Sponsored Thesis Project Competition on  
**"Re-imagining Urban Rivers"**

**METAMORPHOSIS** – Ecological Restoration and Development of ARAI Stone Quarry, Pune

Student Name: Sanika Upasani  
Course Discipline: B. Arch.

**MAHARSHTRA - Full of stone Quarry Holes and permanent scars left on environment.**

**The Poona Post**

Friday, 29 July, 2022



\* RECLAMATION AND REHABILITATION OF MINES MADE COMPULSORY

\* NATIONAL MINERS DAY TO BE OBSERVED ON DECEMBER 6

**First Column**

**Fact file:**

Vetal Hill, Pune

- Reservation: **Forest**
- Type of forest: The natural dry vegetation has a **dry deciduous nature**, without tall trees and with medium sized trees and shrubs.
- Rock type: **Basalt**
- Site area: **5.9 Ha**
- Depth of quarry hole: **10 m**

**Benefits of the project**

- Effective utilization of **abandoned quarries**
- Water conservation
- Invitation to **migratory birds**
- Creating awareness about **nature conservation among citizens**
- Revenue model for Authorities

**LUNGS OF THE CITY RESTORED**

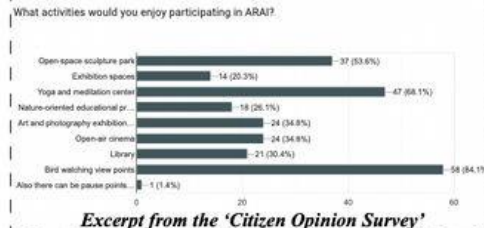
■ **Citizens overjoyed as an abandoned stone quarry site undergoes metamorphosis into a biodiversity park**

■ **This one of a kind project is a result of a joint initiative by National Institute of Urban Affairs - National Mission for Clean Ganga to revive, rejuvenate and beautify wetland eco - systems.**

■ **Citizens participated in an opinion survey citing the issues like lack of security and sanitation facilities on the nature trail, also suggesting interventions that would result in the metamorphosis**



*Areal view of metamorphosis of ARAI Stone Quarry*



*Excerpt from the 'Citizen Opinion Survey'*

**Proposed 3D views**



*Butterfly and Sculpture Park*



*Pisciculture (Decks for fishing)*



*Lotus Plantations*



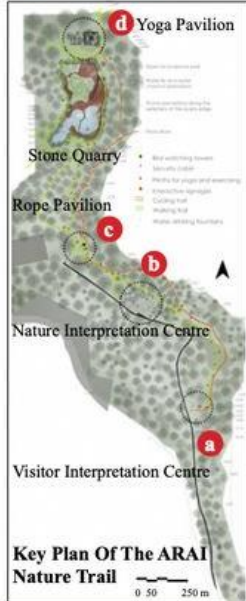
*Visitor Interpretation Centre*



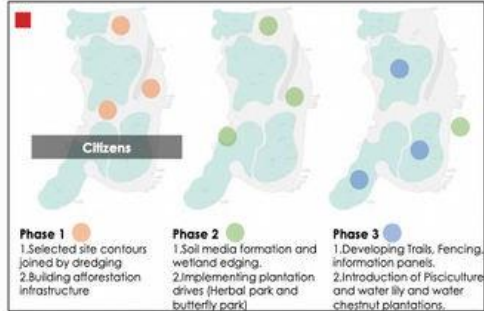
*Nature Interpretation Centre*

**STAKEHOLDERS**

- Owner: **Forest Department**
- Citizens
- Nature Conservationists: **NGOs**
- Construction team
- Fishery Department
- Fishing Agency
- Investor
- Adventure sports agency



**Key Plan Of The ARAI Nature Trail**



**Phase 1**  
1. Selected site contours joined by dredging  
2. Building afforestation infrastructure

**Phase 2**  
1. Soil media formation and wetland edging  
2. Implementing plantation drives (Herbal park and butterfly park)

**Phase 3**  
1. Developing Trails, Fencing, information panels.  
2. Introduction of Pisciculture and water lily and water chestnut plantations.

**Capital Expenses: Rs. 14.0 Cr**  
**Maintenance: Rs 7.0 Cr for 10 years**  
**Expected Government Grant: Rs. 10.00 Cr**  
**Expenses over 10 Years (Including capital cost – grant) = Rs. 11.00 Cr**  
**Per year Revenue: 1.72 Cr**

**Return period = 7 years**

**Possible Funding –**  
**Compensatory Afforestation Fund Management and Planning Authority (CAMFPA) funds.**  
also used to rejuvenate wetlands, and infrastructure development to support the rejuvenate.  
**Capital and Revenue Grants of Urban Local Bodies (Entry Fees)**  
Also the ULBs can make conditions and provisions to collect entry fee as their revenue to meet O&M costs of the facility created.

**Assumption :**  
Operation and maintenance cost is increasing at the rate of inflation.  
Entry fees shall be revised in proportion with rate of inflation.  
Revenue from plantation shall be extra.



Season-2

## Sponsored Thesis Project Competition on "Re-imagining Urban Rivers"

**Planning for Yamuna to mitigate wastewater flow effects on the river**

**Student Name: Rupal Srivastava**  
**Course Discipline: Bachelor of Physical Planning**

### UNDERSTANDING THE NEED & ISSUES

#### CASE OF DELHI, YAMUNA

The Yamuna flows through Delhi for only **22 kilometers** (or less than **1.6%** of its total length). However, the wastes and toxins dumped into that narrow swath account for roughly **80%** of all pollution in the 1,376-kilometre-long river.

#### THIS IS AS A RESULT OF

- 31%** UAC have sewer laid only
- 20%** wastewater discharged directly
- 70%** STPs don't discharge treated water as per standards
- 69%** CETPs don't discharge treated water as per standards

### WAY-FORWARD

A combination of measures to tackle rising concerns on wastewater pollution.

#### Structural at Site Level

At **Site Level** to overcome the issue of connecting areas to centralised treatment plant

- Proposing DWWM



#### Soft at Floodplain Level

At **Flood Plain** to overcome the issue of changing floodplain Land-Use & agricultural run-off through

- Nature Based Agriculture
- Reuse of treated wastewater from DWWM

#### Demonstrating DWWT at New Aruna Nagar Colony through Camus-SBT

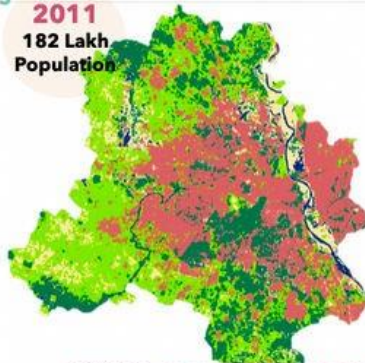


#### Selection Criteria

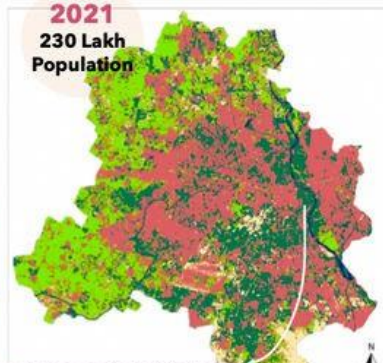
- Capital Cost
- O&M Cost
- Land Required



**2011**  
182 Lakh  
Population



**2021**  
230 Lakh  
Population



**3,300 ha** - Under farming on floodplain. A very neglected factor behind presence of whatever left green cover on floodplain till today

#### LULC ANALYSIS

**44%**, major negative change observed in terms of area of Yamuna. Ignoring the **river-flood-plain interactions** which play significant roles in the ecology of a river, most of the floodplain has been encroached by constructing high levees.

#### Vision for Zone 'O'

Making recognized long-standing ground realities i.e. agriculture on floodplain sustainable that will contribute to better water quality. Integrating Nature-based farming with proposed parks creating a strong **visual & physical** connection b/w water, park & the city and contributing to urban image.



#### ENVIRONMENTAL

Ecological restoration of the river and its surroundings, filtering runoff and fostering biodiversity richness



#### SOCIAL

Community engagement and river-people connect through integrated walkways within farmlands



#### ECONOMIC

Economy generated from riverine farming and supporting sustainable livelihood through green jobs







## Sponsored Thesis Project Competition on "Re-imagining Urban Rivers"

**Water Quality Monitoring System Using  
Machine Learning Technique**

Student Name: Sabnekar Sai Sharan  
Course Discipline: B. Tech

### Introduction

Water plays a vital role in the daily life of human beings and other natural phenomena. Drinking water facilities are facing several problems such as

- Due to the limited drinking water resources
- Overuse and wastage of water
- Growing population
- The excessive use of sea resources for salt extraction



The high use of chemicals in manufacturing, construction, and fertilizers in agriculture are directly leaving the pollutants into the nearby water bodies. About 80% of diseases in a developing country are caused by the consumption of polluted water.

### Background

At present water quality assessment involve the collection of random samples of water at various locations weekly or monthly and analyzing them in the laboratories.

This approach is not much efficient because of

- long-time consumption,
- Water samples were taken from only a few areas.

In order to overcome the above drawbacks, we need a real-time water quality monitoring system

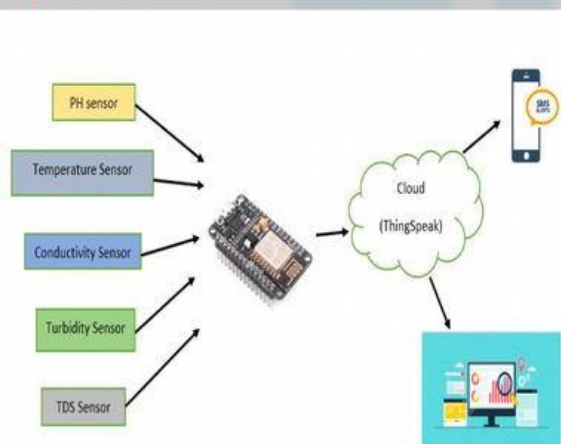
### Analysis

- Quality of water can be predicted using its own properties.
- In this model, we are using pH, turbidity, conductivity, temperature, and TDS as attributes.
- Using these properties we are going to build a prediction model, Through which we can forecast the water quality in the near future.

### Key Issues

- Automatic monitoring and alerting will not be supported by the existing system.
- By tracking the water quality indicators using the sensors set up near the river basin, this system enables the end users to be automatically alerted via SMS.
- This system offers analytics and future forecasting utilizing historical water parameter values and machine learning techniques.

### Proposals



### Way Forward

- In the future we use IoT concepts for water quality monitoring.
- More the parameters, Merrier the results.
- Increase the attributes by using multiple sensors.
- System can be developed for mobile Applications.
- More forecasting methods can be implemented.





Sponsored Thesis Project Competition on  
**"Re-imagining Urban Rivers"**

NOIDA RIVERFRONT DEVELOPMENT

Student Name: RADHIKA GARG  
Course Discipline: B.Arch

**"To resuscitate the relation between river and the city by socio-petal, ingenious and persuasive sustainable practices to transform the urban interface of the river and city with solicitude towards ecology and culture to revive the city's identity on its water front"**

**VISION**

**TOUCH**

**SENSE**

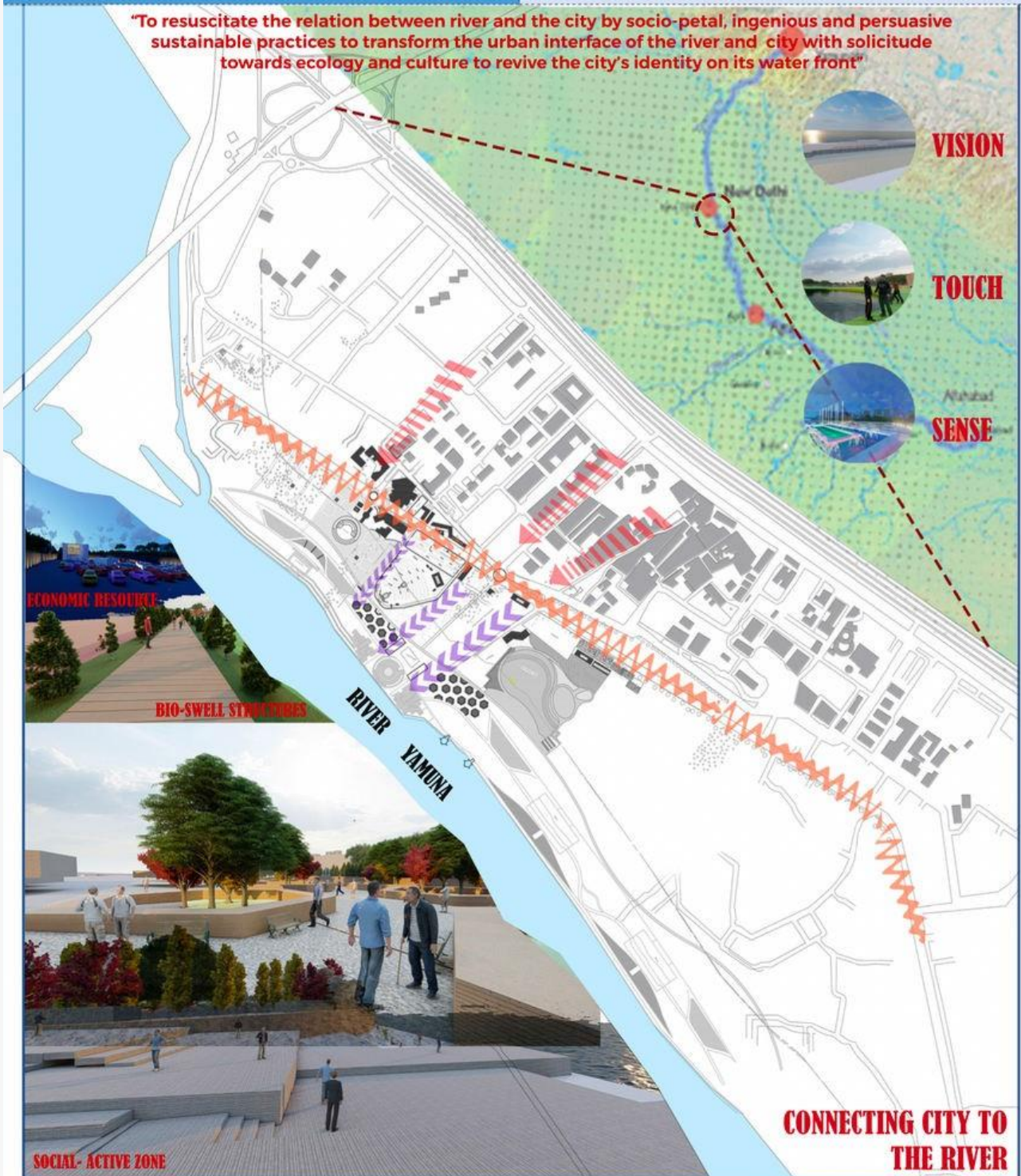
**ECONOMIC RESOURCE**

**BIO-SWELL STRUCTURES**

**RIVER  
YAMUNA**

**SOCIAL- ACTIVE ZONE**

**CONNECTING CITY TO  
THE RIVER**







## Sponsored Thesis Project Competition on "Re-imagining Urban Rivers"

From birds of passage to guardians of rivers: Engaging and engrossing the tribal nomads and indigenous people of Pahaigam in overseeing and management the sacred River Lidder, along the way to the holy Amarnath Cave.

Student Name: MUBASHIR ARSHID  
Course Discipline: BTECH IN CIVIL ENGINEERING

### INTRODUCTION & BACK GROUND

#### Significance of River Lidder:

- acts as a source of potable water for Yattris enroute Amarnath cave.
- Provides livelihood to 2659 households.
- For Pujan and Visarjan ceremonies.
- as the camping sites by the migratory tribals.



### CAUSES OF POLLUTION AND IMPROPER MANAGEMENT OF RIVER LIDDER

- The hectic pace of urbanization among the indigenous people.
- Wallowing/ bathing of animals in the river.
- Open defecation and urination into the river.
- Dumping of dead animals into the tributaries of the river.
- Household waste dumping along the riverside.
- only 3% of general households are equipped with door to door waste collection system



### KEY ISSUES AND ANALYSIS

- Educating and training the tribals about river management and water sampling and testing.
- Tribals as macro-plastic samplers.
- Formulation of 4-pillar engagement model.
- Assessing the reason for involuntary participation by tribals in river management practices.
- Sustaining the developed tribal framework.



Calendar distribution    Verbal discussions with tribal leaders    River related drawing event for children



4-pillar engagement model



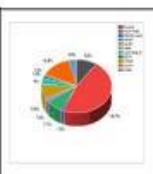
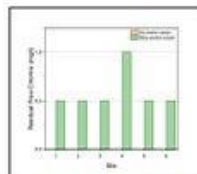
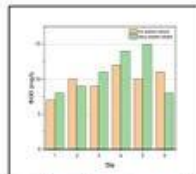
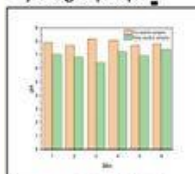
Net and bottle designed for sampling solid waste and water

Sample collecting bottle	Name	
From how many Years have you been migrating to Pahaigam in summers		
Any knowledge about the deteriorating condition of the river		
Ever participated in river management practices		
Approached by any organization in relation to river conservation		
What according to you could be done to safeguard the river lidder		

Survey questionnaire for assessing the reason for involuntary participation by the tribals

### OUTCOMES AND WAY FORWARD

- Improved tribal participation after progressive workshops.
- Banning or restricted use of polythene and plastics.
- More thrust to be given on engaging younger people.
- Lacuna between the tribals and organizations.
- Tribal knowledge to be given an equal standing.



Graphical representation of water quality tests

Solid waste % weight wise composition



River clean-up drive results for a selected stretch of river





Sponsored Thesis Project Competition on  
"Re-imagining Urban Rivers"

Revitalizing the Nullahs of Mumbai

Student Name : Dhaval Mistry  
Course Discipline: B.Arch

Introduction & Background

What are Nullahs ?

Nullahs were originally natural watercourses or rivers. Connected to the sea and thereby the tides, these water bodies regulated groundwater levels and assisted in dispersing water from the land in case of heavy rain.



Moreover, Mumbai's SWDS network, meant only to carry rainwater, is connected with illegal sewerage lines.



Sadly, these watercourses or rivers have unfortunately abused making it open sewage drains, taking our effluents out into the sea.



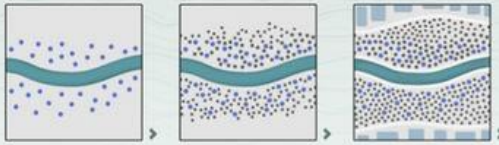
This makes Heat in the ocean ↑ Climate Change ↑



107 Nullahs in the west directly opens into Arabian Sea without any filtration.

Analysis & Key Issues

Who throws the garbage into the nullah ?



Koli Settlements near nullahs for fishing was adjoined by Informal Settlements in 1890s. As other parts of the city developed they have become today's slums

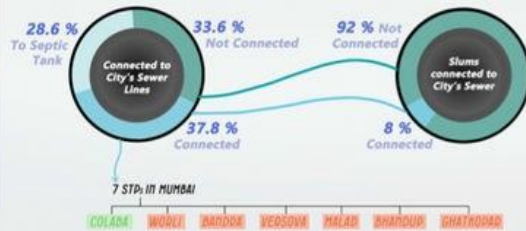


Tight Fabric No Garbage Services possible

As no space, people resort to throwing garbage into the nullah.

According to the BMC Survey, over 76,400 sewage lines have been illegally connected to SWDs, open nullahs and creeks.

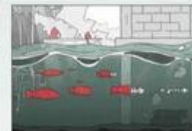
Sewage Disposal Analysis of Mumbai :



Everyday 80 - 110 Tonnes of waste gets directly thrown into the Nullah

This has end up as a floating sheet of garbage on the nullah.

IMPACT On Ecology



IMPACT On Slum Dwellers



IMPACT On City

Choking at one point, affecting the other parts.

Except the one in Colaba, the remaining STPs are currently not fully equipped to purify the quantum of sewage water coming and continue to discharge polluting effluents into creeks.

Proposal & Way Forward

Just Cleaning not a solution :



Instead of solving / cleaning the oceans and rivers, If we focus on the source of the pollution where are these nullahs and people living besides them !

Then, the results will be automatic and be seen quickly !

Change with Circular Economy :

The 3Ps of the system:

People (Society)  
Planet (Environment)  
Profit (Economy)



A program where Environmental Problems gets solves, the people get facilities as well as the Gov. earns.

Approach :

The intervention is designed to be MODULAR, so that the problem is solved with multiple layers throughout the city where the situation of Slums and Channelized Nullahs filled with Garbage and Sewage exists !

1. NULLAH WATER TREATMENT



RENEU Filtration System runs across Nullah with only Anoxic Treatment covered and ECO STPs placed at existing Illegal Sewage Lines connected to Nullah.

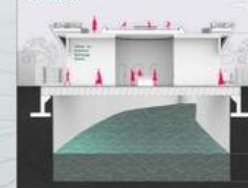
2. COMMUNITY FACILITY PROVISIONAL CENTRE

Programs  
Waste - to - Incentive Exchange Program



• Polyclinic • Community Toilets • Roof Top Area

Community Facility Provisional Centre Section



The Structure sits on a Transfer Girder, so no part of the Structure affects the flow of Nullah. Also MODULAR for all types of widths.





Season - 2

Sponsored Thesis Project Competition on  
"Re-imagining Urban Rivers"

Revitalization of Urban Waterfronts through WaTOD  
A case of Jhelum River in Srinagar

Daman Dogra  
Bachelors of Planning

**Characteristics of Ferry Riders**



**Leisure Users**  
Less Concerned about time



**Value Uplift**  
4% in Brisbane  
8% in New York



**Modal Share**  
15% of all ferry journeys included another mode

**How Ferries differ from Roads & Rails**



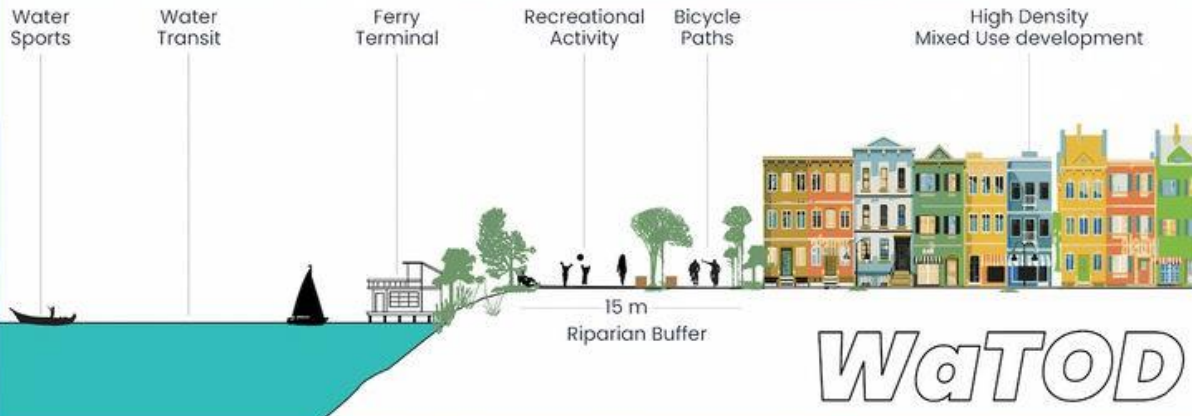
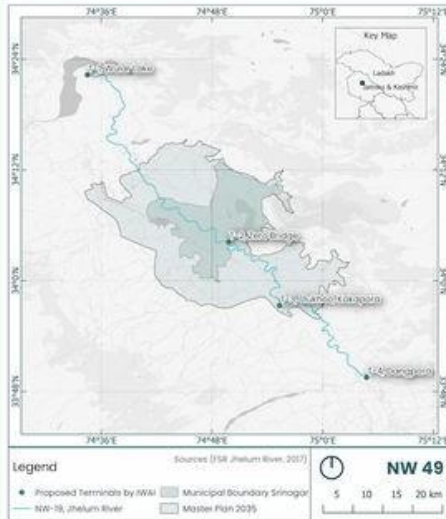
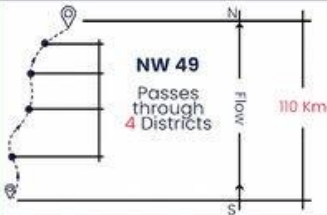
**Ridership**  
declined due to bridges & Roads



**Feasibility**  
depends on how much the route



**Congestion**  
was the common factors for







Sponsored Thesis Project Competition on  
**"Re-imagining Urban Rivers"**

**Spatio-Temporal Flood Dynamics and its impact on Kosi River Morphological changes, Bihar**

**Student Name: Madhavi Gajre**  
**Course Discipline: M.Tech. (RS&GIS)**

**PREVIOUSLY**

**KOSI RIVER LIFELINE OF THE MITHILA**

**EXISTING**

**ECOLOGICAL**

**FISHERY**

**FLOODING**

**River Restoration Strategies**

**River Protection Area**

- ✓ Scale of agricultural land should be strictly controlled
- ✓ farmland and fruit forest should be retreated to restore the natural community
- ✓ avoid soil erosion and water pollution

**Ecological restoration area**

- ✓ illegal buildings occupying the river should be retreated
- ✓ Transform single-channel to a multi-channel river
- ✓ main channel should be used for flood discharge
- ✓ tributary should be used to improve sediment transport capacity and the quality of habitat

**Town Connection Area**

High water level  
Mean water level

Retreat existing illegal buildings

Retains landform

Main channel | Island | Tributary | Wetland and shoal | Town | Mountain

Watershed development | Targeted Communications Campaign | COMMUNITY ENGAGEMENT | Real Time monitoring dashboard | The focus is on...





Sponsored Thesis Project Competition on  
"Re-imagining Urban Rivers"

Integration of spatial technology and citizen participation for nature-based remediation of river Hooghly.

Student Name: Mignayani Chandra  
Course Discipline: M. Tech Environmental Engineering



**BACKGROUND**



- River Hooghly – Major source of potable water
- Transportation, tourism and religious purposes
- Degrading quality of water, affecting benthic communities.
- Need for re-establishing citizen and river connect

- Dakhineswar Temple Ghat**  
• 50000 devotees approx. visit daily and 1.4crore people annually
- Babughat**  
• 2 lakh people daily
- There are about 45 boats in all (running between Kolkata and Howrah)
- Princep ghat**  
• Comparatively cleaner ghat

**ANALYSIS AND KEY ISSUES**

- AIMS AND OBJECTIVES-**
- ❖ POLLUTION QUANTIFICATION AND FRAMEWORK PROPOSAL
  - ❖ FEASIBILITY STUDIES OF FERRY SERVICE, AND SOLAR POWERED BOATS
  - ❖ DEVELOP SPATIAL TECHNOLOGY SUPPORTED APP-BASED SOLUTION

**SOLAR POWERED FERRY SERVICE**

Initial cost is more than diesel powered boats

Yearly energy cost Rs 65000 (Diesel costs around Rs. 22,20,000 approx)

Solar Ferry-274.4 lakhs, Diesel Ferry-914.7 lakhs in a 20-year lifecycle



**APP FOR CITIZEN PARTICIPATION**

- Specific for river
- Connecting people and enabling them - remediation of river and its bank
- Assisting WBPCB
- Promote usage of solar boats-incentive based system for citizen
- Option for citizen volunteering for NBS
- Create event

**PROPOSAL**

- Enables user to create events
- Select an event get details and rate it
- Checklist for created events to track status



- Upload pollution status
- Helping report pollution to WBPCB
- Plan an event based on the status of polluted location

- Volunteering for NBS
- Option to choose from NBS
- Donate for desired NBS to be carried out
- Including citizen in remediation processes
- Educational and direct involvement of citizen



- The page gives info on carbon footprint and other statistics related to the solar powered ferry
- Fare chart
- Ticket booking system
- Reward on using app to book ticket for solar powered ferry



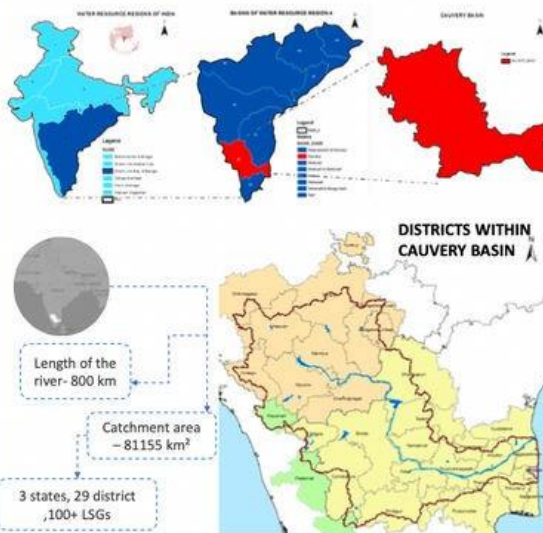


Sponsored Thesis Project Competition on  
"Re-imagining Urban Rivers"

Strategic spatial planning based on Ecosystem services (ES) - A case of Cauvery basin region

Student Name: ARUNIMA KT  
Course Discipline: M.Plan ( Urban Planning)

**INTRODUCTION**

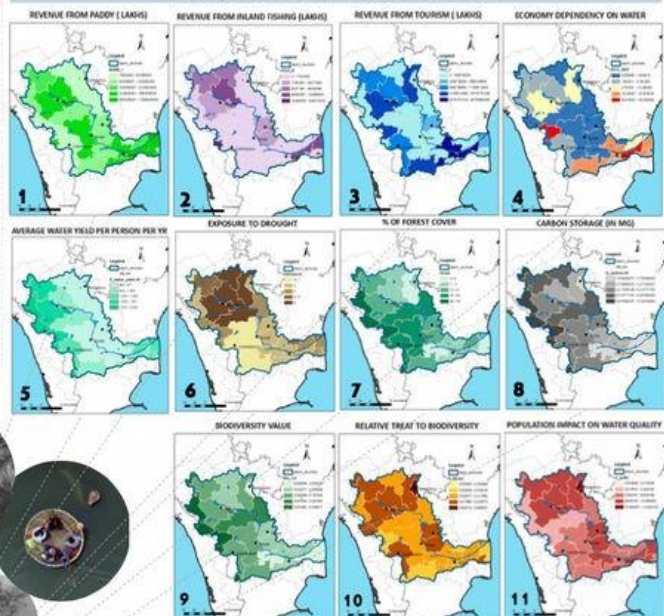


**Cauvery's Depletion**  
Cauvery has depleted over 40% in the last 70 years  
87% of the basin's original tree cover has been lost  
During the summer, Cauvery is unable to reach the ocean  
70% of Cauvery basin's soil suffers erosion

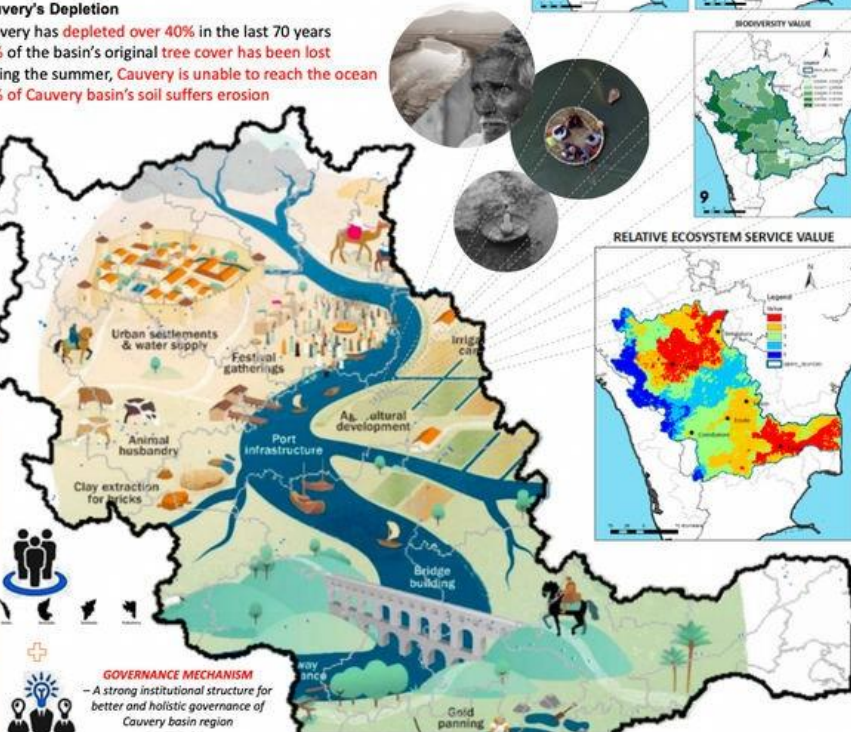
❖ **Ecosystem services (ES)** refer to benefits people obtain from ecosystems.

Such services have value to human communities, but this value is not always captured or monetized.

**ES INDICATOR ASSESSMENT**

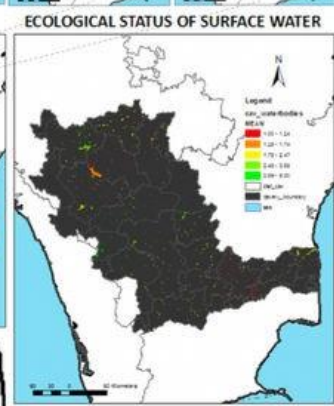


**PROPOSALS & WAY FORWARD**



**GOVERNANCE MECHANISM**  
- A strong institutional structure for better and holistic governance of Cauvery basin region

**CAUVERY BASIN THROUGH THE LENSES OF ECOSYSTEM SERVICES**



- ❖ Result map for all assessment indicators
- ❖ Integrated analysis across indicators
- ❖ Comprehensive overview report
- ❖ Interactive data portal
- ❖ Contribution of relevant knowledge towards optimizing basin development.





## Sponsored Thesis Project Competition on "Re-imagining Urban Rivers"

**PRIORITIZING 'URBAN DRIVERS' RESPONSIBLE FOR POLLUTION IN GANGA RIVER BASIN AND ITS REVIVAL THROUGH POLICY FRAMEWORK AND EFFECTIVE COMMUNITY ENGAGEMENT : Case Study of Kanpur**

Student Name: Shivalika Arora  
Course Discipline: M. Tech. , Urban Planning

### PROJECT IDEA



To identify the Urban Drivers that are majorly responsible for river degradation and pollution.



To prioritize and rank the drivers through qualitative and quantitative analysis by applying Fuzzy Analytical Hierarchical Process (FAHP).



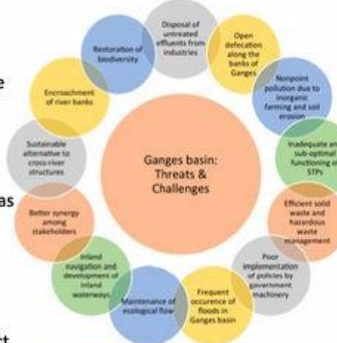
To frame the solutions, approach to tackle urban drivers and suggestions for unique planning approaches pertaining to Urban River Management Plan (URMP) for Ganga basin cities.



Inculcation of innovative techniques and strategies including designing of eco-sensitive River Ghats with active participation of stakeholders and community to overcome the limitations.

### KEY ISSUES

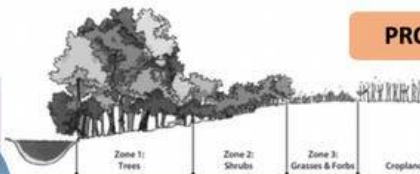
- Anthropogenic activities the riverine ecosystem is at stake.
- This has led to river turning into drains.
- Due to pollution the river has lost its self-cleaning capacity.
- The environmental implications will result in extinction of bio diversity and at later stage will impact human life in deleterious way.



### WAY FORWARD

- Employment generation
- Boost in river economy
- Revenue generation through tourism
- Improvement in micro-climate
- Sensitized citizens for river centric activities

### PROPOSALS



A policy framework to safeguard the Riparian Zones. Streamside , Middle zone & Outer zone Policy for their determined width, activities permitted, restricted, type of vegetation & envisaged outcomes.



The proposals are with the domain of environment, economic & social cohesion. Community engagement: Planned activities for different age group to participate in developing this site.





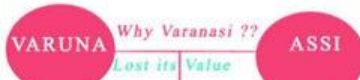


Sponsored Thesis Project Competition on  
"Re-imagining Urban Rivers"

Planning for River Sensitive Developments in Cities  
-A Case of Varanasi

Student Name: SHAKCHI SINGH  
Course Discipline: Master's in Urban Planning

The aim of the study is to plan for river-sensitive development in Varanasi



**VARUNA** Why Varanasi ??  
Lost its Value

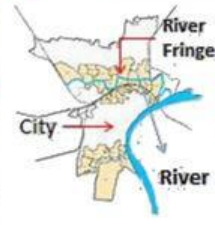
**ASSI**  
Assi River (Nallah)

- Assi has also been encroached by unauthorized constructions upon in a big way. The river has lost all its character - there is no fresh water source, the banks are illegally occupied.
- Degradation floodplains,
- Diminishing groundwater recharge.

**Varuna River**

Varuna River was recognized as the lifeline of Varanasi. Varuna River are facing the problem of flooding. Many people are affected because of unauthorized construction in flood plain areas. A significant portion of the origin (a wetland) is under either cultivation/agriculture land, paddy land as well as fallow land that has changed the not only the land-use but also the land cover of the area.

**3 LEVEL OF STUDY AREA**



**ANALYSIS**

**AT CITY LEVEL**

- Ground Water
- Sewerage & Drainage
- Water Supply
- River Regulations for Varanasi & Assi

**AT RIVER FRINGE LEVEL**

- Water Sensitive Planning
- Biophilic Urban Planning & Design
- River Economic Assessment
- Quality Of Life Assessment
- Composite water Management Assessment
- River Accessibility

**AT RIVER LEVEL**

- Water Quality Assessment
- Environmental Assessment through Integrated water Cycle Management



**ISSUES AND CHALLENGES**



**PROPOSALS**

Parameters for Proposal of Planning River Sensitive Cities



**BIOPHILIA DESIGN**

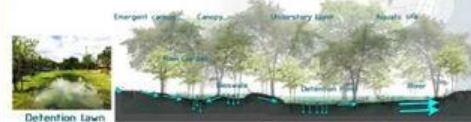
**RIVER SYMBIOTIC**

FLOOD RESILIENCE



Disilting the nallah and cleaning the nallah with Nature Based Solutions

**NALLAH GARDENS**



**Flood Leveling Projection**



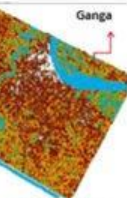
**ELEMENTS**



**CONCEPT**



**Social Inclusion**



During heavy rains, excess water is channeled under the sidewalk grates and filter strip into the bioswale.





Sponsored Thesis Project Competition on  
**"Re-imagining Urban Rivers"**

Integrated Eco-Sensitive Approach to Generate River-Related Economy, A case of Gomti Riverfront, Lucknow

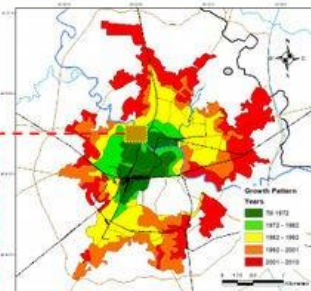
Student Name: **Rajarshi**  
Course Discipline: **Masters of Urban and Regional Planning (MURP)**

**AIM**

To create a sustainable eco-management plan (Ecological & Economical), for Gomti riverfront area in Lucknow with a focus on overall development.

**Potential Interventions based on the Analysis and the site study:**

1. Riparian Buffer
2. Enhancing Public Accessibility
3. Tourism Economics
4. New economy generation
5. Safeguarding indigenous Occupations







## Sponsored Thesis Project Competition on "Re-imagining Urban Rivers"

### INTEGRATING RIVERS IN THE CITY PLANNING PROCESS

Student Name: PREETIKRISHNA PANDA  
Course Discipline: Master In Urban & Regional Planning

#### VISION

Integrating Urban River Management with the City's Master Plan by designing a Policy based initiative to Plan and Manage Urban Rivers within the ambit of the City's Master Planning process.

#### BACKGROUND

- Cuttack is the former capital and second biggest city in the Indian state of Odisha. It is Odisha's commercial hub, with many trading and business establishments in and around the city.
- The city's historic and most significant section is situated on a strip of land between the Kathajodi and Mahanadi rivers. The city is traversed by four rivers, including the Mahanadi and its tributaries Kathajodi, Kuakhai, and Birupa.

#### OBJECTIVES



To enliven the waterfront with a range of attractive uses



To improve governmental regulation, coordination and oversight of the riverfront



To expand public access to riverfronts and revive the people-river connect

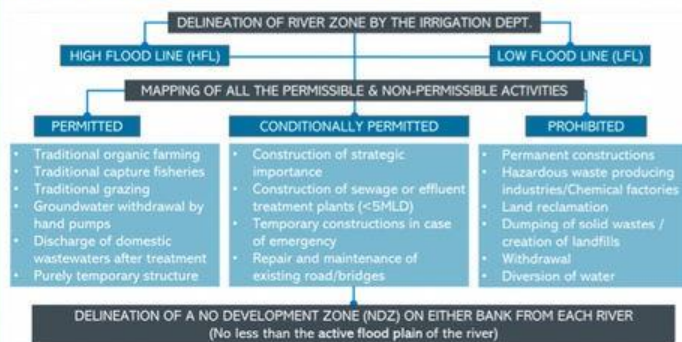
#### KEY ISSUES



#### DIMENSIONS OF RIVER



#### PROPOSAL 1. ZONING REGULATIONS



#### PROPOSAL 2. RIVER MANAGEMENT & GOVERNANCE

To scale up citizen involvement in river management activities

To identify resources for project implementation, management and funding

To establish a wholesome multi-disciplinary and inter-sectoral framework for river management in a city



#### PROPOSAL 3. ENHANCING THE PEOPLE-RIVER CONNECT

To design and develop a riverfront catering to the needs of the citizens in a sustainable manner

To make the riverfront accessible to the public to create a stronger economic value for the river







Sponsored Thesis Project Competition on  
"Re-imagining Urban Rivers"

Blue-Green Infrastructure Planning for Sustainable Development - Tirunelveli

Student Name : Karpagavalli S  
Course Discipline: Master of City Planning, IITKG



**STUDY AREA DETAILS**

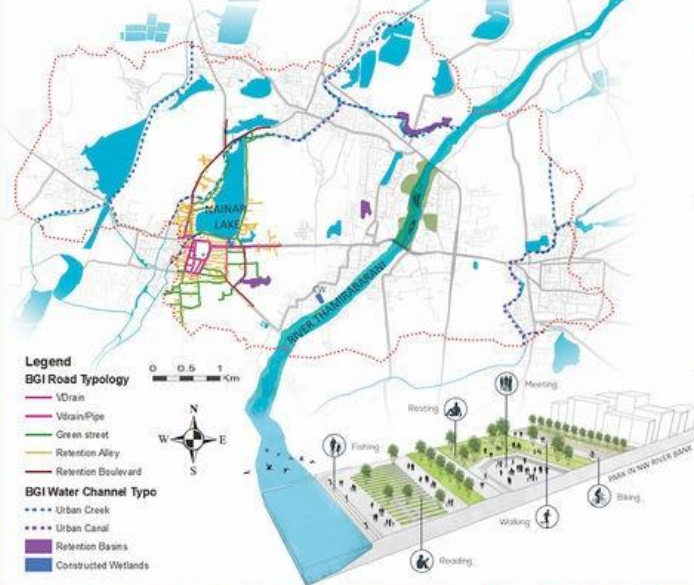
Location : Tirunelveli, Tamil Nadu  
M.Corp Population : 473637  
Name of the River : Thamirabarani River  
Origin of the river : Western Ghats -Pothigai Hills  
Confluence Point : Bay of Bengal -Gulf of Mannar.  
River Basin : L.Thamirabarani River Basin  
Site Study Area : 29.18 Sq.km  
River stretch studied : 4.66 km  
Flood Plain : 120m to 250 m

**CONCEPT:**

The blue-green Infrastructure planning is a strategic planning approach that aims to develop network of green and blue spaces in urban areas, designed and managed to deliver wide ranges of ecosystem services and benefits of environmental, economical and social aspects

**AIM:**

To contribute & protect hydrologic and ecological values of tirunelveli city, through resilient blue-green infrastructure network, built in multi scale



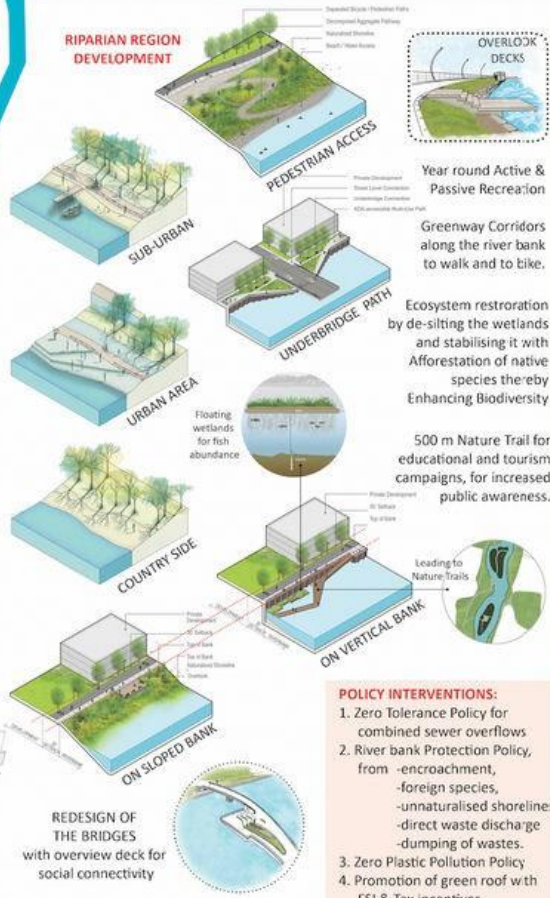
- Legend**
- BGI Road Typology**
- V-Drain
  - V-Drain Pipe
  - Green street
  - Retention Alley
  - Retention Boulevard
- BGI Water Channel Type**
- Urban Creek
  - Urban Canal
  - Retention Basins
  - Constructed Wetlands

**RIVERBANK DESIGN GUIDELINES:**  
Checklist Design Guidelines for River bank development is given

**NATIVE SPECIES INVENTORY**

Riparian Native species Inventory for 150+ flora has been derived suitable for Thramirabarani

**RIPARIAN REGION DEVELOPMENT**



Year round Active & Passive Recreation

Greenway Corridors along the river bank to walk and to bike.

Ecosystem restoration by de-silting the wetlands and stabilising it with Afforestation of native species thereby Enhancing Biodiversity

500 m Nature Trail for educational and tourism campaigns, for increased public awareness.

**POLICY INTERVENTIONS:**

1. Zero Tolerance Policy for combined sewer overflows
2. River bank Protection Policy, from -encroachment, -foreign species, -unnaturalised shorelines, -direct waste discharge -dumping of wastes.
3. Zero Plastic Pollution Policy
4. Promotion of green roof with FSI & Tax incentives
5. Mandatory rainwater harvesting
6. Green proofing Govt Buildings
7. Permeable streets Policy
8. Water quality Milestones
9. Overflow Action Days Ordinance
10. Alignment with "Blue-Green Policy of Delhi 2041"

**INTERVENTION 1: INFRASTRUCTURE IMPROVISATION**

Proposal of Road Improvisation, Channel Improvisation and Water front corridors with blue green interactions; Detail implementation in pilot project

Intervention 1	Pilot Project	Total in study area
V-Drain Roads	1.346 km	4.30 km
V Drain pipe Roads	3.928 km	6.73 km
Retention Boulevards	3.385 km	22.3 km
Green Streets	10.02 km	105.7 km
Retention Alley	16.62 km	112.9 km
Urban Canal	1.194 km	8.35 km
Urban Creek	1.773 km	9.14 km
Water Front Corridor	4.285 km	9.13 km

**INTERVENTION 2: CONSTRUCTED WETLANDS**

Proposal of 6 units of Constructed Wetlands is given to treat the sewage treatment gap of 7.77 MLD existing in M.Corp.

Total Area of the CWs= ~ 111000 Sq.m  
Area of all Vertical Beds = ~ 95500 sq.m  
A single CW unit treats 600 MLD  
Phase 1= 2 CWs; Phase 2= 4 CWs  
Total Cost Estimated 24 Crores  
Use of Napier Grass for native species usage

**INTERVENTION 3: RETENTION BASINS**

Basin	Capacity	Area	Depth
1	191436 Cu.m	31906 Sq.m	~ 6.0 m
2	143577 Cu.m	93508 Sq.m	~4.5 m
3	191660 Cu.m	38332 Sq.m	~5.0 m

Proposal of 3 Retention Basins are given from the discovery of three disappeared waterbodies using the LULC Change detection analysis. Cost 20 Crores.



**BGI-GREEN STREET WITH LAKE SECTION**  
Green Streets are proposed as upstream connections to Burst roads or retention area. They have combination of small channel, stormwater planters and permeable pavings.

**RETENTION BOULEVARDS**  
Retention Boulevards incorporate large, green depressed medians that detain and retain stormwater while allowing regular street traffic. They require more space in the ROW and are recommended in underutilised arterial roads

**BURST ROADS**  
V-Drain Roads with and without pipes, ensure water will flow in middle of road and drain them into retention area

**RETENTION ALLEYS**  
Typically located in upstream or vulnerable low-lying areas detention with Bioswales, planters, permeable pavings





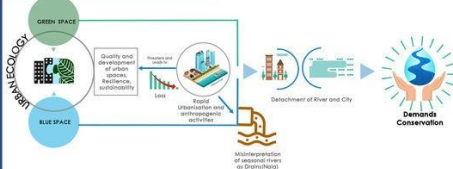


Sponsored Thesis Project Competition on  
"Re-imagining Urban Rivers"

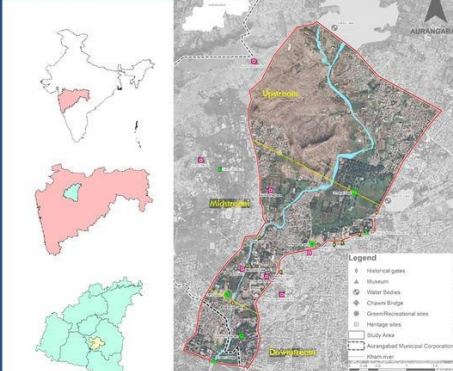
Planning Strategies for Riverfront development of Kham River in Aurangabad

Student Name: Abhishek Kailash Burkuley  
Course Discipline: Master Of City Planning

**PROBLEM STATEMENT**



**CONTEXT**

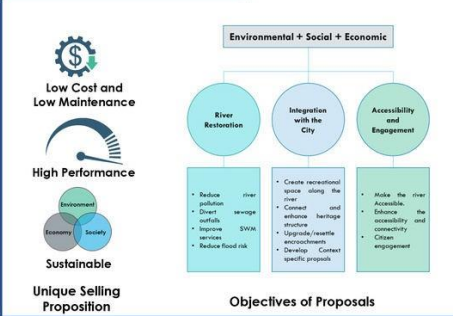


Features	Data/Information
Nature of the River	Seasonal
Origin of the River	Jahwada hills
Confluence Point	Godavari river (Nath sagar)
Rainfall	735.51 mm
Total Length of the River	60 Km
Source of Water	Rainfall, sewage inflow, fresh water springs
Length of the River considered under present study	7.73 Km
Depth	Shallow 1-3m
River Dimensions	Flood plain width - 80m River width - Non uniform (8-68m) Depending on the physical features, land use characteristics & functions and transport corridor
Basis of delineation of study area	Broadly divided into 3 zones - Upstream, midstream, and downstream

**ISSUES**



**PLANNING APPROACH**

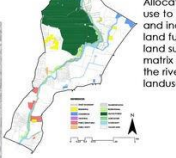


**Pollution Control Measures**

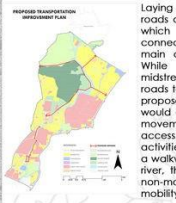


Application of environment based and cost effective in-situ eco-technologies such as green bridge and green lakes are proposed. Along with these installation of net traps, connecting drains to underground sewage system, augmentation of SWM services and Nala cleaning is proposed for better management of solid and liquid waste.

**Landuse Allocation Proposal**



**Transportation Improvement Plan**



**Flood Control & Development Regulations**

Channelization of the river to uniform mean width of 55m and 20m offset on either sides as floodplain area is demarcated. Embankments, river deepening & widening and bunds etc. Demarcation of Red and Blue and blue floodlines. Plinth 450 above red line.

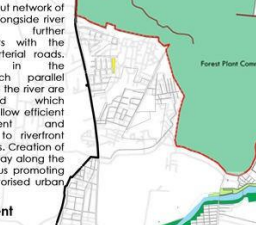


**Overall Plan of Riverfront Interventions**



**Proposals**

Recommendations for Nether Conservation: Museumification of a identified stretch & linking with heritage trail, Structural upgradation of components, Water management, Regulation on withdrawal pattern, Parallel tunneling for overcrossing seasonal fluctuations.



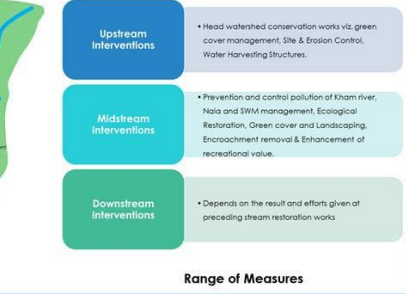
**Tourism and Heritage Plan**



A possible tourist circuit plan is proposed, that integrates existing sites of tourist importance with newly proposed riverfront sites. Various conservation measures such as structural restoration, illumination and fountains are proposed for heritage assets in the study area.



**WHAT WE VALUE, WE USUALLY CARE FOR**



Urban river spaces design possibilities in a systematic and transferable way are envisioned to provide opportunities for enhancement of river ecology, improve flood protection, and expand human amenities.





