



Introduction and Rationale

Course Modules

Way Forward



Eco-friendly Waterfront Development



Academic course to cultivate the next generation of river-centric planners, designers and leaders.

14 January, 2026

Rationale: Why Eco-friendly Riverfronts Matter

India's rivers are at cross-roads, caught between rapid urbanization and ecological limits.



Our cities have always depended on rivers for resources, transport and culture. However, today's model of urban expansion is breaking this ancient bond, forcing a choice between two futures.

Indian will add **404 million people** to its urban population by 2050 intensifying the pressure on its river systems.

The Flawed Blueprint: The High Cost of Hard Engineering

Current development is dominated by interventions like **channelization, embankments, and floodplain reclamation**. This outdated approach treats rivers as simple conduits, not living systems, with severe consequences.



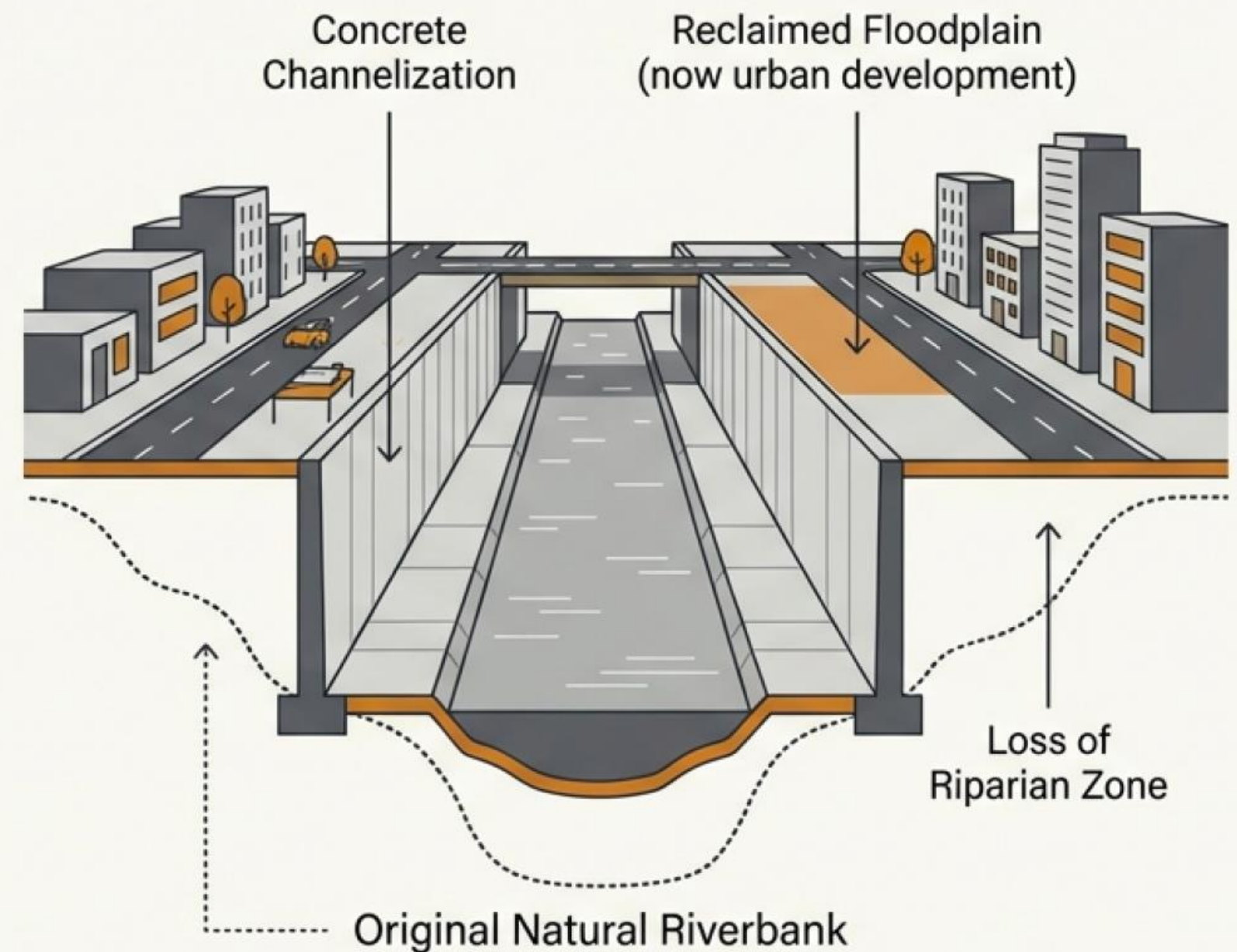
Weakenes river-floodplain connectivity, disrupting natural flood cycles and nutrient flows.



Reduces habitat diversity and degrades water quality, harming aquatic life.



Creates a false sense of security while increasing climate vulnerability to catastrophic floods and droughts.



Billions are being invested in projects that accelerate biodiversity loss

~203

waterfront projects approved across India.

Financial Investment

Sabarmati: ₹1,400 crore

Tapi/Surat: ₹7,882 crore

Biodiversity at Risk

Ganges River Dolphin (est. 6,300 remaining)

Gharials & Freshwater Turtles

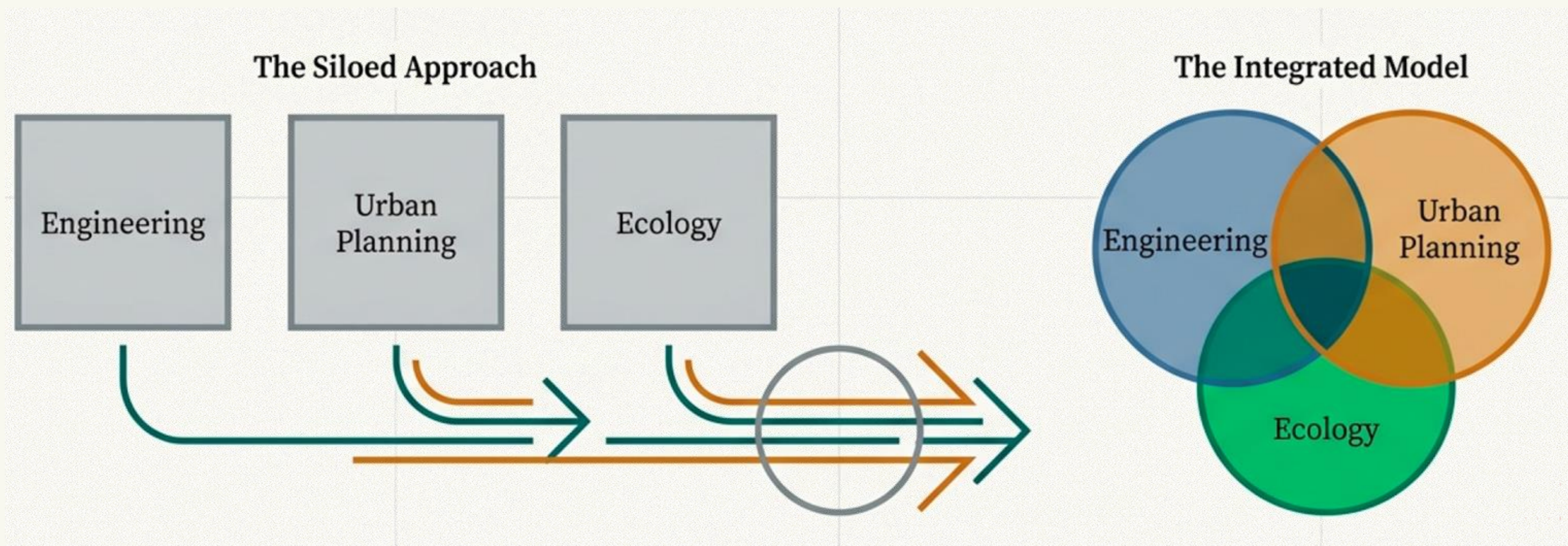
Countless Amphibian species



The misallocation of resources towards these damaging projects has a direct and measurable ecological price tag, threatening critical species that are barometers of river health.

The root of the problem is lack of interdisciplinary, river centric-thinking.

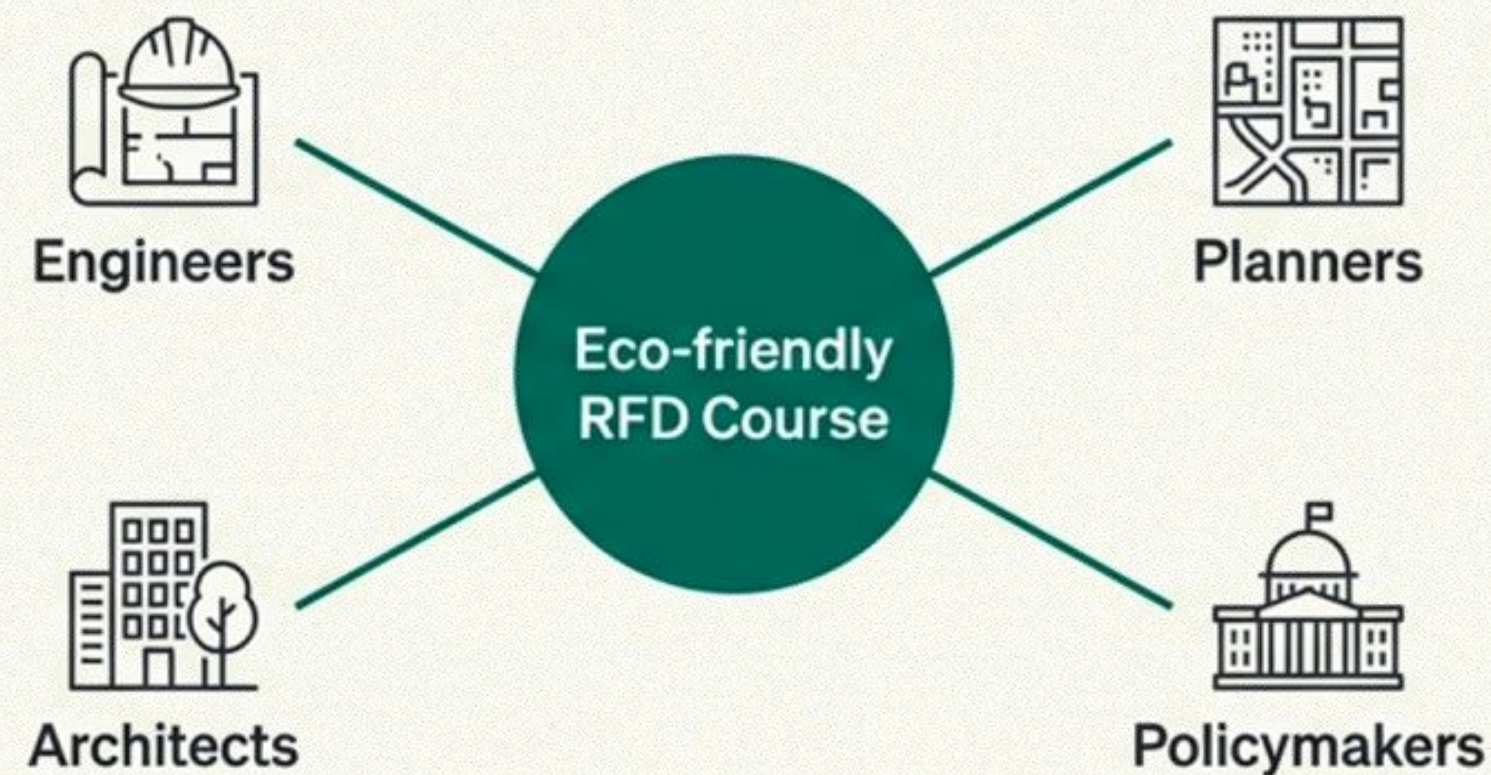
- The dominance of Hard Engineering stems from a fundamental misunderstanding of rivers as dynamic living systems.
- Effective design requires a deep understanding of everything from catchment-scale hydrology to microhabitat dynamics.



“A critical gap lies in the limited interdisciplinary understanding of fluvial habitats and geomorphology within many riverfront projects.”

SOLUTION: An Academic course to Build a New generation of Stewards

- We can shift the paradigm by equipping future professionals with a holistic, multidisciplinary framework.
- This course redefines the riverfronts through an eco-friendly lens, moving beyond aesthetics to prioritize ecological health



Course Vision

- ✓ Restore river health and enhance biodiversity.
- ✓ Balance urban development needs with ecological resilience.
- ✓ Integrate community participation, cultural values, and climate adaptation.

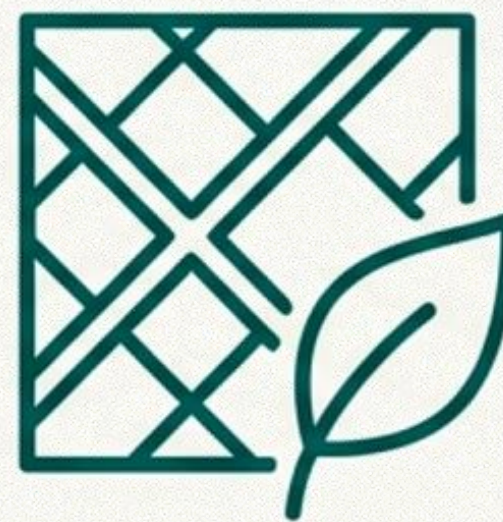
Shaping Future-Decision makers by Embedding Principles Where they Matter Most

This course is proposed as an elective for students in degree programs that directly shape the future of India's Urban landscapes



Architecture

Bachelor's & Master's in Architecture
(Urban Design, Urban Regeneration)



Planning

Bachelor's & Master's in Planning
(Environment Planning)



Heritage Conservation

Master's in Heritage Conservation

Structured Learning Journey from Foundational Theory to Rea-World Application

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FOUNDATION



Module 1: Overview of the River Ecosystem

Module 2: Rationale for Eco-Friendly Riverfronts

DESIGN & APPLICATION



Module 3: Making Each RFD Component Eco-friendly

Module 4: Envisioning Greenfield Contexts

Module 5: Brownfield & Retrofitting Interventions

Module 6: Extending Principles to All Waterfronts (Lakes, Drains)

IMPLEMENTATION & GOVERNANCE



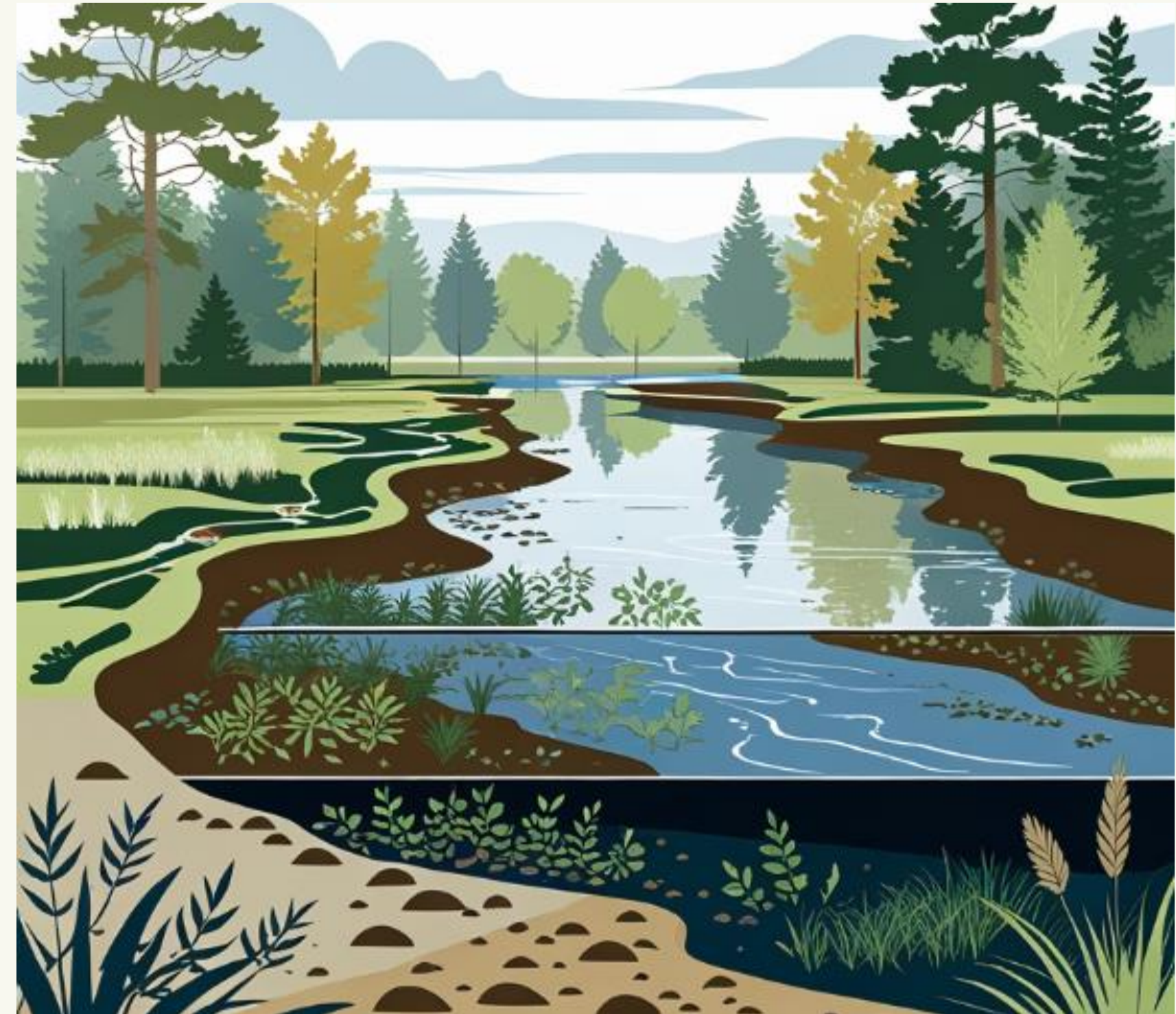
Module 7: Maintenance, Financing, and Governance

Module 8: Critical Review and Applied Learning

Building the Foundation: Understanding River Ecosystems

MODULE 1: Introduces river Ecosystems through their physical, hydrological and spatial components. Cover basin-to-city scale interactions and foundational hydrodynamic concepts (flow regimes, seasonal variability, sediment processes).

MODULE 2: Strengthens the foundation via traditional practices and chronological evolution of RFD in India. Introduction to principles for eco-friendly riverfronts, referencing NMCG-NIUA five guiding principles as a framework for sustainable, context-responsive planning.



Module Deep Dive: Applying Ecological principles to every Riverfront Component

MODULE 3: Practical toolkit for moving from theory to Design, focusing on Nature-based Alternatives to core riverfront elements.

River Edge
Vegetation-based stabilization
over concrete embankments.

Floodplain
'Room for the River' strategies,
riparian buffer restoration, and
habitat creation for flagship species.

Introduction to the EXERCISE

5 different case scenarios for waterfront/ riverfront development

Built Riverbanks
Minimal footprint structures (ghats),
permeable surfaces, and Sponge City
concepts for stormwater
management.

Module Deep Dive: Envisioning Riverfront Design (Greenfield, Brownfield and other Waterfronts)

MODULE 4: Guides Vision formulation, pre-design investigations (hydrology, biodiversity, land surveys), design stage elements (activity nodes, connectivity, amenities), and sustainable material selection. Emphasizes flood-responsive public spaces and cultural integration.

MODULE 5: Address retrofit challenges, informal settlement displacement lessons (Yamuna, Sabarmati), equitable access, and implementation scenarios.

MODULE 6: Apply eco-sensitive design to lakefronts, drains, and other urban waterbodies with context-specific adaptations.



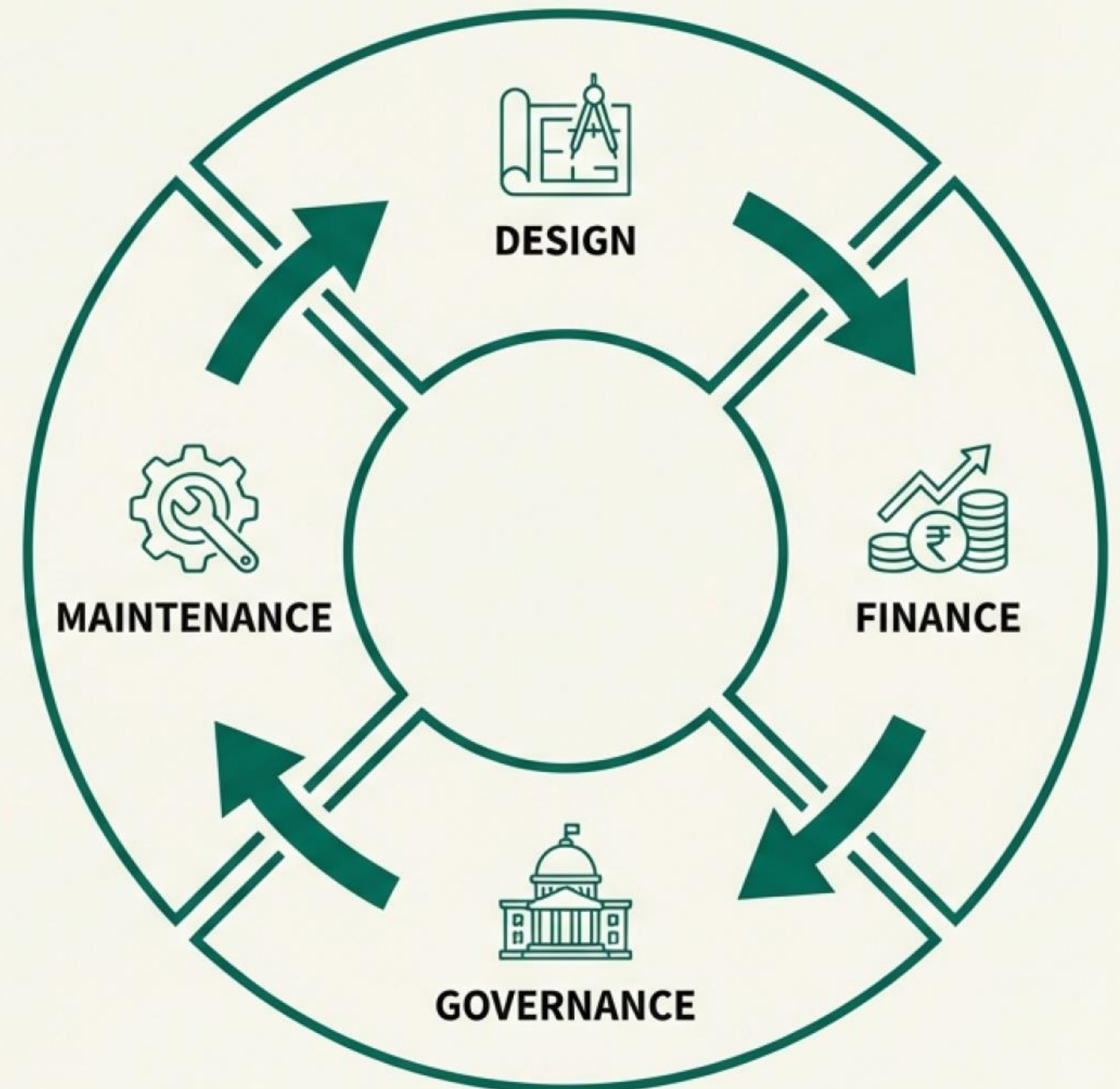
Beyond Design: Implementation and Governance Frameworks

MODULE 7 : Focuses on crucial post-design stage, equipping students to create projects that are not only ecologically sound but also financially sustainable and institutionally supported.

Module 8: Applied learning on stakeholder analysis, and participatory planning approach.

Key Concepts Covered:

- **Economic Viability:** Lifecycle costs, cost-benefit analysis, and valuation of ecosystem services.
- **Innovative Financing:** Hybrid Annuity Model (HAM), Public-Private Partnerships (PPPs).
- **Sustainable Livelihoods:** Aligning projects with the 'Arth Ganga' philosophy.
- **Governance Frameworks:** Environmental legislation (e.g., Environment Protection Act, 1986) and institutional roles.



Key Learning outcomes

Upon completion, students will be equipped with the practical skills to plan, design, and implement a new generation of riverfront projects.



ANALYZE

the ecological and hydrological implications of development.



APPLY

nature-based solutions and green infrastructure strategies.



DESIGN

socially inclusive and culturally sensitive plans with stakeholder engagement.



ASSESS

economic viability and innovative financial models for projects.



EVALUATE

global and national case studies to extract lessons for local application.

Teaching Philosophy

The course methodology moves beyond traditional lectures to foster **interactive, applied learning.**



Indianized Contexts

Global case studies are adapted to address specific challenges and opportunities in Indian cities.



Interactive Dialogue

A two-way format encourages discussion and incorporates real-life learnings from projects on the ground.



Applied Learning

Infographics, project-based exercises, and fun facts make complex information accessible and memorable.

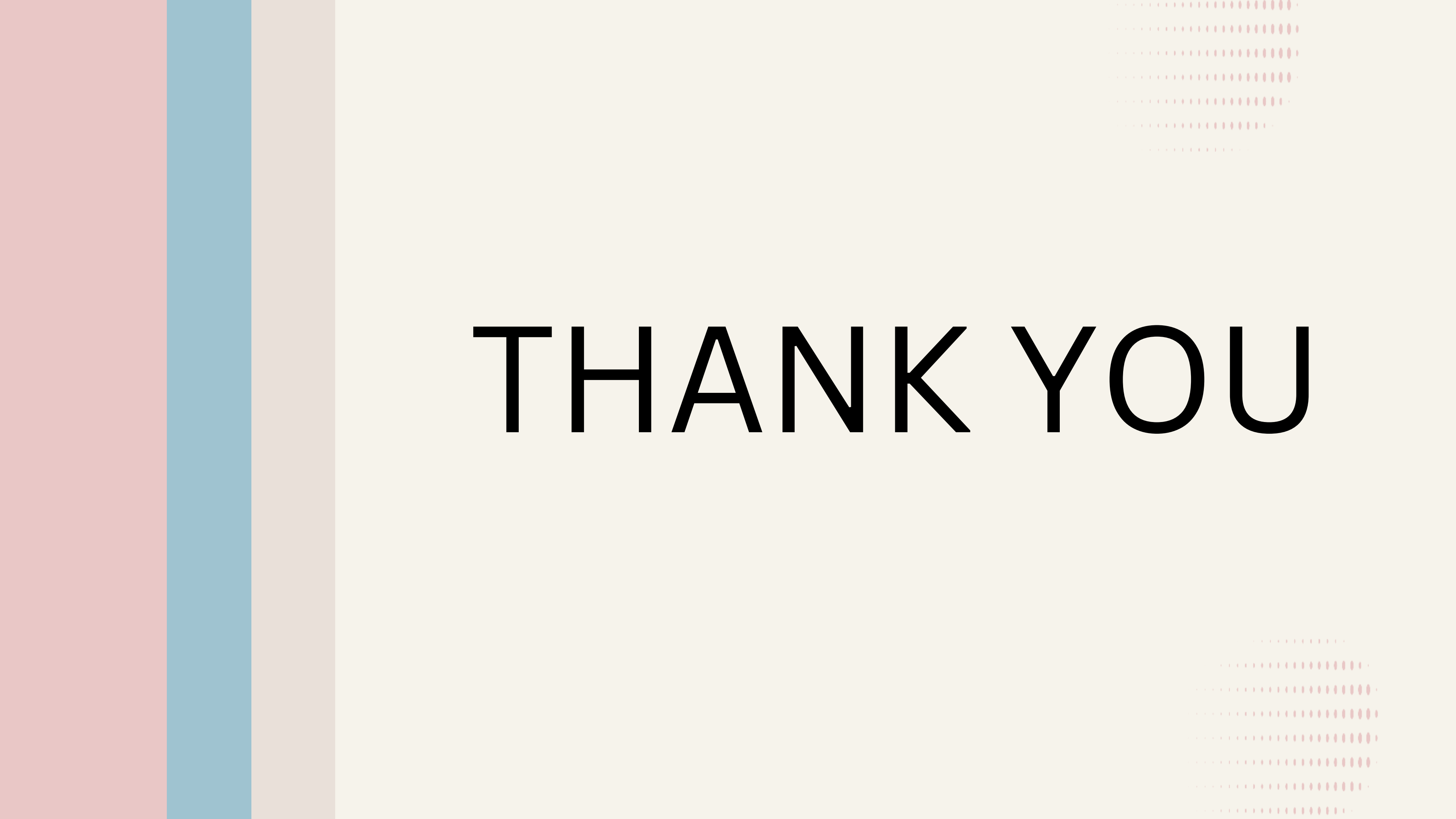
All about EXPERTS !

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THANK YOU