Eco-revitalization of the River Ravi Basin

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ADB Asian Development Bank
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Punjab Planning Development Department

Present State of Ravi River Ecosystem

Disposal of untreated sewage and industrial effluents

Urbanization and cultivation of floodplain

Sand mining

Disposal of solid waste and squatting

In-channel infrastructure

Low flows – mined bed

Livestock pressure

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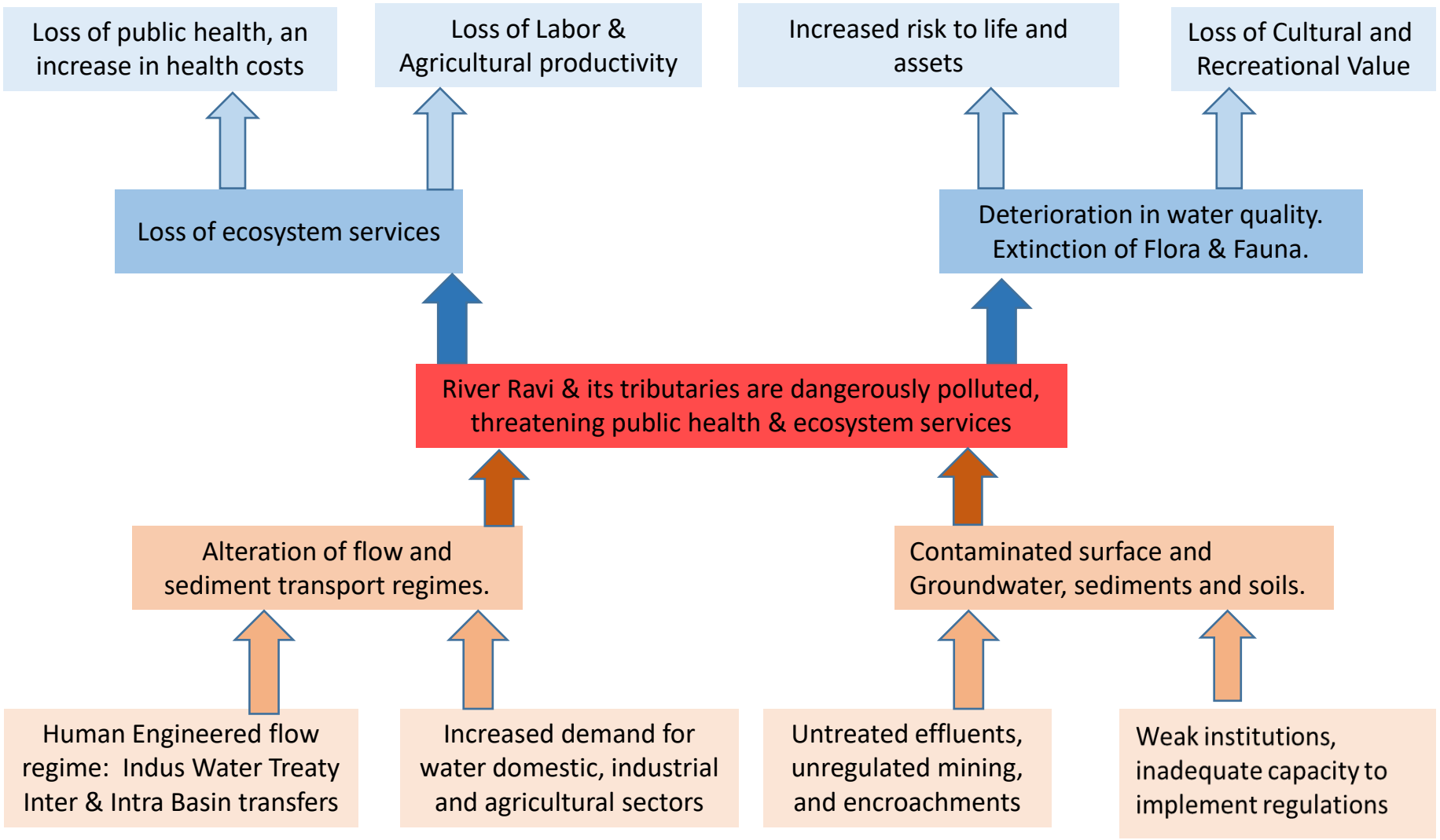
Defining the Problem



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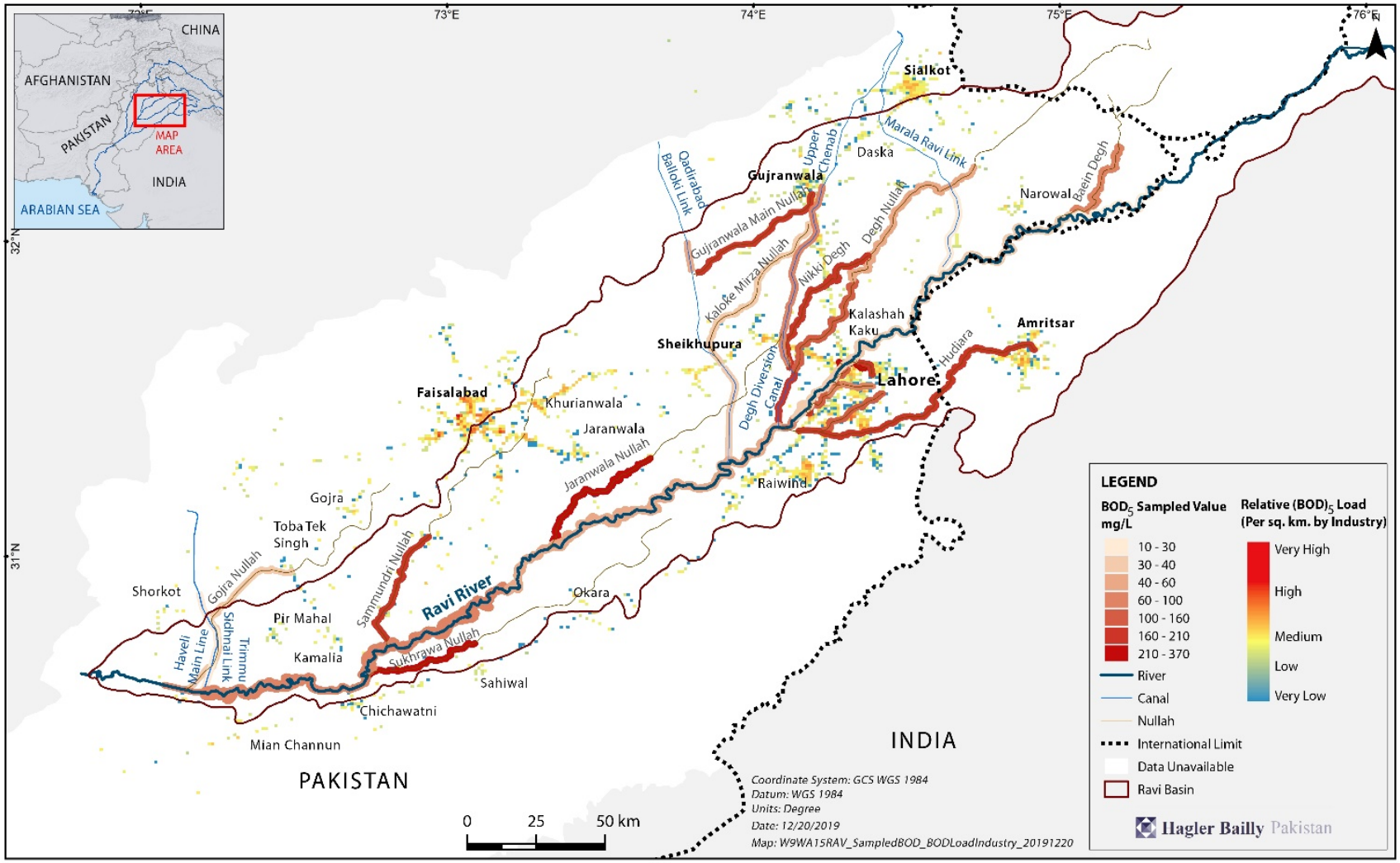
Approach to Development of the Revitalization Plan

- Comprehensive current situation assessment of the river basin, including:
  - water quality
  - impacts on human and ecosystem health
  - climate change risks and vulnerabilities
  - institutional gaps and development needs
- A knowledge product document to raise public awareness, foster policy engagement and generate support for the eco-revitalization plan
- Developing a shared vision for revitalization
- Long-term, multisector Master Plan to revitalize and build resilience in the River Ravi ecosystem, including:
  - an analytical framework developed through multi-stakeholder visioning exercises and consultation
  - recommendations for institutional reforms
  - recommendations for investment projects

Mapping of Biological Oxygen Demand in the Basin



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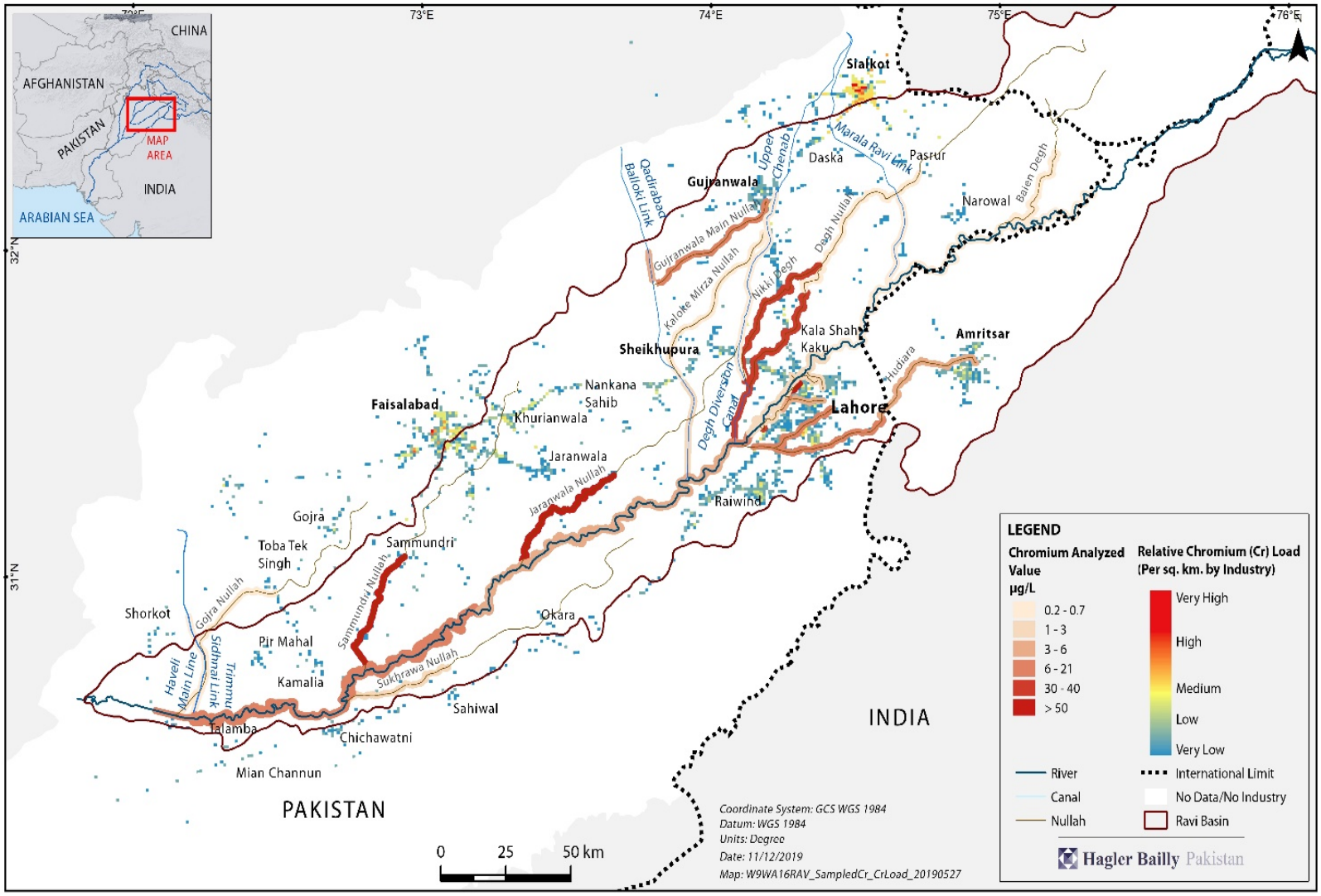
Mapping of Chromium Contamination in Surface Water



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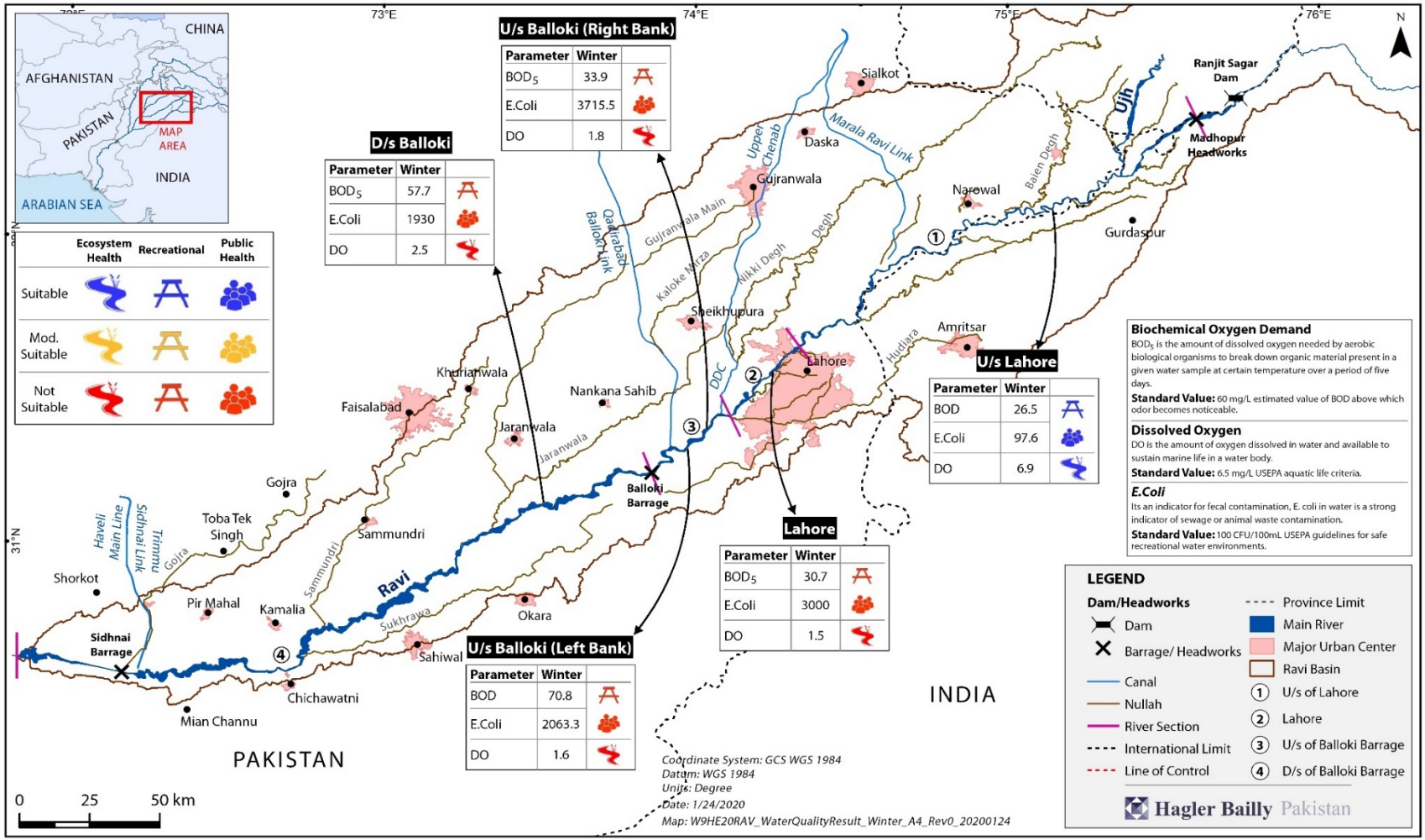
Mapping of Suitability of Surface Water Quality for Ecosystem Services



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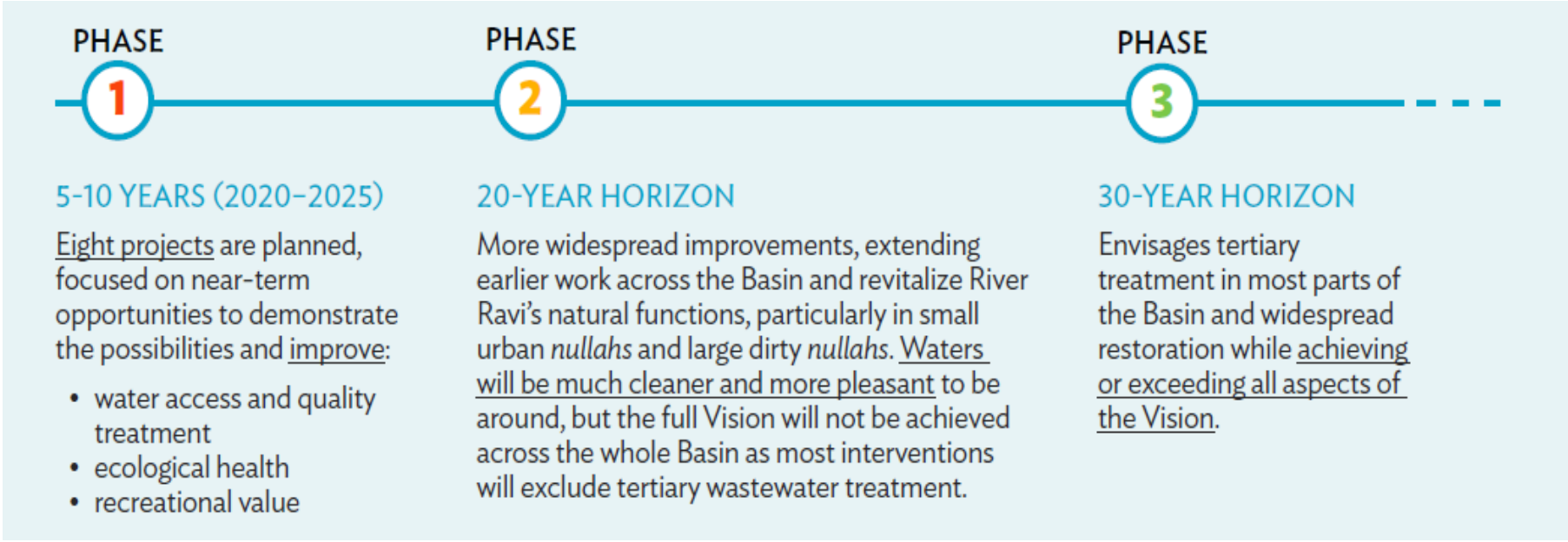
Strategy for Ecorevitalization

1. Centralized and decentralized **wastewater treatment, combining** engineering and nature-based solutions
2. Spearhead **Integrated Urban Water Management**
3. Promote **Water Stewardship**
4. Promote **sustainable and profitable agricultural practices**
5. Delineation, demarcation and **acquisition of the land where needed** along the River Ravi and nullahs
6. Progressive **eco-revitalization** of the River Ravi and its nullahs
7. Comprehensive **basin-wide institutional strengthening and awareness program**

A phased-approach



Costs, Benefits and Financing

- The required investment River Ravi Eco-Revitalization Plan is ~US$ 5.4 billion over the 30-year plan period
- Phase 1 is ~US$ 1.0 billion.
- Economic benefits are USD 15.6 billion to USD 33.1 billion.
- Opportunities for Public Private Participation (PPP) in construction and operation of WWTPs and recreational areas
- In view of the limited capacities for management of PPPs and lack of a ready market, the Plan recommends initial project development by the government with support from DFIs to be followed by expansion through PPPs

Supporting Project Documentation

- Water Quality Assessment Report
- Climate Resilience Assessment Report
- Ecology and Ecosystem Services Report
- Health Assessment Report
- Institutional Assessment and Political Economy Report
- Shared Vision for Ecorevitalization of Ravi River Basin
- Guidelines for Selection of Technologies for Wastewater Treatment in River Ravi Basin
- Ravi River Eco-revitalization Model (REM)
- Study Trip and Training Report
- Knowledge Product Manuscript
- River Ravi Basin Ecorevitlization Masterplan
- Prefeasibility reports for eight investment projects included in Phase I of Plan

Phase 1 Projects

A. Revitalization of River Ravi floodplains

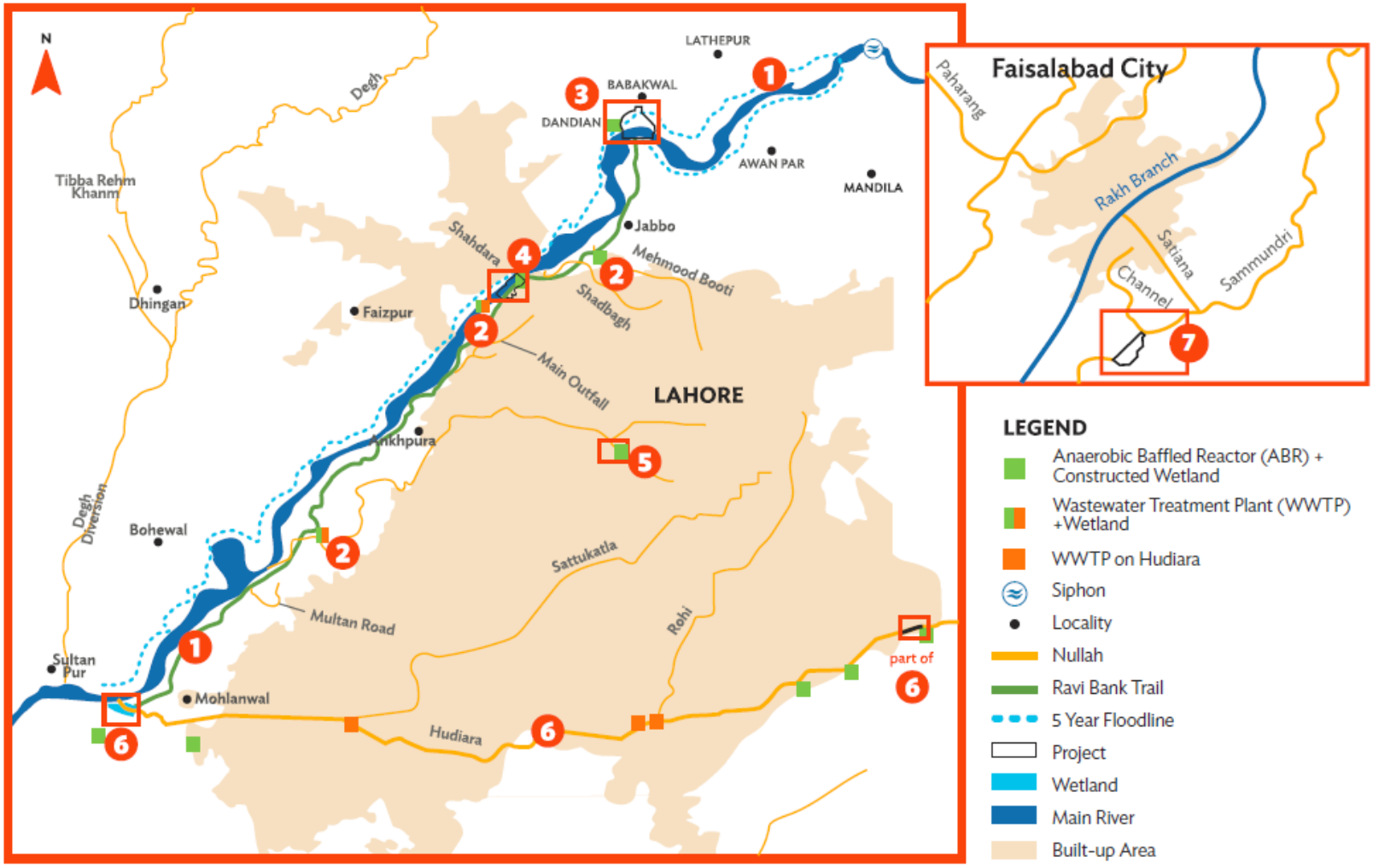
1. River Ravi Recreational Pathway
2. Centralized WWTW with constructed wetlands
3. Ravi Recreational Area at Shahdara
4. Agri Nature Park at Dandian Village

B. Eco-Revitalization of nullahs and reduction of poor-quality effluent to River Ravi

5. Eco-revitalization of Gulberg Nullah in Lahore
6. Eco-revitalization of Hudiara Nullah in Lahore
7. Eco-revitalization of Satiana Nullah in Faisalablad

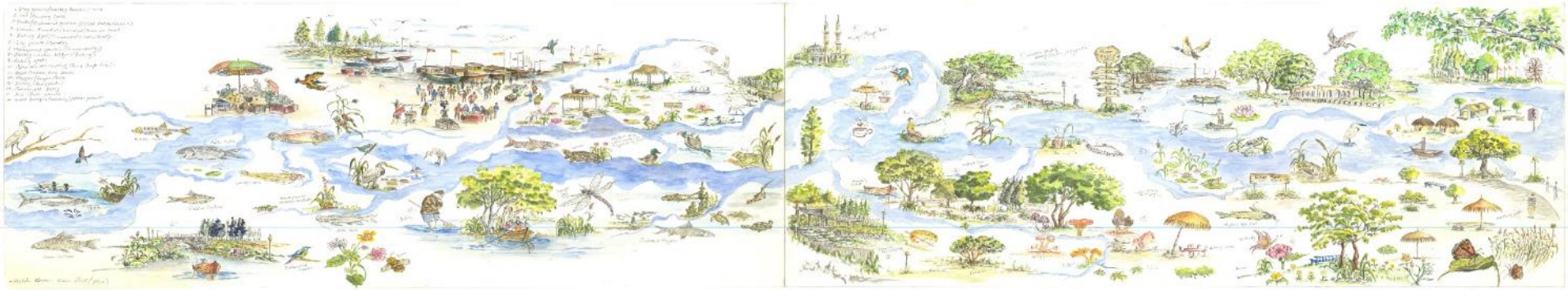
C. Institutional strengthening and awareness campaign

Phase 1:A&B Projects

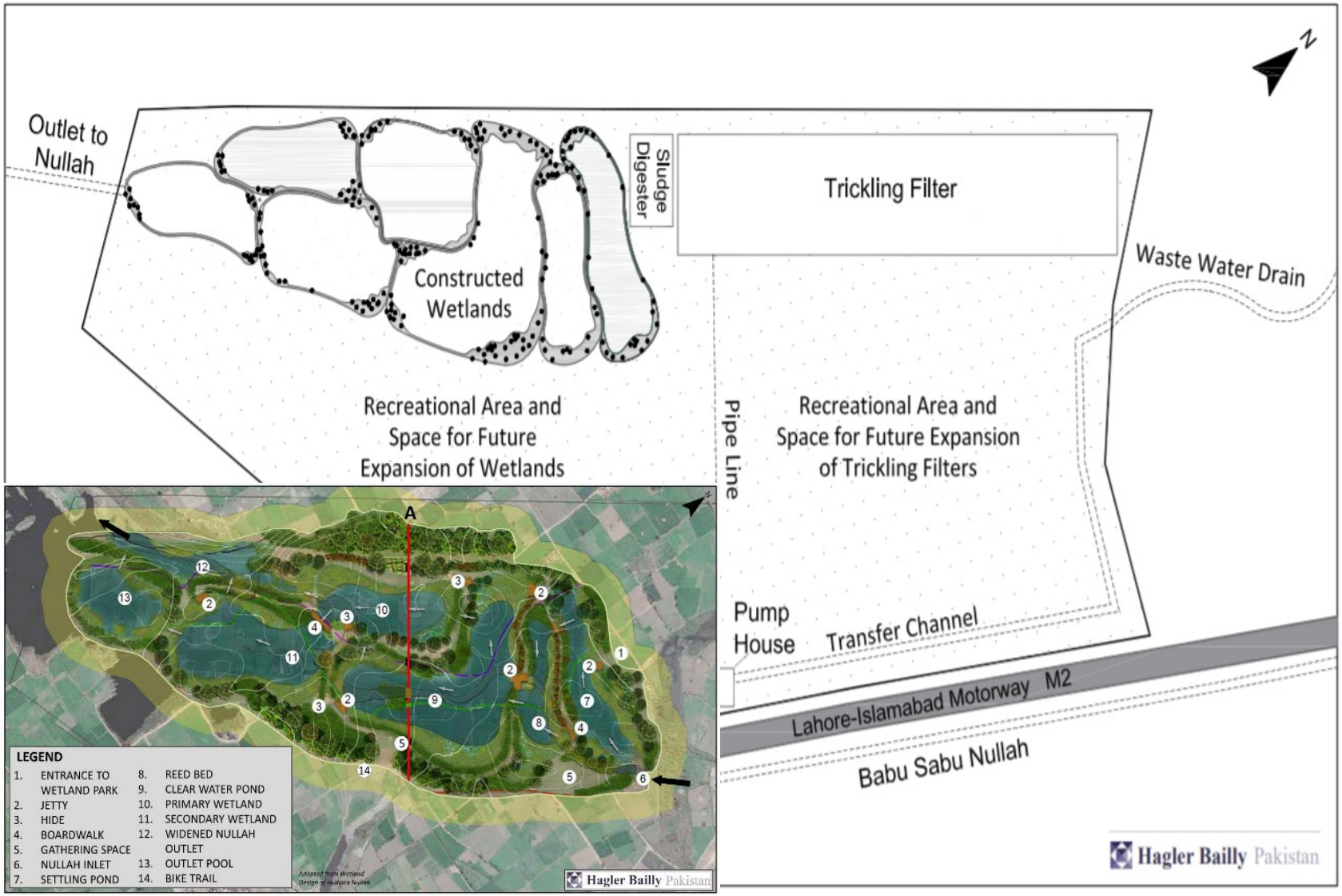


A1: Ravi Floodplain Management and Recreational Pathway

- Acquisition of ~3,600 ha of private land
- Displacement of ~920 households
- Creation of buffer zone for eco-revitalization and to reduce the risk of property damage and loss of life in floods
- A pathway to support recreational and cultural activities and livelihoods
- A Sustainable-Agriculture Development Pilot to support local communities
- Notification of the **Ravi River National Park** along 42 km from Siphon to Hudiara Nullah to provide basis for long-term ecological management and nature-based recreation



A2: Centralized WWTW with constructed wetlands



A3: Ravi Recreational Area at Shahdara

- No acquisition of private land
- Displacement of ~150 households
- Nature-based restoration
- Construction of ABRs and wetlands
- A visitor center with informal eateries
- Boat jetties
- A sports precinct for the area within 1:5-year floodplain

A4: Agri-Nature Park at Dandian

Easily accessible from Lahore via Lahore-Sialkot Motorway.

- Acquisition of 190 ha of land, of which 75 ha is private land
- No displacement of households
- Nature-based revitalization activities on the western bank of the Ravi River
- Visitor center with renewable energy and innovative sanitation infrastructure
- Restoration of floodplain with native vegetation
- Demonstration fields of sustainable and profitable agricultural practices; and Farmers Market
- Recreational facilities such as cycling and walking trails, and camping

B5: Eco-revitalization of Gulberg Nullah

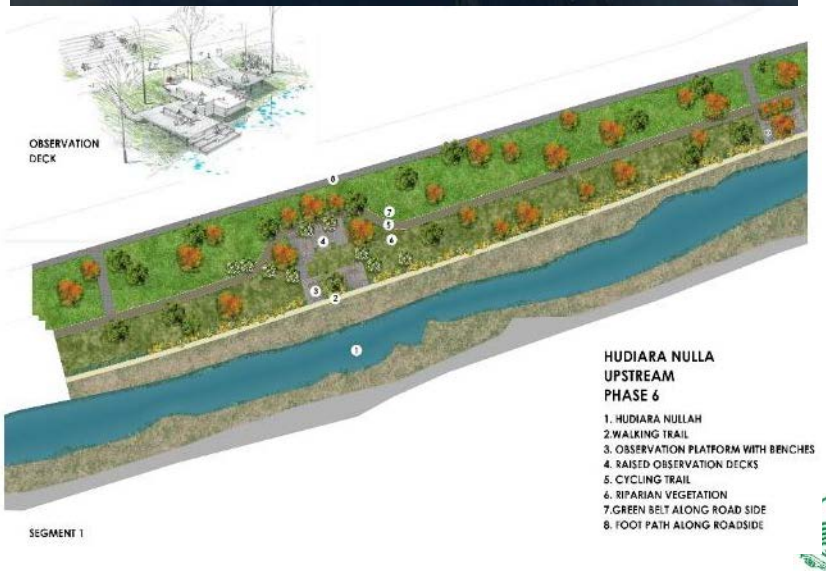
Important residential and commercial area of Lahore

- No private land
- Displacement of three households
- Decentralized water treatment using ABRs and constructed wetlands
- Activity areas and a nature area linked to upgrades to the nullah and landscaping extending over a 1-km length of the nullah
- An IUWM project in Walton Cantonment .

B6: Eco-revitalization of Hudiara Nullah

Largest nullah in Lahore and carries the most industrial and municipal effluent

- No private land
- WWTWs on Sattukatla Nullah, Rohi Nullah and drains at Ferozepur Road; with constructed wetlands
- WWT for villages
- Upgrades to the nullah located alongside Karbath
- A large nature-based treatment area at the confluence with the River Ravi, for residual treatment and supporting recreation
- Pilots of
  - IUWM
  - Sustainable Agriculture



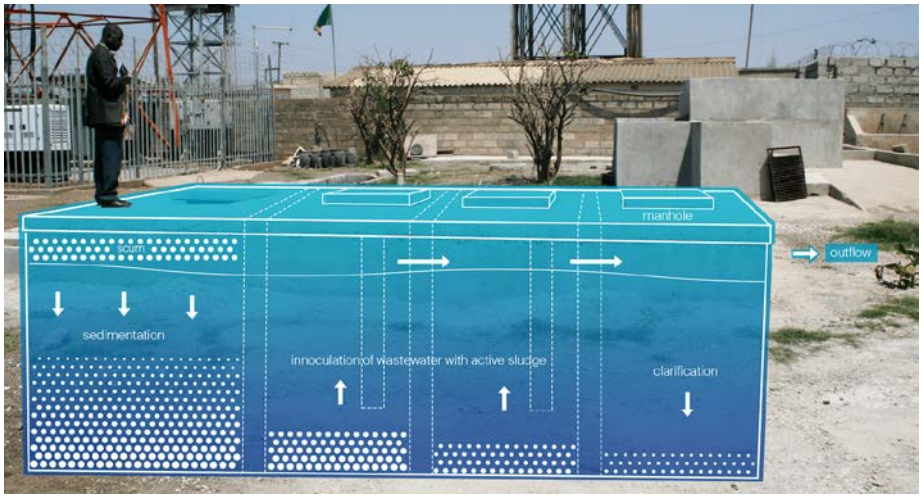
B7: Eco-revitalization of Satiana Nullah - Faisalabad

Wastewater from Textile Industries and Municipal Sources

- No private land
- Upgrades to the nullah, including: revegetation, gardens and walking tracks
- Implementation of an IUWM Program in the catchment area for Satiana Nullah and in the Khurianwala industrial area
- WWT in five villages
- Off-channel WWTP to treat the wastewater in Satiana Nullah and effluent from Khurianwala industrial area
- Pilots of
  - IUWM
  - Sustainable Agriculture

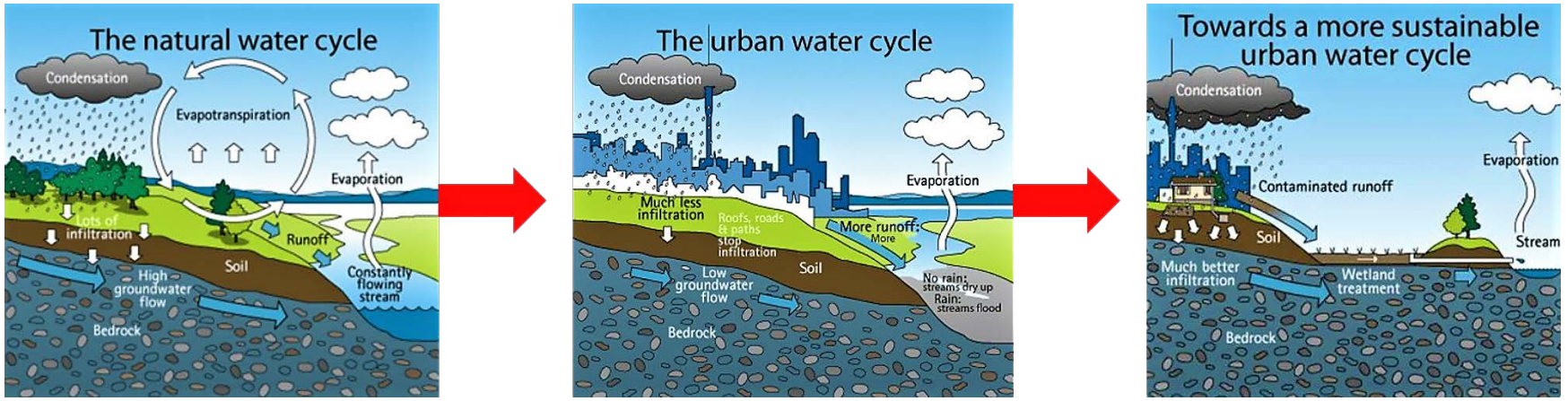
Decentralized Wastewater Treatment

- Sedimentation and primary treatment in sedimentation ponds or septic tanks
- Secondary anaerobic treatment in baffled reactors (baffled septic tanks) or fixed-bed filters
- Secondary and tertiary aerobic/anaerobic treatment in constructed wetlands
- Secondary and tertiary aerobic/anaerobic treatment in ponds



Anaerobic baffled reactors (ABR)

Integrated Urban Water Management



- protect water quality through centralized and decentralized treatment
- protect water quality through preventive management practices;
  - manage storm water runoff;
  - manage solid waste;
- engage communities in water management planning and application;
- establish and implement policies and strategies to facilitate the above activities;
- support capacity development of personnel and institutions;
- improve economic efficiency of services.

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C: Institutional Strengthening and Awareness Campaigns

The Ravi Re-imagined Campaign

- Improve capacity of the agencies reporting to Punjab Water Regulatory Authority to enforce IUWM and floodplain regulation
- Capacity and institution building of water undertakers within the water utilities and local governments
- Compliment existing initiatives to build capacity of environmental regulator
- Promote water stewardship
- Increase awareness of eco-system services among communities, students and civil society

Innovations

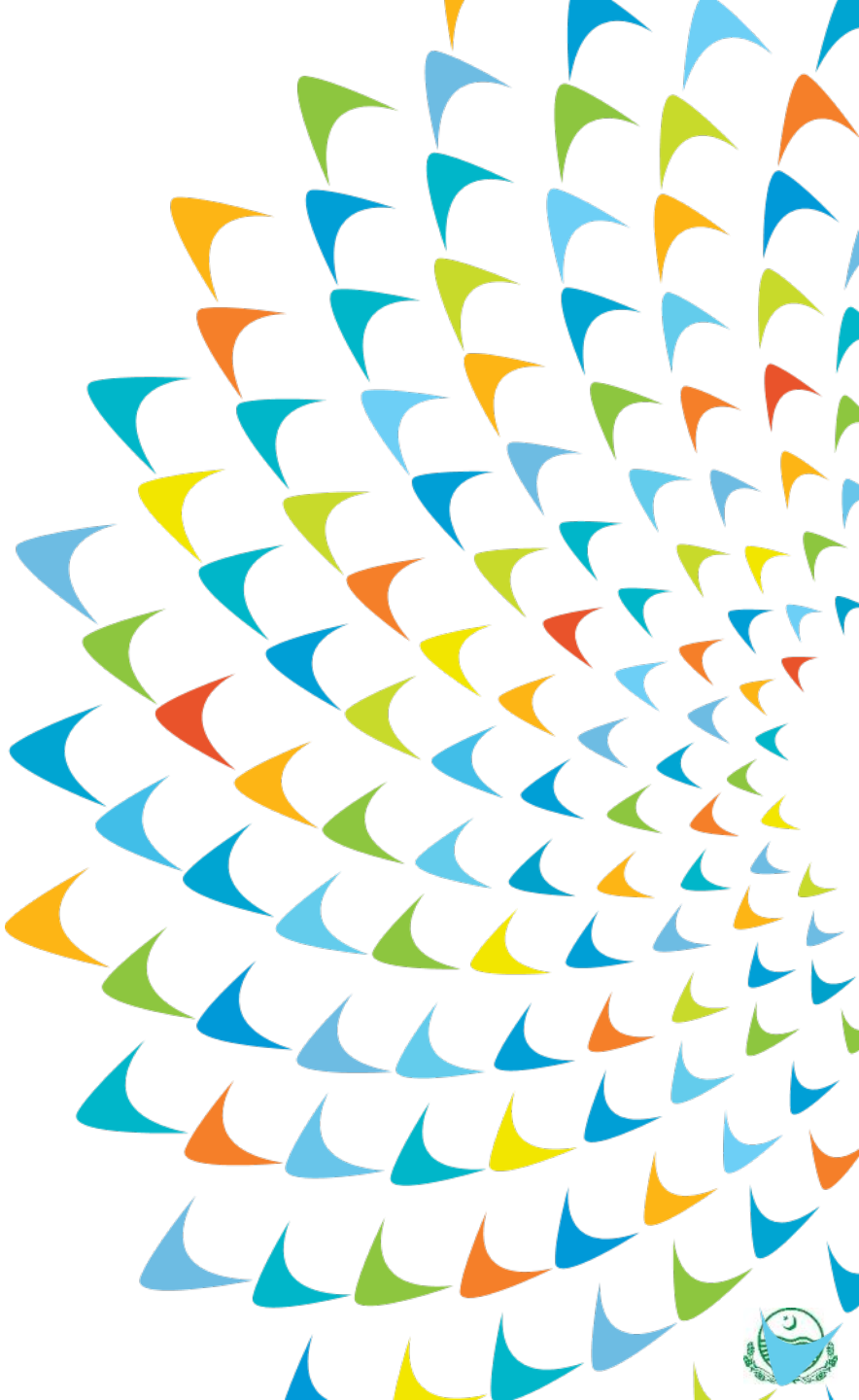
Conceptual

- Holistic assessment combining ecology, recreation, public health, culture, hydrology, and socio-economics
- Strategic, basin-wide and complete approach to revitalization
- Contemporary approaches to Eco-revitalization
  - IUWM
  - Water Stewardship
  - Nature-based Solutions
  - Engagement with students and civil society.

Technology

- REM eco-social model. An integrated platform to assess and prioritize interventions
- Combination of centralized and decentralized water treatment
- Common lands targeted for constructed wetlands and buffer zones
- Integrating ecorevitalization approaches in village designs and development
- Sustainable and profitable agricultural practices

Thank you



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