



ASSESSMENT OF HIGH POTENTIAL & SCALABLE NATURE-BASED SOLUTIONS IN THE MEKONG DELTA, VIETNAM

SIWI | World Water Week | August 27, 2021

Justine Shapiro-Kline
One Architecture & Urbanism
shapirocline@onearchitecture.nl



WWF INITIATIVE FOCUSED DELTAS



PROJECT OBJECTIVES & SCOPE

As part of the Resilient Asian Deltas initiative, the project will identify high potential examples of NbS that are transformative, innovative, and can be scaled-up. The project aims to develop implementable solutions for a more resilient Mekong Delta in Vietnam and be applied in other sinking and shrinking Asian river deltas.

The project comprises two phases of work:

1. NbS identification and development of case studies for two distinct conditions:
 - Flood management and sedimentation enhancing along river corridors
 - Sustainable coastal zone management and erosion prevention
2. Integrated vision development & implementation pathways through:
 - Opportunity mapping & visualization of risks and propositions
 - Stakeholder workshops & mapping the enabling environment

LOWER MEKONG DELTA CONTEXT & DYNAMICS

MEKONG DELTA TODAY

- 21.5M inhabitants (18% of country)
- ~28% of Vietnam's GDP
- Annual economic growth: 6%
- Major producer of rice and aquaculture
- Large economic development potential

A unique delta: fertile & vulnerable

- Rapid & major transitions in recent decades
- Indigenous knowledge of living with flooding
- Lowest delta in the world
- Accelerating dam development upstream & sand mining
- Increasing saltwater intrusion & environmental degradation



Source: The Third Pole / Gareth Bright



Source: Cai Rang Market - Shutterstock / Banana Republic

LOWER MEKONG DELTA



CAMBODIA

VIETNAM

Gulf of Thailand

East Sea

Ho Chi Minh City

Tan An

My Tho

Mekong River

Vinh Long

Can Tho

Vi Thanh

Soc Trang

Chau Doc

Hong Ngu

Long Xuyen

Cao Lanh

Kien Luong

Rach Gia

Ca Mau

Ho Phong

Bac Lieu

Sa Dec

Song Hau

Tra Vinh



URBANIZATION & GROWTH PRESSURES



Note: urban growth rate refers to the period 2000-2015

Population density 2010 (person per km²)

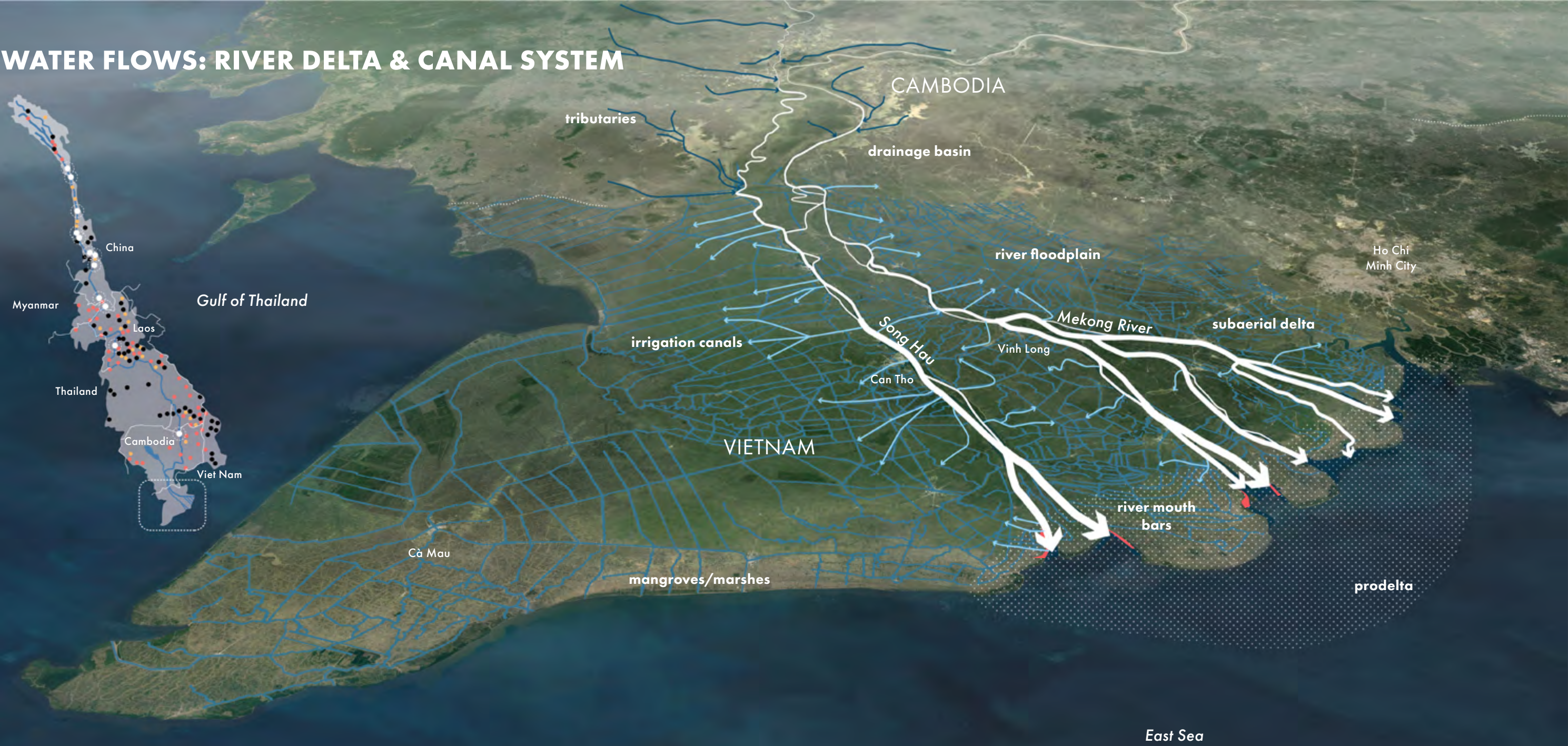
- 0-24
- 25-999
- 1000+

Urban extents

Source:
 [1] Climate change environmental degradation & migration, December 2010 Natural Hazards
 [2] <https://www.city-facts.com/vietnam>



WATER FLOWS: RIVER DELTA & CANAL SYSTEM



- Existing Mekong River dams
- Existing dams on tributaries
- Dams under construction
- Planned dams

Source:
 [1] Hydropower dams of the Mekong River basin: A review of their hydrological impacts
 [2] Edward Anthony, 2014. Chapter 13 Deltas
 [3] Coastal protection for the Mekong Delta: a decision support tool



SEDIMENT MOVEMENTS



● Existing Mekong River dams	■ Coastal retreat
● Existing dams on tributaries	■ Coastal advance
● Dams under construction	
● Planned dams	

Source:
 [1] Hydropower dams of the Mekong River basin: A review of their hydrological impacts
 [2] Edward Anthony, 2014. Chapter 13 Deltas
 [3] Coastal protection for the Mekong Delta: a decision support tool



RIVERBED INCISION & SAND MINING



GROUNDWATER PUMPING & SURFACE WATER POLLUTION

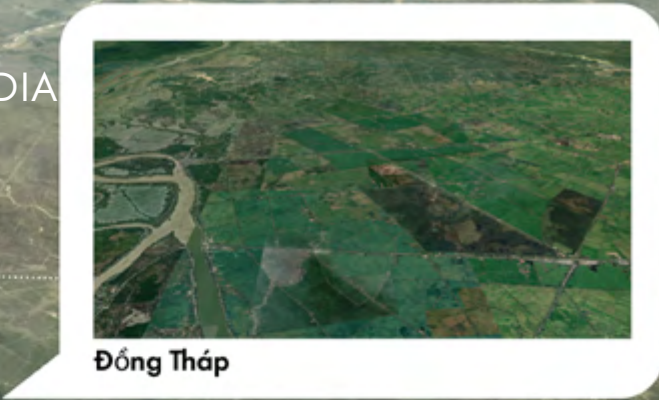


Source:
 [1] The Status of Aquaculture in the Mekong Delta Region of Vietnam: Sustainable Production and Combined Farming Systems
 [2] Agriculture and Water Quality in the Vietnamese Mekong Delta
 [3] In Mekong Delta, Rice Boom Has Steep Environmental Cost
 [4] Mekong Delta shrimp-rice farming on rise
 [5] <https://www.mrcmekong.org/>
 [6] Evers and Benedkter: Hydraulic bureaucracy in the Mekong delta

SALINIZATION & SUBSIDENCE



PROJECT FOCUS AREAS



DONG THAP PROVINCE

Tràm Chim National Park & environs

CASE STUDY COMPONENTS

**Context &
stakeholder
mapping**

**Landscape
stresses &
risks**

**NbS
opportunities
("the landscape
proposition")**

**NbS upscaling &
implementation**

**Qualitative
(high-level) cost
assessment**

WORKSHOP PROCESS

Tam Giang / Ca Mau Peninsula

Sustainable coastal zone management and erosion prevention

Issues

- Salinity intrusion
- Coastal erosion
- Loss of agricultural land
- Loss of mangrove forest
- Loss of biodiversity
- Loss of cultural heritage
- Loss of livelihoods
- Loss of social cohesion
- Loss of resilience
- Loss of sustainability

Opportunities & benefits

- Enhance coastal resilience
- Improve coastal protection
- Enhance coastal productivity
- Enhance coastal sustainability
- Enhance coastal inclusivity
- Enhance coastal equity
- Enhance coastal justice
- Enhance coastal integrity
- Enhance coastal vitality
- Enhance coastal well-being

Map includes labels for 'Nhon Co District' and 'Ca Mau District'.

Dong Thap Province

Flood management and sedimentation enhancing along river corridors

Key objectives: Enhance flood resilience, improve sediment management, and enhance ecosystem services along river corridors.

Opportunities & benefits

- Enhance flood resilience
- Improve sediment management
- Enhance ecosystem services
- Enhance agricultural productivity
- Enhance rural livelihoods
- Enhance social cohesion
- Enhance resilience
- Enhance sustainability

Map includes labels for 'Dong Thap City' and 'Can Tho City'.

Key findings

- Coastal erosion is a major threat to the livelihoods of the people living in the coastal zone.
- Salinity intrusion is a major threat to the agricultural production in the coastal zone.
- The loss of mangrove forest is a major threat to the biodiversity in the coastal zone.
- The loss of cultural heritage is a major threat to the social cohesion in the coastal zone.
- The loss of livelihoods is a major threat to the social equity in the coastal zone.
- The loss of social cohesion is a major threat to the social justice in the coastal zone.
- The loss of integrity is a major threat to the social vitality in the coastal zone.
- The loss of vitality is a major threat to the social well-being in the coastal zone.

Map includes labels for 'Nhon Co District' and 'Ca Mau District'.

Opportunities & benefits

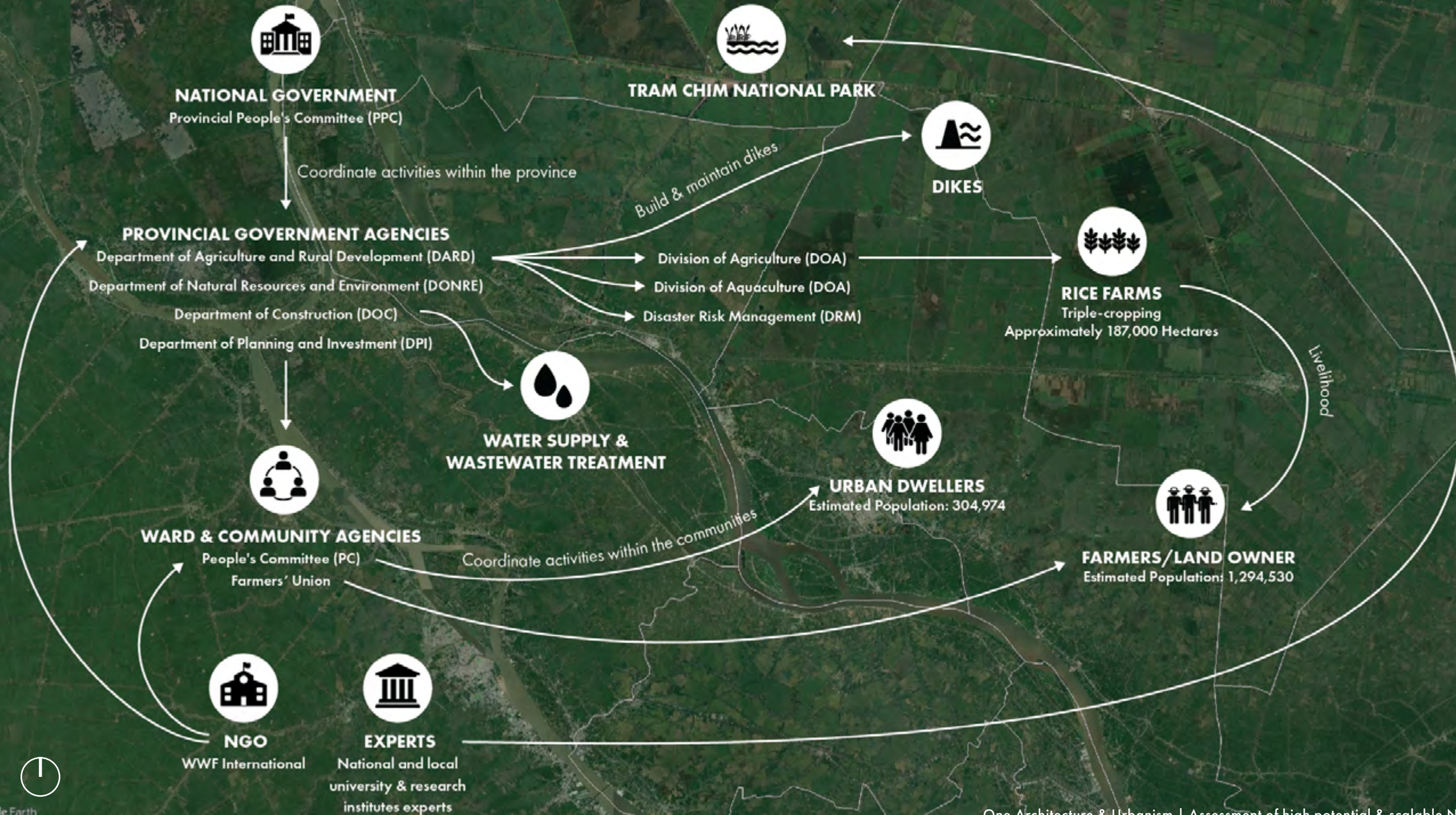
- Enhance flood resilience
- Improve sediment management
- Enhance ecosystem services
- Enhance agricultural productivity
- Enhance rural livelihoods
- Enhance social cohesion
- Enhance resilience
- Enhance sustainability

Map includes labels for 'Dong Thap City' and 'Can Tho City'.

Aug 24 session

STAKEHOLDER MAPPING

Dong Thap



EXISTING CONDITIONS & STRESSES

Dong Thap



'Incidences of land subsidence in Dong Thap province were reported from 40 communes across nine districts, spanning an area of 3,100ha, affecting up to 4,000 families'

Source: Illegal sand mining along the Tien River, Dong Thap province, Vietnam - Environmental Justice Atlas (2015) / Illegal sand mining partly to blame for land subsidence in southern Vietnam - Tuoi Tre News VN (2015)

Dong Thap Province has an annual Subsidence rate of 2-3cm (to be verified by RHDHV)

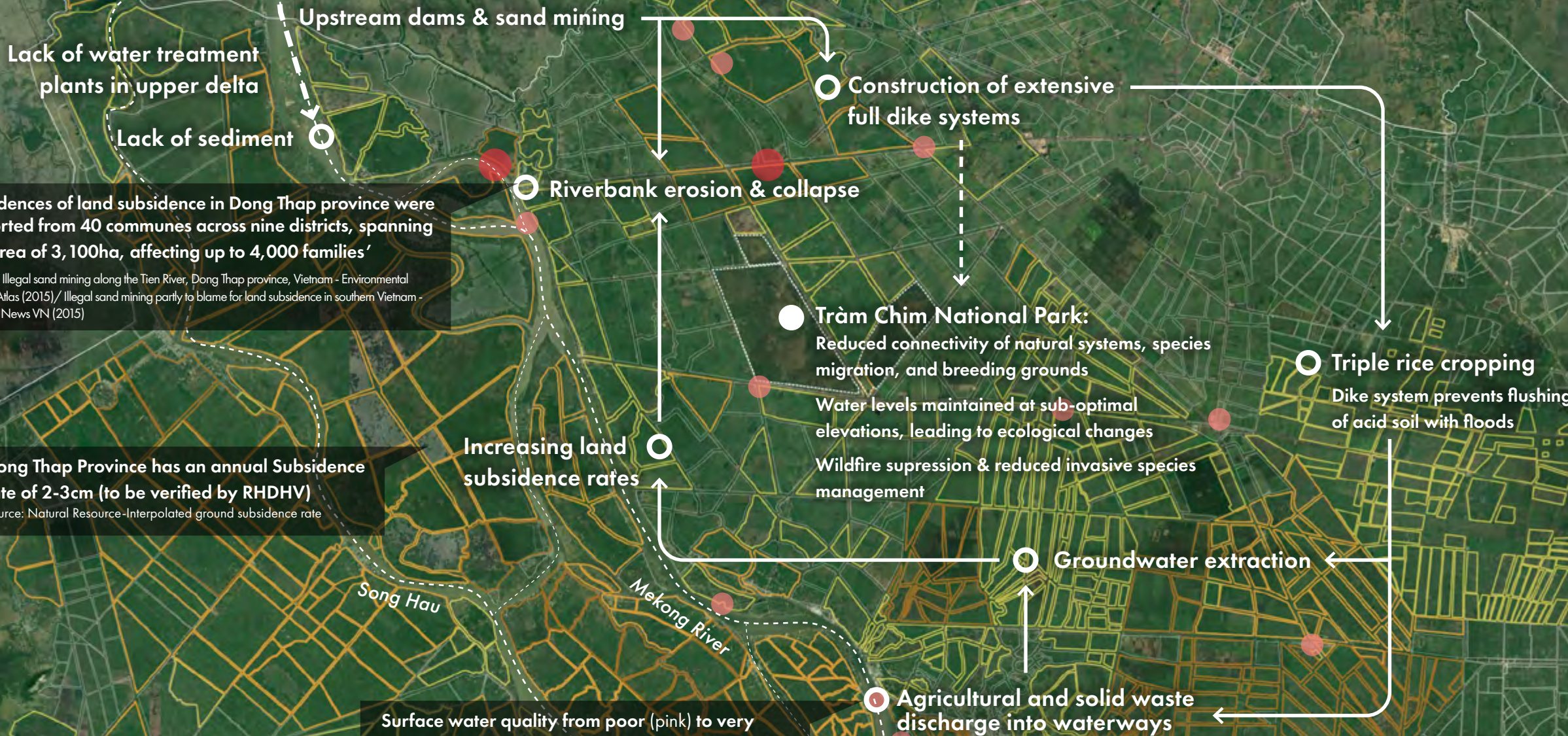
Source: Natural Resource-Interpolated ground subsidence rate

Surface water quality from poor (pink) to very poor (red) levels by WQI analysis (2019), especially in dry season.

Source: Spatiotemporal Analysis of Surface Water Quality in Dong Thap Province, Vietnam Using Water Quality Index and Statistical Approaches

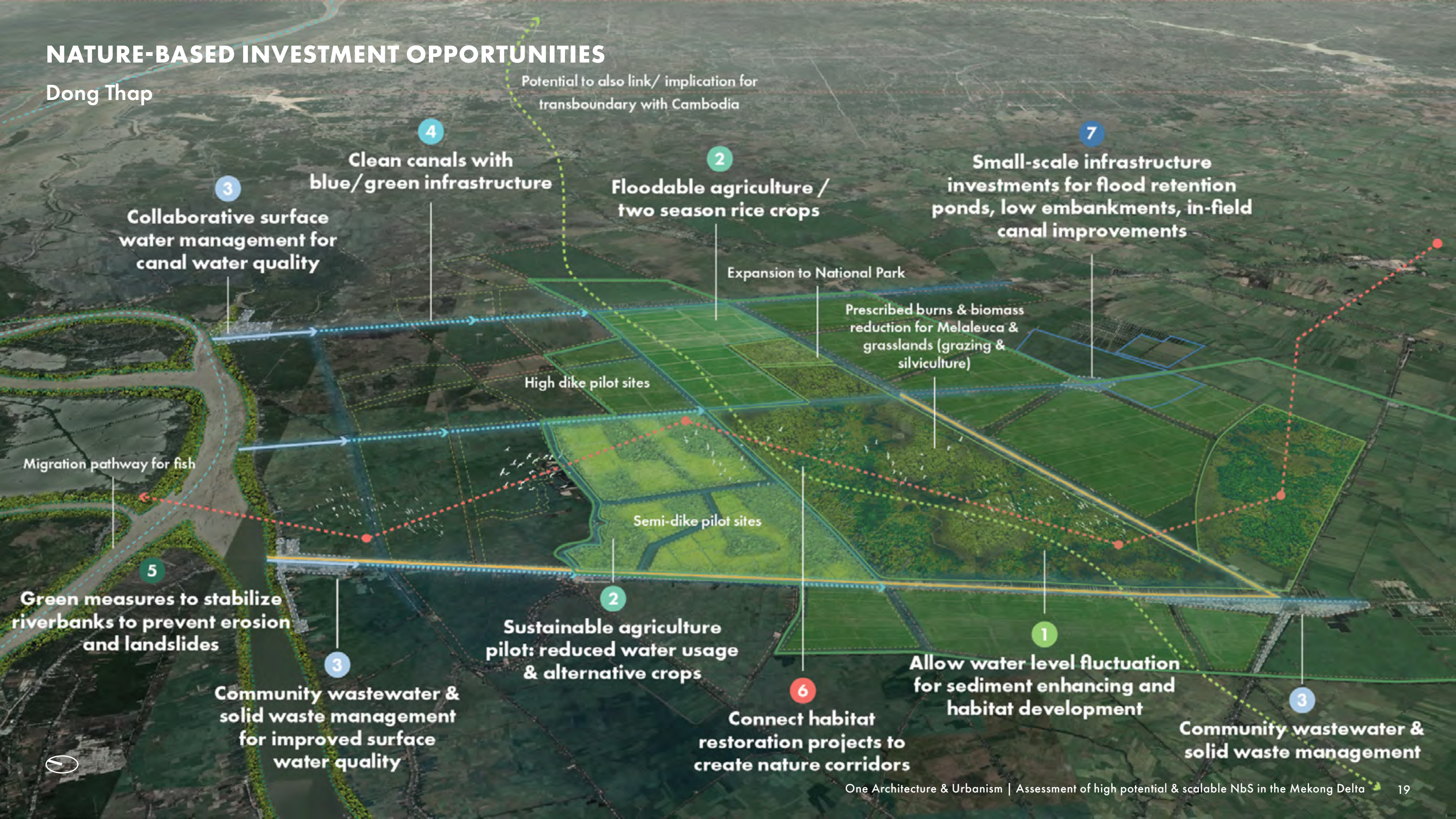
- Full Dikes constructed by 2000 (estimated)
- Full Dikes constructed between 2000-2012 (estimated)
- Full Dikes constructed after 2012
- Semi-Dikes

Sources: RHDHV; N. V. K. Triet et al.: Dyke development and flood hazard in the VMD; V. Q. Thanh et al.: Flooding in the Mekong Delta: the impact of dyke systems on downstream hydrodynamics



NATURE-BASED INVESTMENT OPPORTUNITIES

Dong Thap



THANK YOU!



Justine Shapiro-Kline
One Architecture & Urbanism
shapirocline@onearchitecture.nl