





GREEN vs **BLUE**
STATIC vs **DYNAMIC**
CERTAIN vs **UNCERTAIN**
DEFINITE vs **INDEFINITE**

LAND CAN SOMETIMES **BE WATER**

Bridging the dichotomy between land and water through
amphibious landscapes

Naeema Ali

MscI Landscape Architecture

land

noun

UK  /lənd/ US  /lənd/

land *noun* (DRY SURFACE)

B2 [U]

the surface of the earth that is not covered by water:

water

noun

UK  /'wɔː.tə/ US  /'wɑː.tə/

A2 [U]

an area of water, such as the sea, a lake, or a swimming pool:





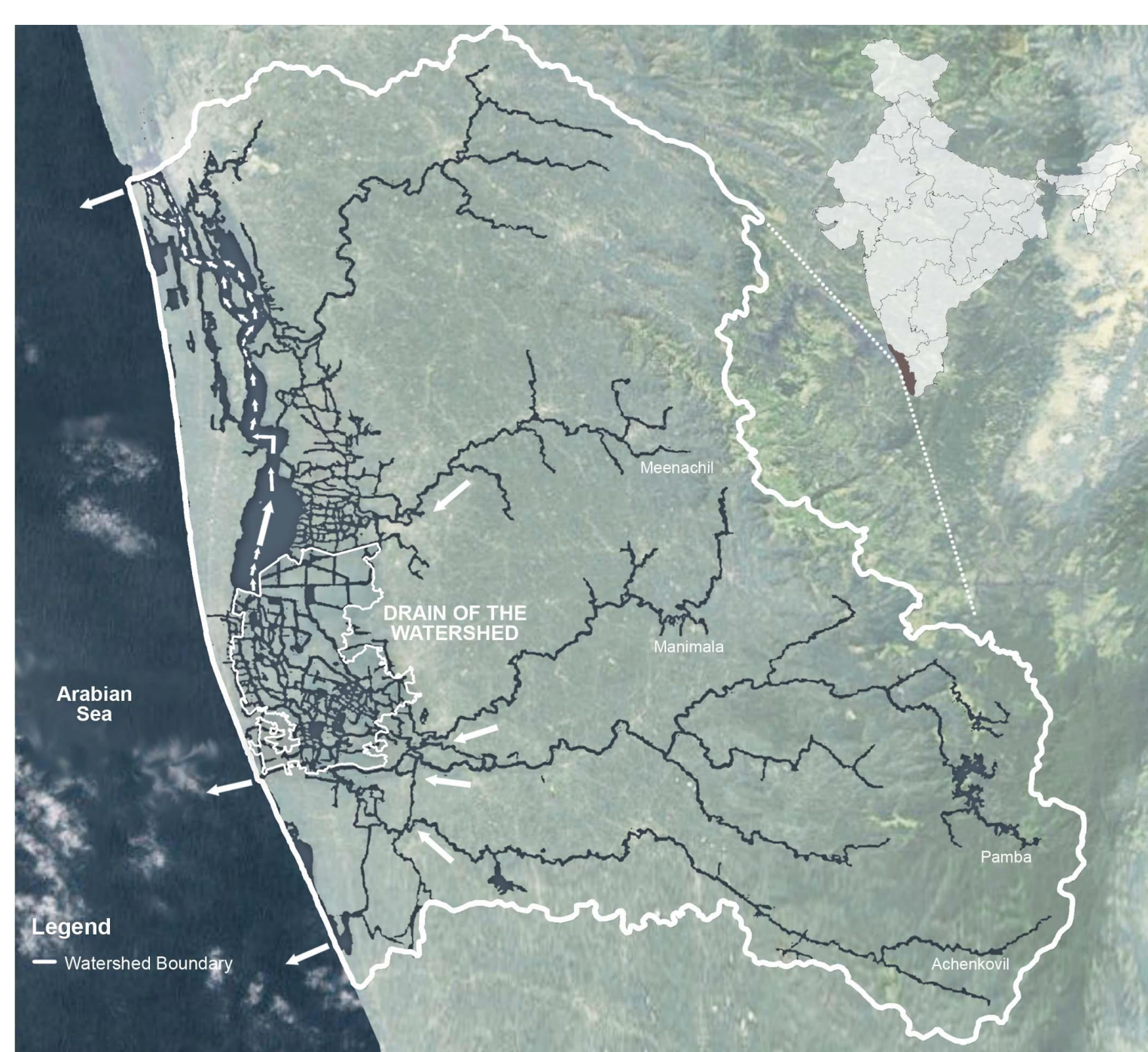


swamps

wetlands

DELTA





Site context

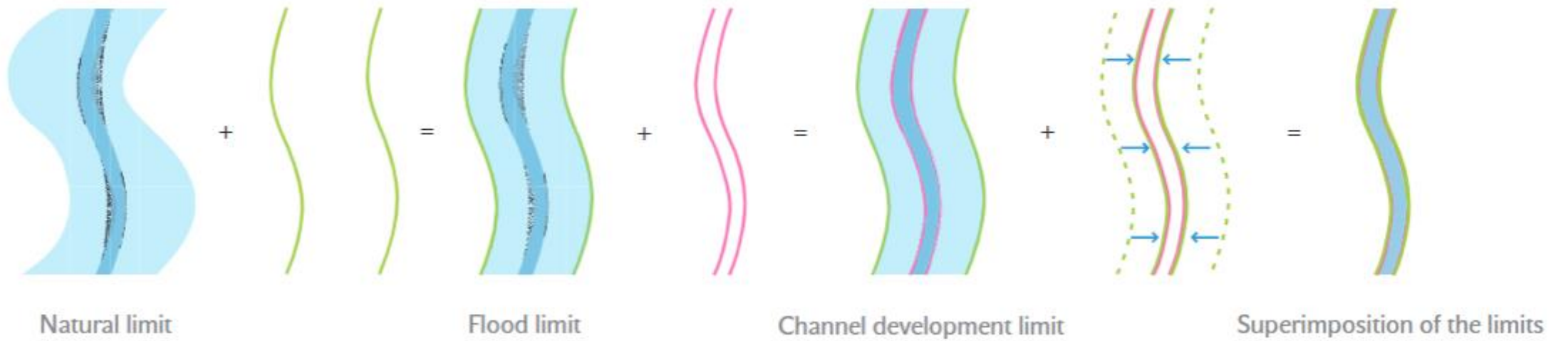


life in the delta

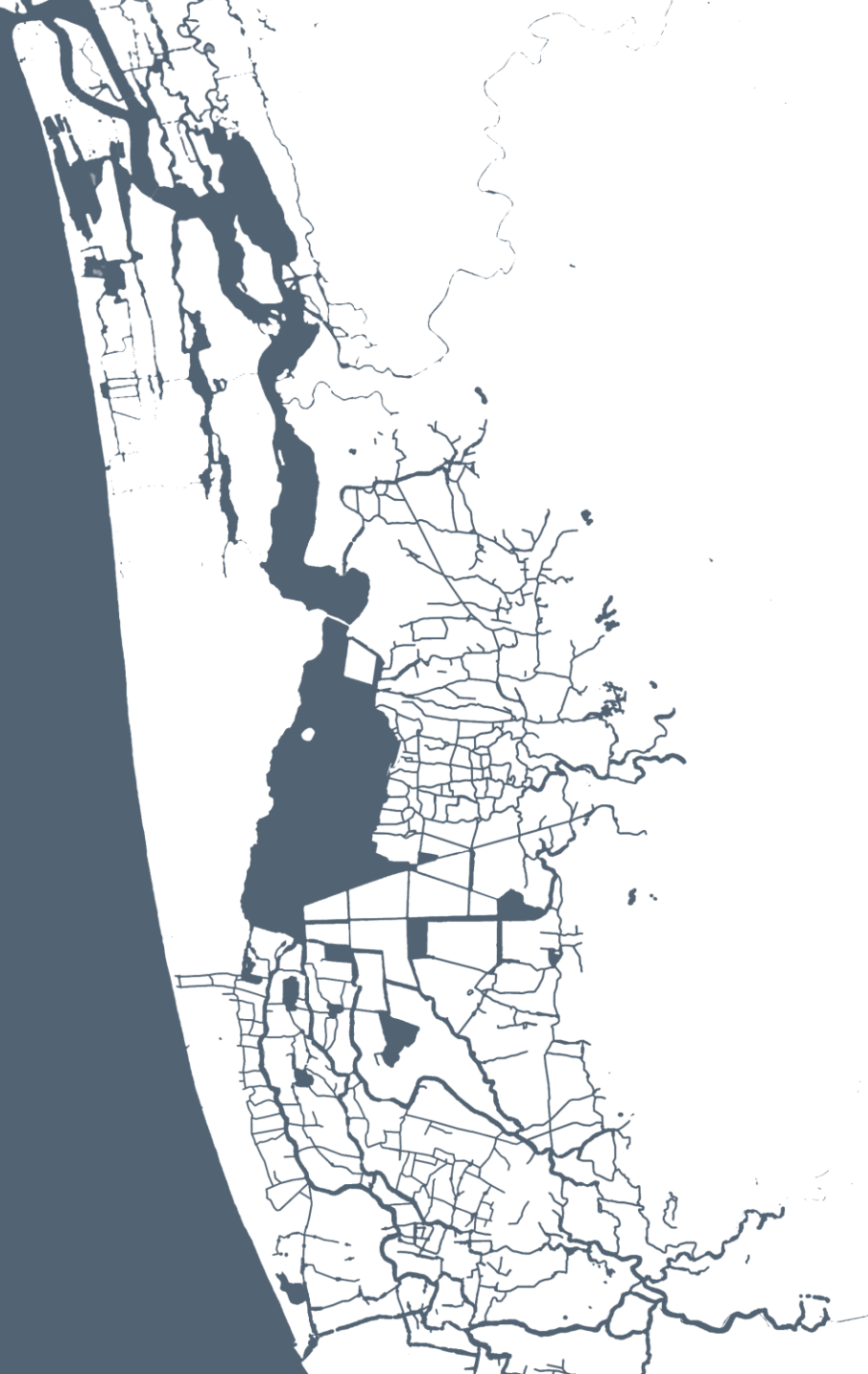
unique **water-centred** cultural traditions evolved



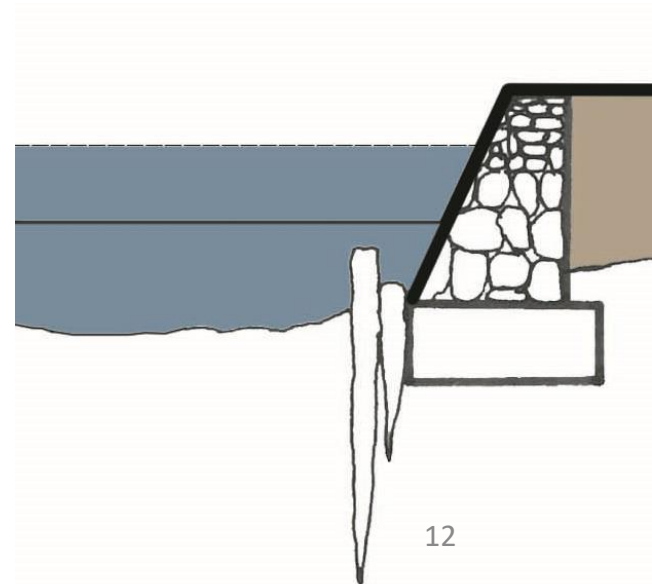
In short life in deltas is **amphibious**



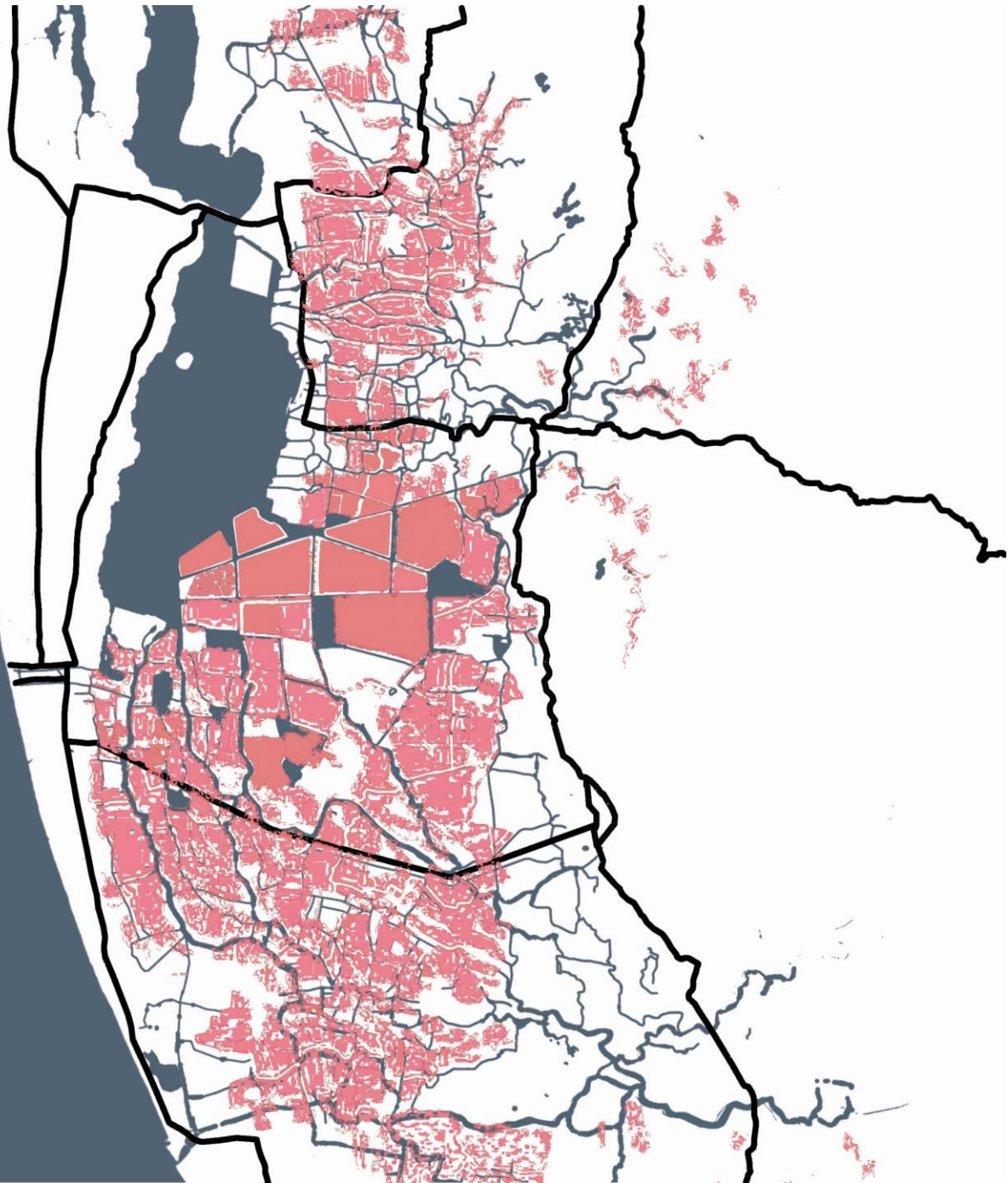
ARABIAN
SEA



context

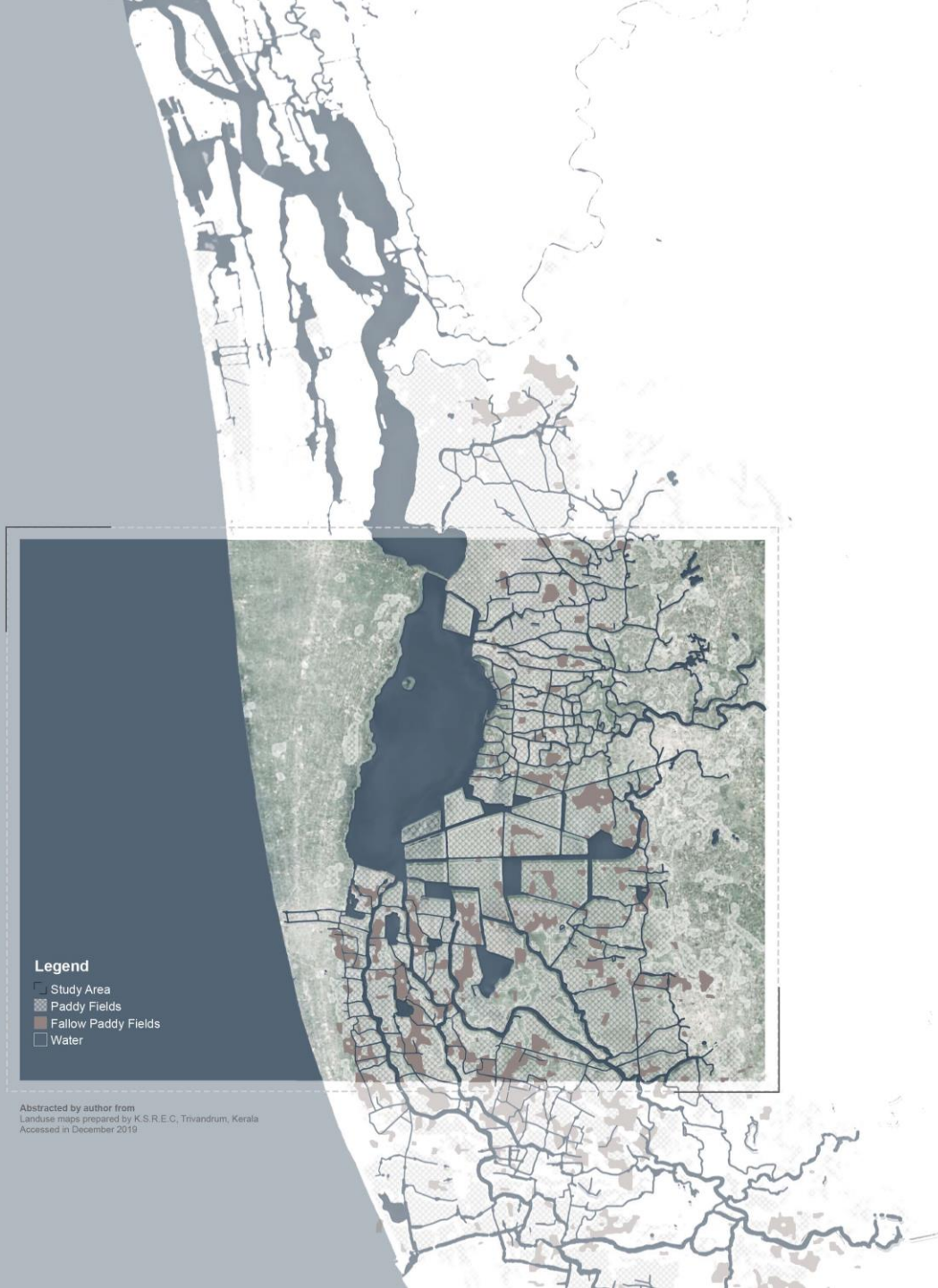


ARABIAN
SEA



flooding

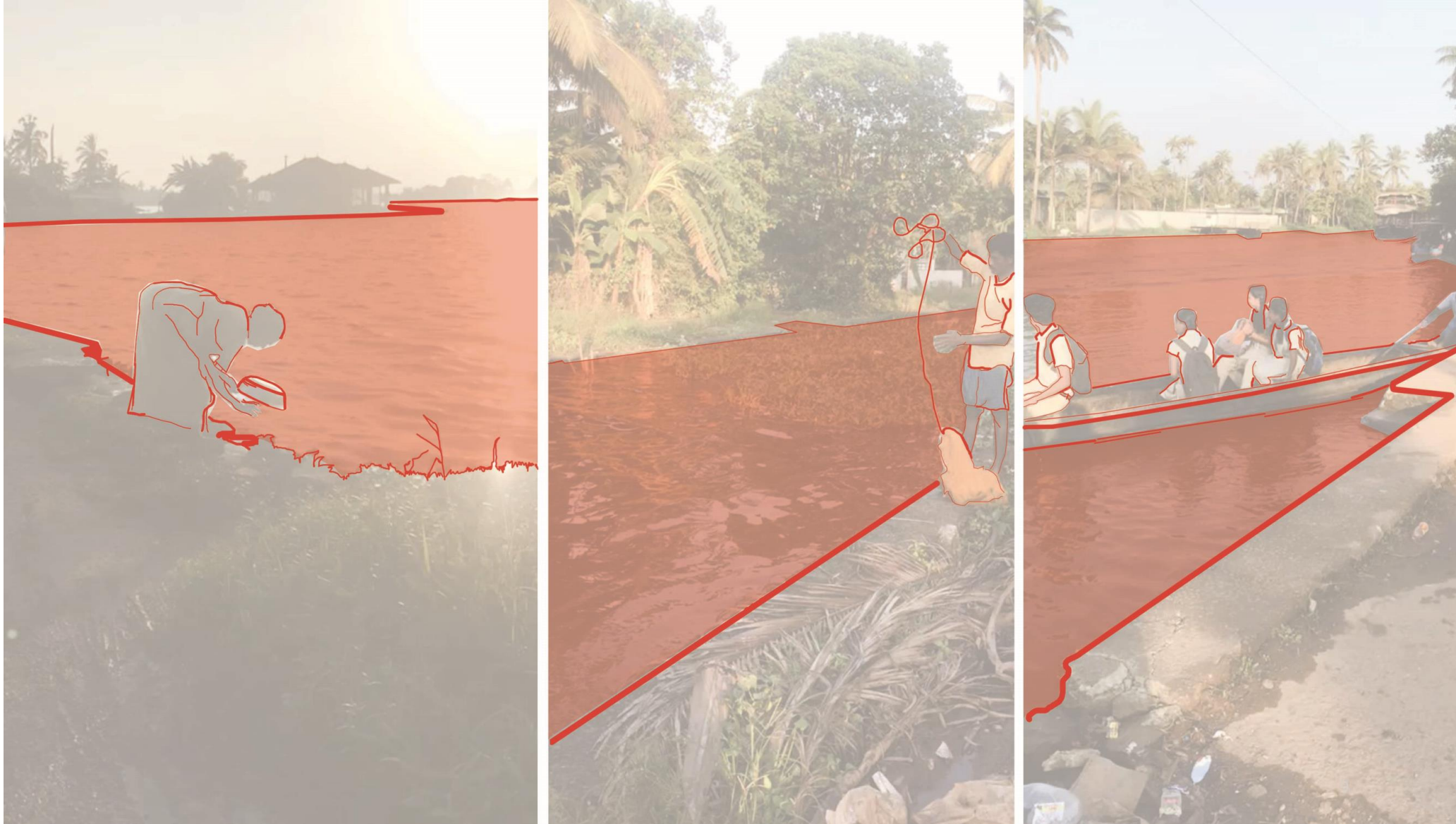




problem statement

The inadaptability of the agricultural landscapes has reduced their socio-economic value drastically resulting in a **poor quality of living.**

How to create a flexible landscape by redefining the **relationship between land and water** in order to **improve the quality of life and space** in the Kuttanad Deltaic region?



These lines of flow which were crossed, breaching the terrestrial boundaries of habitation and cultivation are **not existing lines** drawn **but lines imposed** for the functioning of the cultural landscape

Hydro-sociality

volatility

wetness

rhythm

new approach

Wetness

Volatility

Hydro-sociality

Rhythm

Towards a Flexible Delta

volatility



19th century
natural landscape



1850-1945
land reclamation



1945- 1976
salt barrier construction



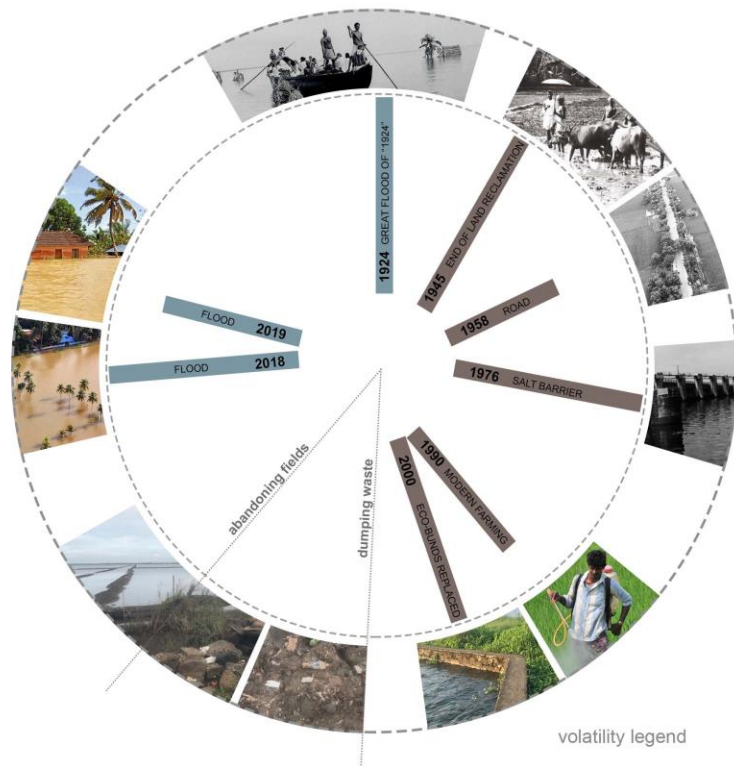
1976- 2000
diasappearing paddy fields



2000- 2020
diasappearing paddy fields,
seasonal flooding



business casual
completely below sea level

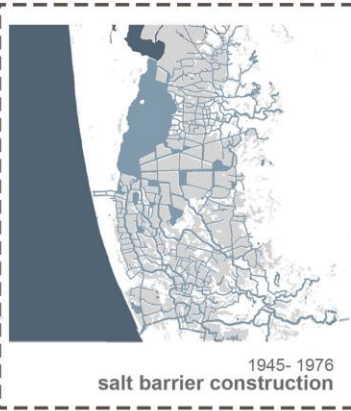




19th century
natural landscape



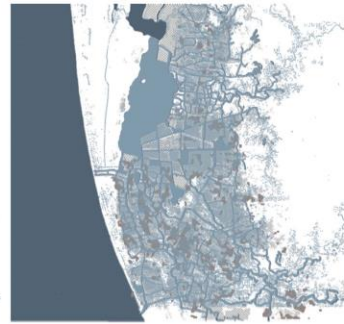
1850-1945
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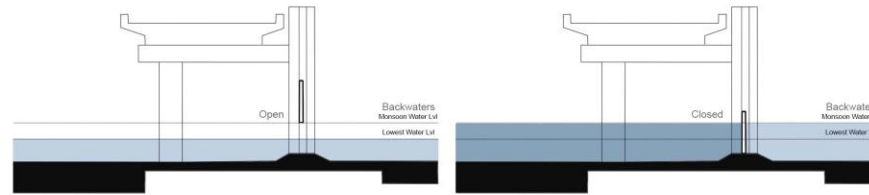
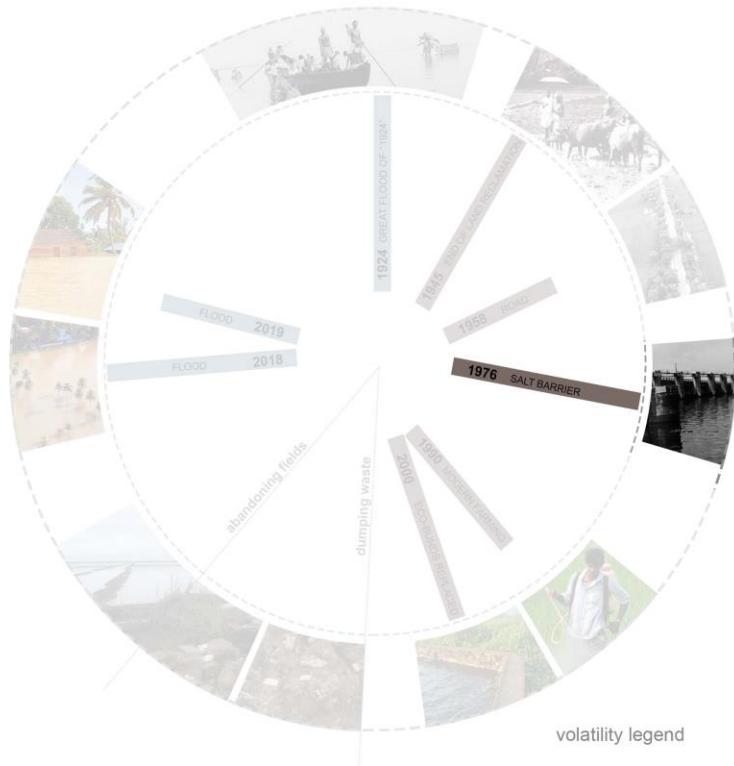
1976- 2000
diasappearing paddy fields



2000- 2020
diasappearing paddy fields,
seasonal flooding

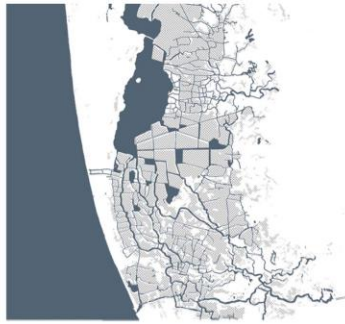


business casual
completely below sea level





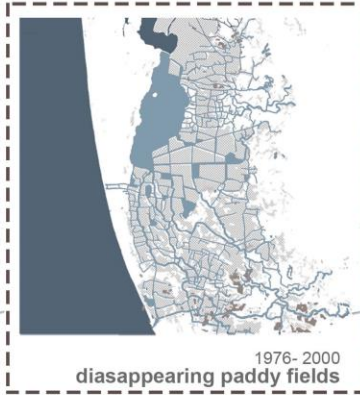
19th century natural landscape



1850-1945 land reclamation



1945-1976 salt barrier construction



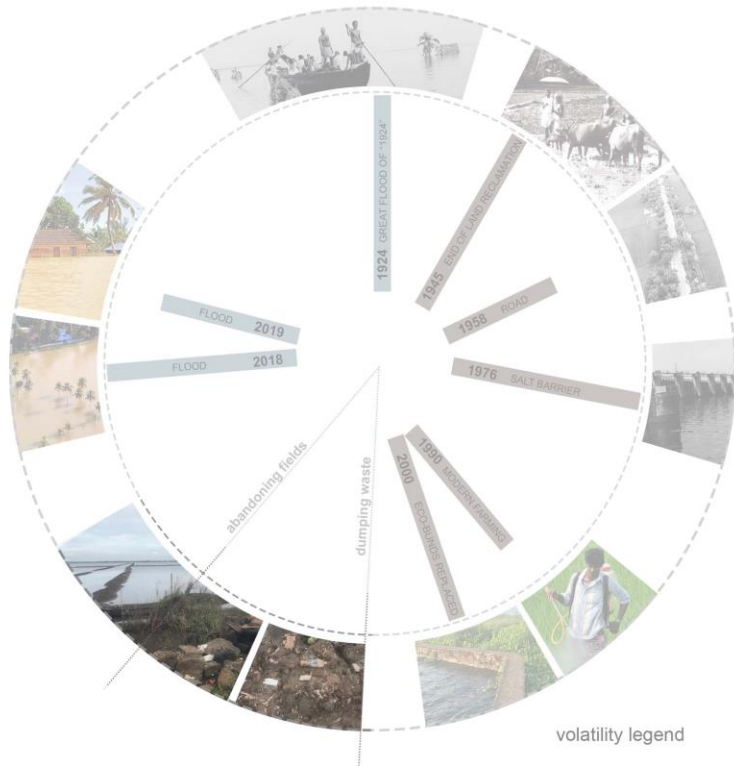
1976-2000 disappearing paddy fields



2000-2020 disappearing paddy fields seasonal flooding



business casual completely below sea level





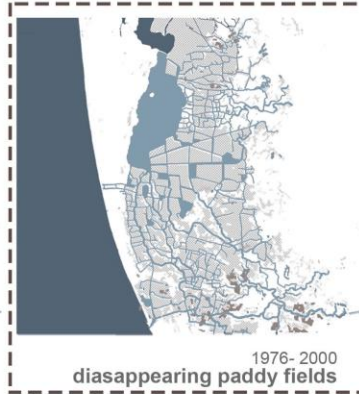
19th century
natural landscape



1850-1945
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salt barrier construction



1976- 2000
disappearing paddy fields



2000- 2020
disappearing paddy fields
seasonal flooding



business casual
completely below sea level





19th century
natural landscape



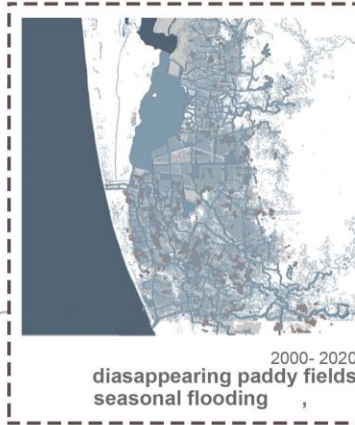
1850-1945
land reclamation



1945- 1976
salt barrier construction



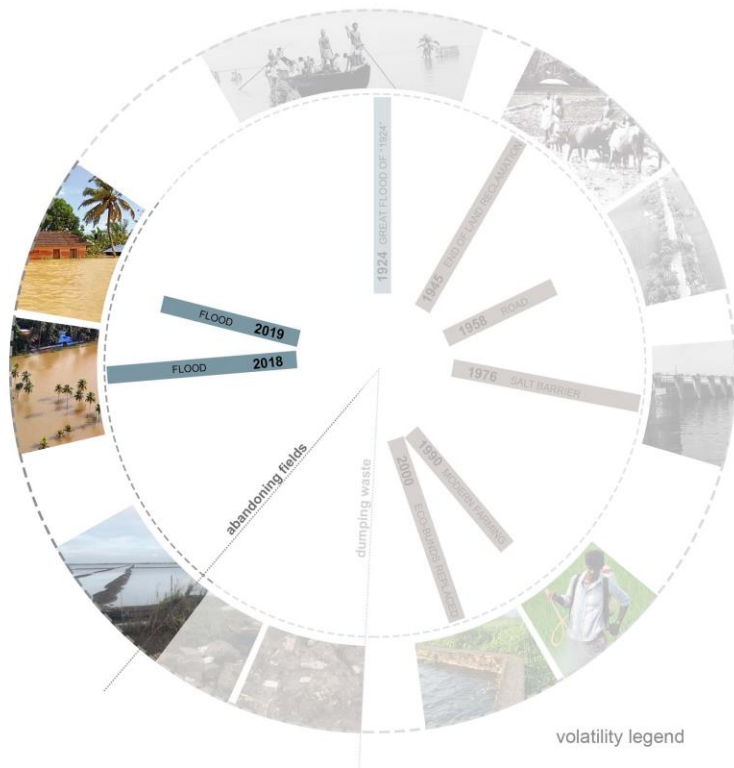
1976- 2000
diasappearing paddy fields



2000- 2020
diasappearing paddy fields
seasonal flooding

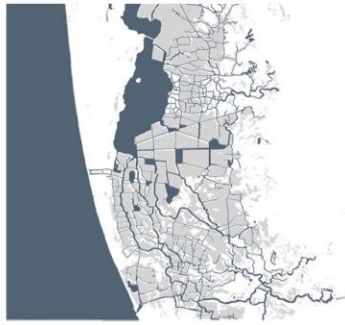


business casual
completely below sea level





19th century natural landscape



1850-1945 land reclamation



1945- 1976 salt barrier construction



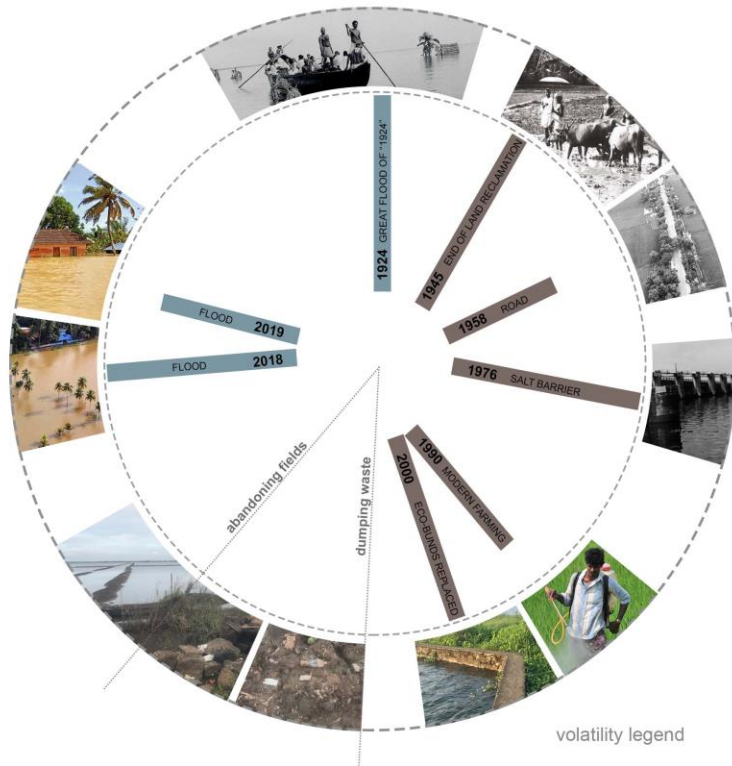
1976- 2000 disappearing paddy fields



2000- 2020 disappearing paddy fields seasonal flooding



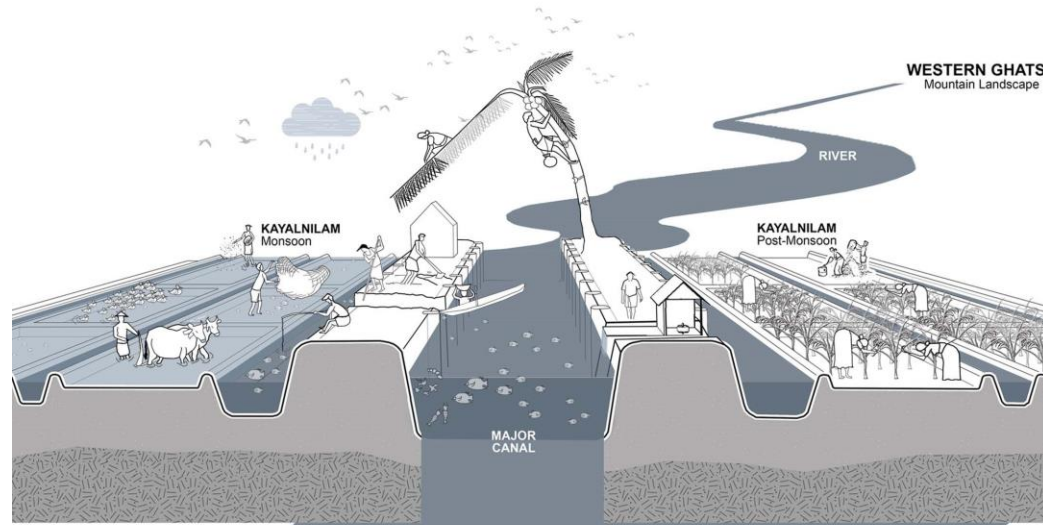
business casual completely below sea level



Extreme case

1. Sea level rise of 1.5m
2. No room for livelihood in these landscapes

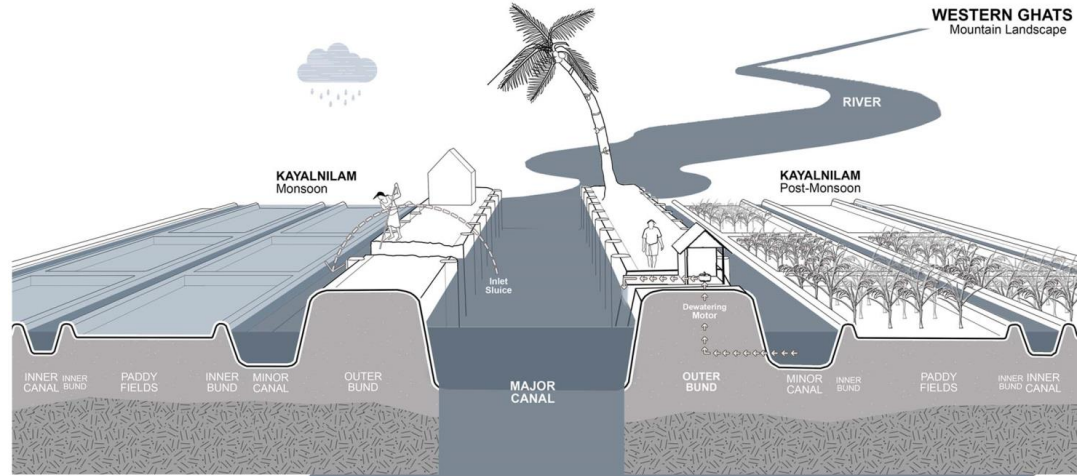
Hydro-sociality



“Our land gave us everything. Water gave us fish and land gave us rice and coconuts. Our land never left us go hungry. We could catch fish from the rivers that flowed in front of our houses”

SEA

Before



“This is our hereditary occupation. I like my occupation and will do it till I die. I am known by this occupation which is my identity in this region. But this occupation must end with me. I will not let my children enter the fields”

After

Hydro-sociality diagram

NaCl



H₂O



Agriculture

Agriculture

Agriculture

Aquaculture

Aquaculture

Aquaculture

Aquaculture

Traditional Water System



Existing Water System

Agriculture

Agriculture

Agriculture

Agriculture



Future Water System

Agriculture

Agriculture

Agriculture

Agriculture

Aquaculture

Aquaculture

Aquaculture

Aquaculture

Ecoculture

Ecoculture

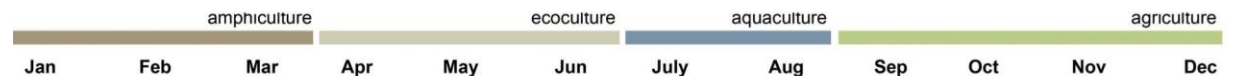
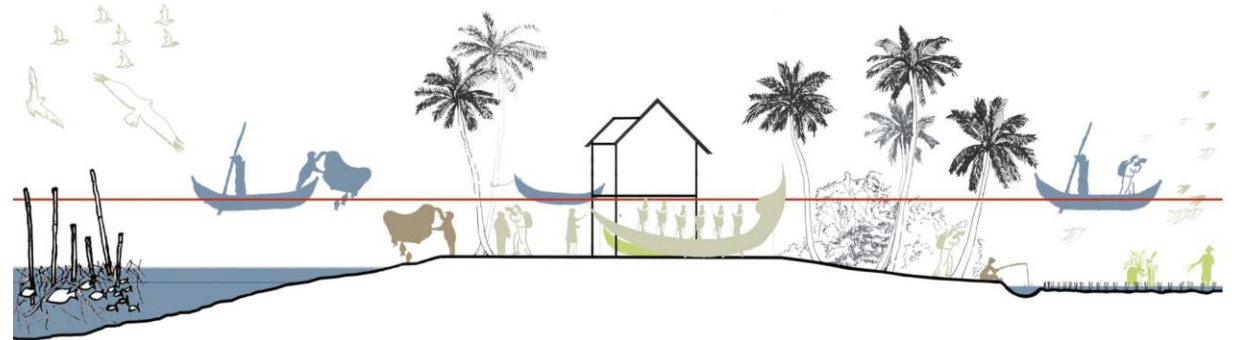
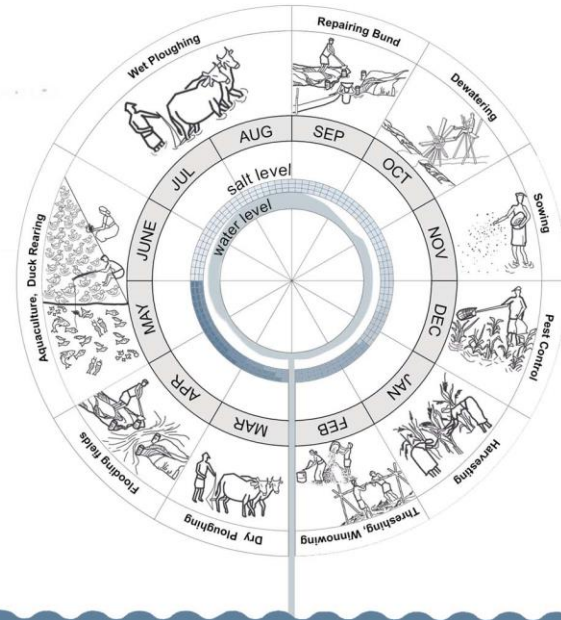
Ecoculture

Ecoculture

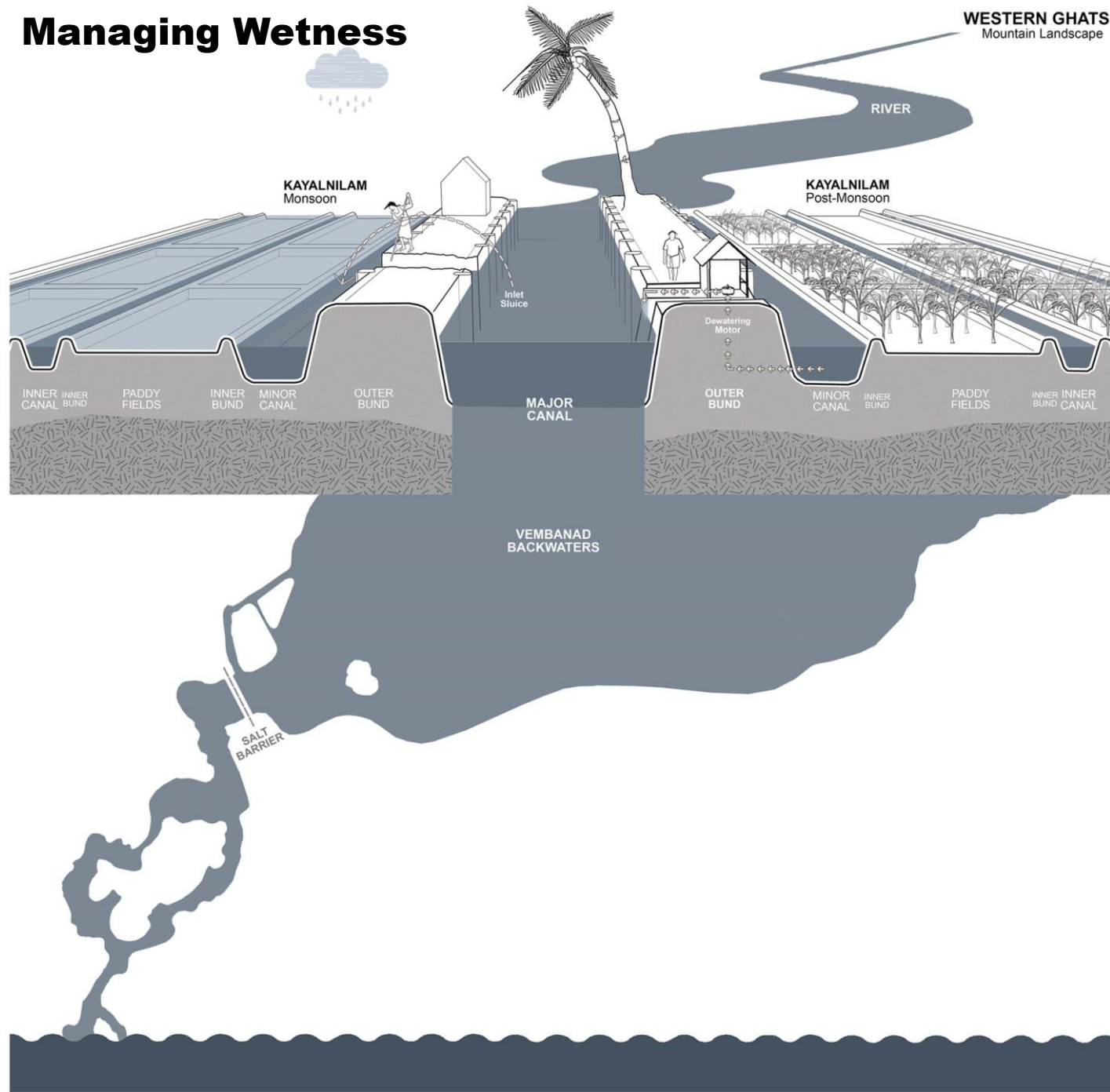
Rhythm

WATER CALENDAR

Dry Ploughing The action of tilling the soil. **Flooding fields** The release of water from canals through sluices. **Duck Rearing** The raising of ducks for meat and eggs. **Aquaculture** The harvesting of fish and shellfish. **Wet Ploughing** The action of tilling wet soil. **Repairing Bund** The fixing or strengthening of the bunds when damaged. **Dewatering** The action of removing water. **Sowing** The action of planting the seeds by throwing them. **Pest Control** The action of removing pests by beating the upper tips of the . **Harvesting** The action of gathering rice crop. **Threshing** The action of beating and separating grains. **Winnowing** The action removing husk from grains.



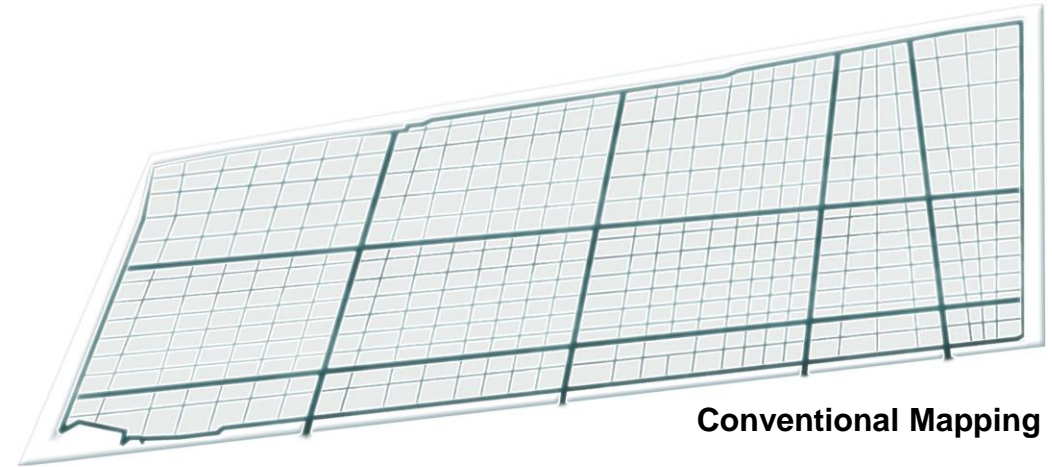
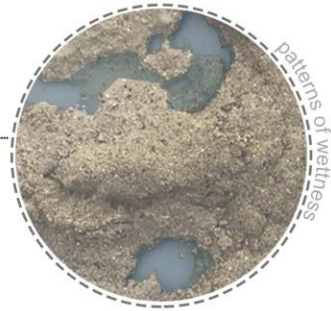
Managing Wetness



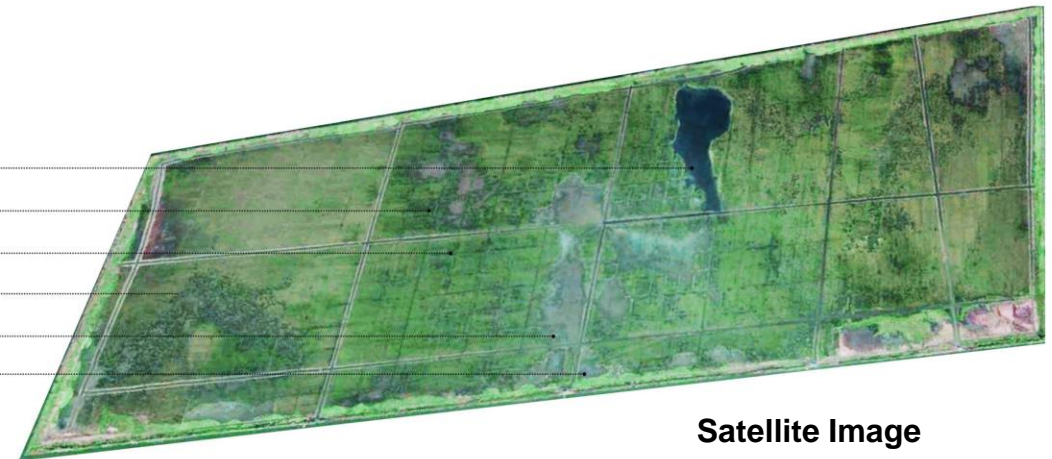
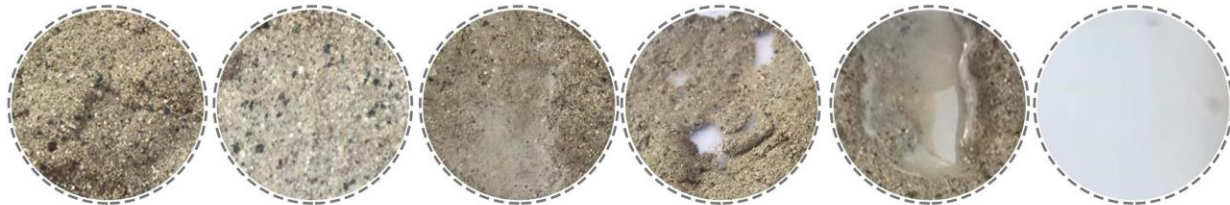
“The idea of confining land and water to infrastructural lines was essentially a cultural expression of how people perceived, understood and managed their landscape”

Understanding Wetness

Modelling Wetness

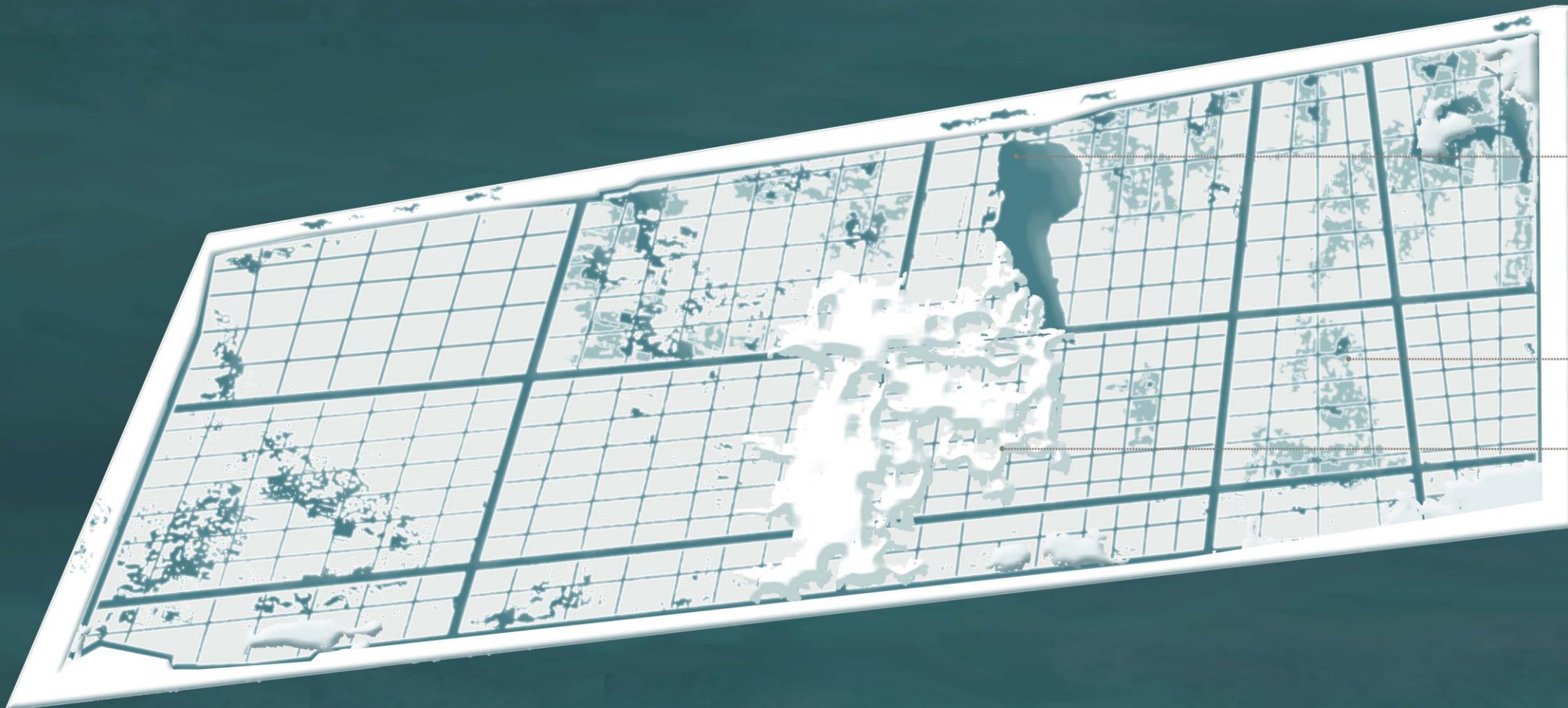


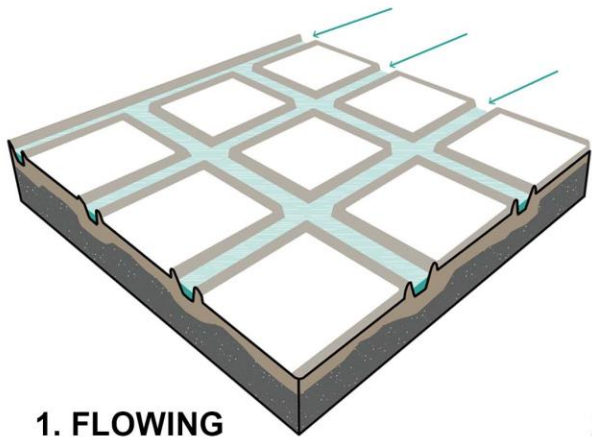
Conventional Mapping



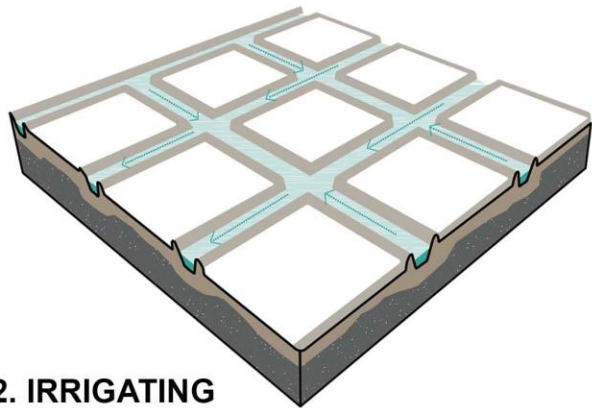
Satellite Image

Wetness Gradients

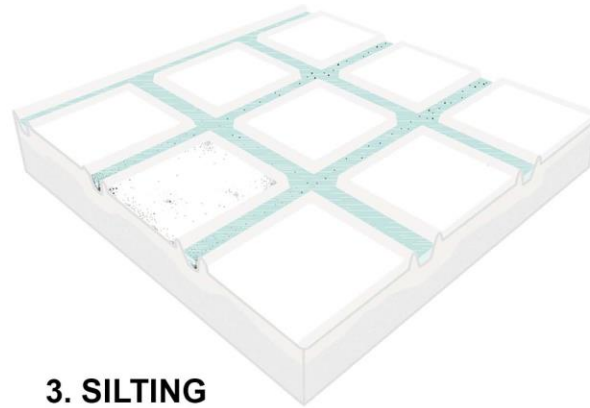




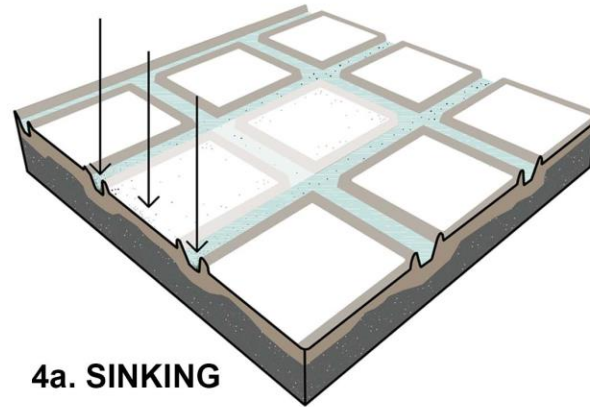
1. FLOWING



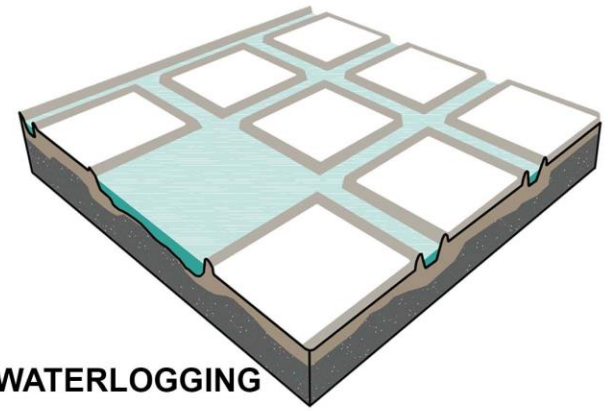
2. IRRIGATING



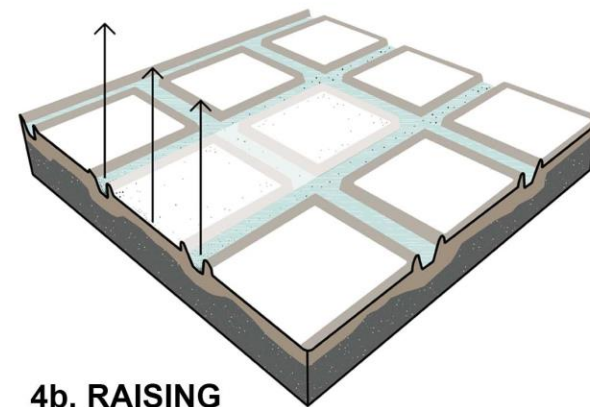
3. SILTING



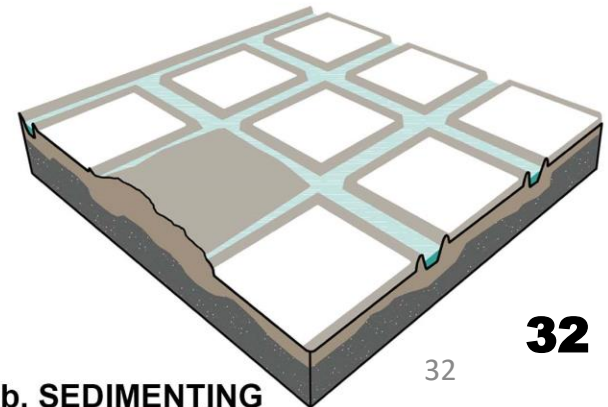
4a. SINKING



5a. WATERLOGGING



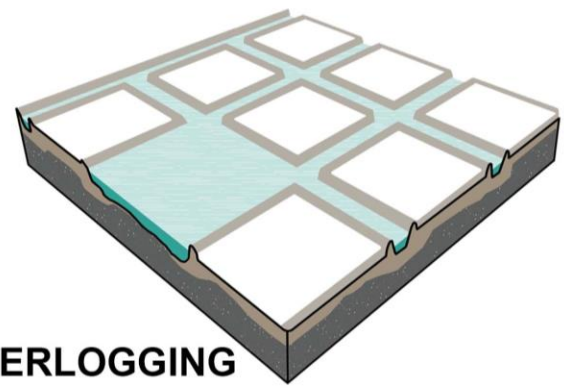
4b. RAISING



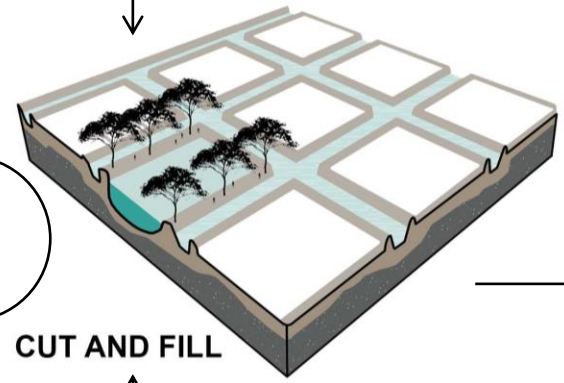
5b. SEDIMENTING

wetness principles

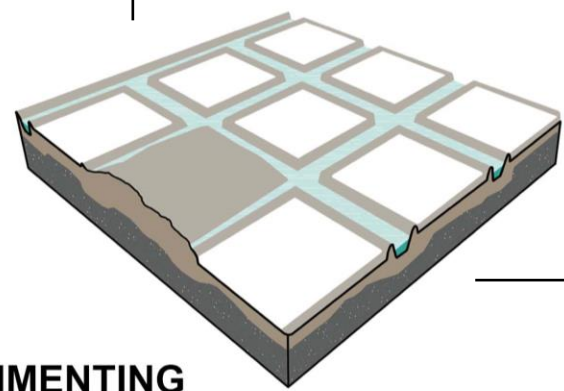
managing wetness



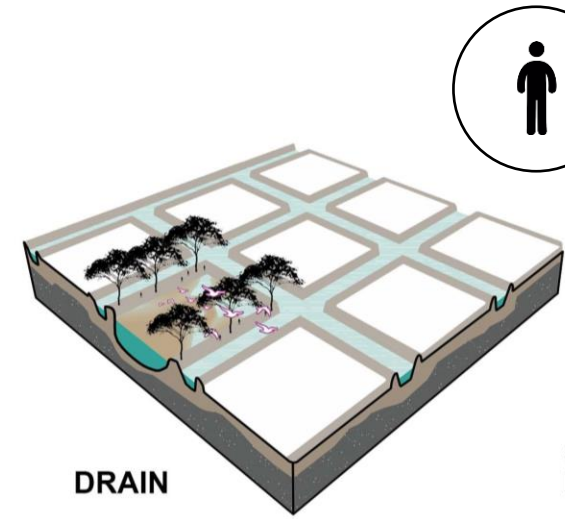
WATERLOGGING



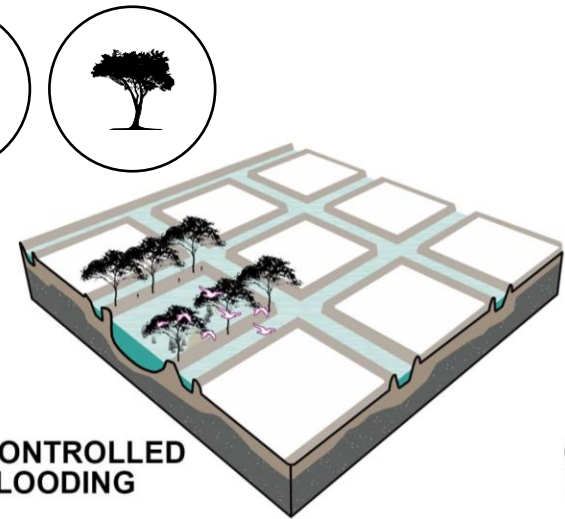
CUT AND FILL



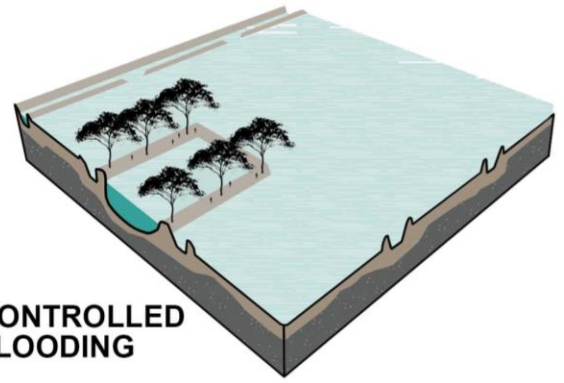
SEDIMENTING



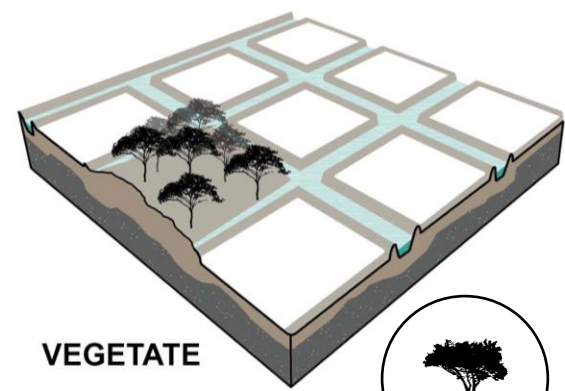
DRAIN



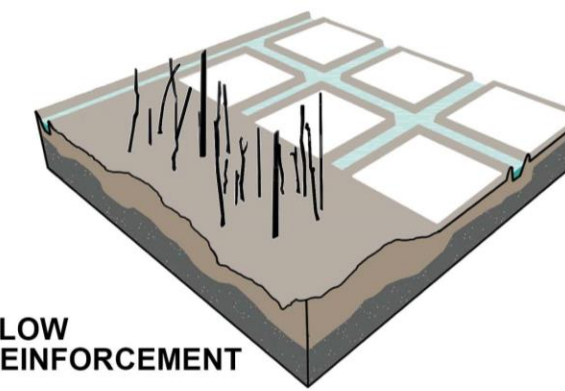
CONTROLLED FLOODING



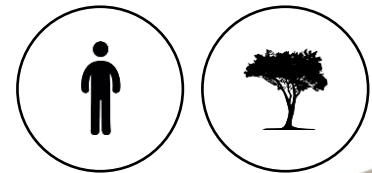
CONTROLLED FLOODING



VEGETATE

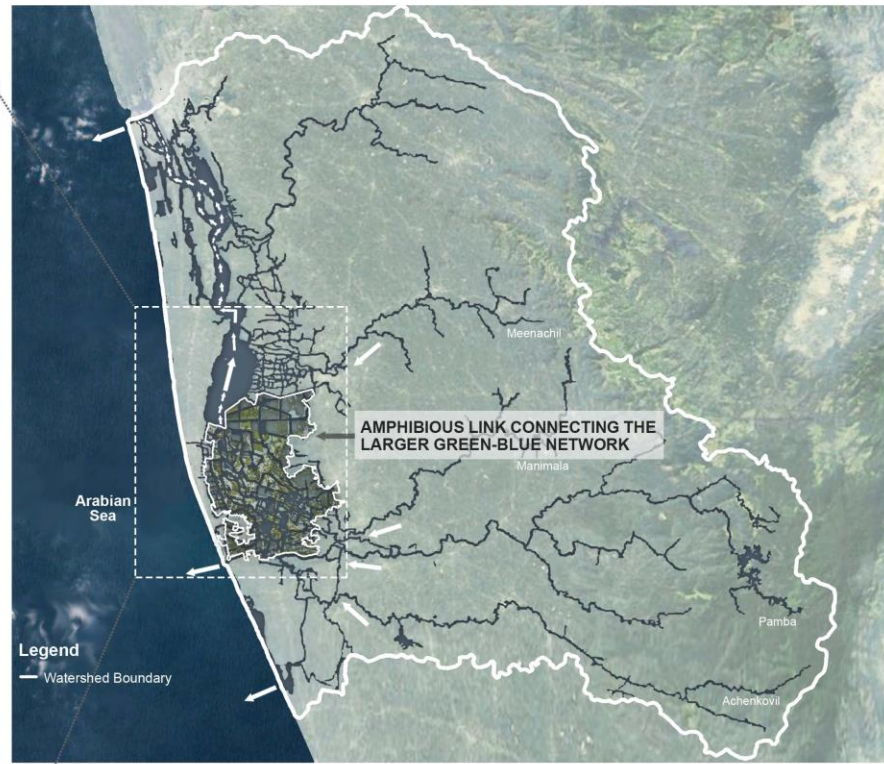


SLOW REINFORCEMENT

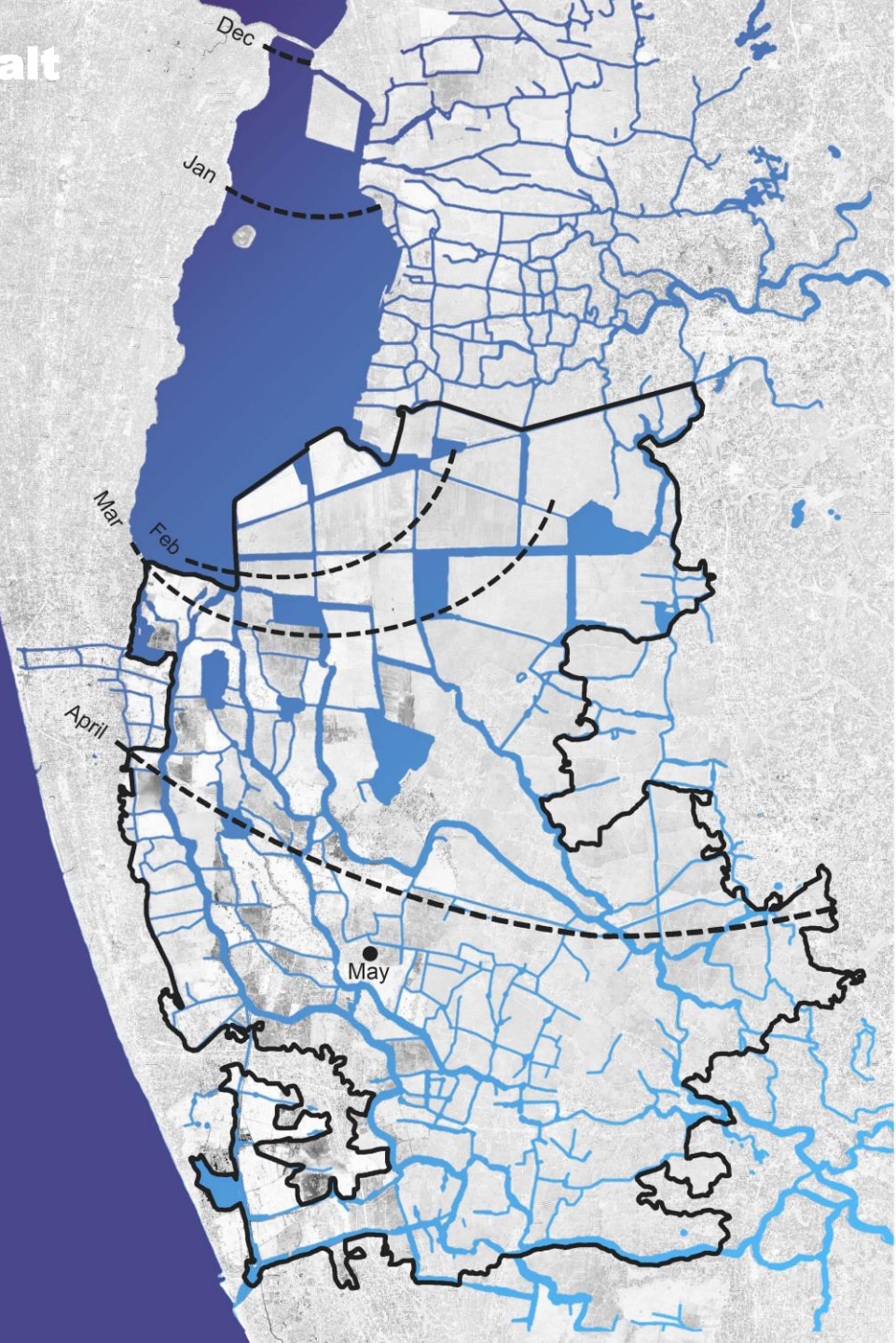


Scaling Wetness

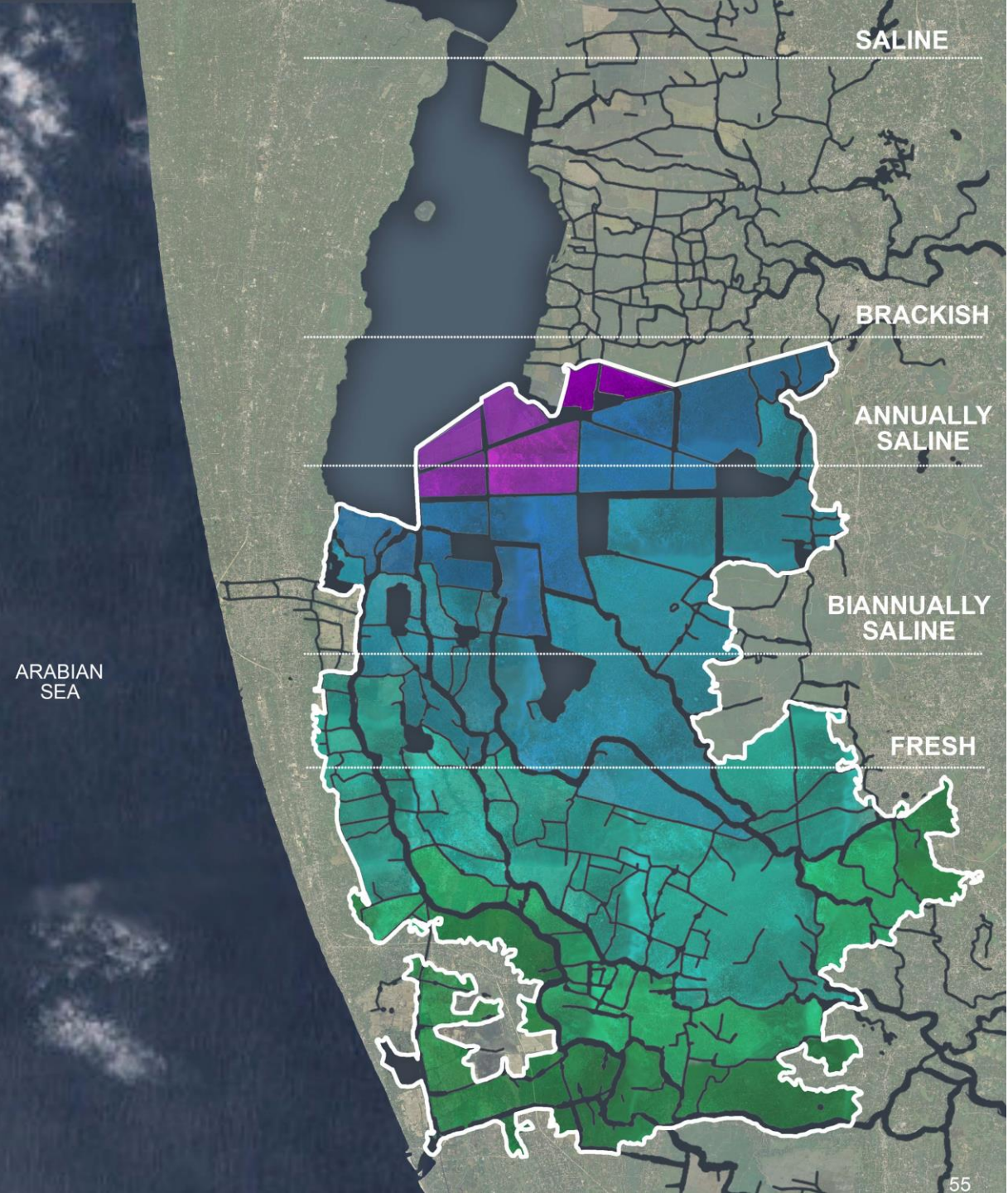
- Legend**
- Farming below zero
 - Paddy Fields
 - Amphibious Spaces
 - Water

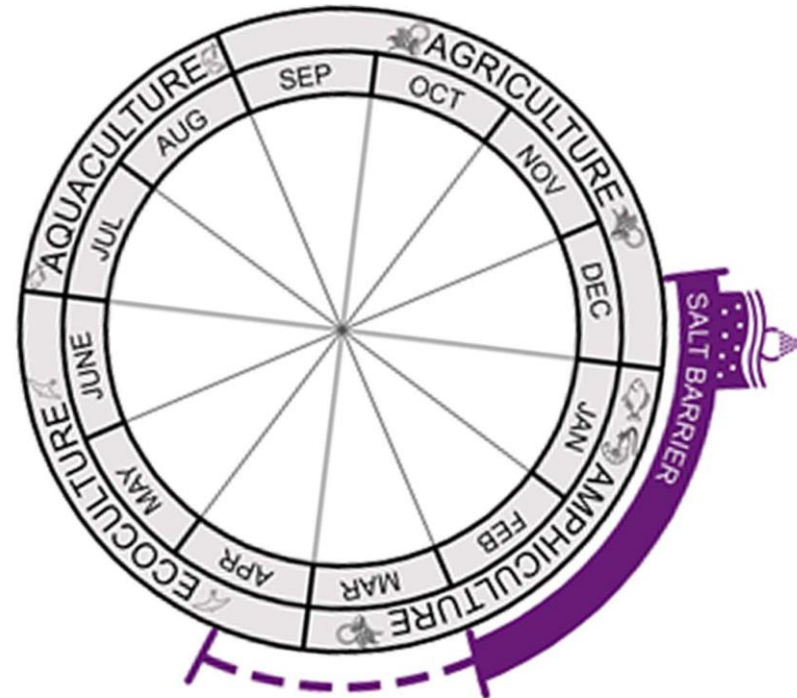
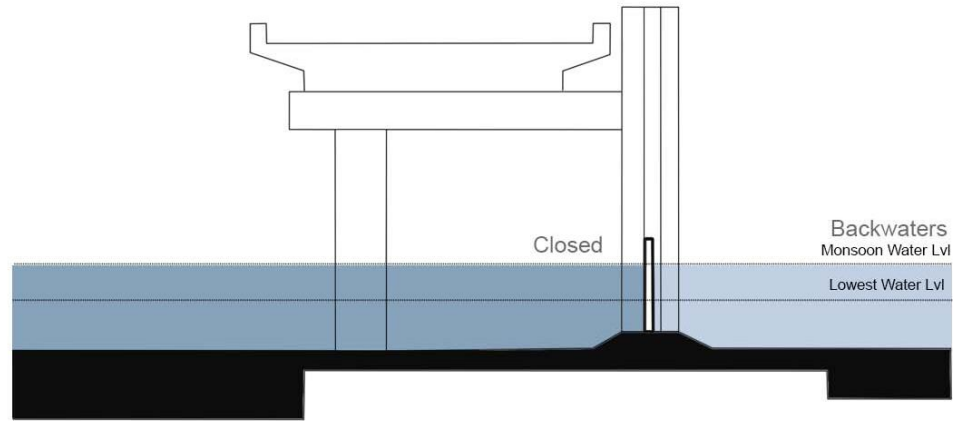
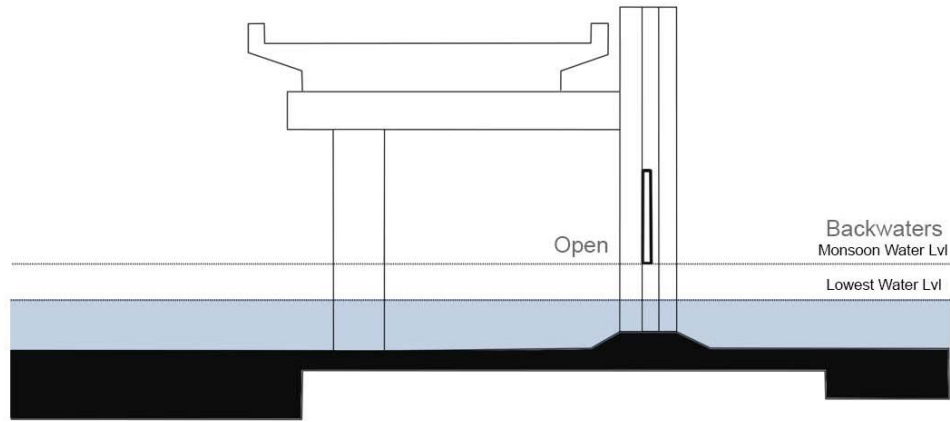


Cycle of salt

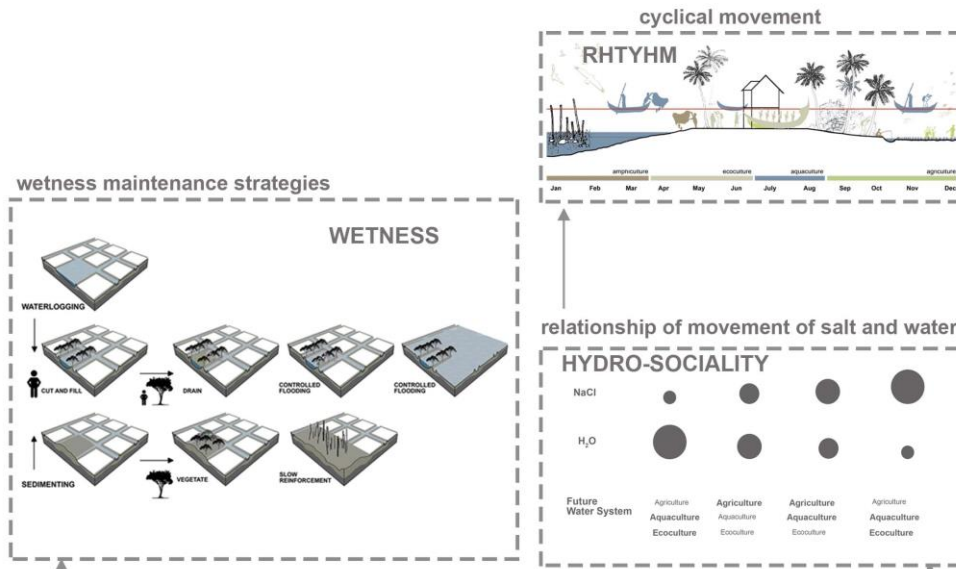


- Legend**
- Farming below zero
 - Salty
 - Fresh



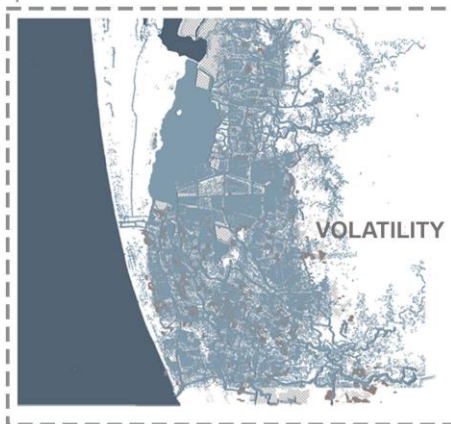


Applying Principles to Research Question



How to create a flexible landscape by redefining the **relationship between land and water** in order to improve **the quality of life and space** in the Kuttanad Deltaic region?

extreme case scenarios
1. sea level rise
2. threat to livelihood

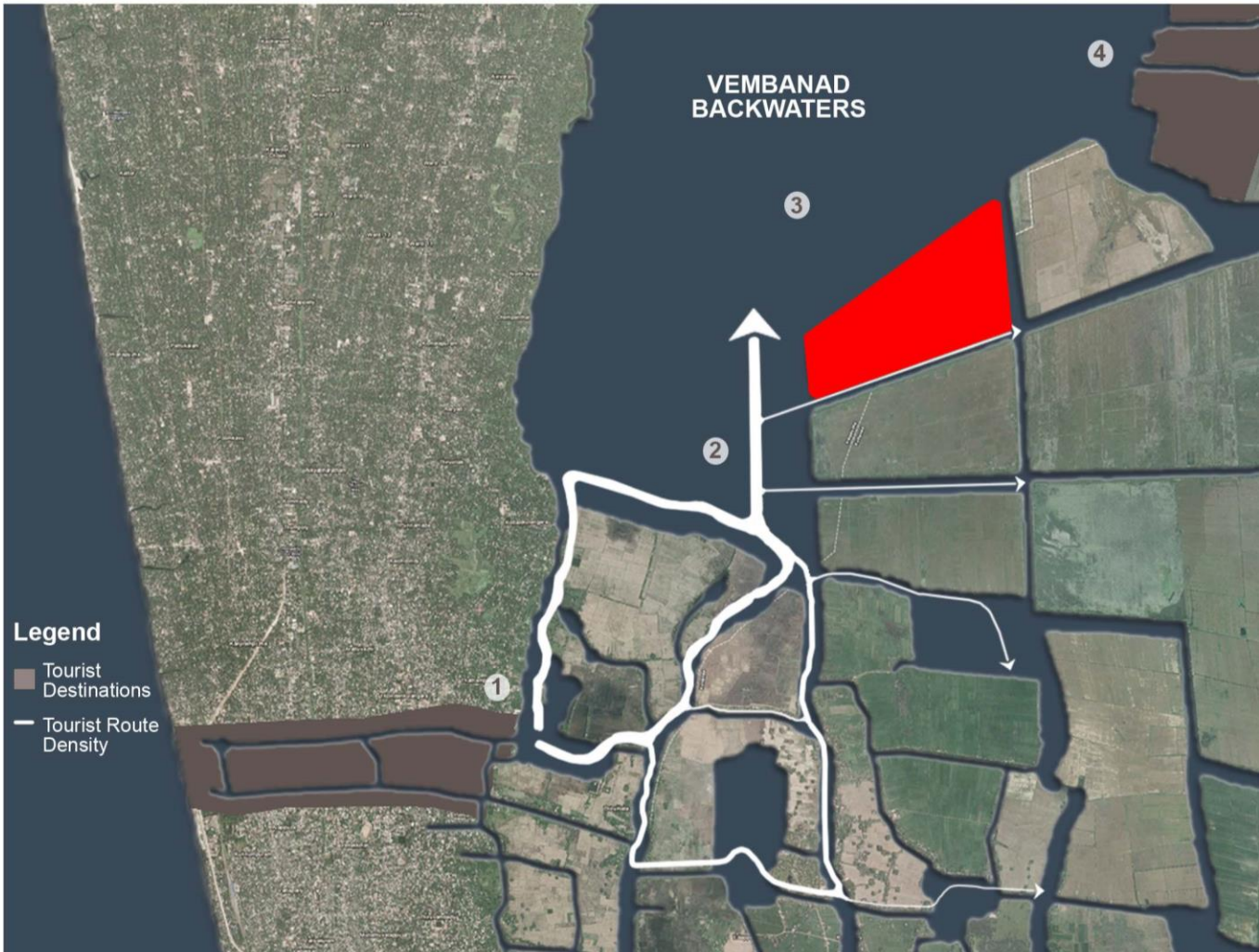


Design Question

How to transform **seasonally flooded agricultural landscapes** into **amphibious landscapes** that can resonate with the **cyclical movement of salt and water**?

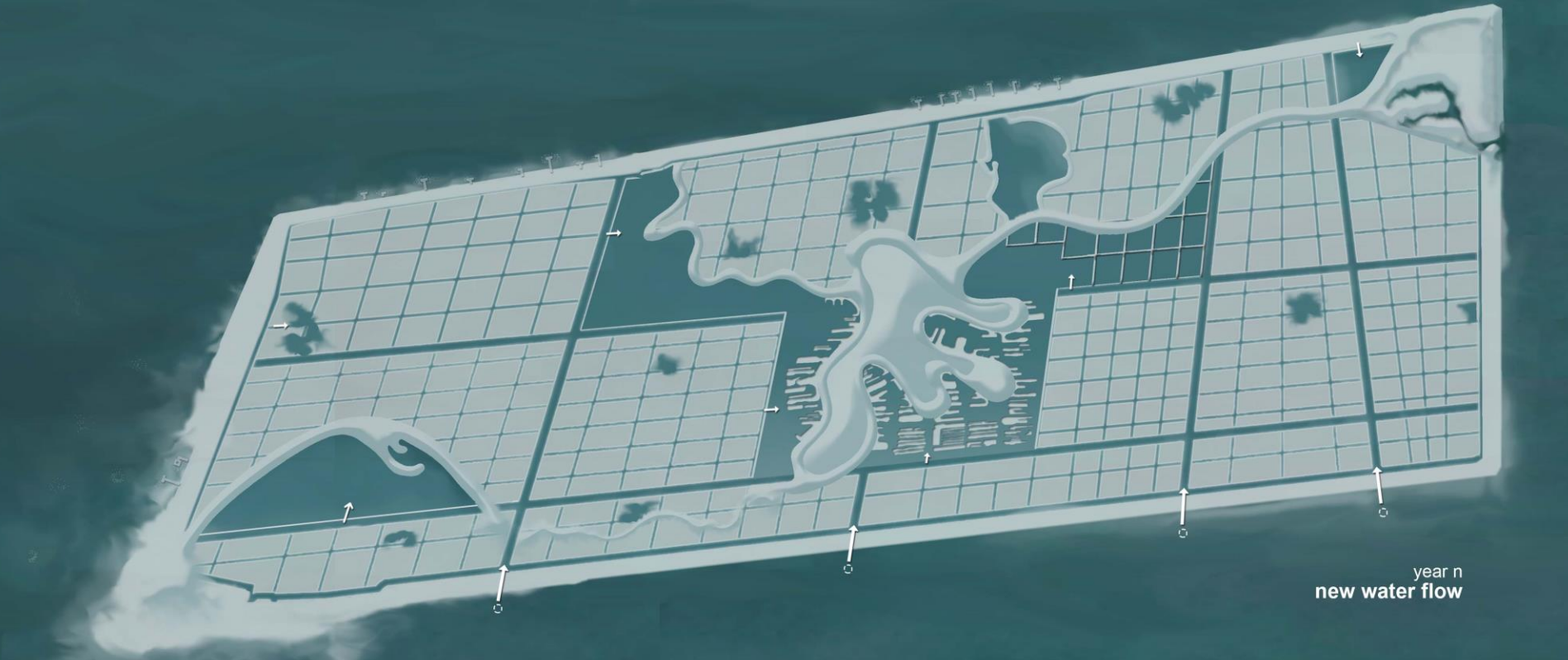
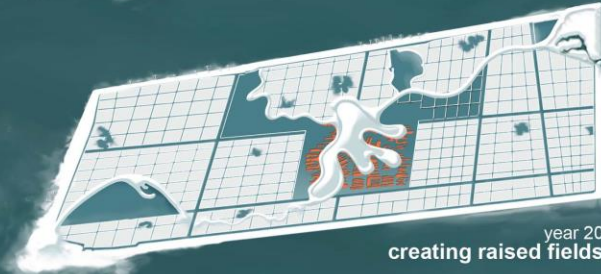
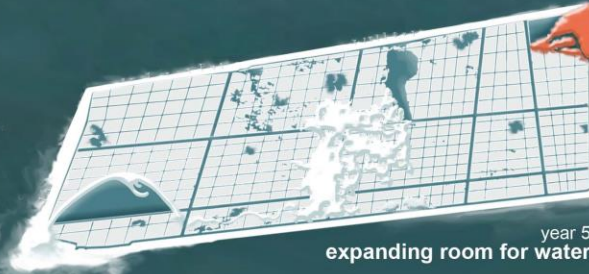
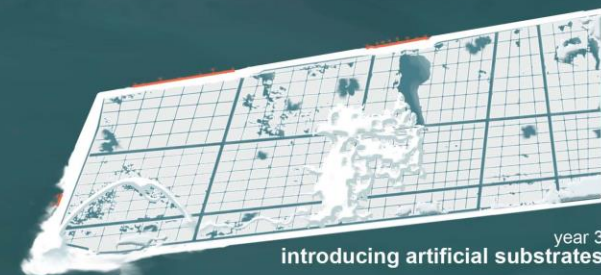
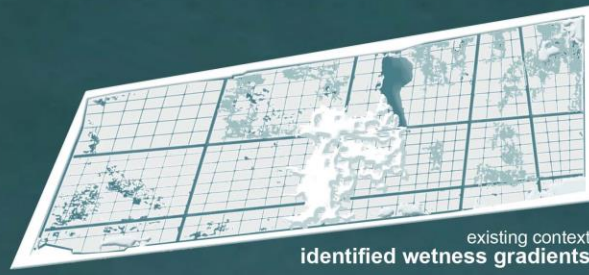
- How can these new amphibious landscapes be valuable to inhabitants by offering year-round livelihood opportunities?
- How can tourism be integrated with these livelihood opportunities?
- How to bring about this transformation gradually without disrupting the existing functioning?
- What is the role of the inhabitants, nature and the landscape architect in bringing about this transformation?

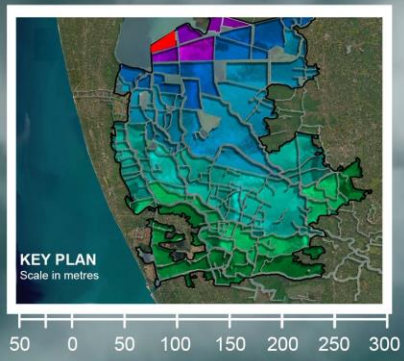
Site Dereliction



Handmade in the delta

Slow Landscape Architecture



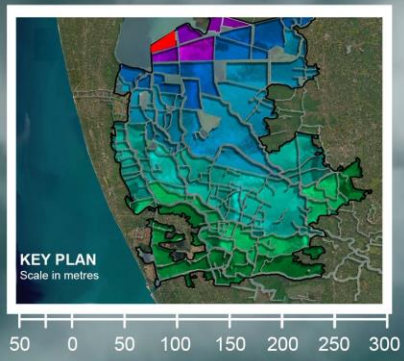


Dewatering pump station

year n
new "amphibious" landforms

N LEGEND

- Fish Sanctuary
- Shrimp Farm
- Paddy fields
- Wetland Garden
- Polder Park
- Raised Fields
- Minor Canal
- Inner Canal
- Dewatering Pump Station
- Sluices



TIDAL AQUACULTURE



Dewatering pump station

year n
new "amphibious" landforms

N LEGEND

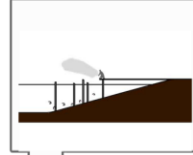
- Fish Sanctuary
- Shrimp Farm
- Paddy fields
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- Raised Fields
- Minor Canal
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- Dewatering Pump Station
- Sluices

fish sanctuary

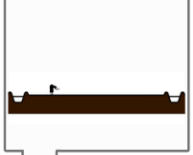


1. TIDAL AQUACULTURE

tidal farm



paddy fields



complex habitat structuring

adding species

new high tide +2.1m
sea level rise +1.9m / seasonal flooding level
high tide +0.6m
low tide 0m

intertidal zone

minor canal -0.6m

habitat breakwaters

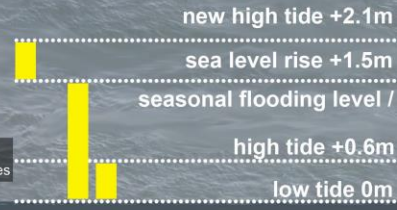
ecological enhancement

eco-recreational aquaculture

existing infrastructure

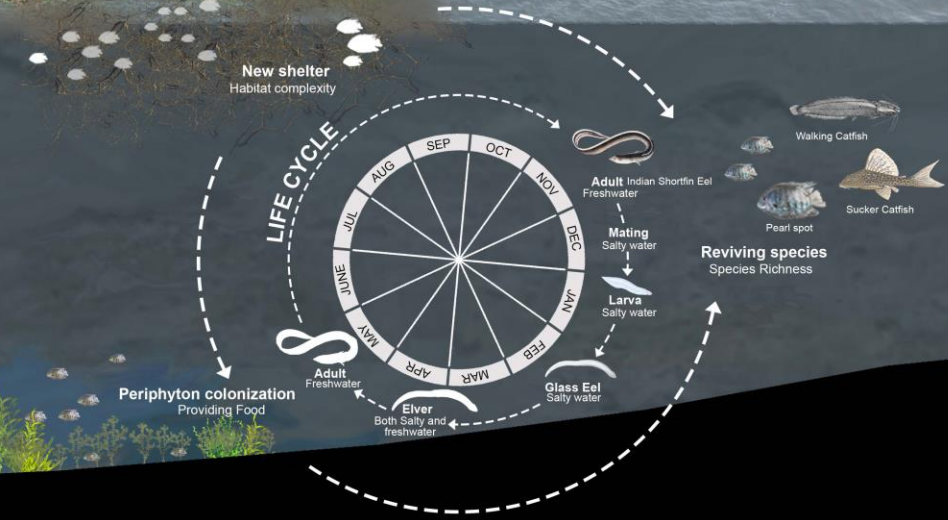
fish sanctuaries

We want to go see that fish sanctuary

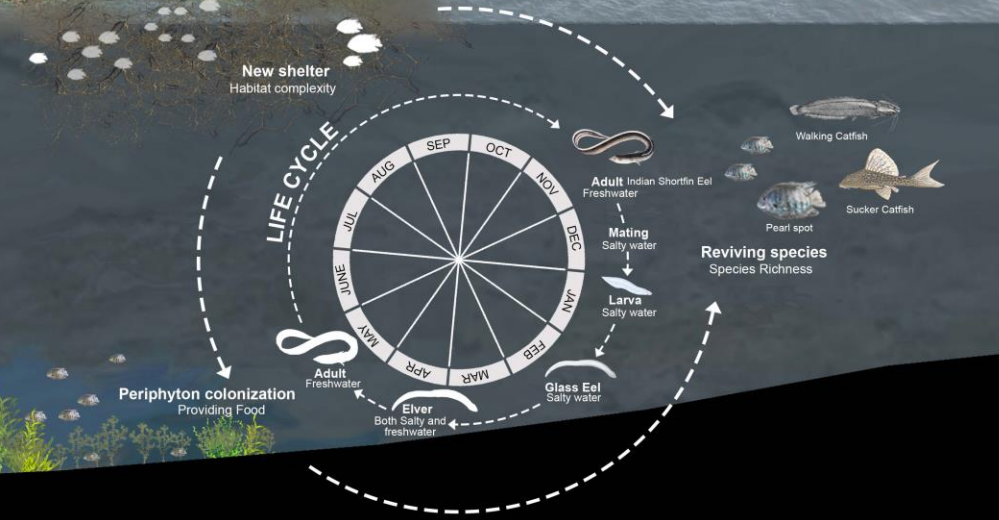
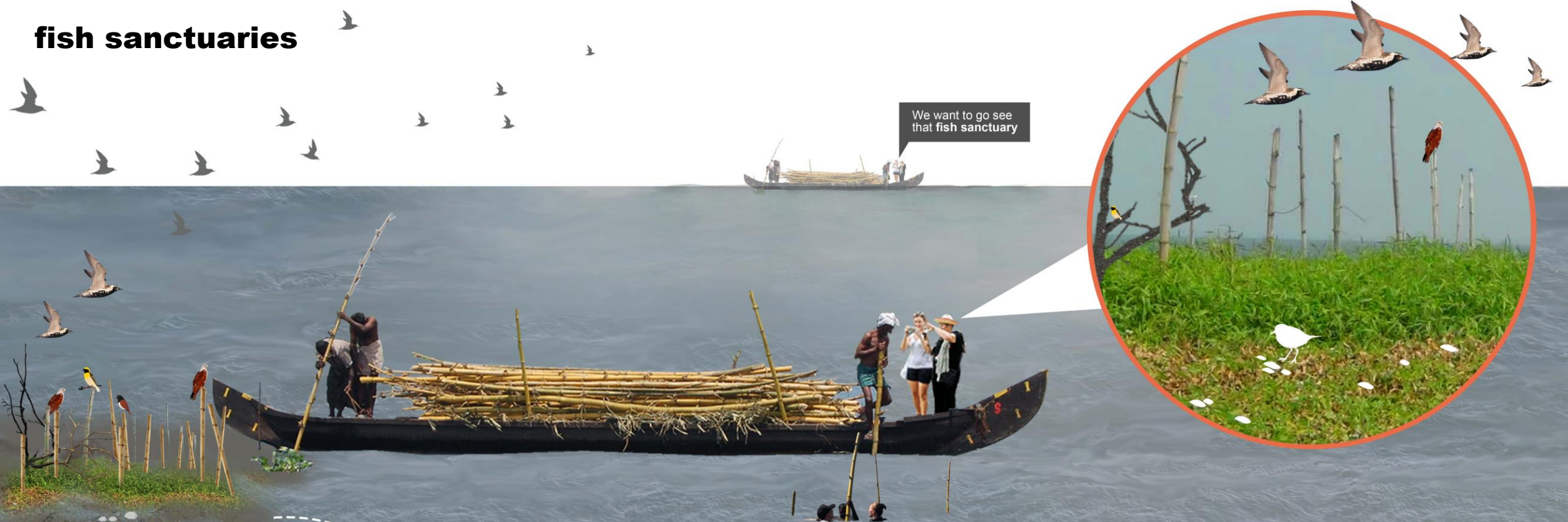


- Bamboo poles
- Vegetative material
dried reeds tied with coir ropes
- Tree Branches

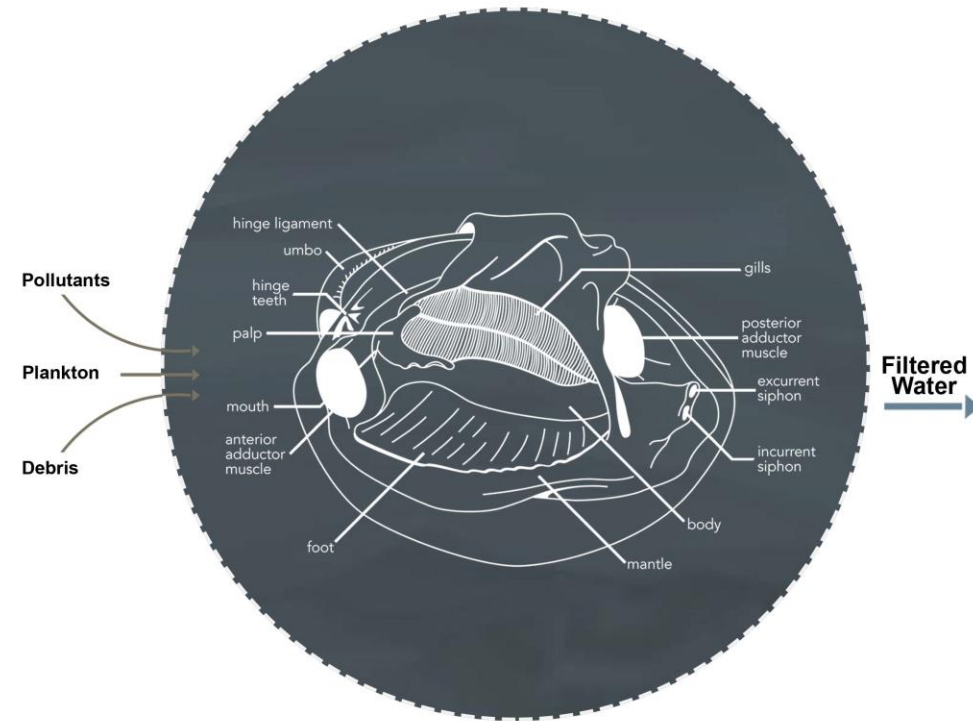
CONSTRUCTION DETAIL



fish sanctuaries



Monitoring water quality



tidal farms



tidal farms

establishing spatial corridor
with the backwaters

Did you people
construct this ?

new high tide +2.1m

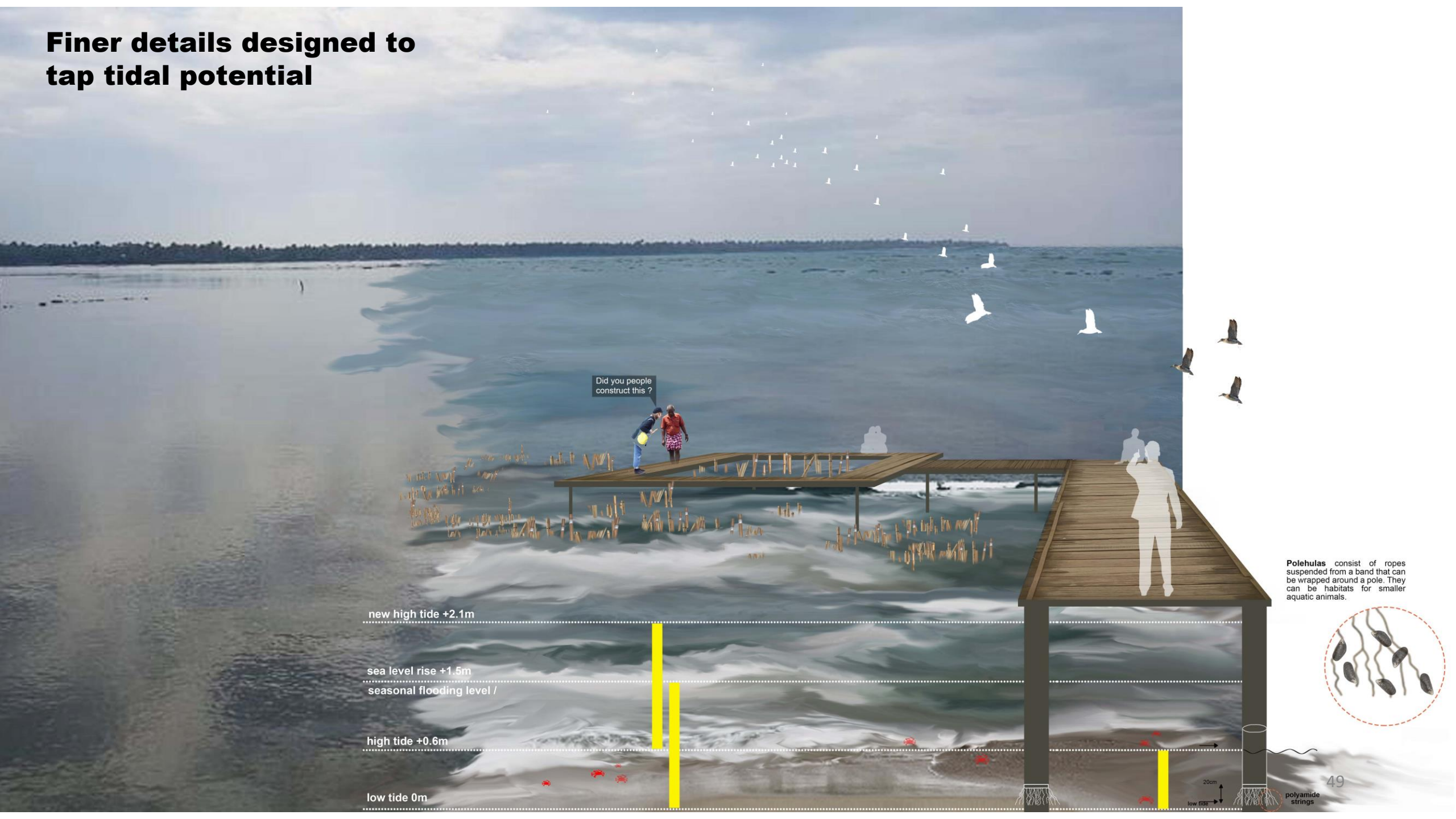
sea level rise +1.5m

seasonal flooding level /

high tide +0.6m

low tide 0m

Finer details designed to tap tidal potential



Did you people construct this ?

new high tide +2.1m

sea level rise +1.5m
seasonal flooding level /

high tide +0.6m

low tide 0m

Polehulas consist of ropes suspended from a band that can be wrapped around a pole. They can be habitats for smaller aquatic animals.



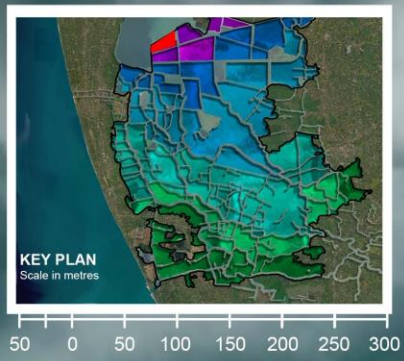
20cm
low tide

polyamide strings



Cycle of salt is a cycle of curse?

**Not for the fishermen,
it's a cycle of blessing**



DYNAMIC AGRICULTURE

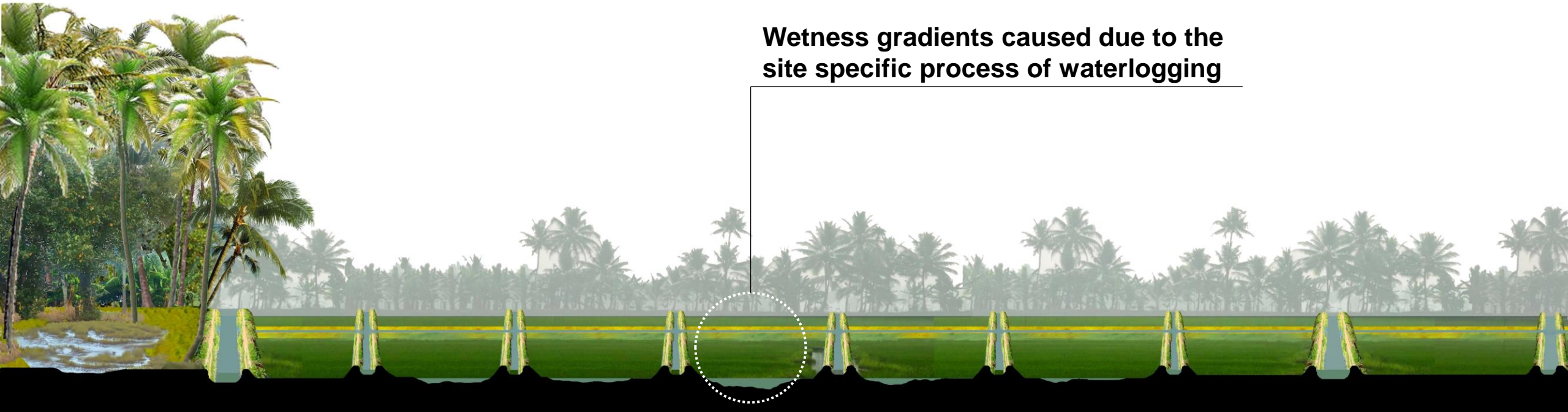
Dewatering pump station

year n
new "amphibious" landforms

N LEGEND

-  Fish Sanctuary
-  Shrimp Farm
-  Paddy fields
-  Wetland Garden
-  Polder Park
-  Raised Fields
-  Minor Canal
-  Inner Canal
-  Dewatering Pump Station
-  Sluices

Existing paddy fields

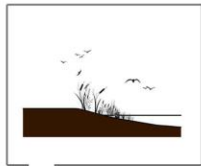


seasonal flooding

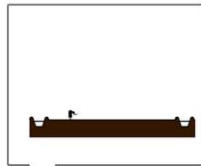


flooding or opportunity?

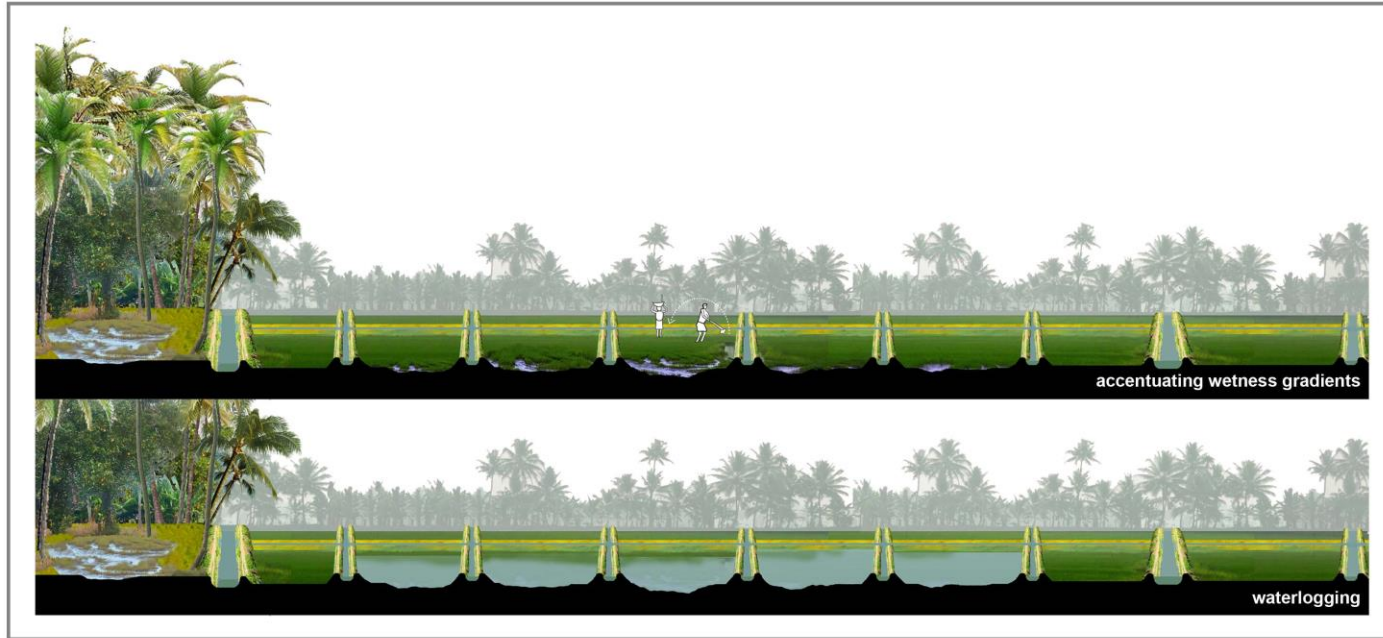




paddy field



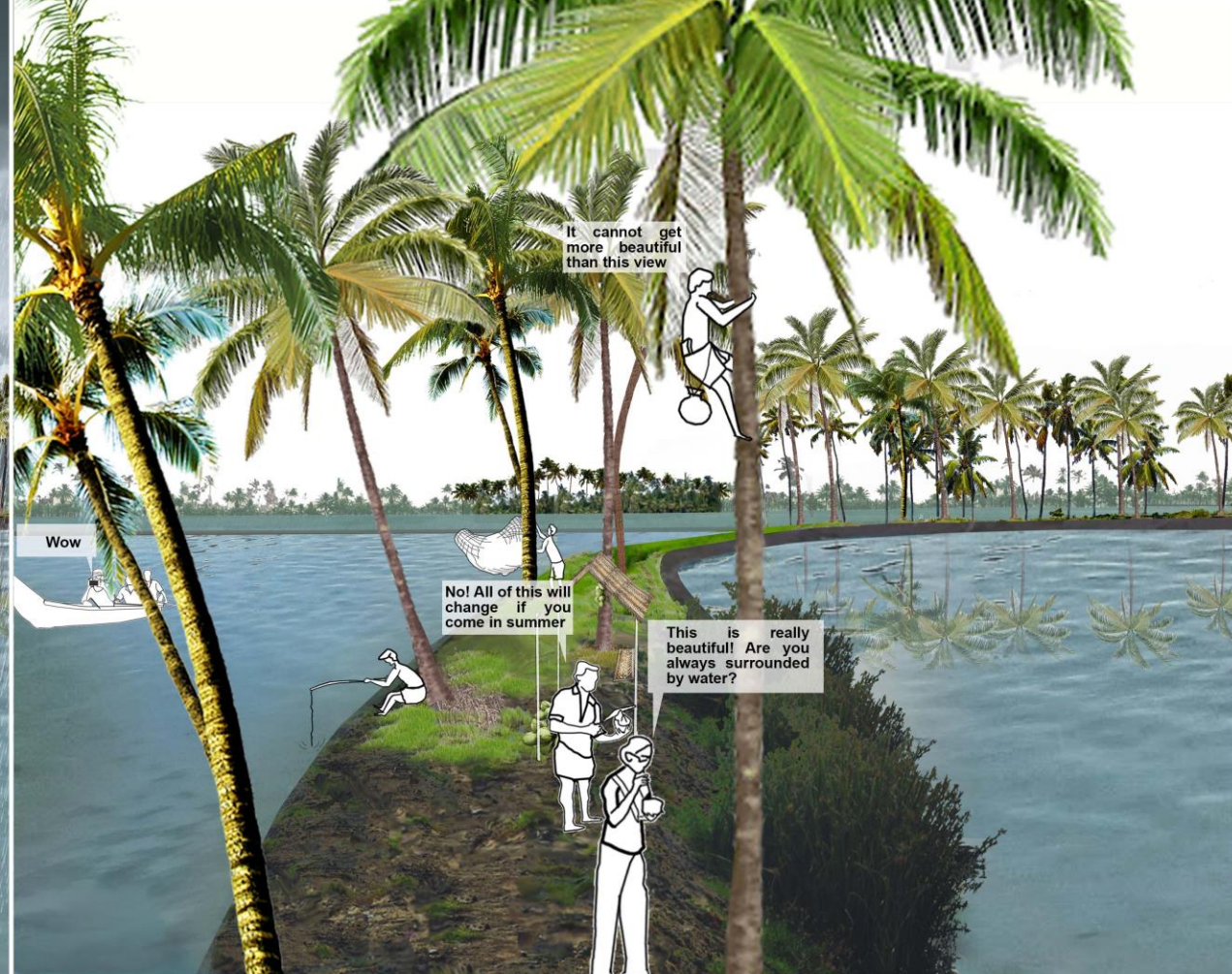
wetland garden



wetland garden



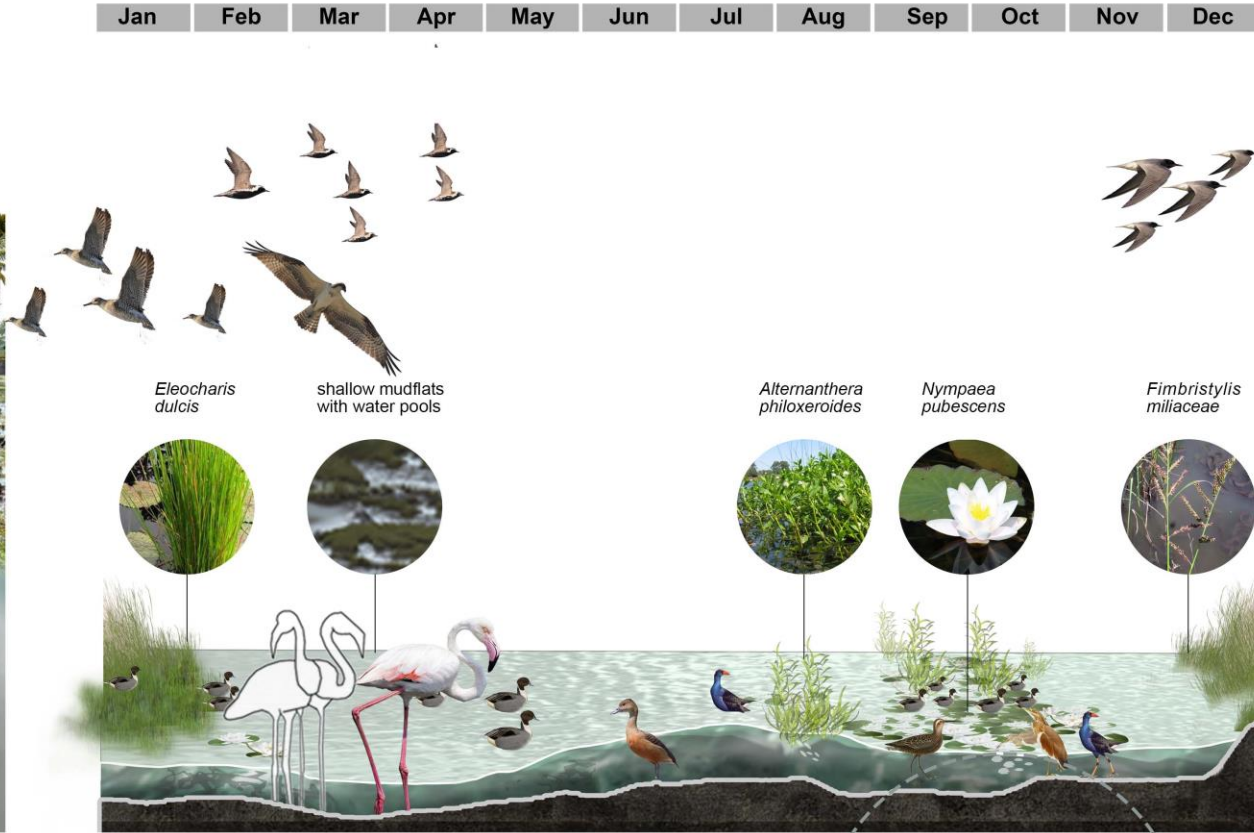




**“When life gives you a flood,
you have fun with water”**

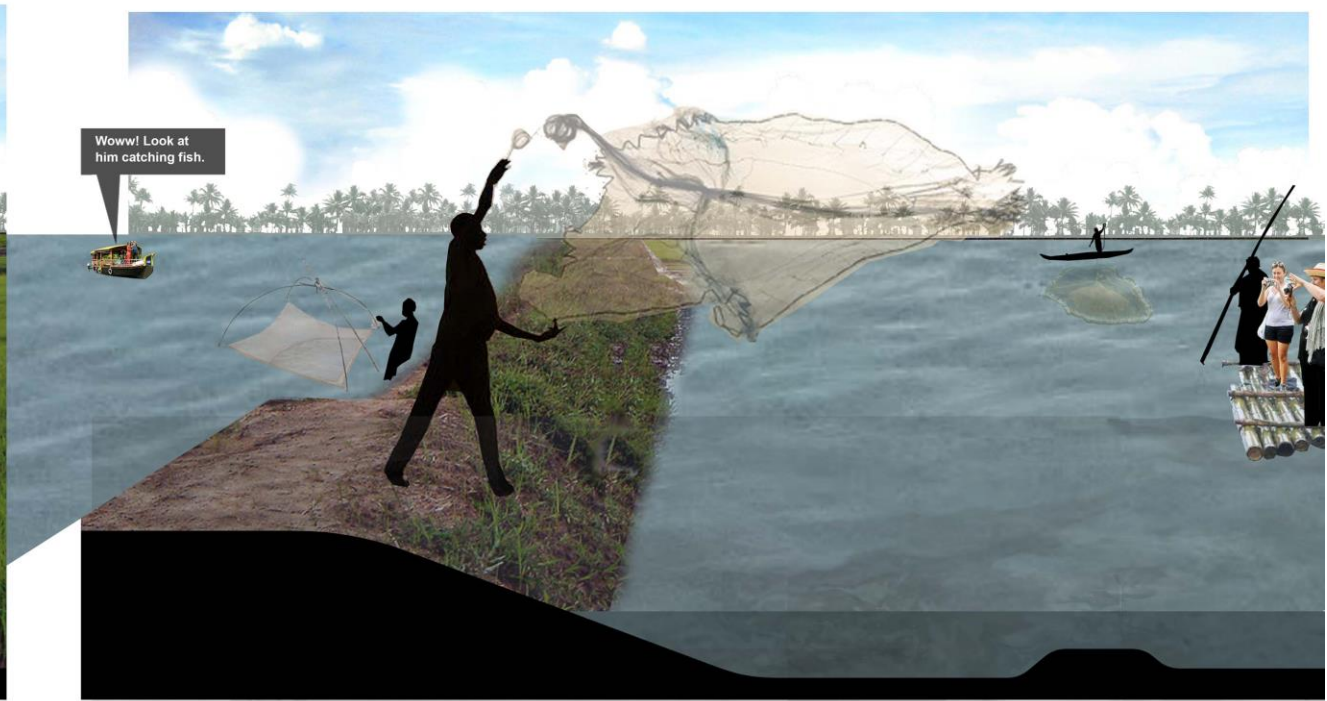
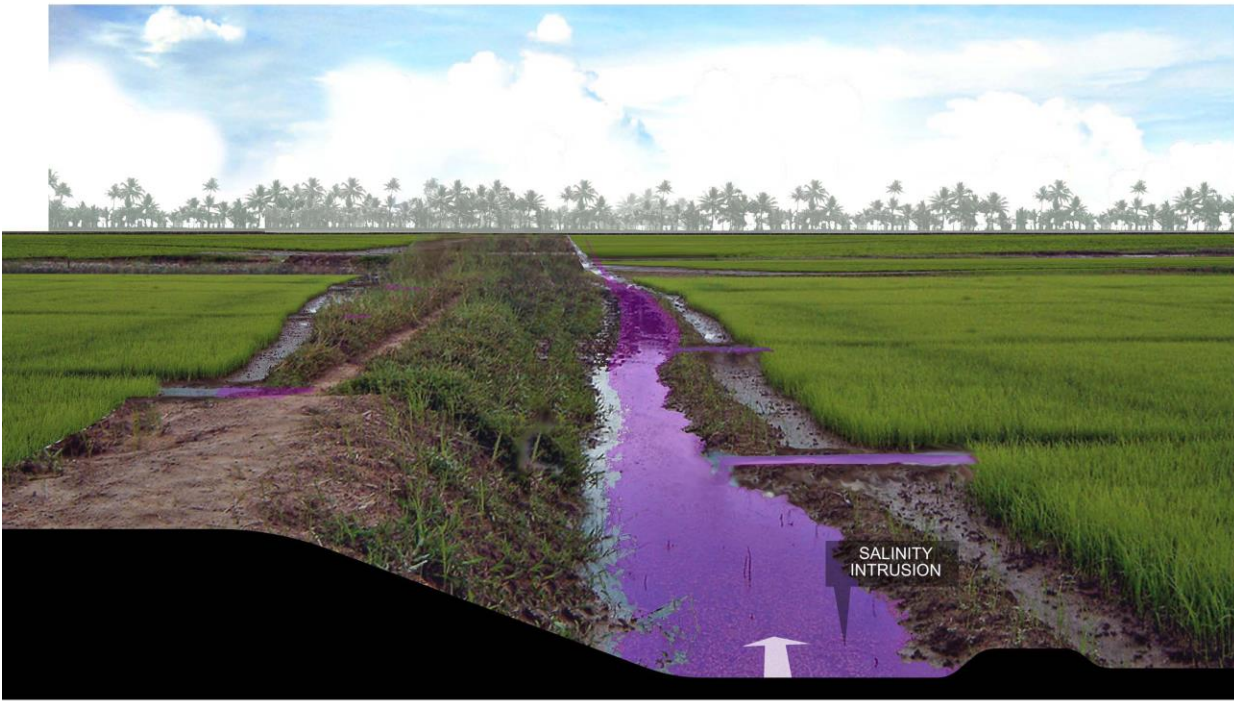


Get lost in the experience of a culture



Get lost in the ecstasy of nature

But not everything is sugar, spice and everything nice!

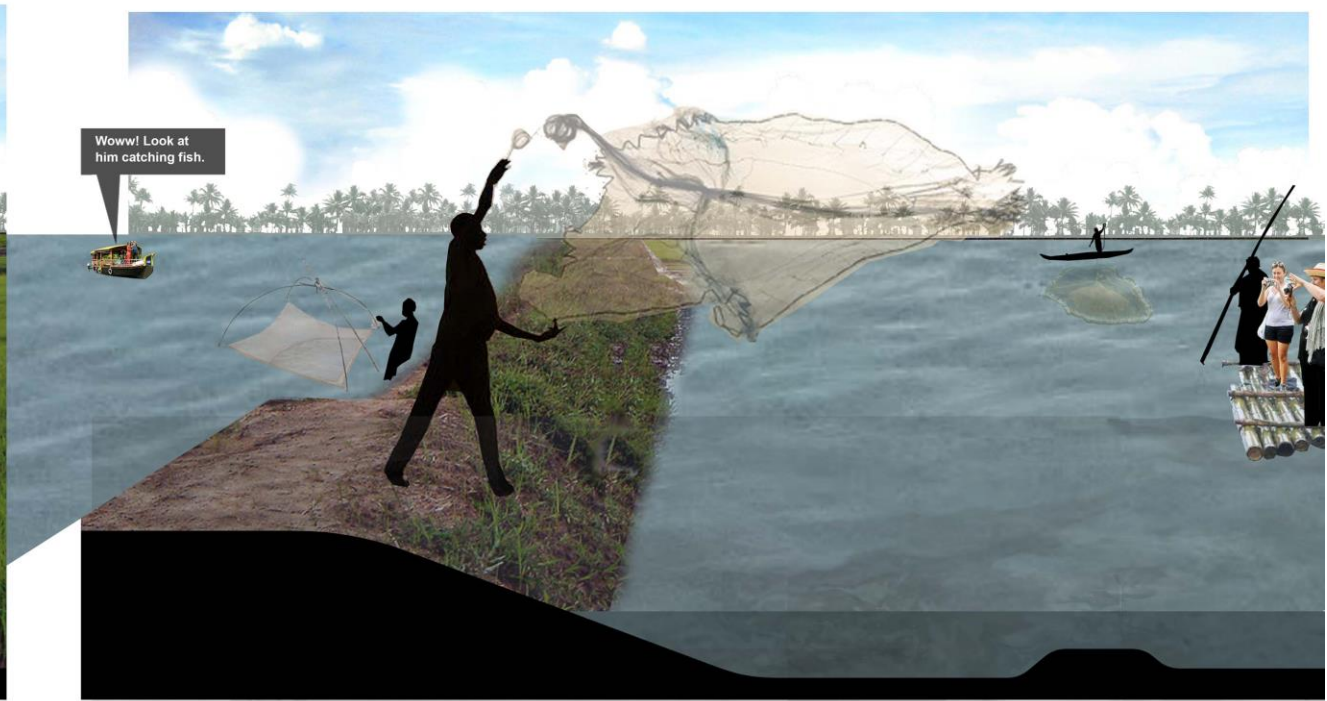
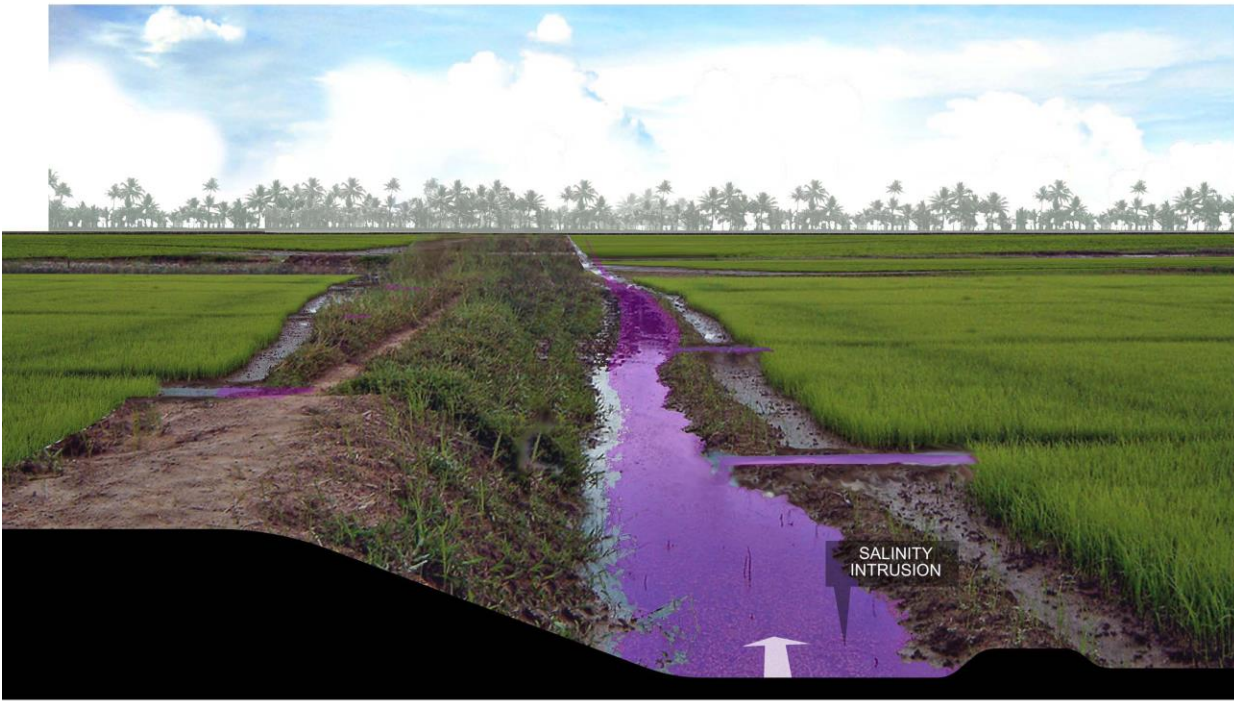


Instagram
#kuttanadfishing

I am going to
upload this as my
instagram story!



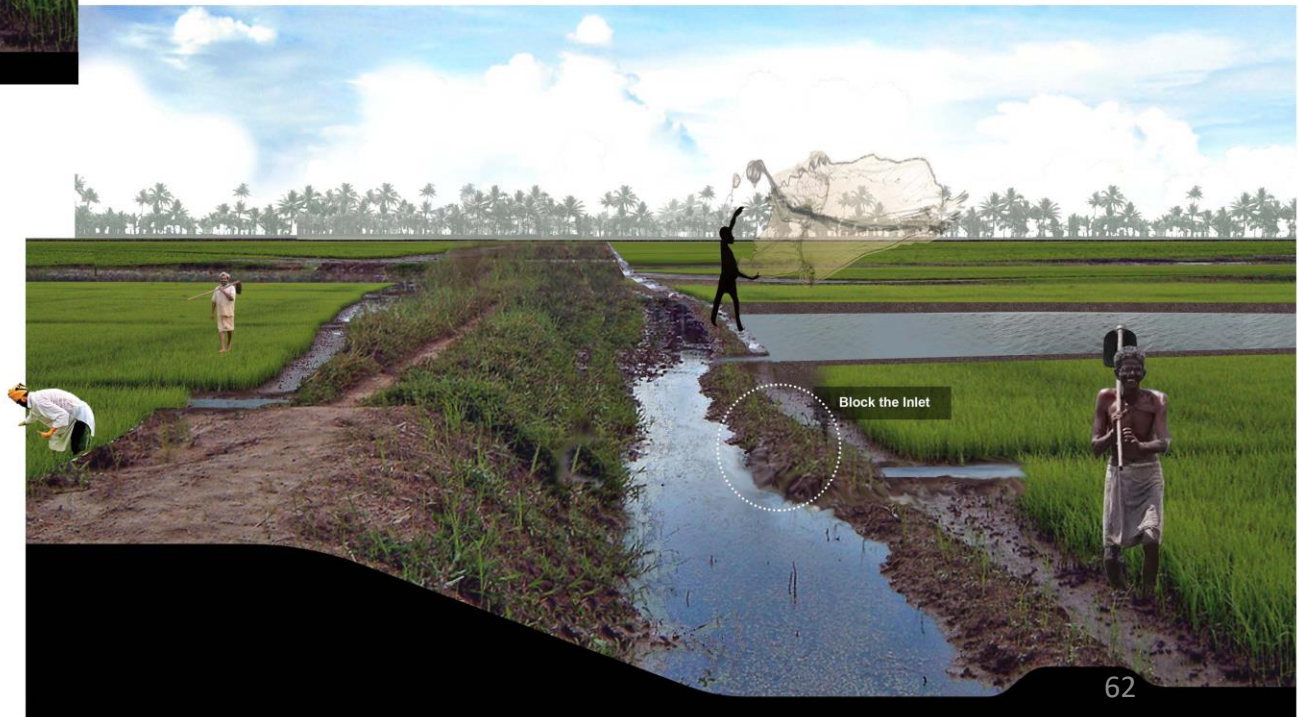
Salinity intrusion



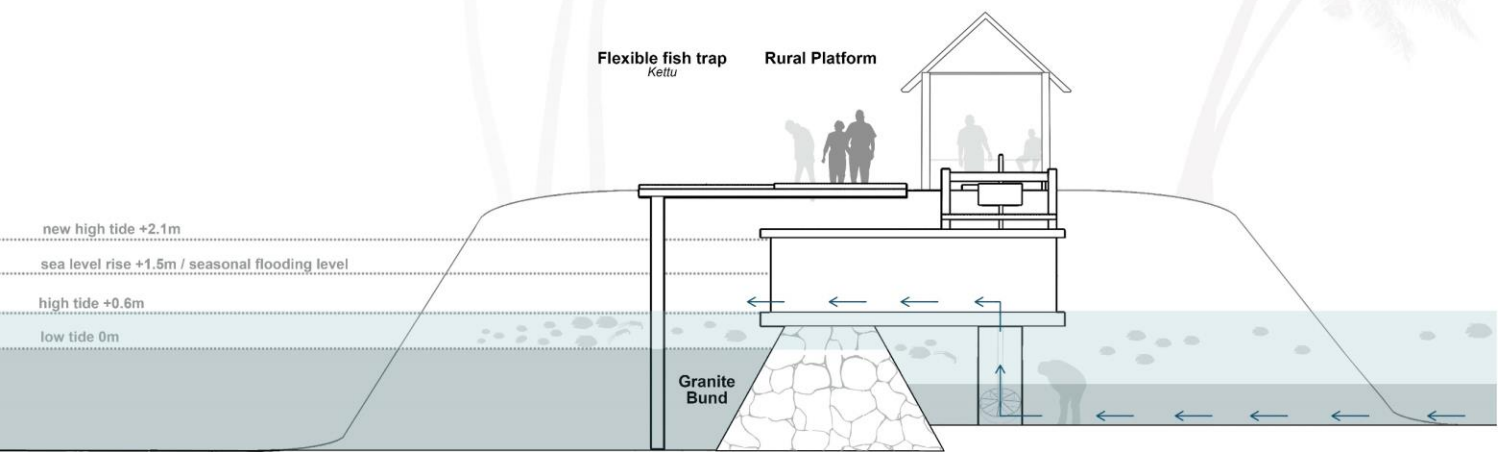


TO “LANDSCAPE OF CONSENSUS”

FROM A “LANDSCAPE OF CONFLICT”



Polder Parks



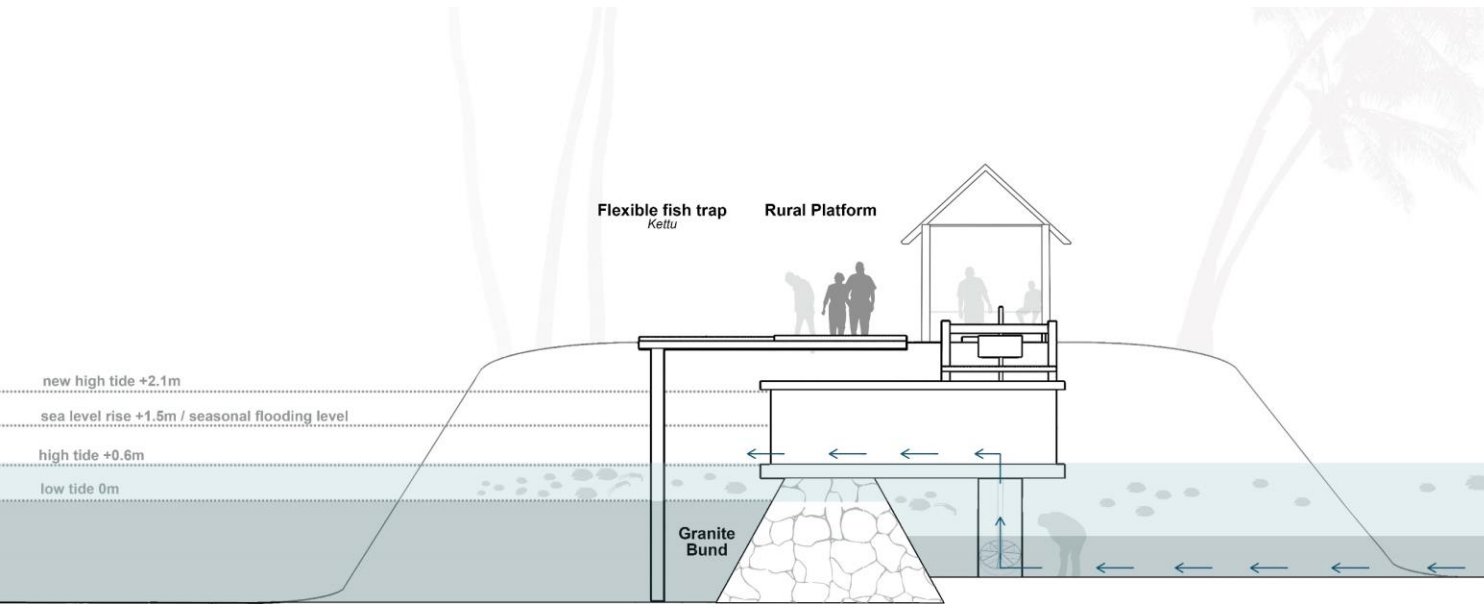
Motor shed *Thara*

Motor floor *Thara*

Box *Petti*

Submerged vessel *Para*





Motor shed *Thara*

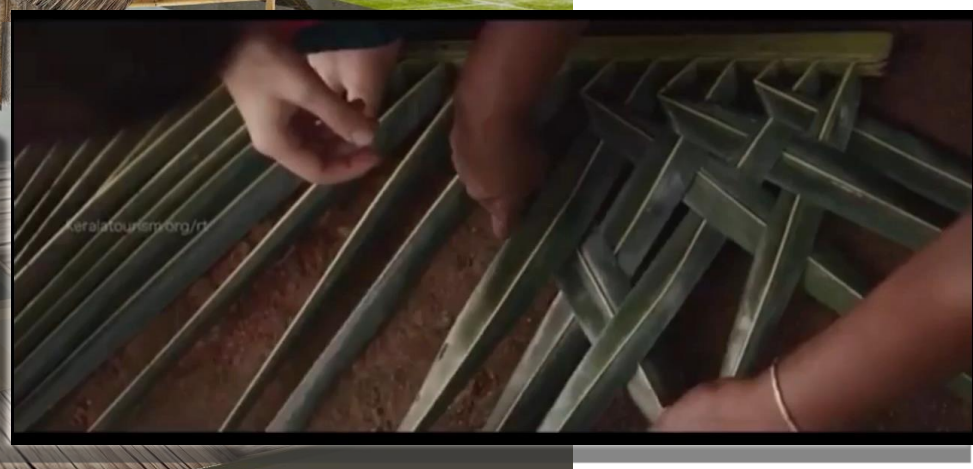
Motor floor *Thara*

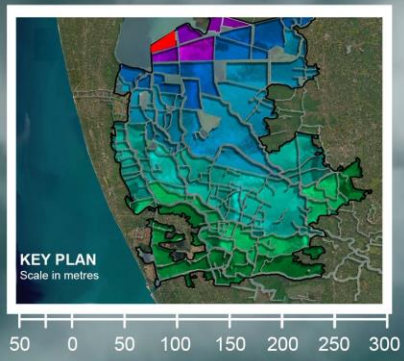
Box *Petti*

Submerged vessel *Para*









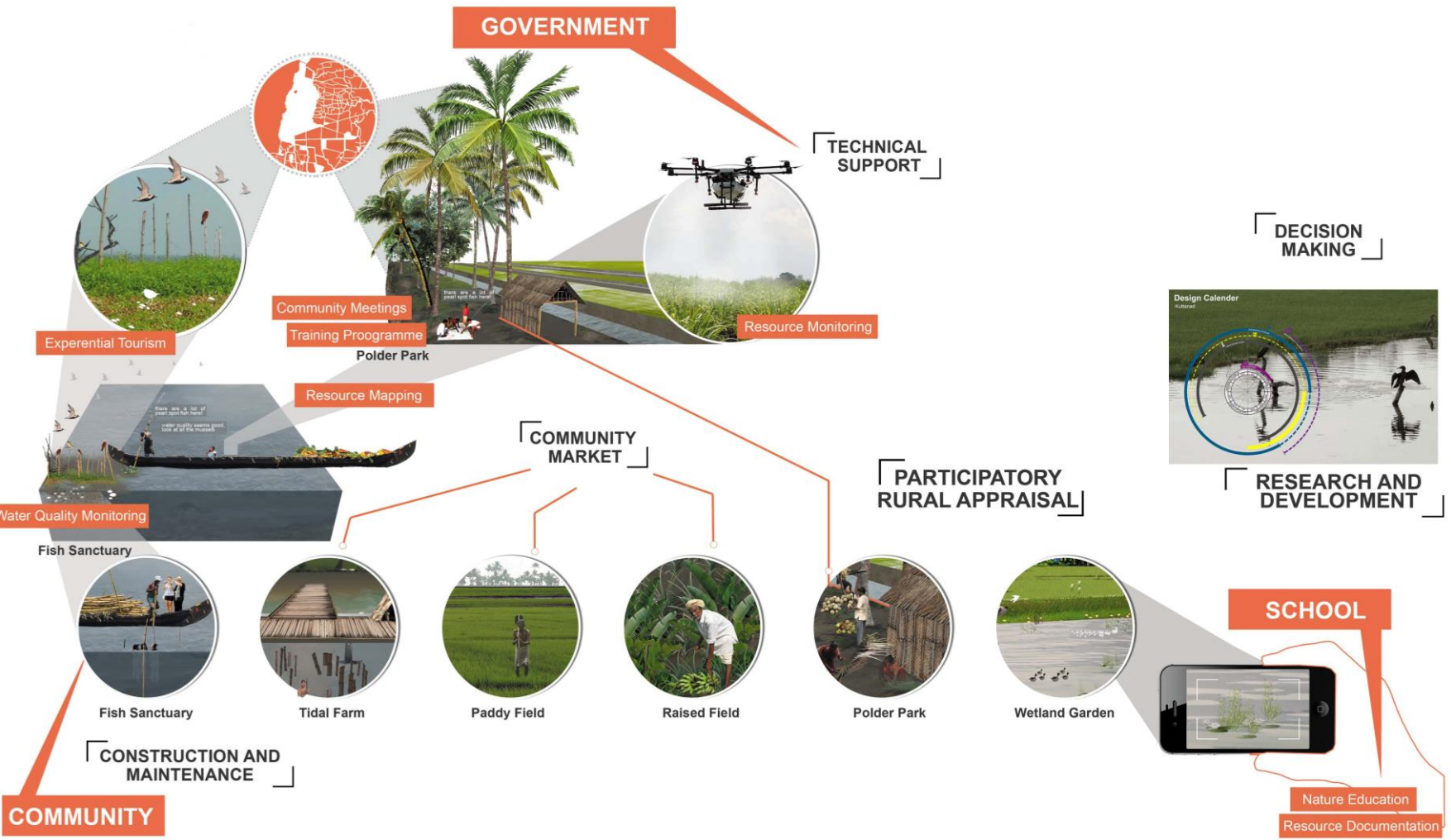
N LEGEND

- Fish Sanctuary
- Shrimp Farm
- Paddy fields
- Wetland Garden
- Polder Park
- Raised Fields
- Minor Canal
- Inner Canal
- Dewatering Pump Station
- Sluices

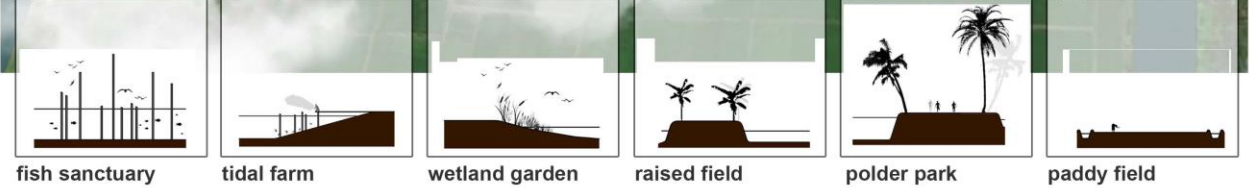
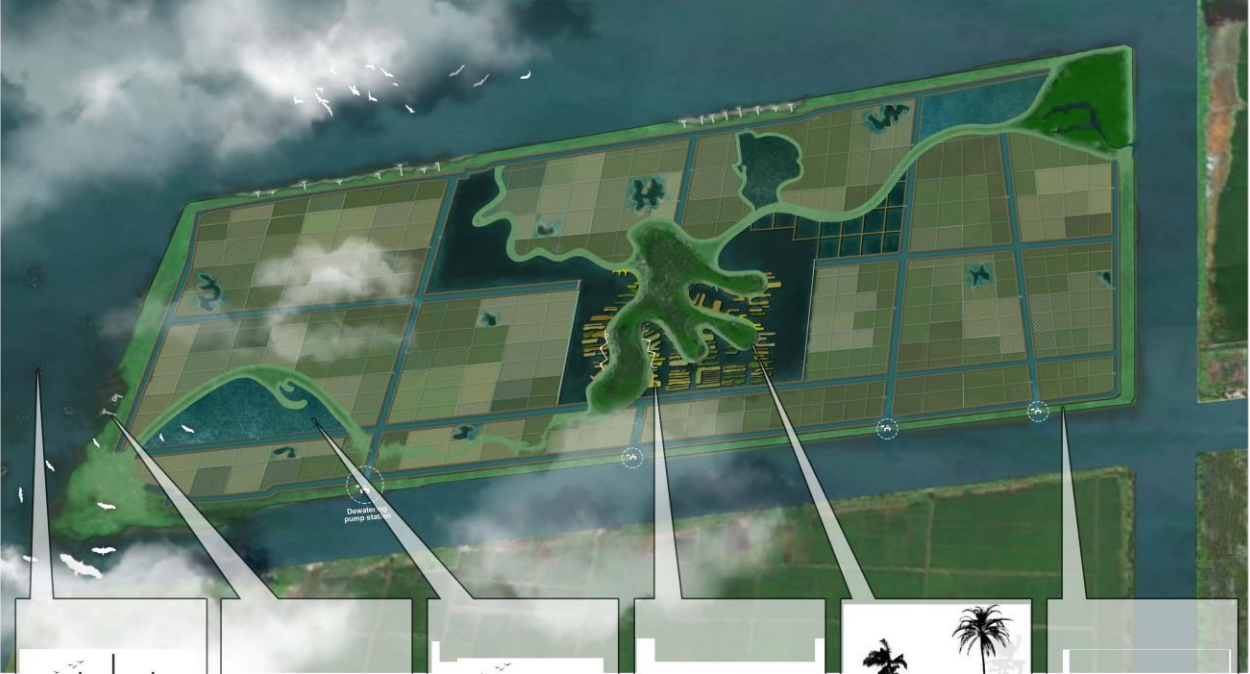


The Amphibious Approach

Participatory Urbanism

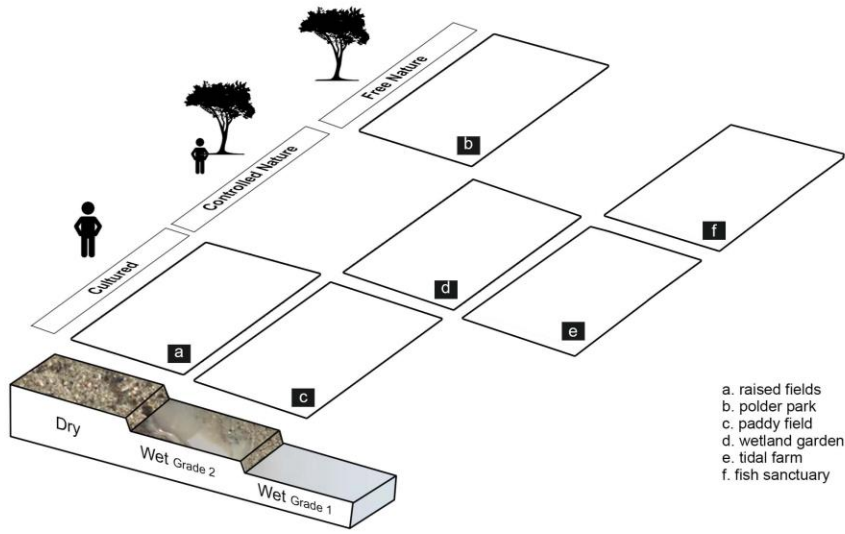


Amphibious Spatial Vocabulary



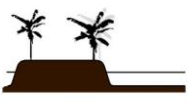
fish sanctuary tidal farm wetland garden raised field polder park paddy field

proposed typologies



a. raised fields
 b. polder park
 c. paddy field
 d. wetland garden
 e. tidal farm
 f. fish sanctuary

Value Analysis



Raised Field



Polder Park



Paddy Field



Wetland Garden



Tidal Farm



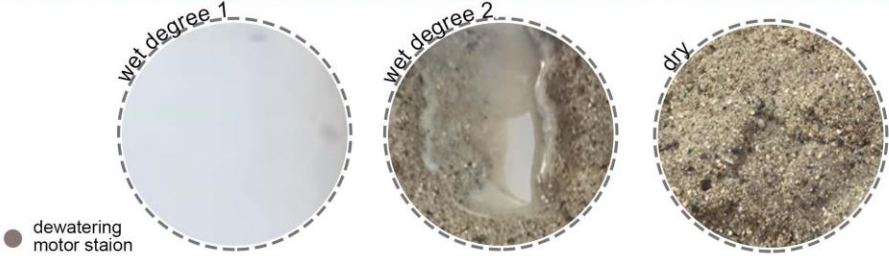
Fish Sanctuary

Generalizing Results

Design Feedback Loop

Design Process

Step1. Analysing the wetness gradients of the selected Kayalnilam



Step2. Delineating areas suitable for a wetland garden

Step 3. Finding a location closer to a dewatering motor station.

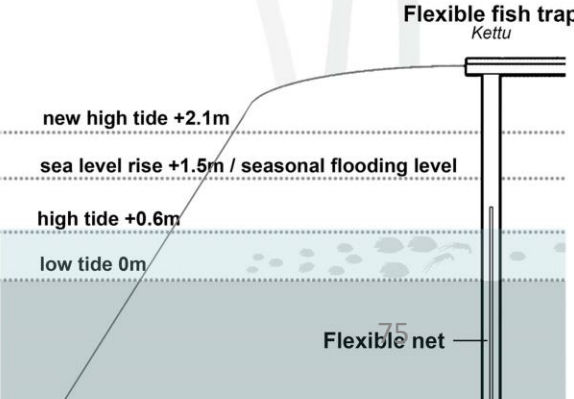
Step 4. Consolidation of Patterns of Wet Degree 1 in the identified area.



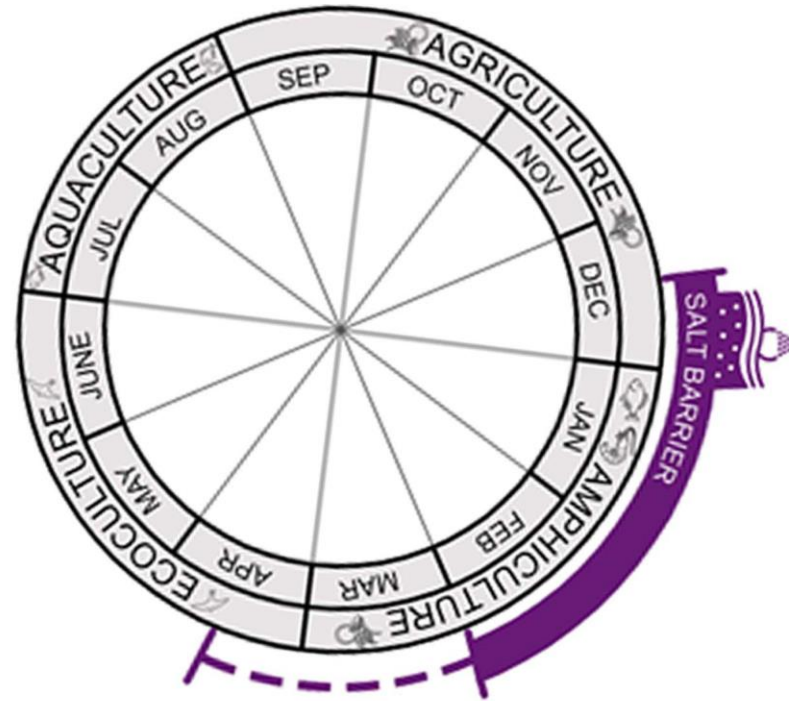
Design Process



Step 6. Installing a filter that traps fishes during high tides near the inlet at the dewatering pump station so that all the incoming aquatic species can be directed to the nearby wetland gardens

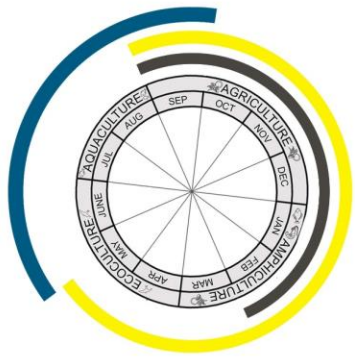


Green Scat Pearl Spot Great Freshwater Prawn



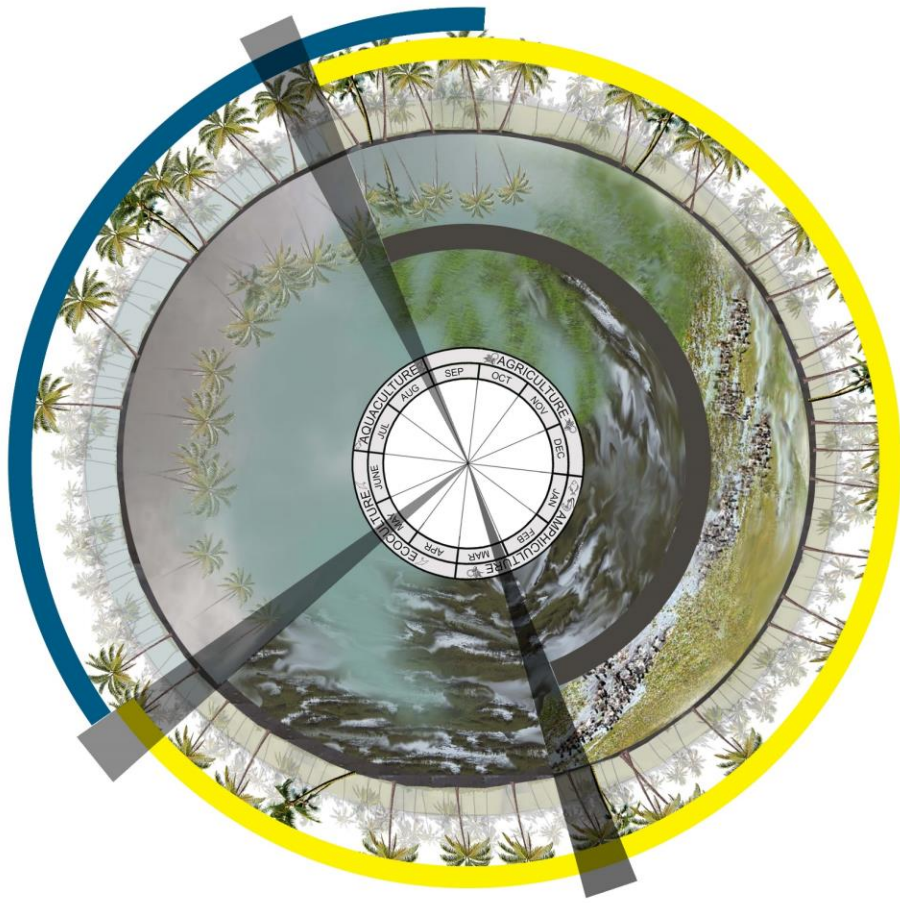
Adaptive Design Calendar

WETLAND GARDENS

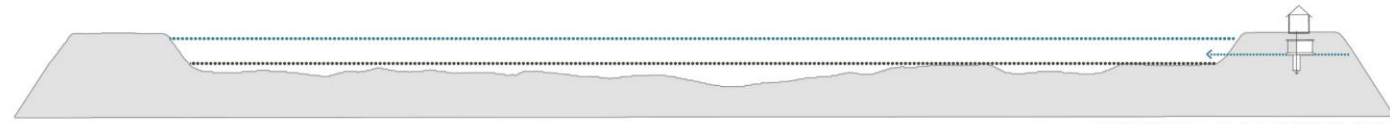


- UNDISTURBED
- FLOOD
- DRAIN

CALENDER

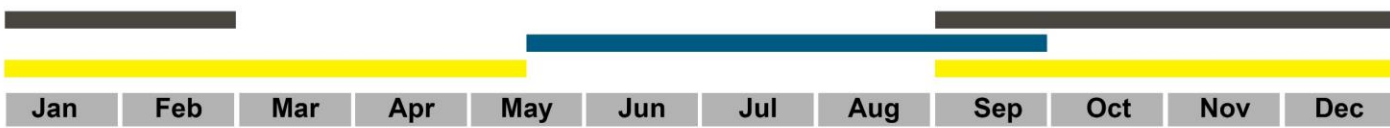


SPATIAL QUALITIES



POSSIBLE DECISIONS

DRAIN by operation of the dewatering motor pump and FLOOD by opening the sluice gate



BIODIVERSITY

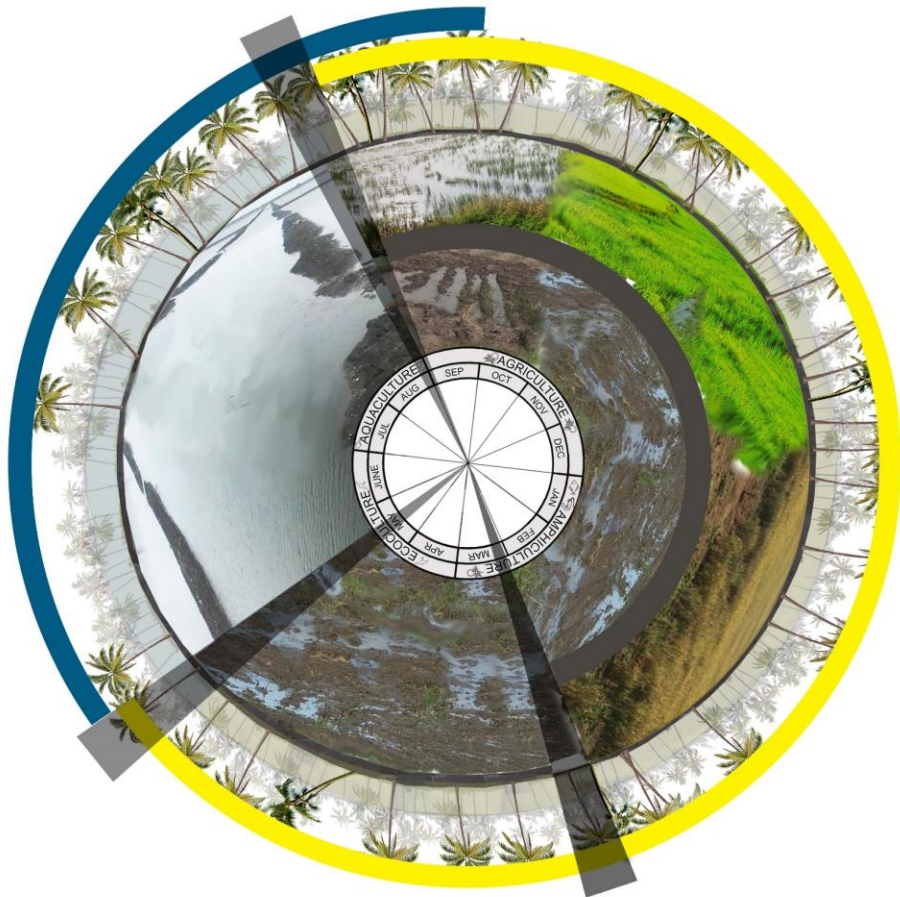
Adaptive Design Calendar

PADDY FIELDS



- UNDISTURBED
- FLOOD
- DRAIN

CALENDER



SPATIAL QUALITIES

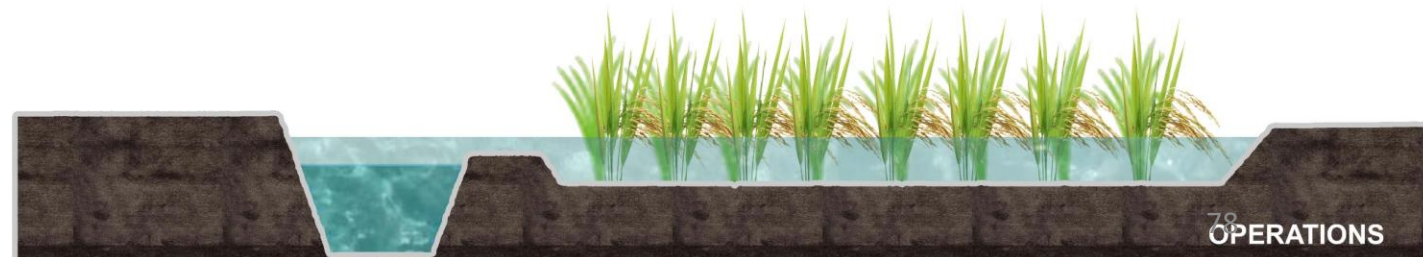
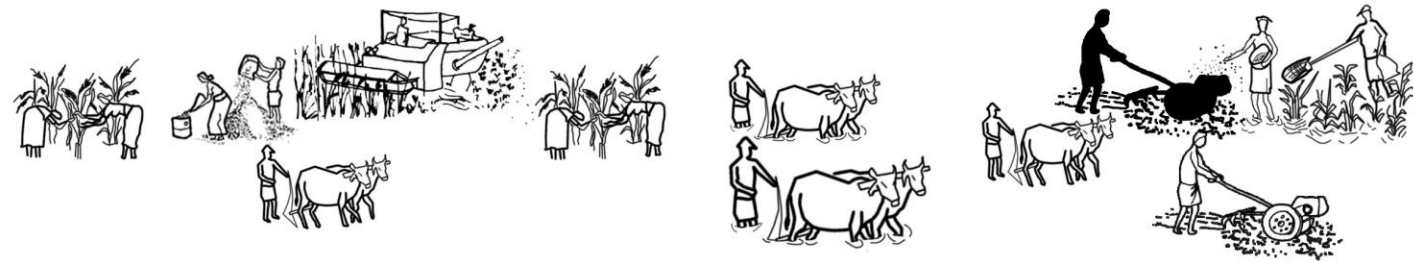


POSSIBLE DECISIONS

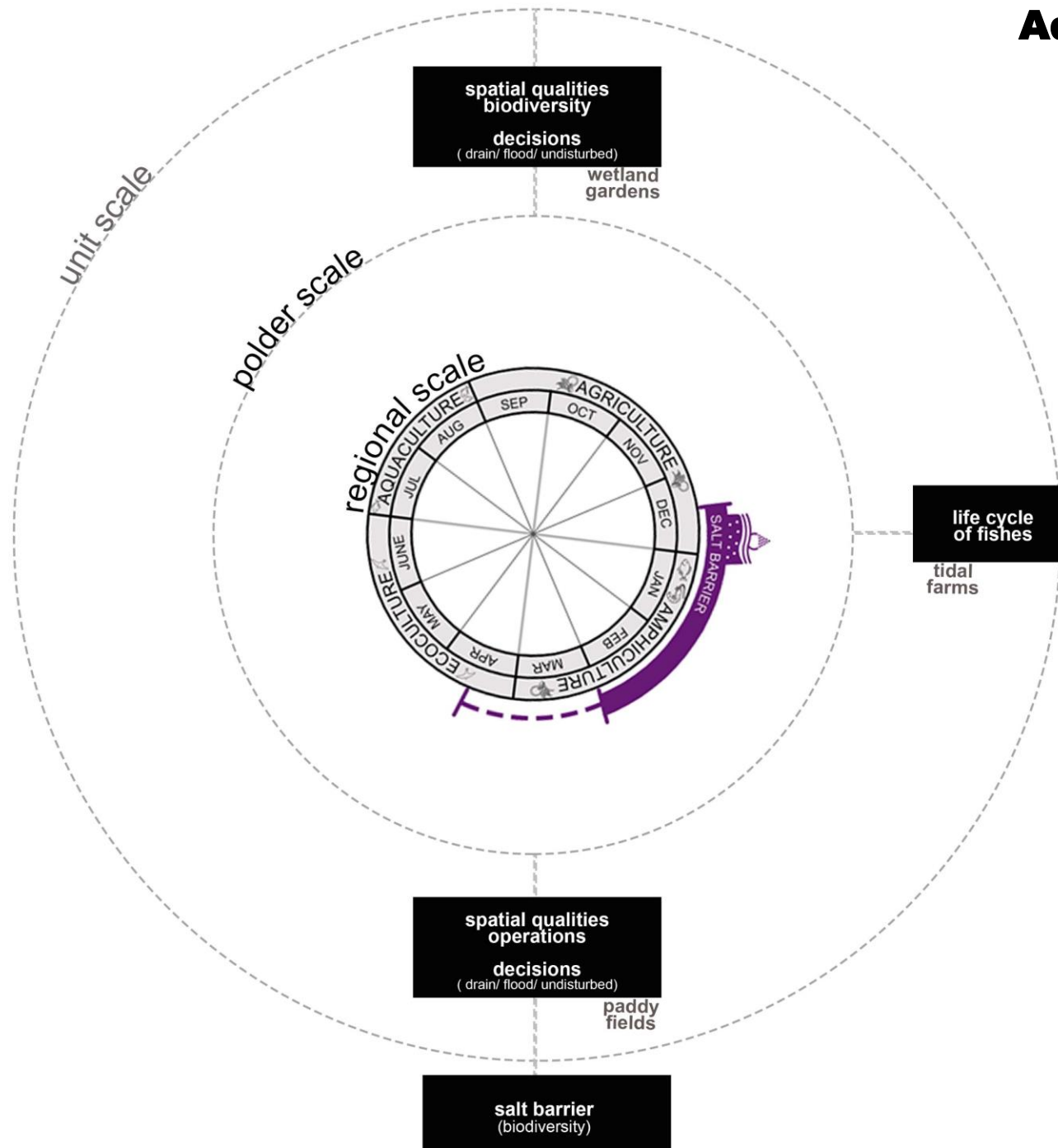
DRAIN by operation of the dewatering motor pump and FLOOD by opening the sluice gate



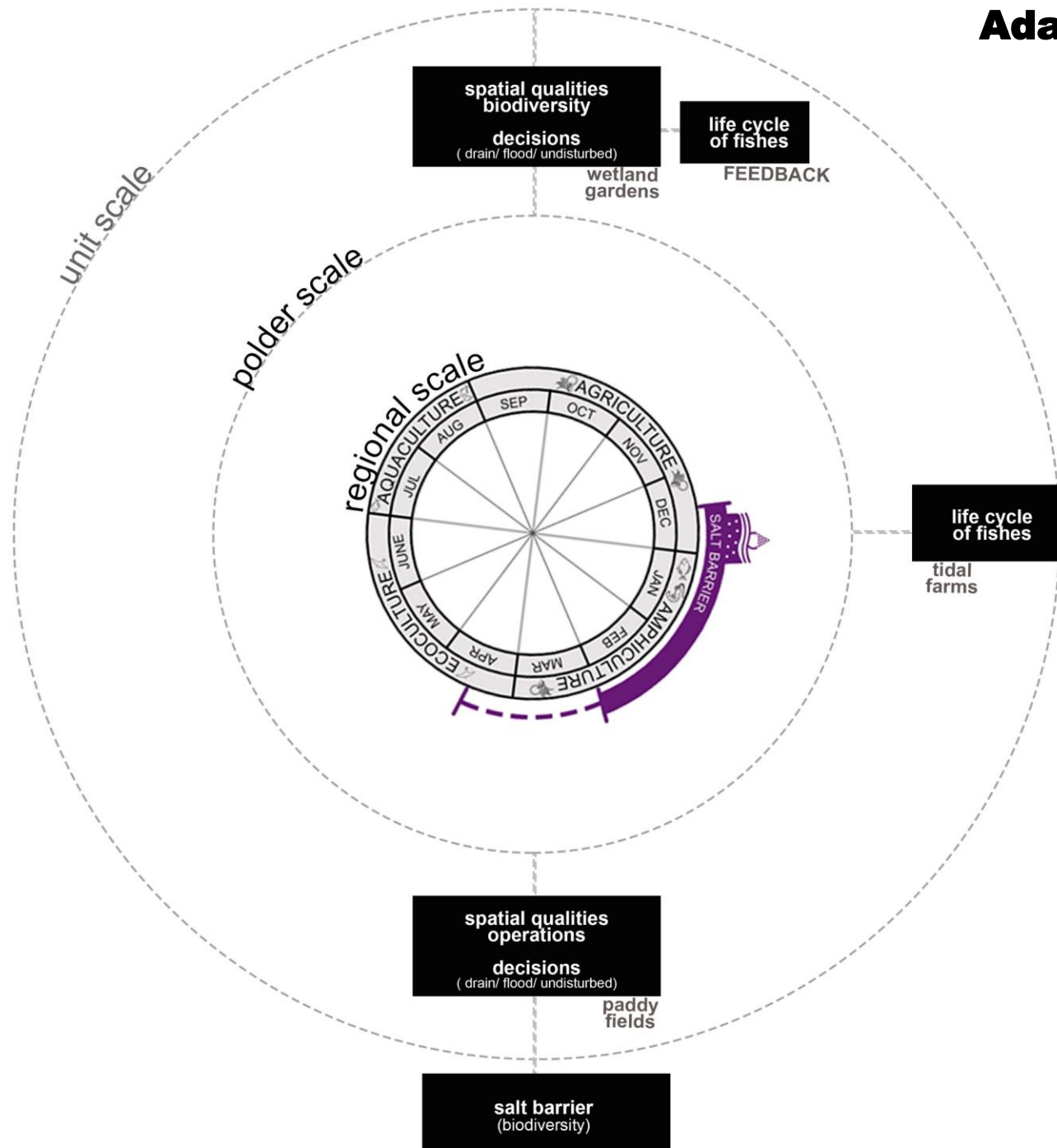
SALT BARRIER

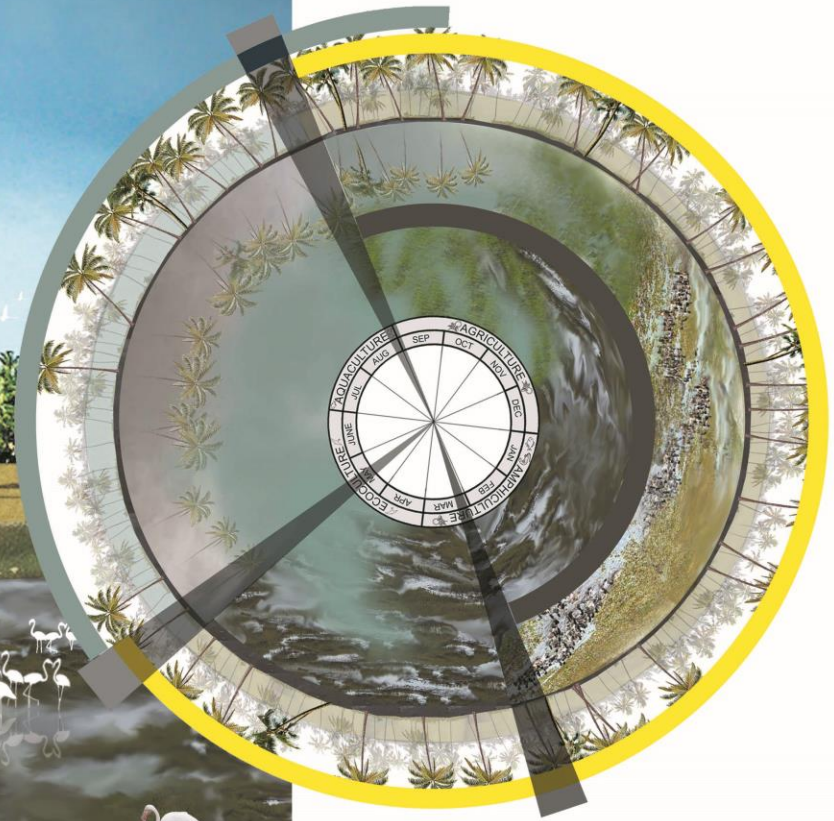


Adaptive Design Calendar FRAMEWORK



Adaptive Design Calendar FRAMEWORK

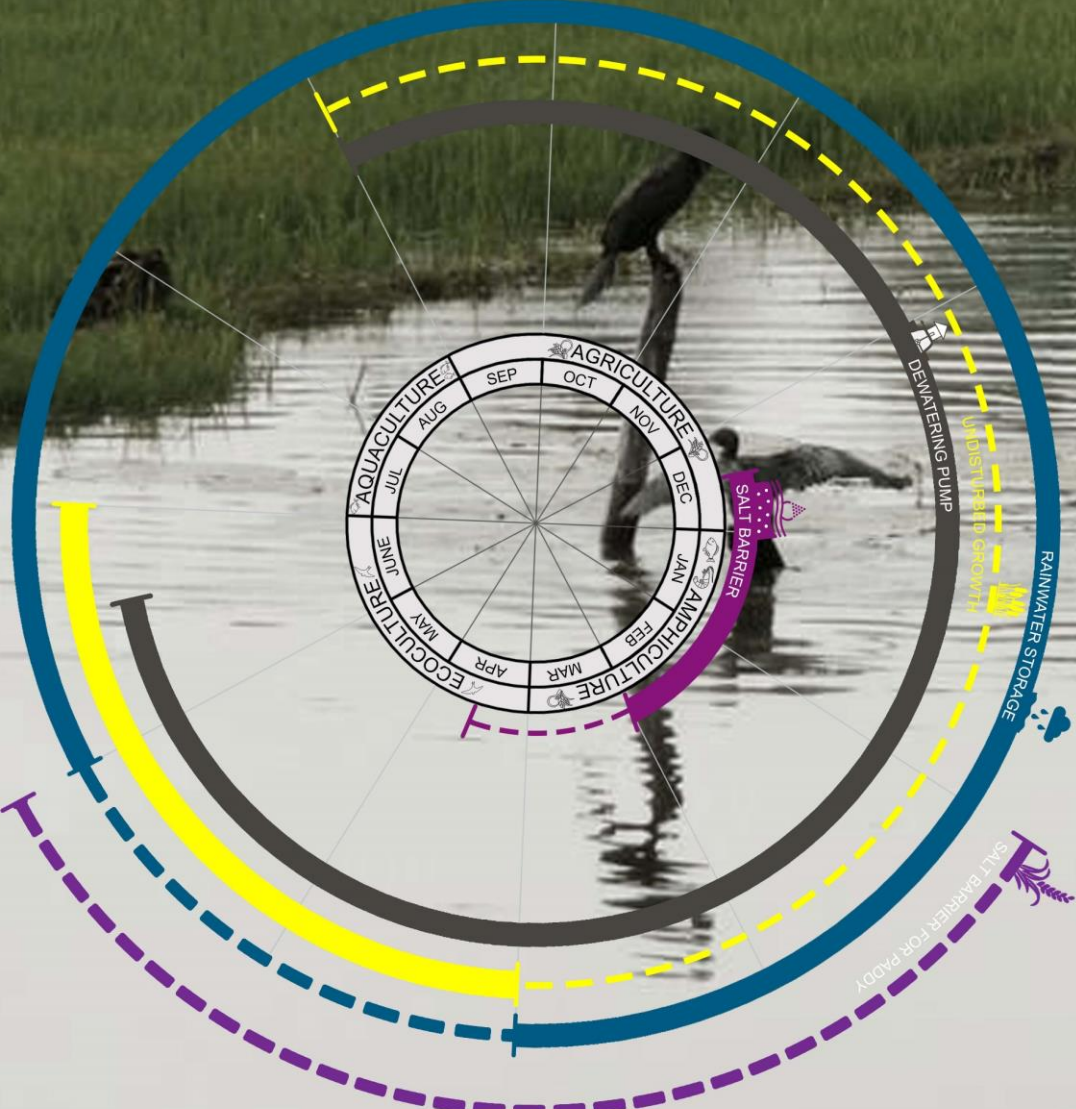




LAND CAN SOMETIMES BE WATER

Design Calender

Kuttanad





“Landscape as an object”

“Landscape as a situation”

Over to you!