

Chapter 4

CARTAGENA

COLOMBIA

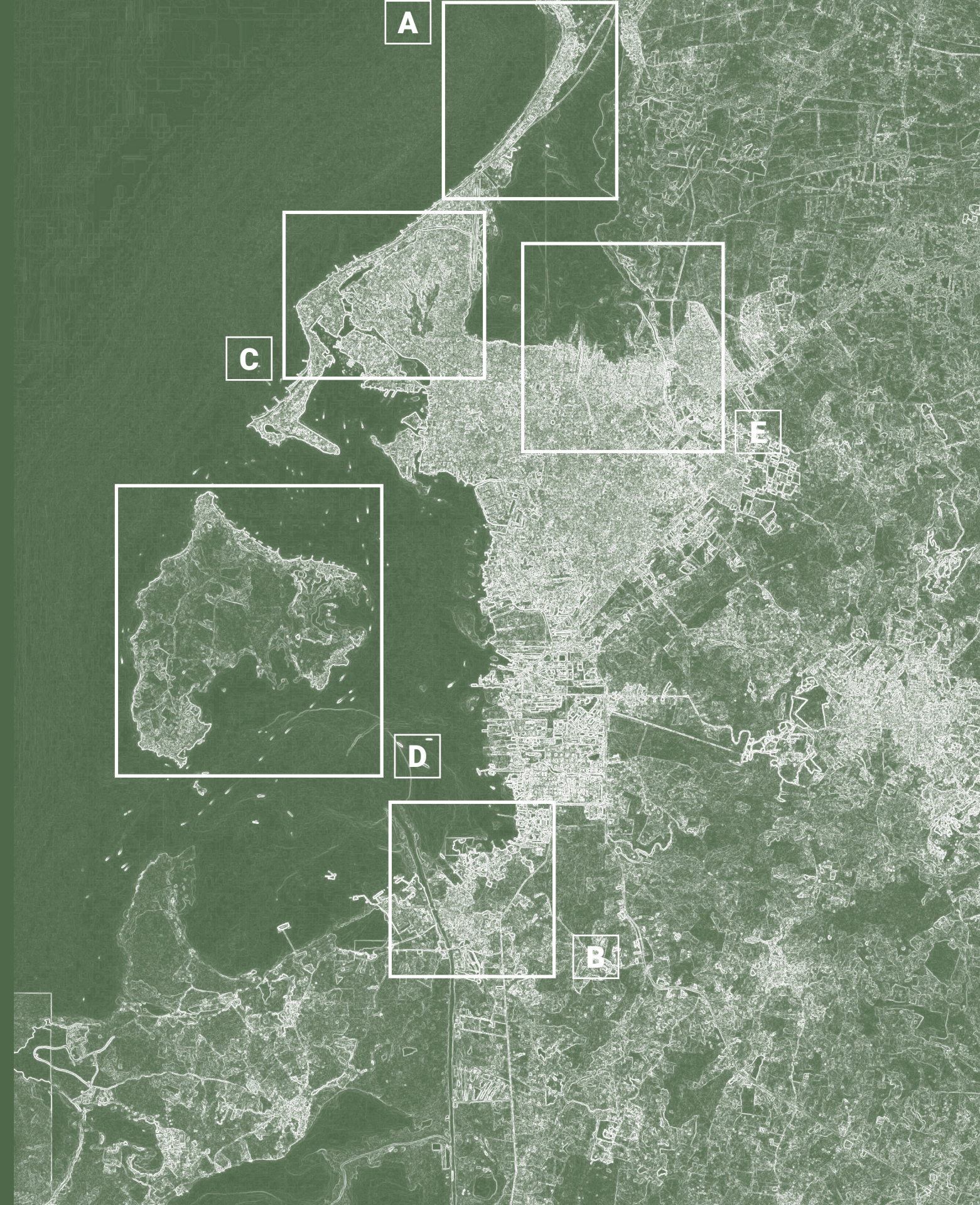
Cartagena, a historic Caribbean colonial capital established in 1533 by Pedro de Heredia, has transformed from a hub of resource extraction during colonization into a UNESCO World Heritage site celebrated for its cultural richness, Black heritage, and resilient communities. While UNESCO's designation has fueled a thriving tourism economy, the city faces stark inequalities beyond the charm of its old city walls, with 43.6% of the population living below the poverty line. Rapid urban expansion has also exacerbated environmental degradation, threatening its unique ecological systems, which include mangroves, ciénagas, and diverse water landscapes.

Cartagena's ecology, defined by interconnected water systems—from ciénagas and mangroves to canals, inland water bodies, the Caribbean Sea, and the Bay of Cartagena—has been drastically altered over decades, impacting its biodiversity and the livelihoods it sustains. Coastal environments and polluted bays further threaten its tourist economy, while informal settlements face increasing flood risks. Meanwhile, the community is actively working on mangrove restoration, regenerative and social entrepreneurship, and programming around reimagining transportation and housing rights. These efforts reflect a drive to redefine Cartagena's relationship with water and address extreme flooding challenges, among other pressing issues.

The city's growth has intensified coastal resiliency and climate change challenges, including sea level rise, subsidence, extreme heat, and pollution. Declining water quality, rising plastic and nitrogen pollution, and diminishing opportunities for subsistence fishing now jeopardize the livelihoods of vulnerable communities. The logistics and petrochemical industries along the Bay of Cartagena and El Dique Canal further exacerbate pollution and environmental degradation. Additionally, the proliferation of self-built settlements around Ciénaga de la Virgen, combined with pollution in its canals, underscores pressing issues of climate justice and the need for equitable solutions to these interconnected challenges.

Despite these challenges, Cartagena's residents demonstrate remarkable resilience through their knowledge, community stewardship, and shared governance frameworks. These community-driven efforts, deeply embedded in cultural heritage and collective action, offer innovative solutions to the city's pressing social and environmental issues. Expanding and replicating these models could lay the groundwork for a more inclusive and sustainable future, strengthening the relationship between communities and their environment.

In response to these dynamics, the Urban Design Studio explored five key sites, asking: How can grassroots efforts scale from pilot initiatives to citywide transformation? Anchored in the concept of living in harmony with ciénagas as a model for thriving with water, the projects align with community-led initiatives that integrate ecological and cultural education, empower communities with new governance models, and foster a local economy independent of extractive tourism. This approach envisions a long-term pathway for Cartagena's prosperity, redefining its relationship with water to promote equity, resilience, and sustainability while improving the livelihoods of its most vulnerable populations.



PARTNERS

PARTNER ORGANIZATIONS

Philanthropic Partner:
Fundación Grupo Social



Government Partner:
Mayor's Office of Cartagena
Alcaldía Mayor de Cartagena de Indias



Academic Partner:
Universidad Pontificia Bolivariana



Community Partner:
Ecovida



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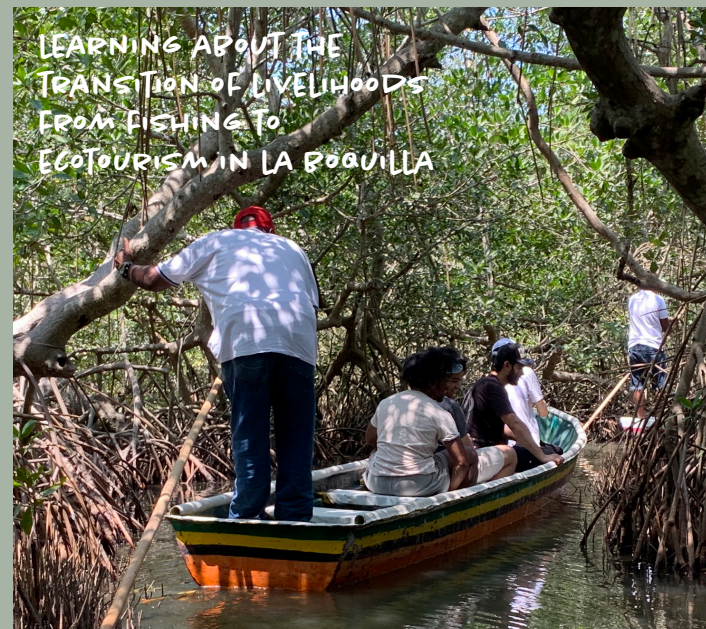
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Asociación Arriberos de La Boquilla
Corporación Desarrollo y Paz Canal del Dique y Zona Costera
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Fundación Planeta Azul Caribe
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Consejo Comunitario de Bocachica
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Corporación Desarrollo y Paz Canal del Dique y Zona Costera

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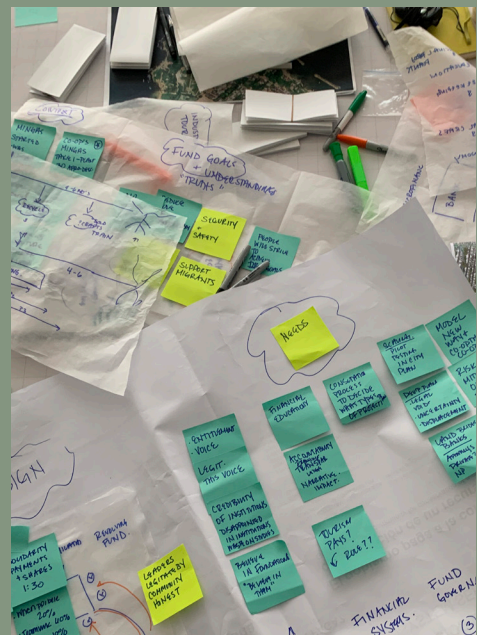


CARTEGENA WORKSHOP

On Tuesday, March 5, 2024, Fundación Grupo Social and the Studio hosted an intersectoral workshop with community members, philanthropy, academia, and government agencies to advance planning for the Seeds of the Mangroves project and development of an integrated urban plan for Comuna 6. Together, they created and identified ideas to support community planning projects and city-wide policy integration, uncovered opportunities for implementation through policy, science, and finance, and developed an action plan. Students shared case study presentations, developed spatial and visual plans, and practiced facilitation skills.

WORKSHOP THEMES

- Mangrove Monitoring and restoration
- Culture, care and stewardship
- Sustainable Funding
- Integrated urban project



¡Le invitamos!
Taller de Resiliencia Comunitaria y Planificación Urbana
Semillas del Manglar
 Martes, 5 de marzo del 2024
 8:00am - 1:00pm

Universidad Tecnológica de Bolívar
 Campus Manga
 Calle del Bouquet cra.21 #25-92.
 Salón Teleaula

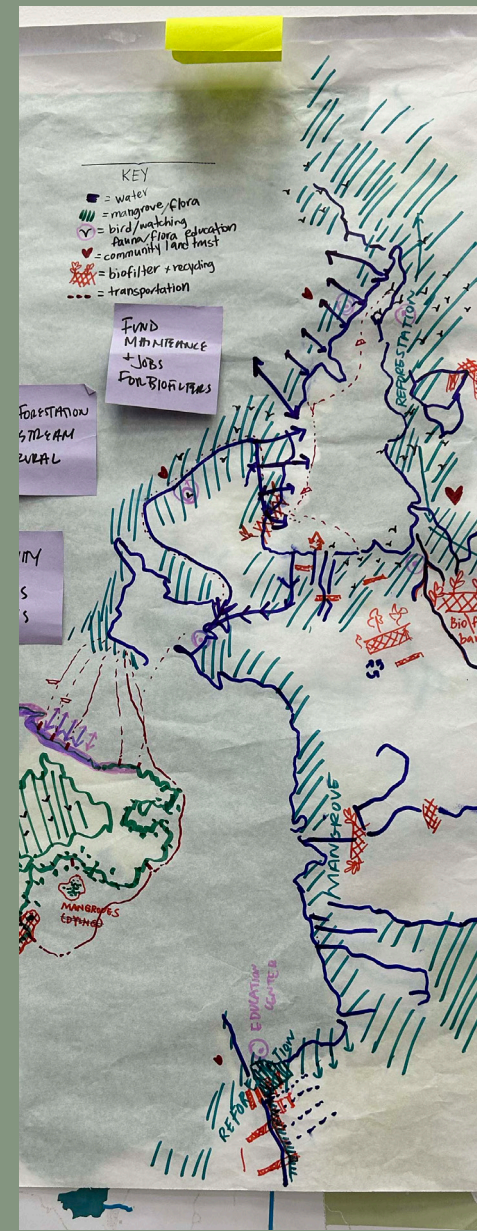
8:00am	Bienvenida
8:30am	Presentaciones de apertura Metodología y base temática
9:30am	Proyectos demostrativos
10:00am	Discusión con panelistas Retos y oportunidades para Cartagena Restauración del manglar Finanzas del clima
11:00am	Sesiones de ideas Mesas de trabajo Pagos por servicios al ecosistema Fondos y financiamiento verde Cultura y Educación Proyectos Urbanos Integrales
12:00pm	Almuerzo y síntesis

COLUMBIA
GSAPP
 URBAN DESIGN
 COLUMBIA CLIMATE SCHOOL
 Climate, Earth, and Society

FUNDACIÓN GRUPO SOCIAL | Plan PARA EL Buen Vivir COMUNA 6

¡Separe la fecha!
 Save the Date!

Ubicación a determinar. Invitación intransferible. Favor utilizar el código QR para confirmar su asistencia.



FRAMEWORK FOR CARTAGENA

Magdalena
River

Canal del Dique

Cartagena Bay

Ciénaga de la Virgen

Principle 1

Reimagine Cartagena's system of ciénagas as models of thriving with water, ensuring equitable access to social infrastructure, improving water quality, and cultivating resilient habitats and communities.

Principle 2

Encourage ecological and cultural education around water and mangroves by nurturing stewardship, local knowledge and practices, with ecological and climate awareness programs that include children, women and elders.

Principle 3

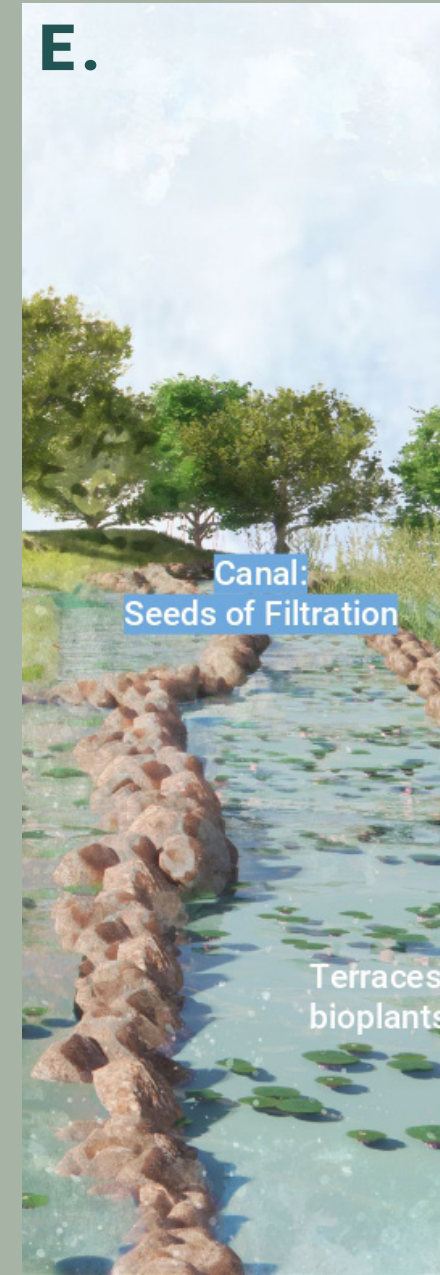
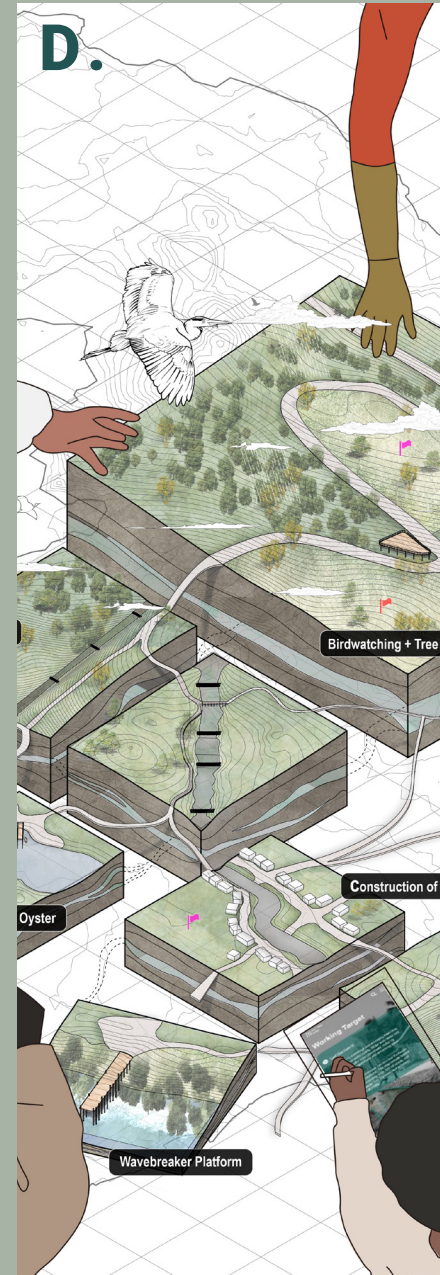
Empower Cartagena communities through the design of communal spaces for collective-decision making and adaptive governance.

Principle 4

Foster Cartagena's community identity, local knowledge, arts, crafts, green jobs, and recycling practices, towards economic resilience, enhanced livelihoods and ecological sustainability.



URBAN DESIGN VISIONS



SEAMLESS ARCHIPELAGO

CIÉNAGA DEL DIQUE

WEAVING WATERWAYS

FROM CLOUD TO SEA

SEEDS OF CHANGE

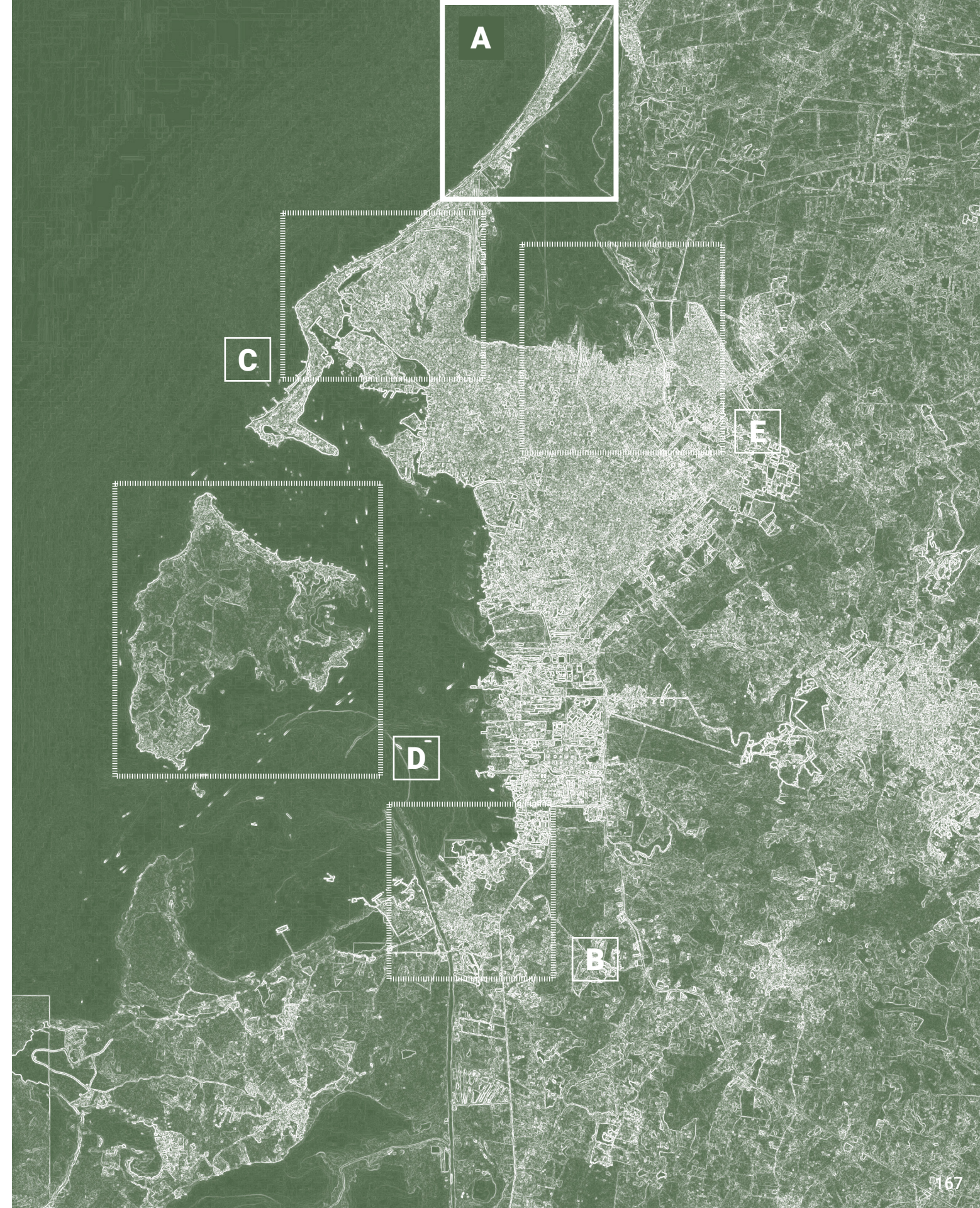


A. SEAmless Archipelago

Designing for possibilities, resilience, and community empowerment

TEAM: JIAYE LIE, XUEYUAN WANG, YUHAN XU, YUXUAN WANG

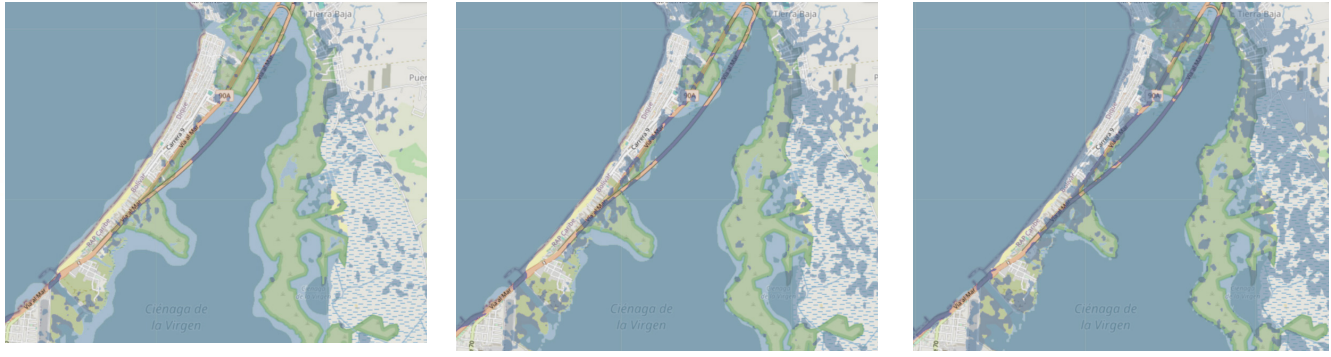
La Boquilla is a neighborhood occupying a tentative strip of ground between Ciénaga de la Virgen and the Caribbean Sea. The connection across this ground is as vital to the saline world of mangroves in the ciénaga as the ciénaga and sea are to the lives of the fishing community inhabiting this ground. However, sea level rise due to global warming is about to transform this ground by fragmenting it into an archipelago. SEAmless Archipelago embraces this transformation toward land fragmentation, working to create multiple possibilities, build resilience, and empower community. The project introduces five 'anchors.' Each addresses the local community's needs in the face of environmental change. Each anchor grows, expands, and develops at its own pace and by their own language; their intersections in the hands of the community promise to open multiple ecological, cultural, and economic possibilities.



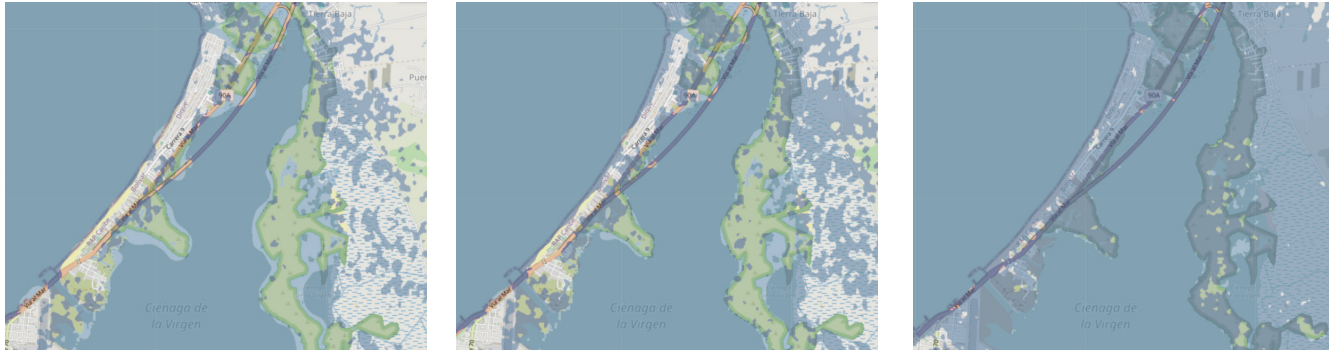
PROJECTIONS



PROJECTIONS

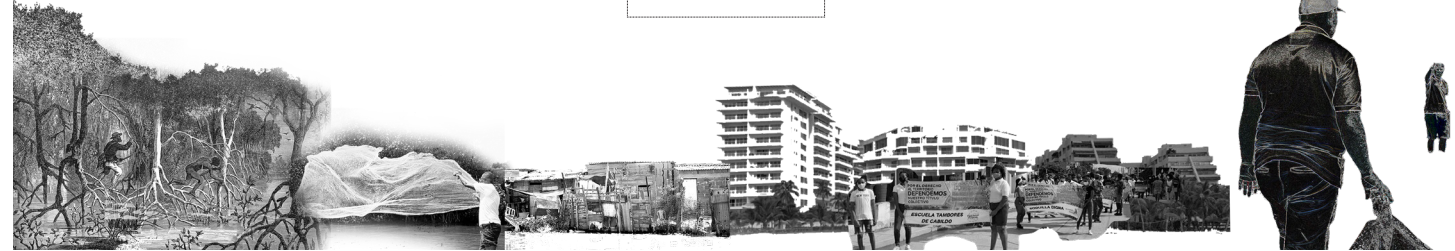


PROJECTIONS



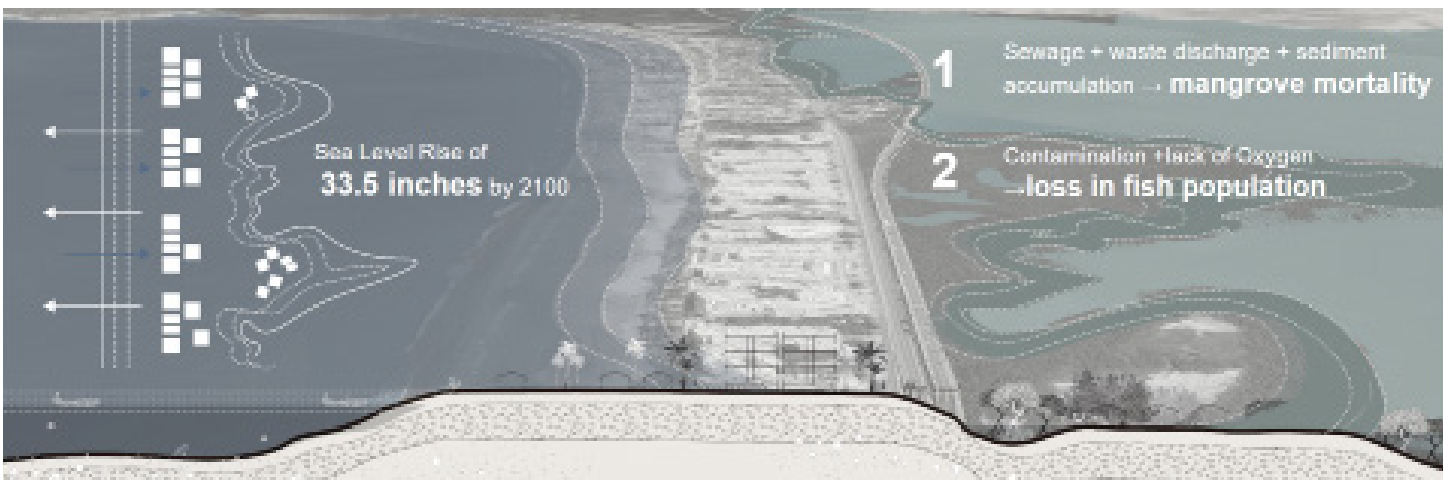
0.1 MULTIPLE POSSIBILITIES OF SEA LEVEL RISE

We acknowledge the immediacy of sea level rise, but as these three projections show, the rate of sea level rise is unpredictable.



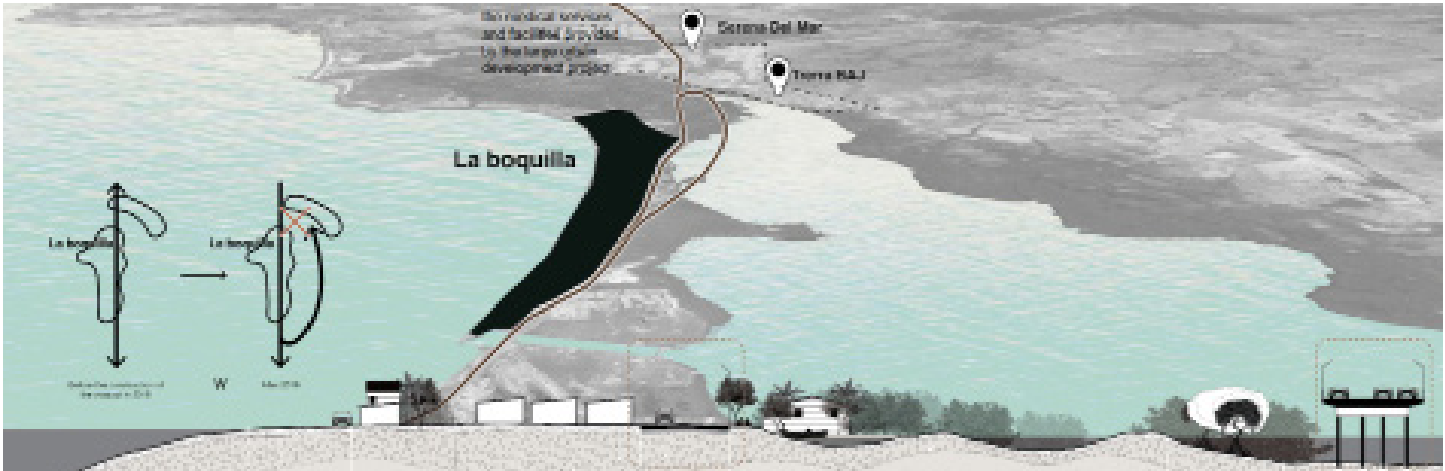
0.2 TRANSFORMATION OF THE LAND AND LOCAL LIFESTYLE WITH TIME

La Boquilla has been a site of constant transformations. The land itself was formed from geological shift, and sea level rise is about to transform this ground. Similar dynamism shapes the lifestyles of the local communities.



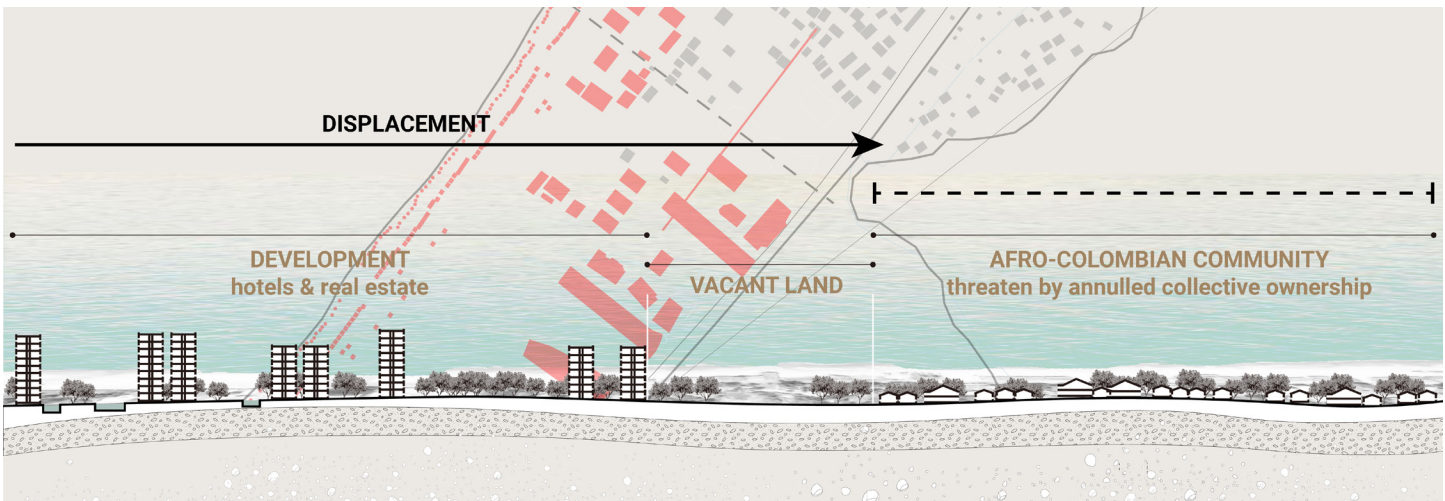
0.3 EDGE 1 - THE BARRIER ISLAND SEPARATES TWO WATER BODIES

The first edge is the barrier island that prevents water exchange and is choking the ciénaga and its ecosystem by accumulating pollutants from the entire watershed.



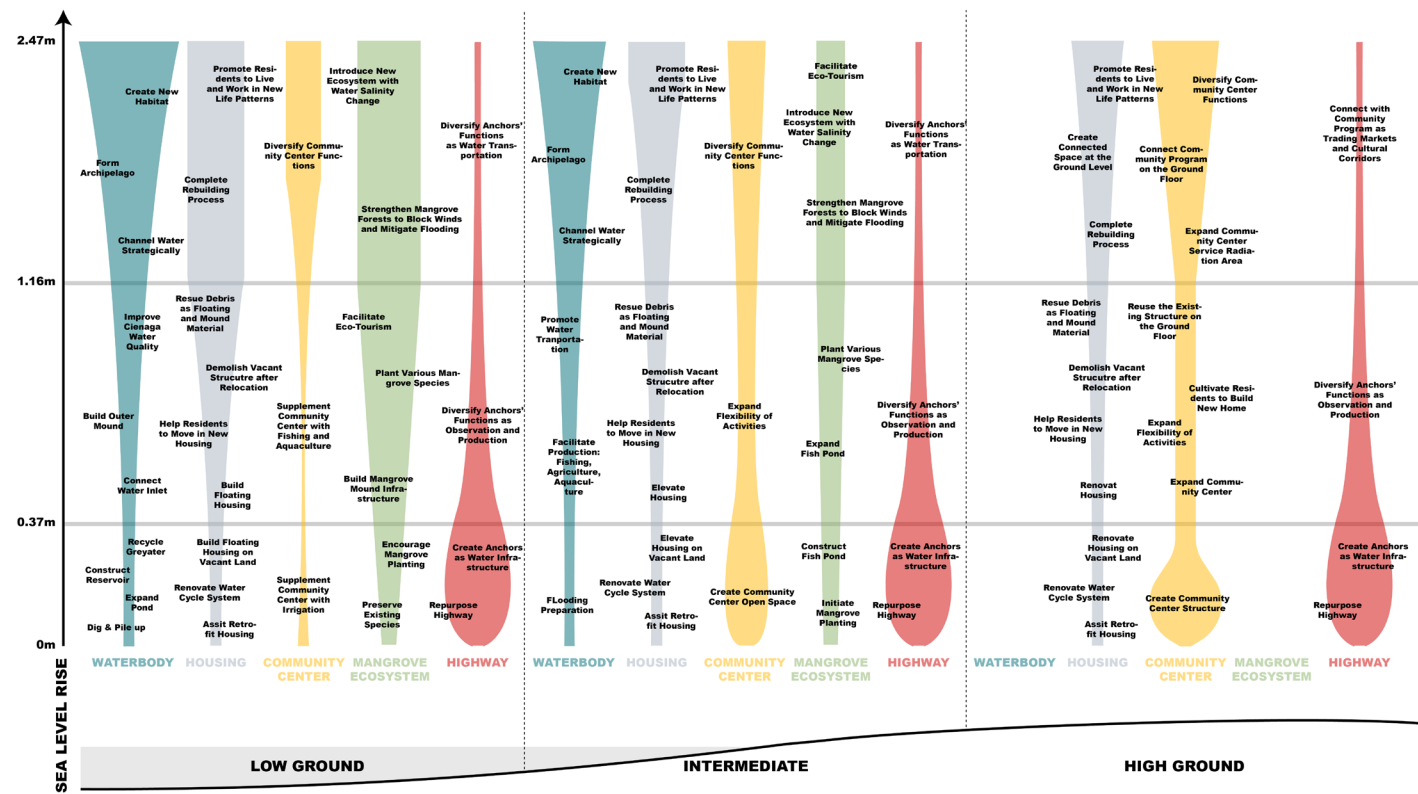
0.4 EDGE 2 - HIGHWAY CONSTRUCTION ISOLATED LA BOQUILLA.

The second edge is Highway 90A, which consists of a ground-level highway and an elevated viaduct. The infrastructure isolates residents from access to social and educational infrastructure, as they have to take a detour around the entire island.



0.5 EDGE 3 - INVESTMENT DISPARITY EXACERBATED SPATIAL AND SOCIAL SEGREGATION

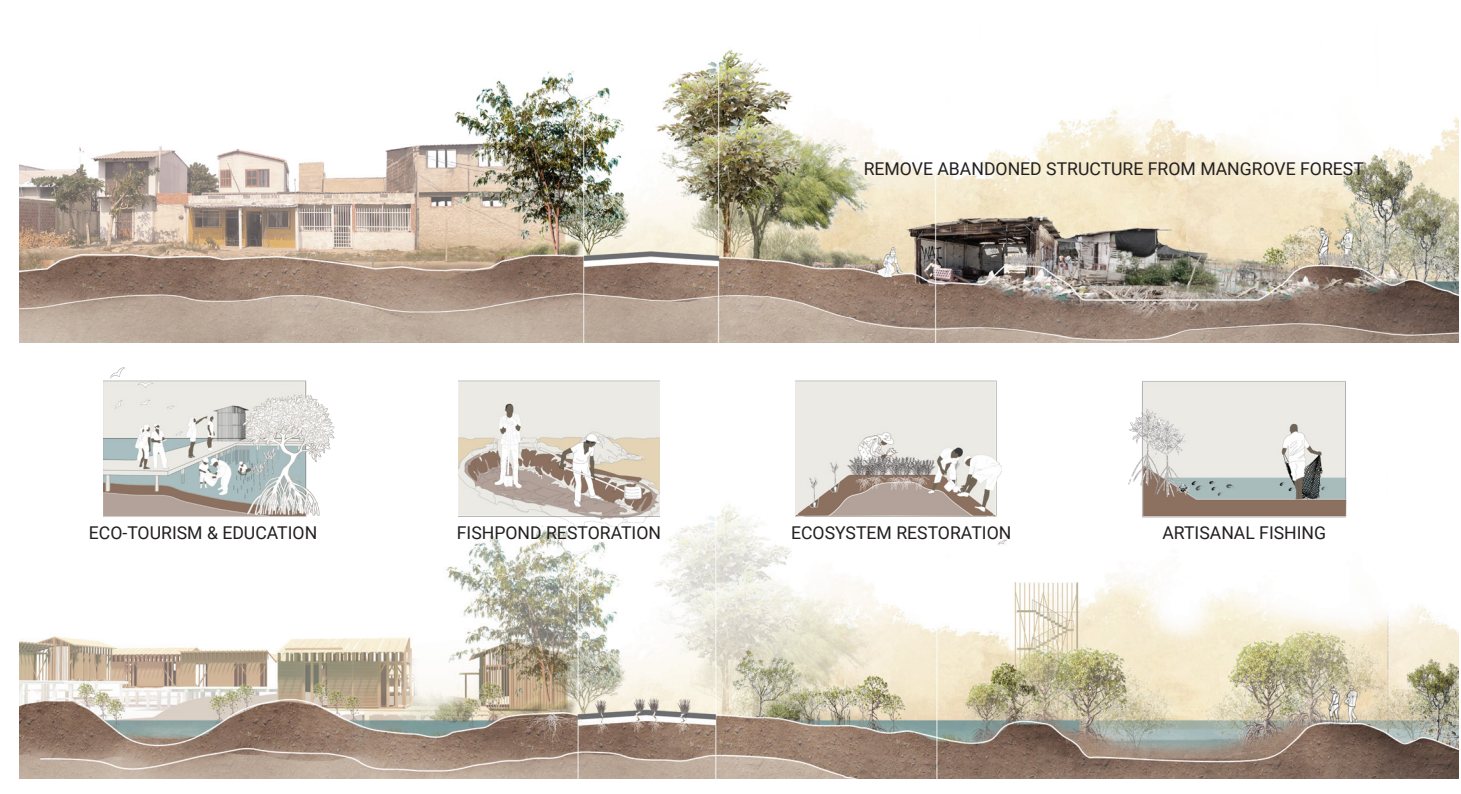
The third edge marks the investment disparity between the southern hotel areas and the northern local residential area. Residents do not really have authority over their land and are continuously displaced.



0.6 FIVE STRATEGIES AS "ANCHORS" FOR THE COMMUNITY
 0.7 SEAMLESS ARCHIPELAGO 2150



These anchors can be seeded and developed throughout La Boquilla, empowering local communities toward a future with multiple possibilities.



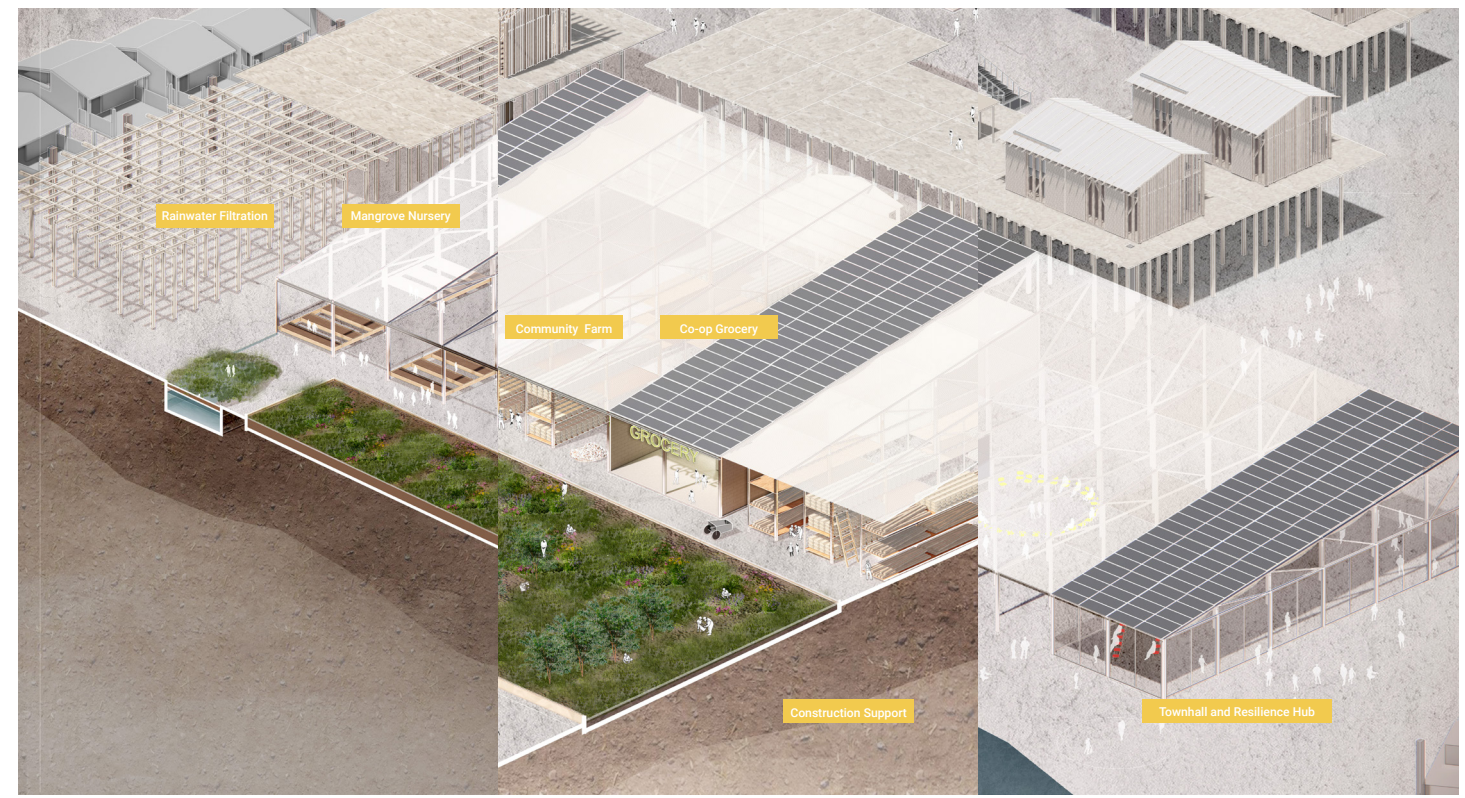
0.8 RECIPROCITY BETWEEN ECOSYSTEM AND ECONOMY RESILIENCY
 0.9 COMMUNITY STEWARDSHIP TOWARDS THE LA BOQUILLA ARCHIPELAGO



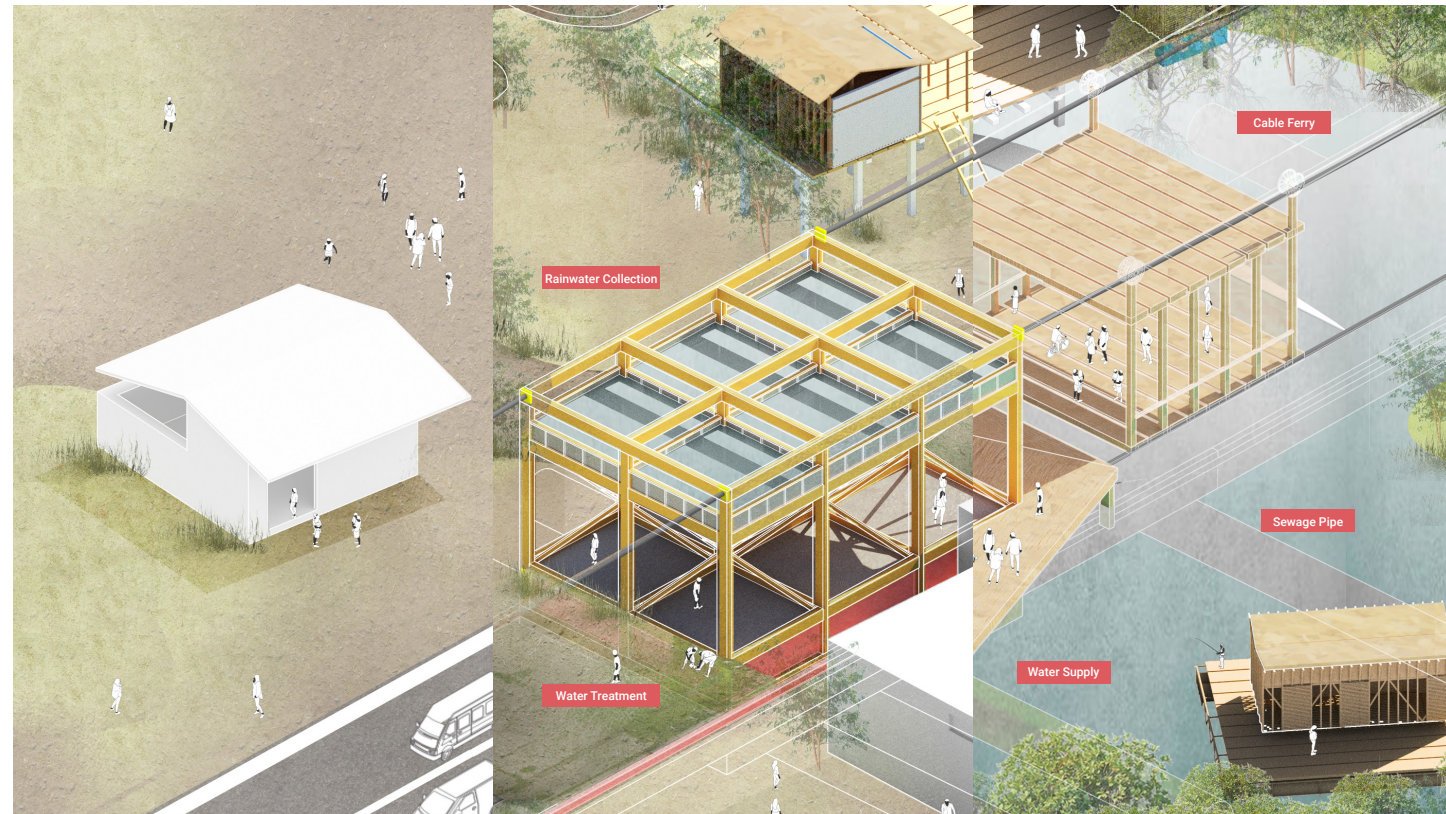
The mangrove forest will expand across the archipelago, providing favorable conditions for kelp cultivation, protecting communities against severe hurricanes, and protecting high ground from erosion.



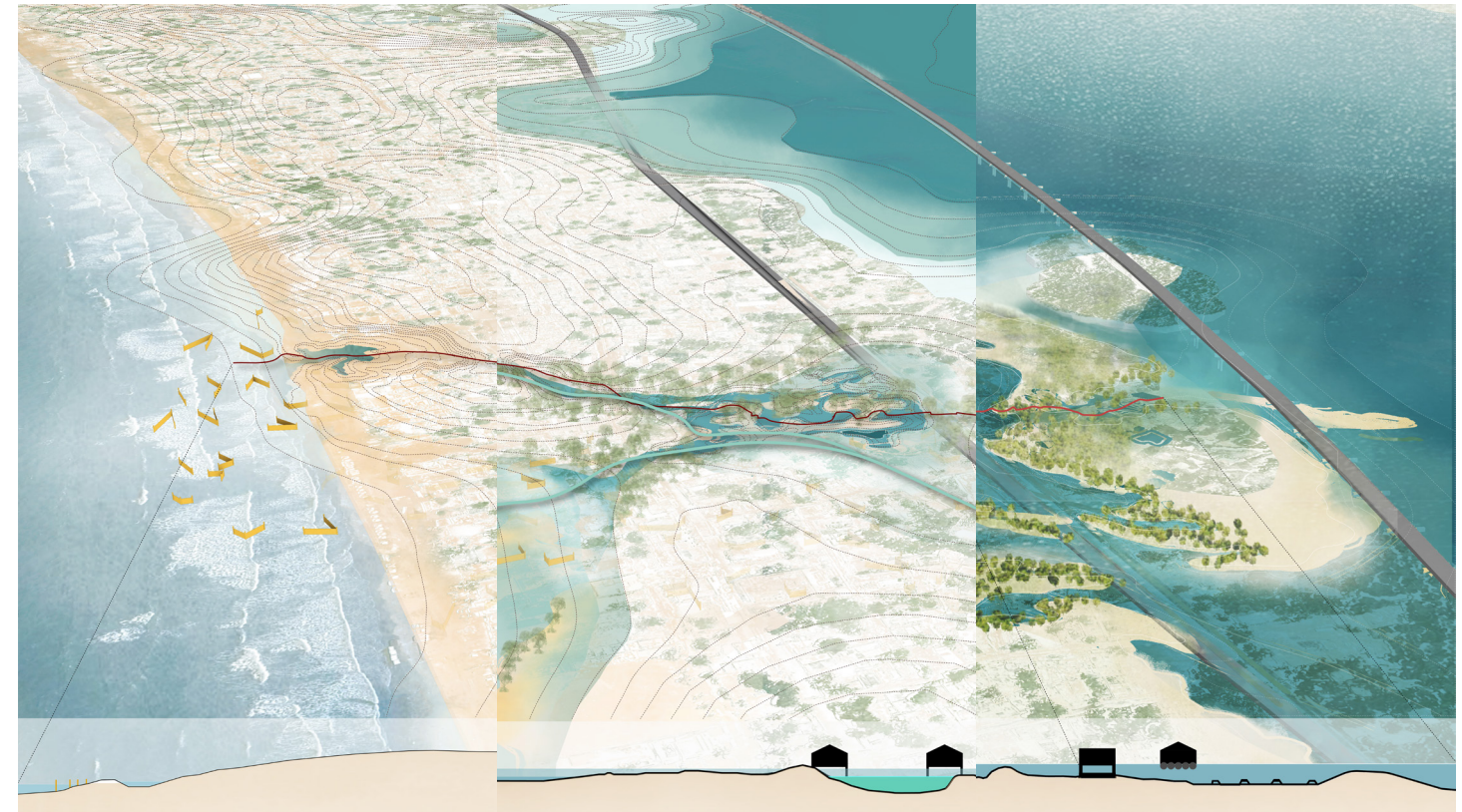
1.0 STRATEGIC HOUSING ADAPTATION
1.1 REPURPOSING THE HIGHWAY



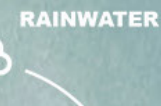
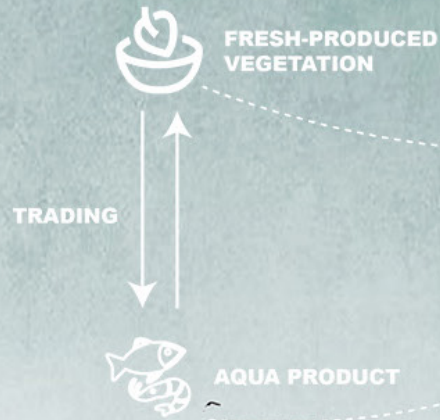
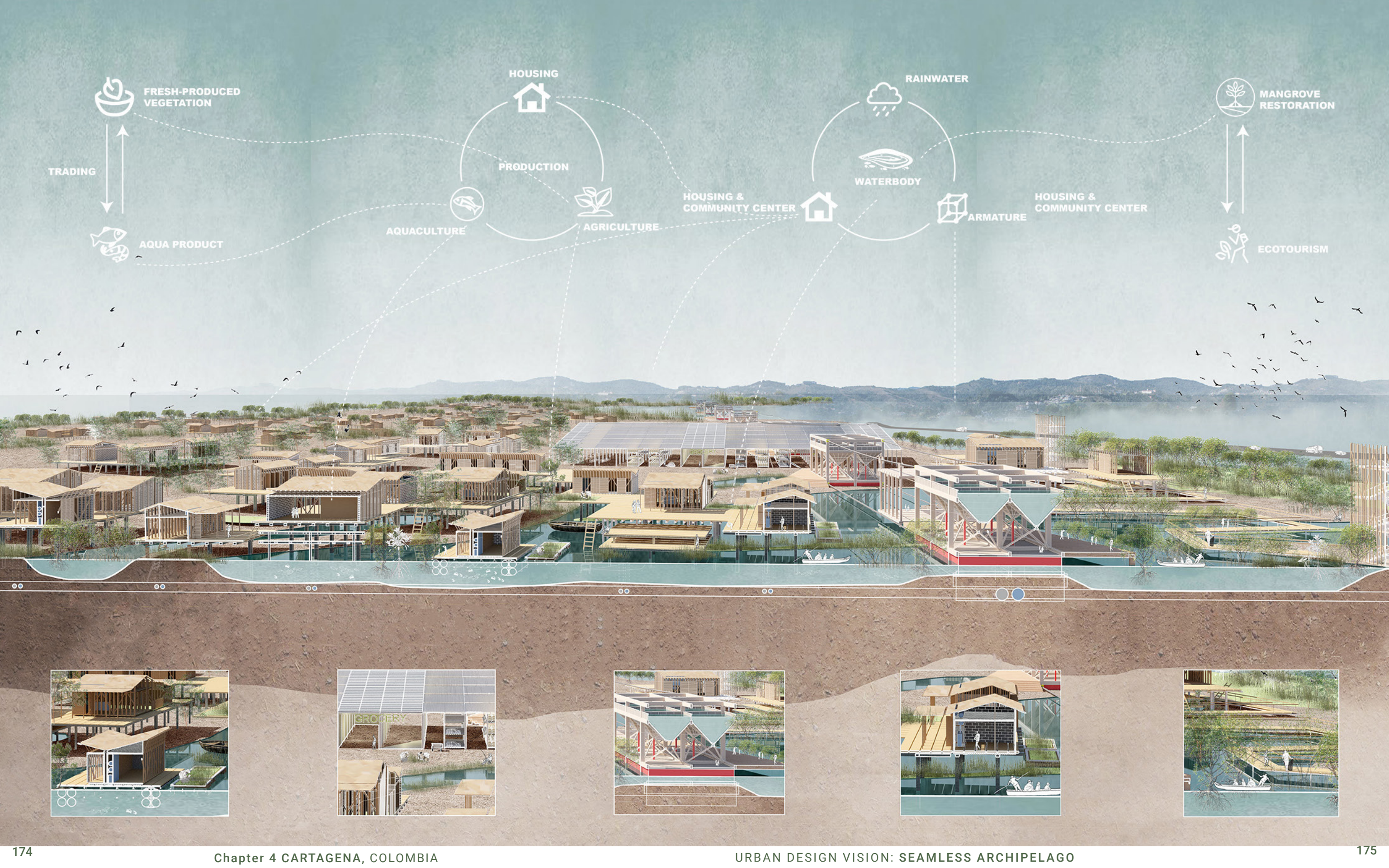
1.2 SUPPORT COMMUNITY STEWARDSHIP
1.3 GUIDING WATER CONNECTION



This interchanging housing expansion and resident relocation starting simultaneously at multiple locations in the neighborhood allows for a gradual process of housing renovation, which eventually frees up the ground floor for a sewer system and production. The repurposed highway is an organizing infrastructural backbone to support communities' lives at different stages.



Adding to the landscape are community centers that provide space and resources for organizational efforts and community gatherings for a set radius of households. Underlying all interventions is the connection between the sea and the ciénaga. Over time, a resilient archipelago will take its shape, functioning as a base upon which humans and non-humans cohabit.



PRODUCTION



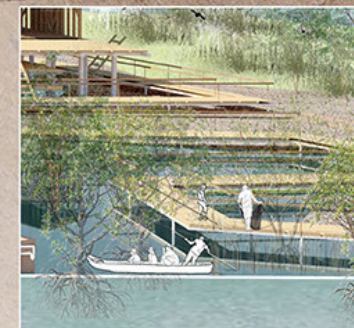
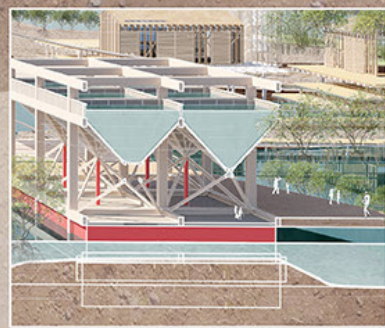
AQUACULTURE



HOUSING & COMMUNITY CENTER



HOUSING & COMMUNITY CENTER





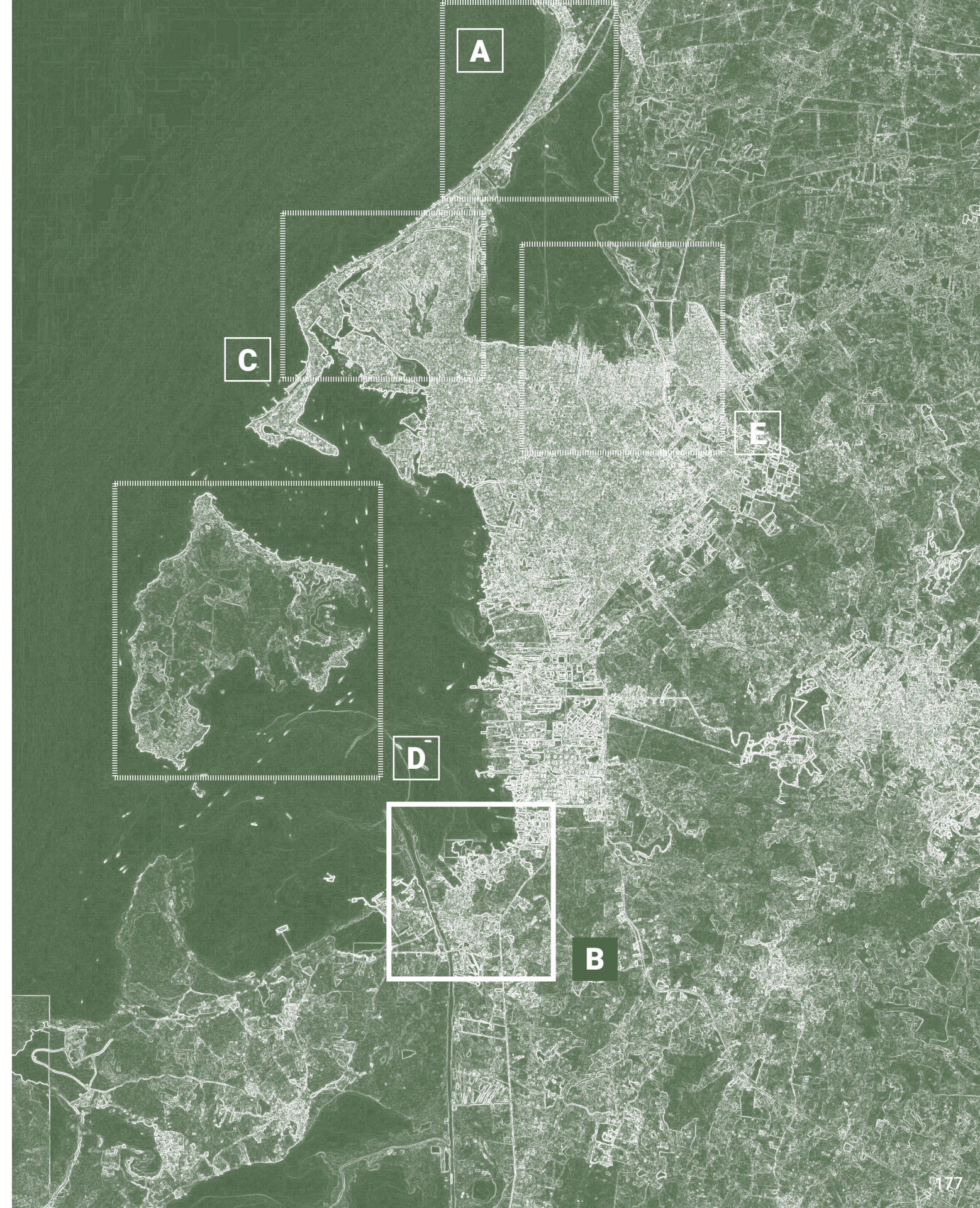
B. CIÉNAGA DEL DIQUE

Pasacaballos: From Magdalena to Bay

TEAM: ANDY LU, CARRIE GE, YIQUN FENG, ZEMIN YAN

The Canal del Dique connects Cartagena Bay and the Magdalena River. Its appearance was a sudden force that disturbed the natural balance between those two water bodies and interior ciénagas. The canal opened access to tremendous sediments running from the river to the bay, creating edges between the water and local communities. Moreover, it was the mark of Spanish colonial extraction of the environment and people. The locals have been suffering from the unjust consequences of industrial development by the canal.

Our project aims to address the multifaceted frictions caused by the linear canal by reconstructing the connected ciénaga system and restoring the resilient open wetlands in this region. We would apply multi-scaled ciénagas composed of different urban infrastructures and vegetation to create triple-layered protection for communities and support local strength tones to combat contemporary economic extraction.

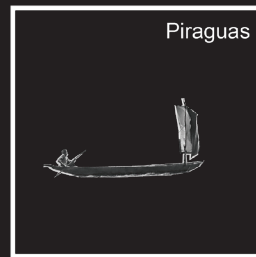




1500

• 1800

• 2010



Piraguas



Champán



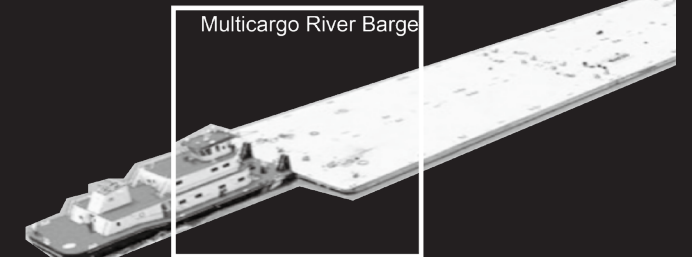
Bongo



Paddle Steamer



Paddle Steamer



Multicargo River Barge

HISTORICAL EXTRACTION

Canal del Dique, built by Spanish colonists in the 18th century, was used to transport resources from Colombia to Europe. Colonizers expanded the canal to accommodate large barges and ships, changing the landscape and transforming the gradient water system into a linear canal.

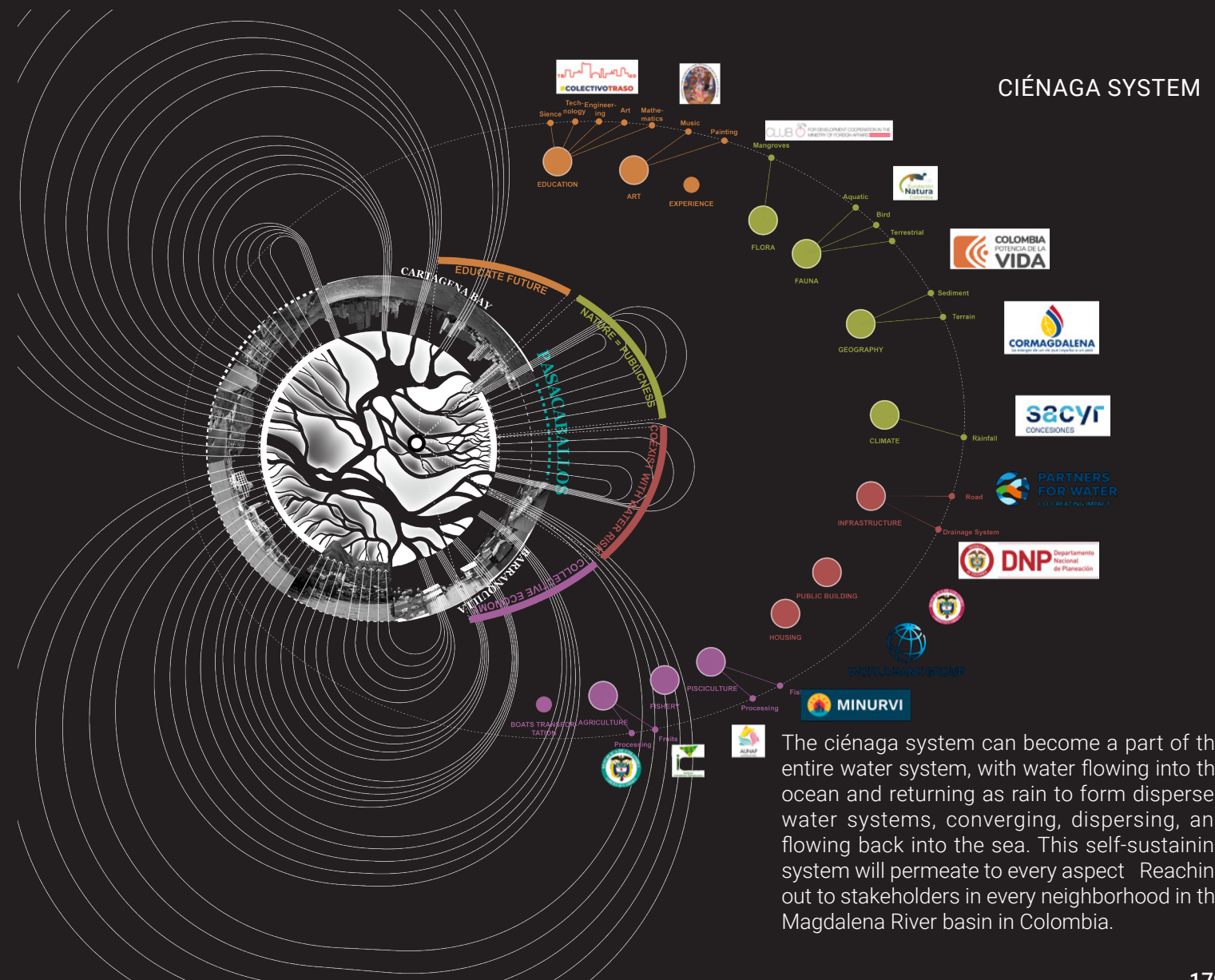


TRAGEDY OF THE CANAL SYSTEM

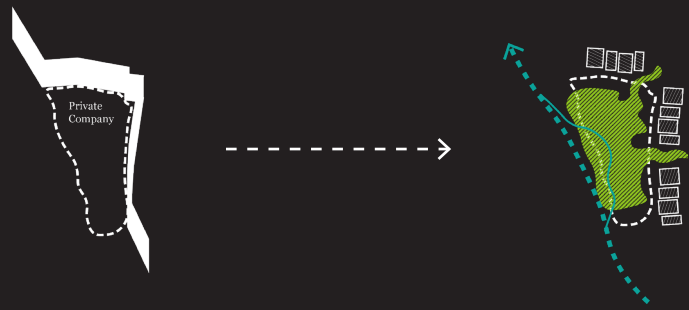
In 2010, the flooding from this Spanish project damaged 42,000 homes, a tragedy that lasted for two years.

OPPORTUNITY OF CIÉNEGA SYSTEM

We want to start from a small scale based on the community location, expanding the ciénega, connecting it, and recovering it. The interconnected ciénegas will significantly strengthen resilience to flooding and pollution in this region.



The ciénega system can become a part of the entire water system, with water flowing into the ocean and returning as rain to form dispersed water systems, converging, dispersing, and flowing back into the sea. This self-sustaining system will permeate to every aspect. Reaching out to stakeholders in every neighborhood in the Magdalena River basin in Colombia.



MAKING A MANGROVE EDGE



ELEVATING HOUSE



BACKYARD CIENEGA



NATURE = PUBLICNESS

COEXIST WITH WATER RISK

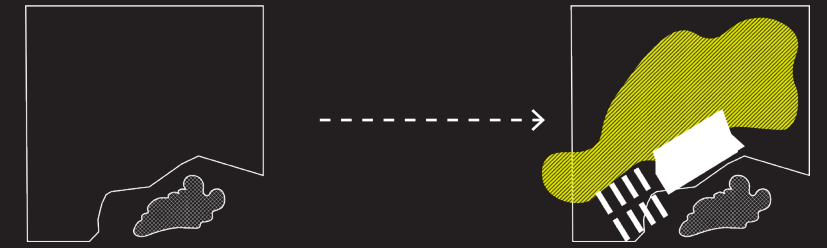




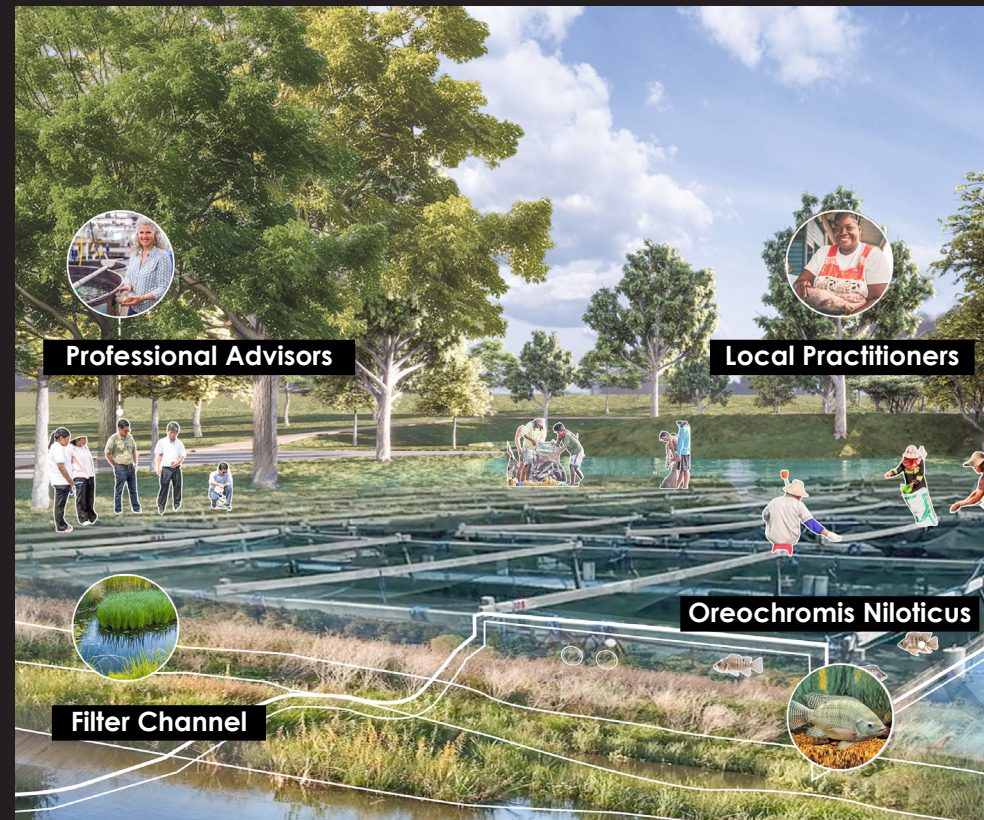
FRUIT TREES GRID



PRODUCTION CHAIN

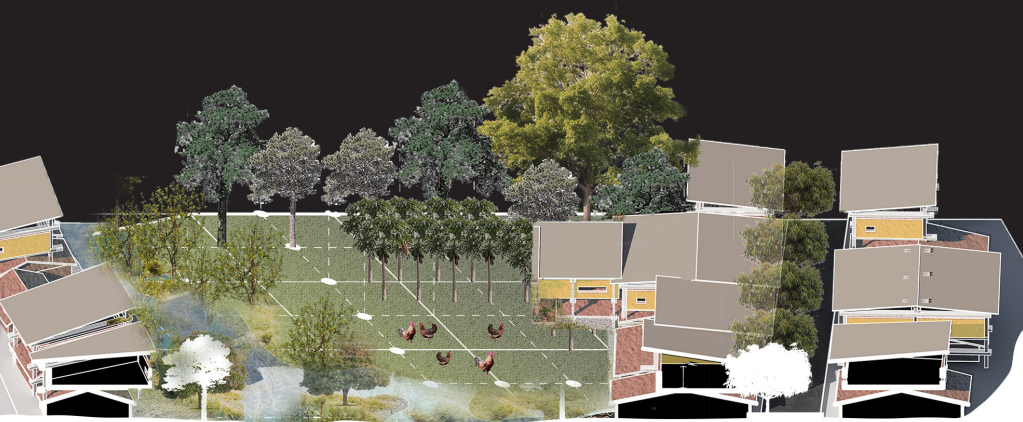


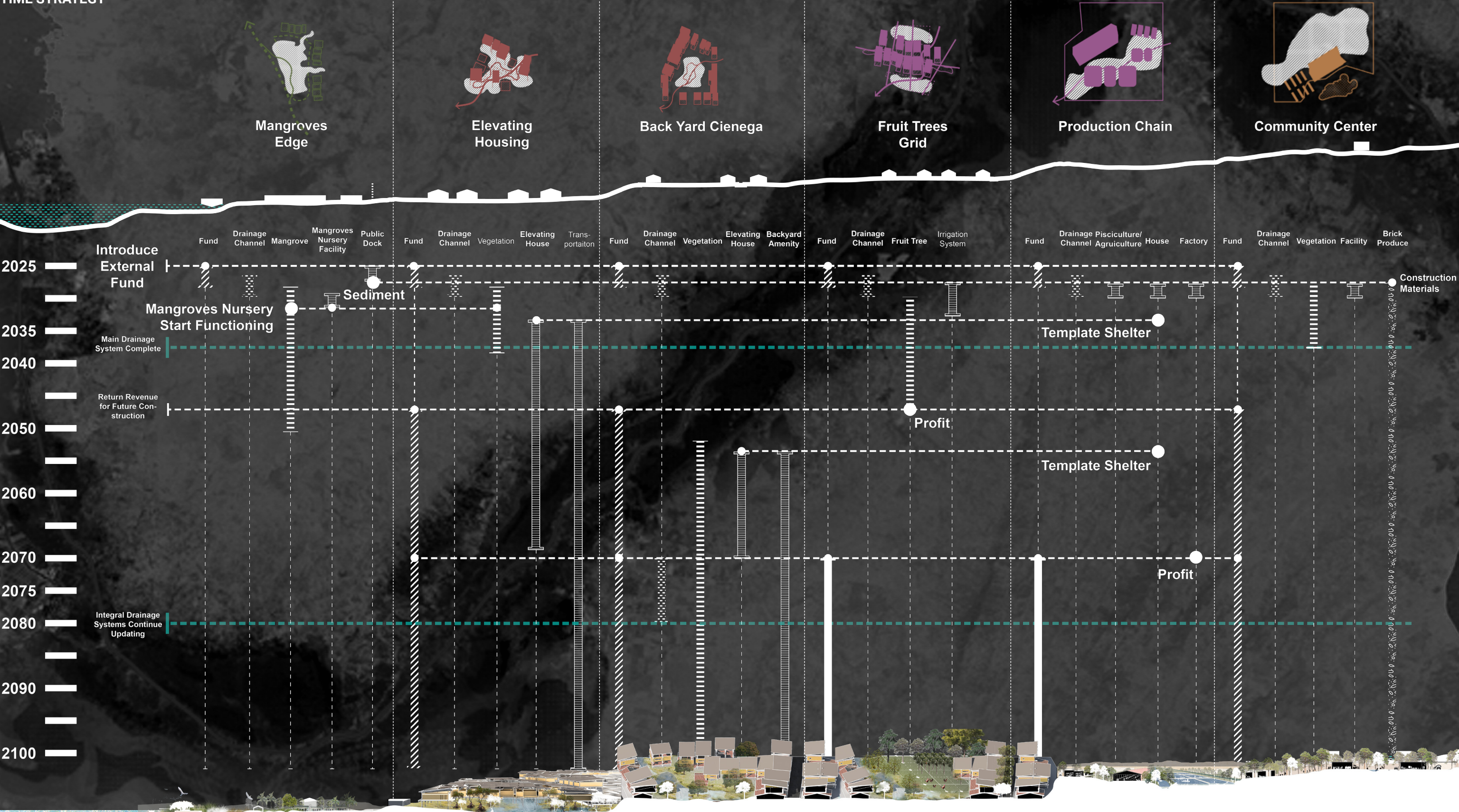
COMMUNITY CENTER



COLLECTIVE ECONOMY

EDUCATE FUTURE





Combined, these initiatives form a gradient system based on water, terrain, and urban fabric. They interact and mutually support each other.



C. WEAVING WATERWAYS

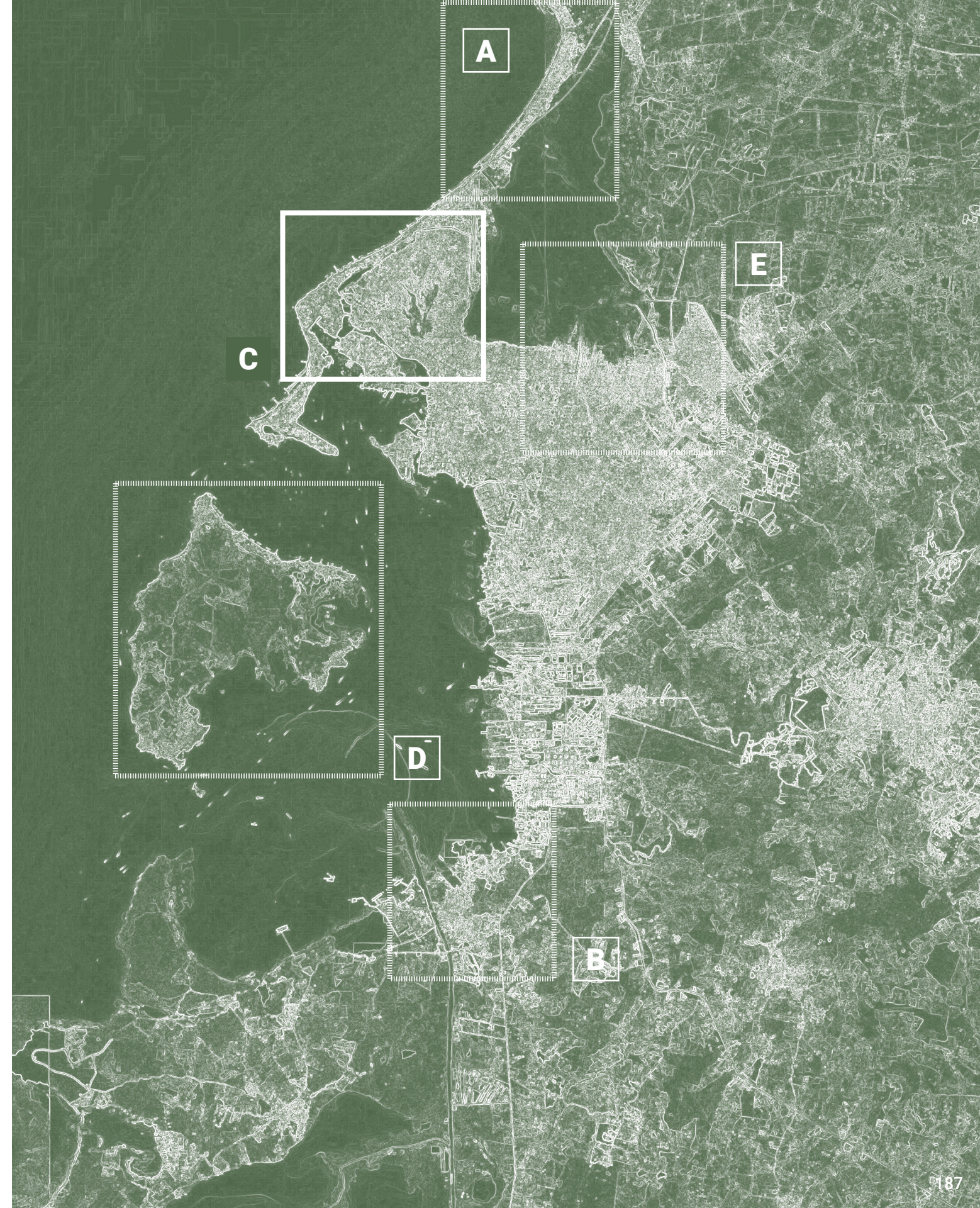
Strengthening Ecosystems, Uniting Communities

TEAM: ANADYA KUKREJA, HEQIAO MENG, HYUNGKYUNG SEO

Juan Angola Canal in Cartagena is a vital link in the chain of water bodies on Colombia's coast. It connects the Ciénaga de la Virgen and the Cartagena Bay and, through them, the Caribbean Sea. Current developments endanger and impede this connection. Our design focuses on revitalizing this link, both its ecological well-being and as a mitigator of flood risks.

In this process, we also connect and vitalize communities on either side of the canal. By selecting five distinct sites along the canal, we propose tailored interventions to address specific challenges and opportunities. We envision these five sites as opportunities such as an ecological mouth, a community living with mangroves, connecting expanded edges, and a resilient sponge park and coast. These interventions include expanding the canal into adjacent communities, which serve the dual purpose of fostering mangrove growth alongside human settlement and treating waste and rainwater before it enters the canal.

Working between high and low grounds, we harmonize community and ecological restoration, promoting resilience and sustainability. Through collaborative efforts, we envision the canal becoming a dynamic hub of biodiversity and social interaction, enriching the natural environment and the lives of those who call its banks home.

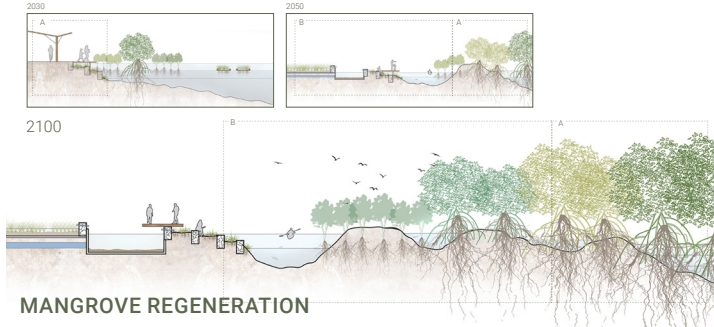




DESIGNING FOR ECOLOGY AND COMMUNITY

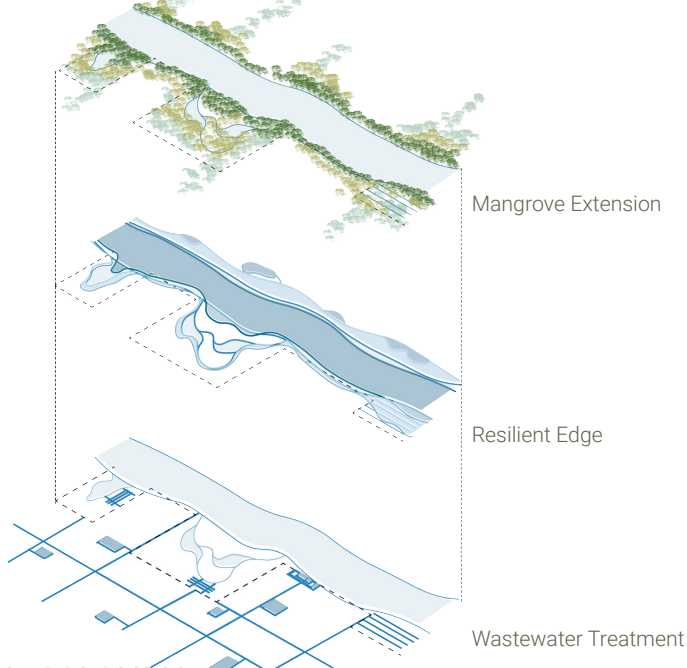
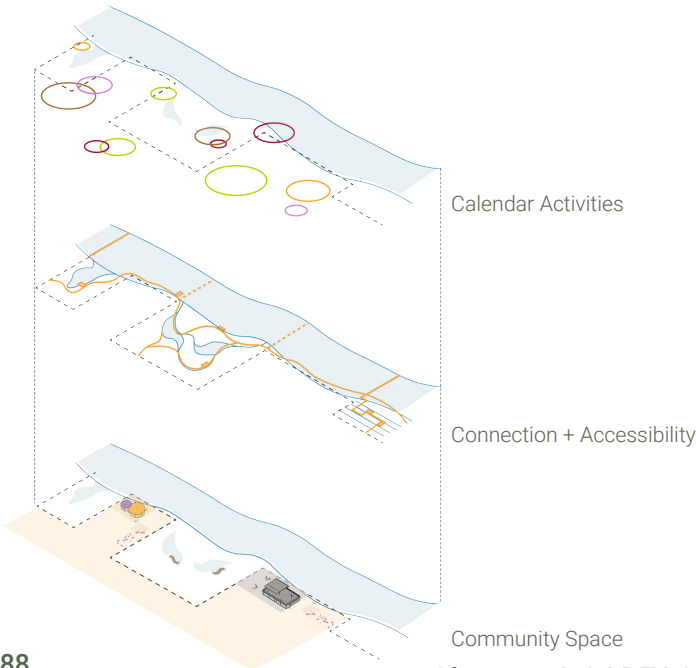


The overarching aim of the project is to integrate ecological restoration with community development by leveraging the canal's potential as a conduit for environmental revitalization and social cohesion. The design seeks to foster symbiotic relationships between people and nature while mitigating flood risks and enhancing biodiversity.



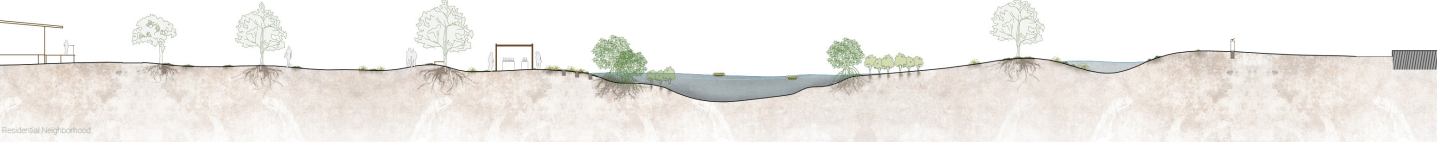
01. COMMUNITY STRATEGIES

02. ECOLOGY STRATEGIES

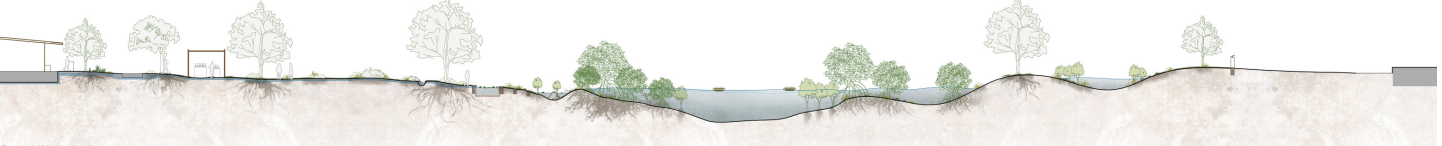


SITE 01: ECOLOGICAL MOUTH

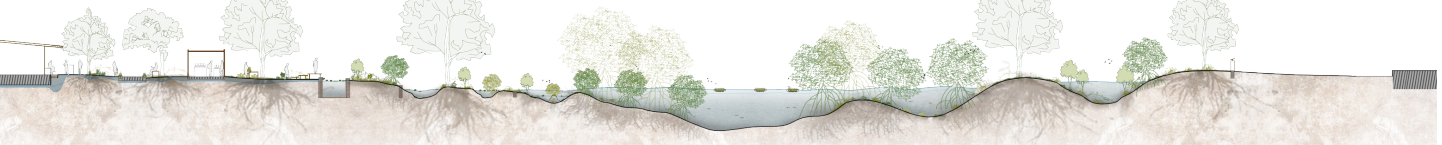
Site Section: Year 2030



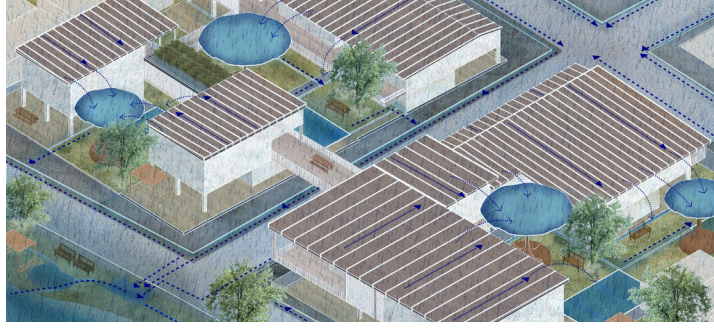
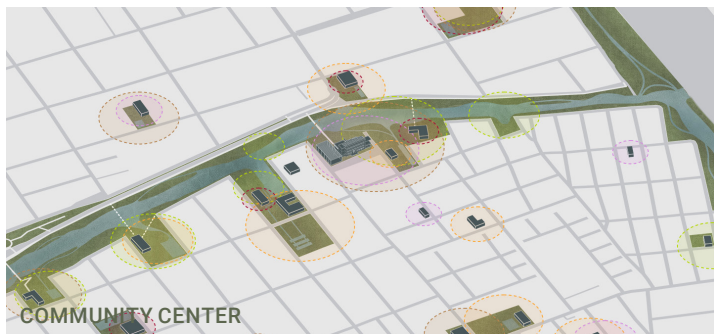
Site Section: Year 2050



Site Section: Year 2100

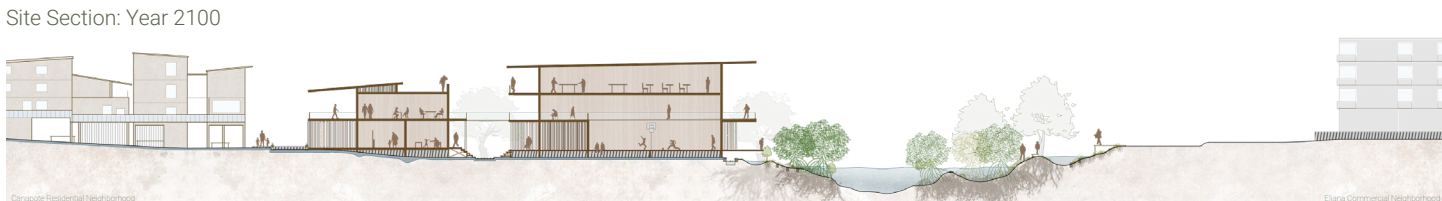
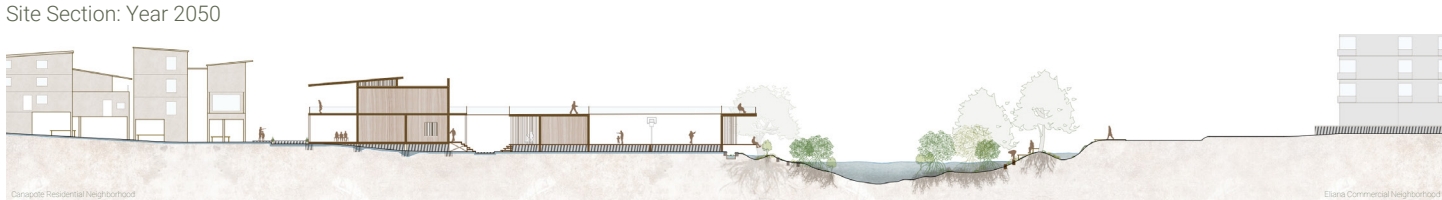
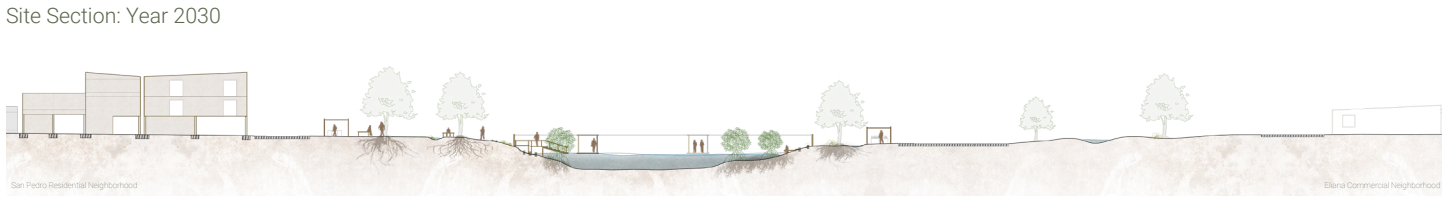
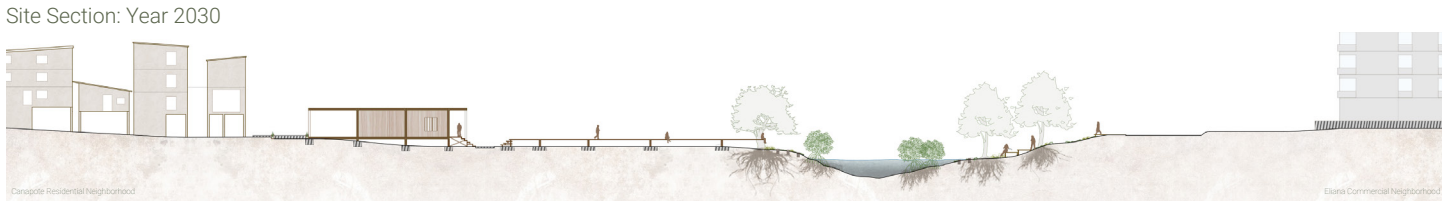


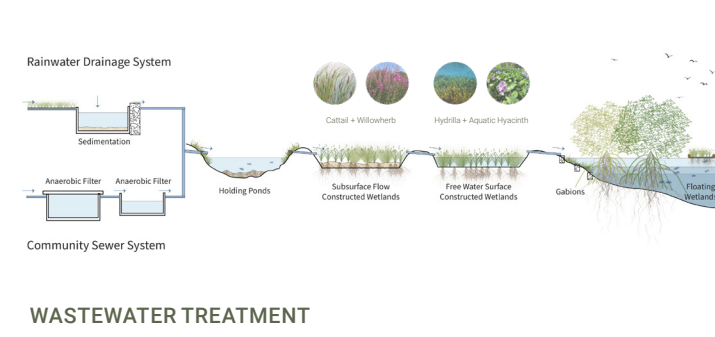
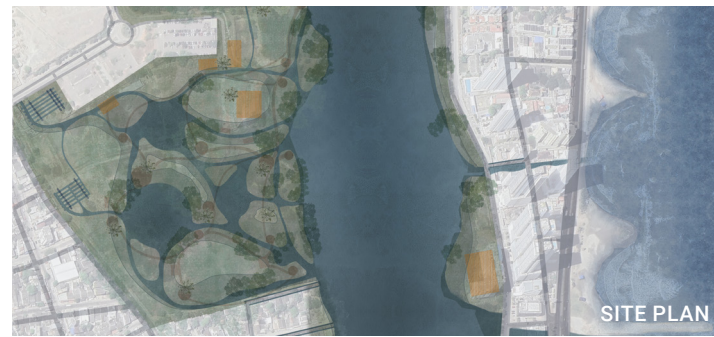
URBAN DESIGN VISION: WEAVING WATERWAYS



SITE 02: COMMUNITY LIVING WITH MANGROVES

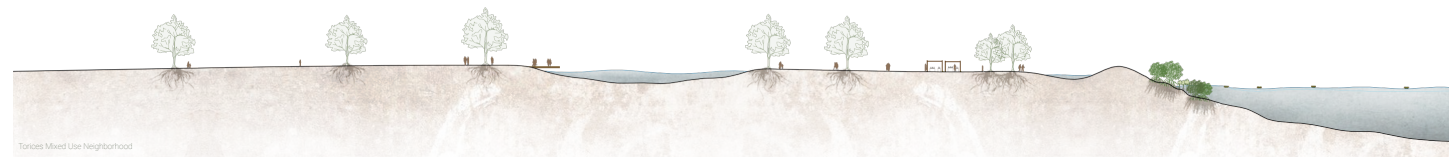
SITE 03: CONNECTING EXPANDED EDGES



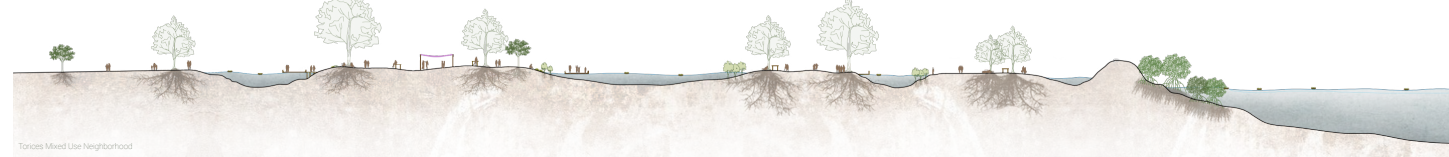


SITE 04: RESILIENT SPONGE PARK

Site Section: Year 2030



Site Section: Year 2050



Site Section: Year 2100



SITE 05: WATERFRONT HERITAGE

Site Section: Year 2030



Site Section: Year 2050



Site Section: Year 2100





Caribbean Sea

Connecting Expanded Edges



Resilient Sponge Park



Community Living with Mangroves



Ciénaga de la Virgen

Ecological Mouth



Waterfront Heritage



Bahias de Cartagena



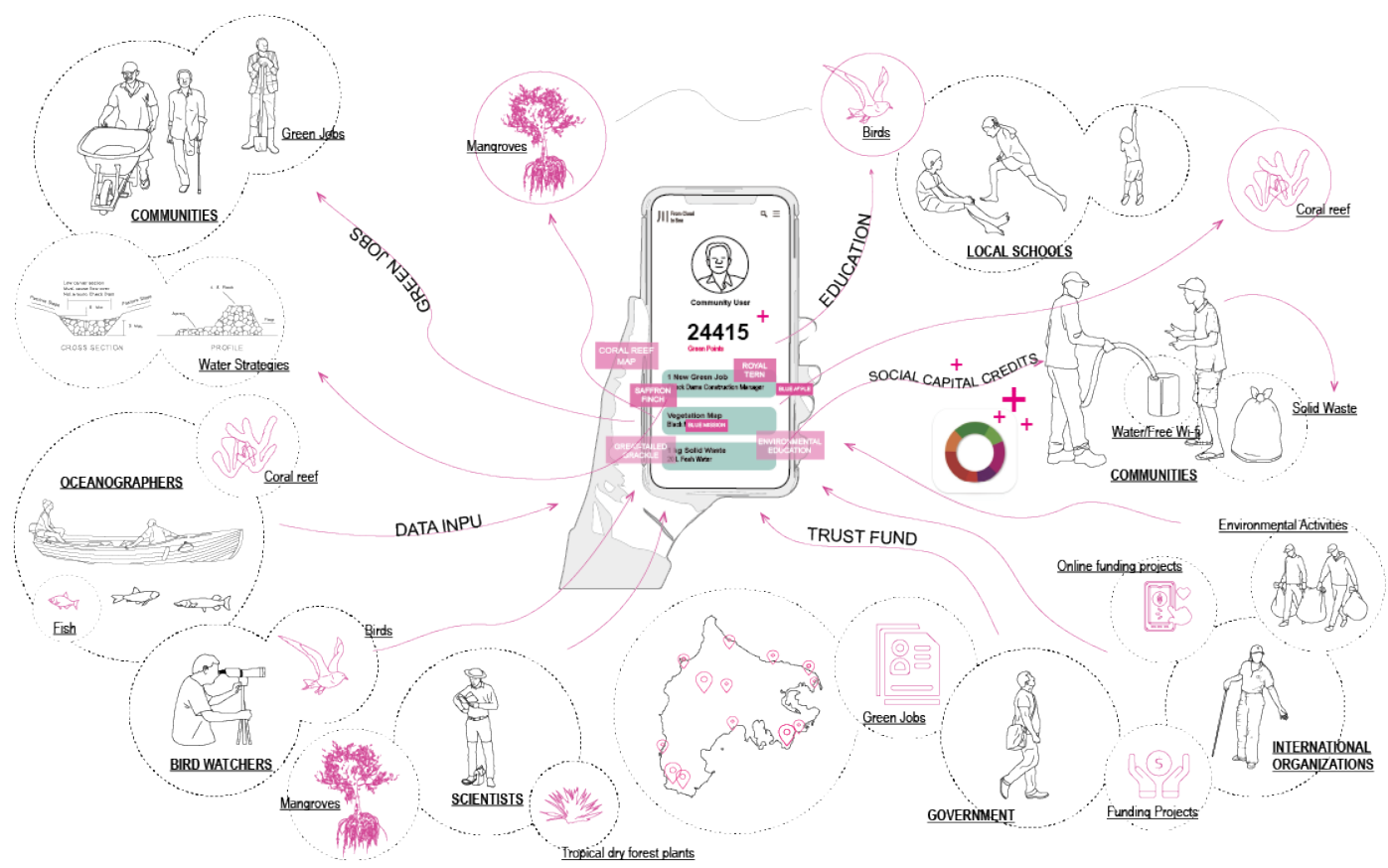
D. FROM CLOUD TO SEA

Restoring Ecology and Empowering Communities in Tierra Bomba

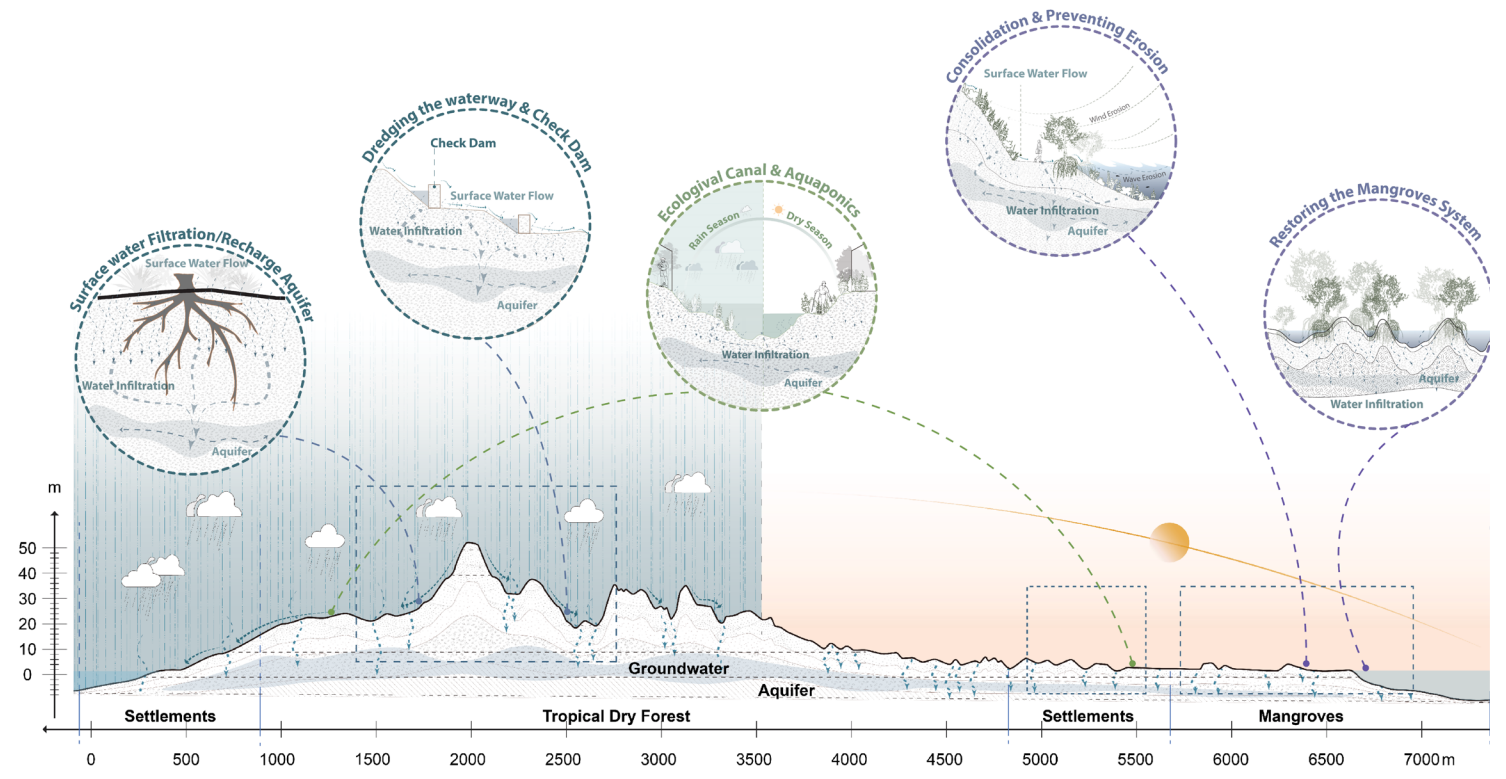
TEAM: AN-TSE HUANG, PHOEBE ZHANG, STEPHEN LUO, TAI NING

Tierra Bomba Island faces myriad challenges, including coastal erosion, habitat loss, and water scarcity, endangering its 4,000 residents. Our integrated strategy involves community engagement, technology utilization, and environmental conservation. For the dry tropical forest, we plan collaborative restoration efforts and construction of check dams for water storage. In settlements, we implement rainwater collection systems, enhance drainage, and promote green planting. Mangrove conservation involves cleaning pollution and reclaiming. We aim for a resilient future, fostering sustainable connections and serving as a model for future communities.

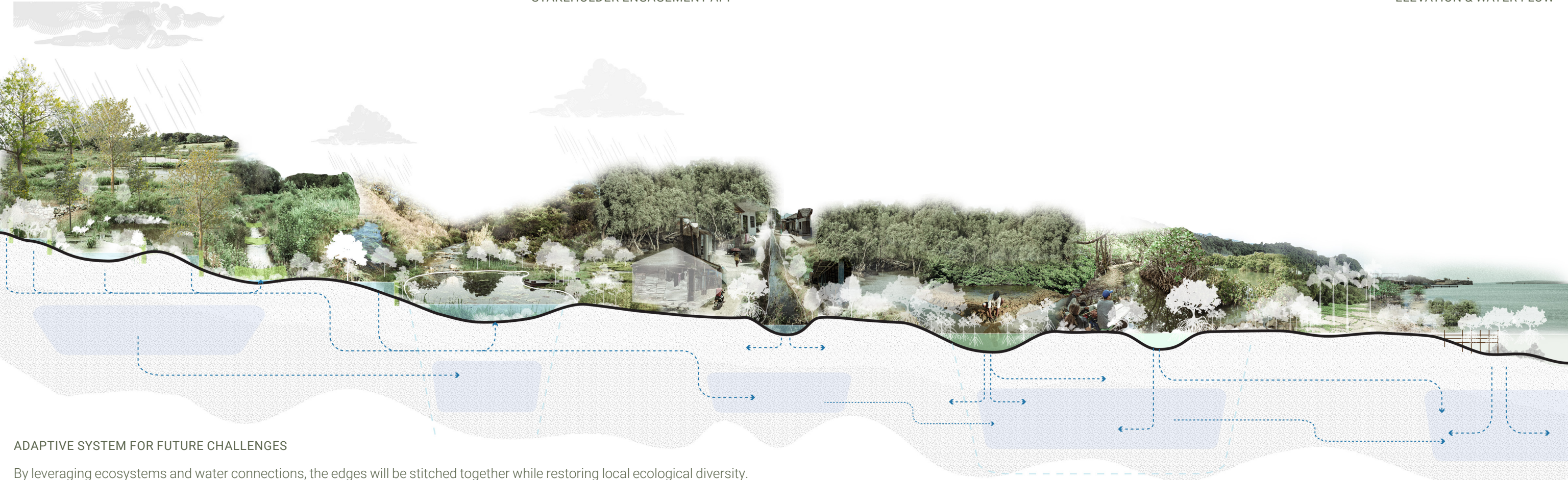




STAKEHOLDER ENGAGEMENT APP



ELEVATION & WATER FLOW



ADAPTIVE SYSTEM FOR FUTURE CHALLENGES

By leveraging ecosystems and water connections, the edges will be stitched together while restoring local ecological diversity.



0.1 GREEN JOBS INCREASE PROSPERITY

The process will involve the participation of the government, organizations, communities, and local schools. Activities will include excavating ditches, constructing check dams, and conducting scientific research.

0.2 GUARDIANSHIP & MAINTAINING

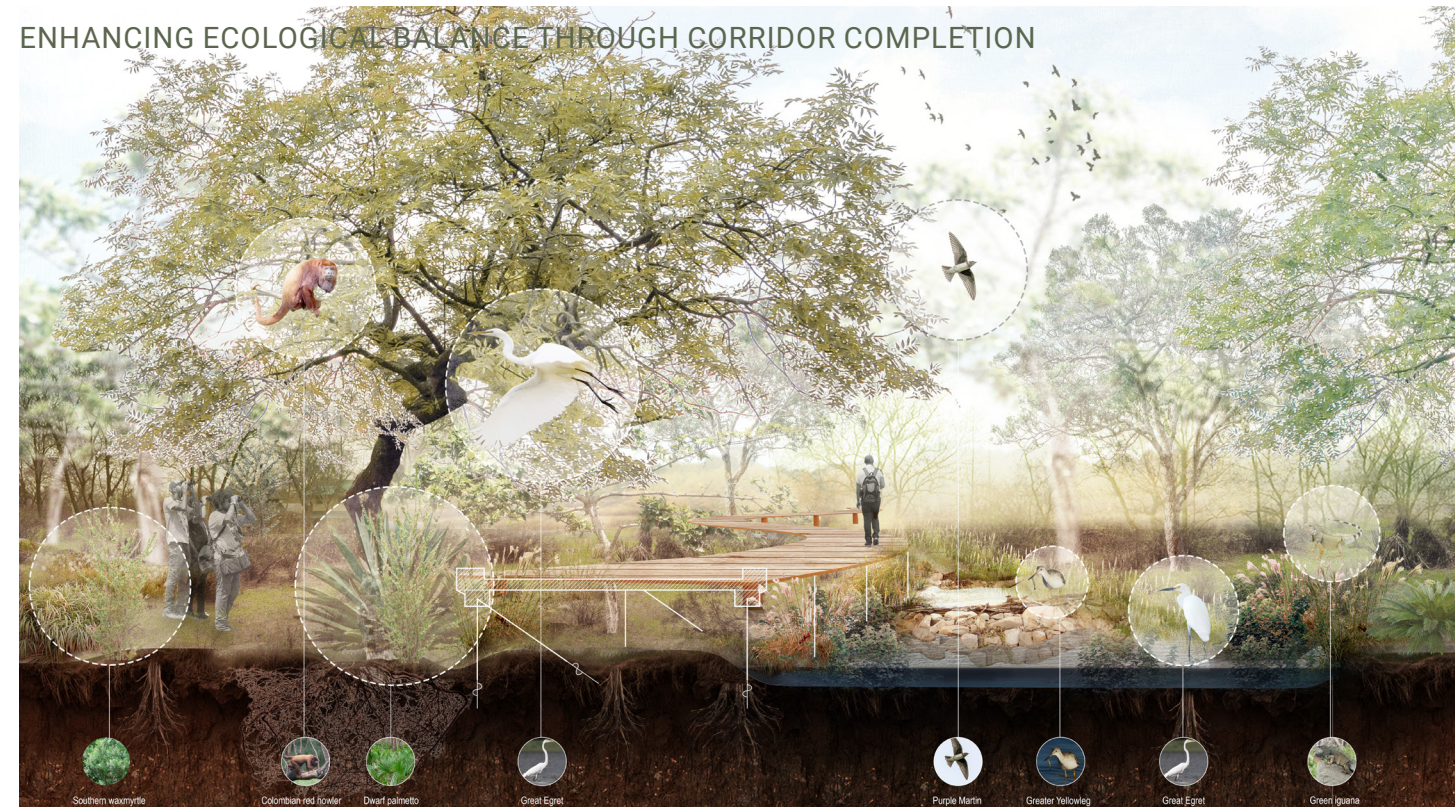
After the transformation, the forest will continue to be maintained by the community and local schools as a diverse ecological corridor. The app will be an excellent tool for eco-education at this time.

0.3 COMMUNITY ACTIVATION_ RAIN SEASON

During the rainy season, water runoff helps alleviate the hot climate and provides a comfortable recreational space for residents. Residents also exchange social capital credit points for resources such as water, food, and health care.

0.4 COMMUNITY ACTIVATION

The renovation process will involve excavating ditches along the water system's path into the settlement while connecting residential water purification systems. The debris from the excavation will be reintegrated into the settlement.





0.1 COMMUNITY ACTIVATION

The government can encourage residents to plant mangroves through eco-education and utilize a social capital credit points system.



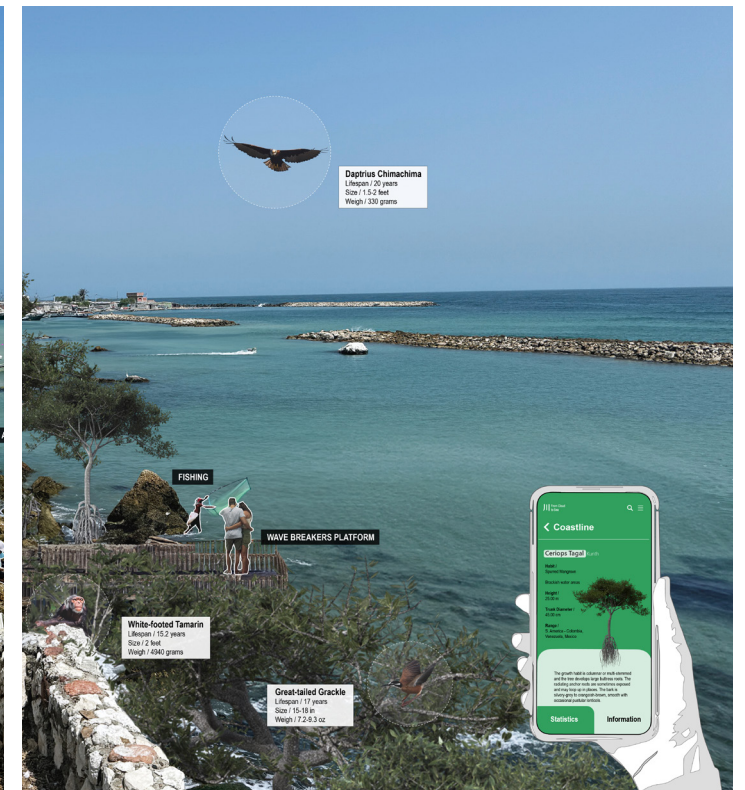
0.2 MANGROVE PARADISE

Restoring the diversity of mangrove ecosystems can help mitigate severe water pollution.



0.3 COMMUNITY ACTIVATION

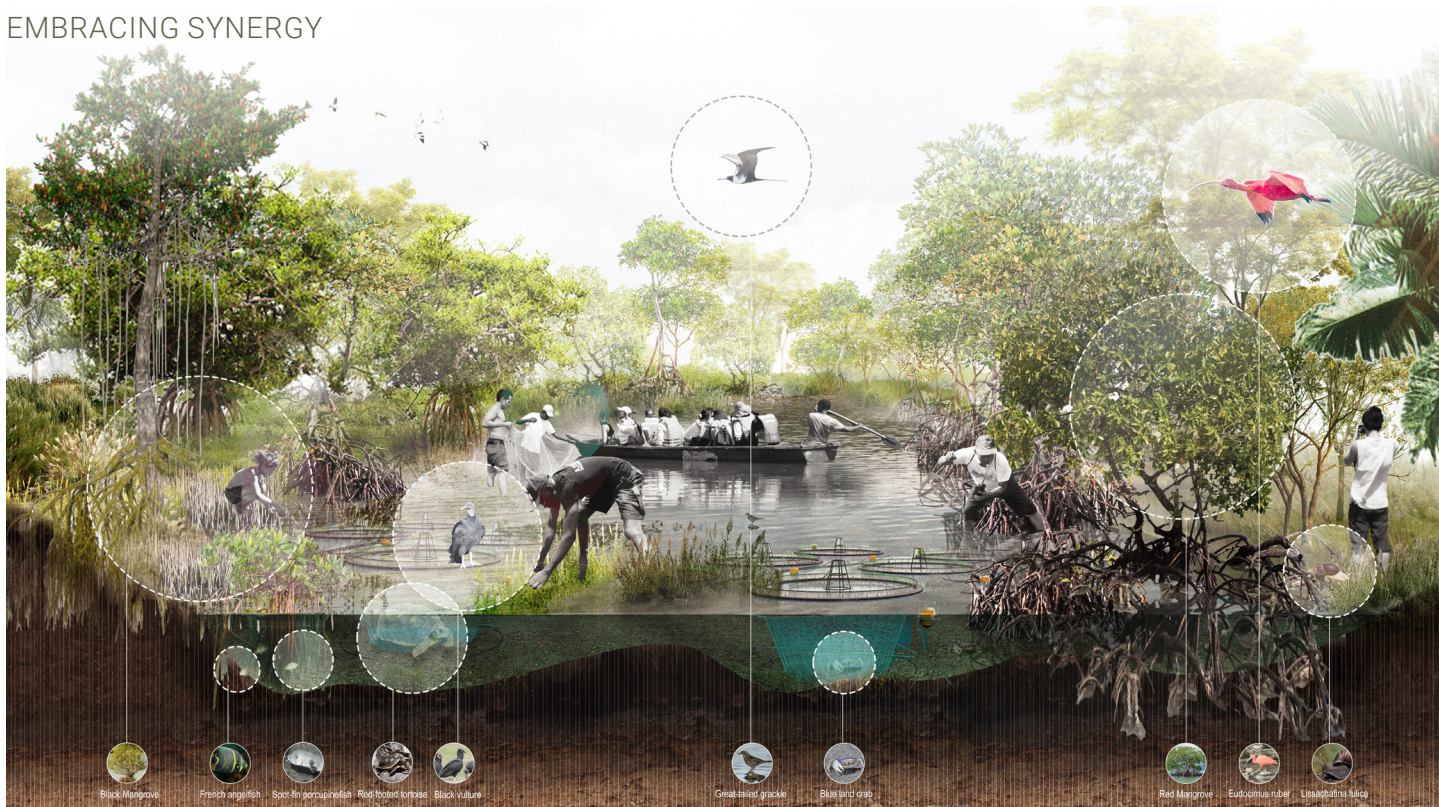
The demolition of abandoned artificial structures and the planting of mangrove forests along the coastline to improve the environment in shallow waters, with the cooperation of many stakeholders.



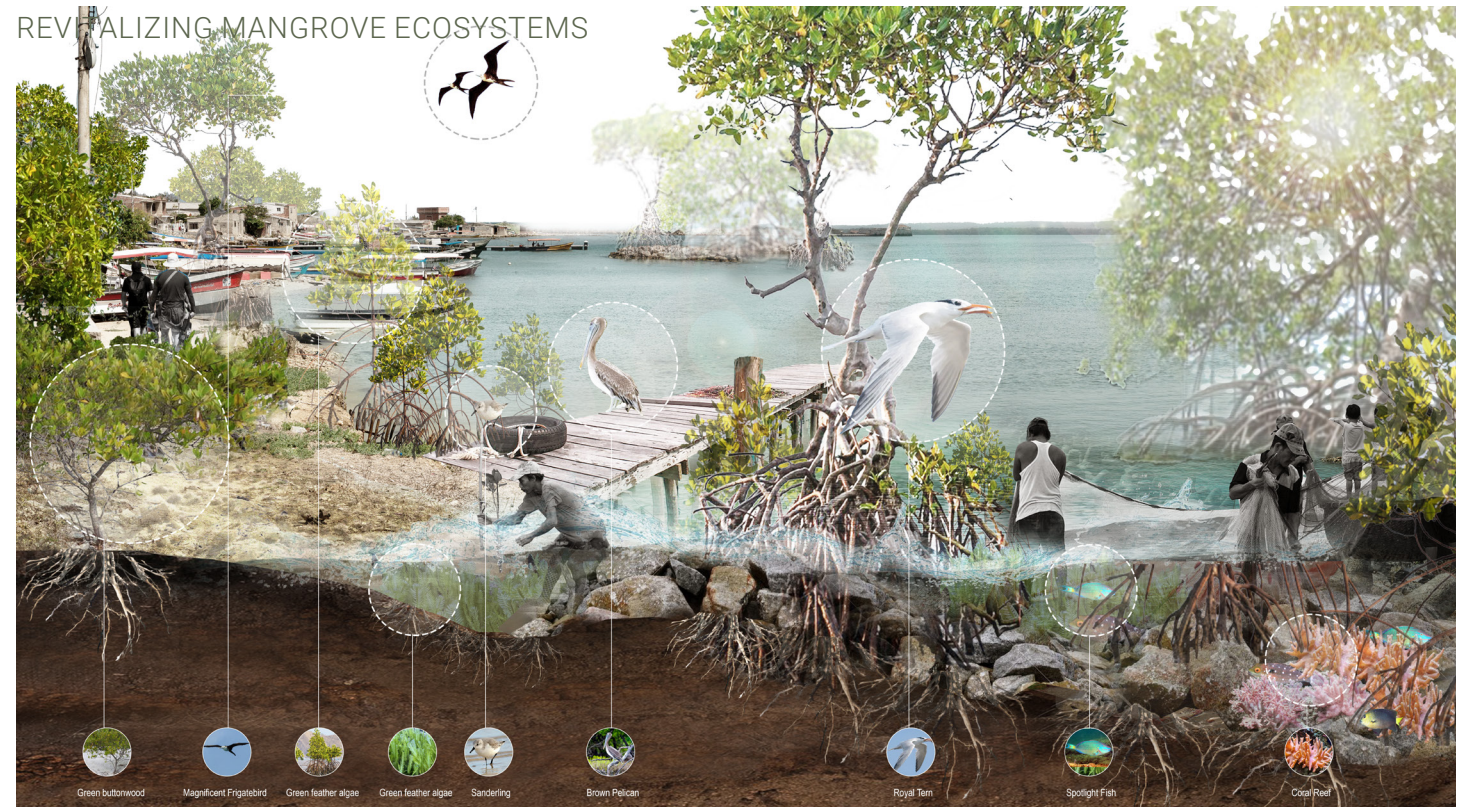
0.4 RESTORING THE LOST MANGROVES

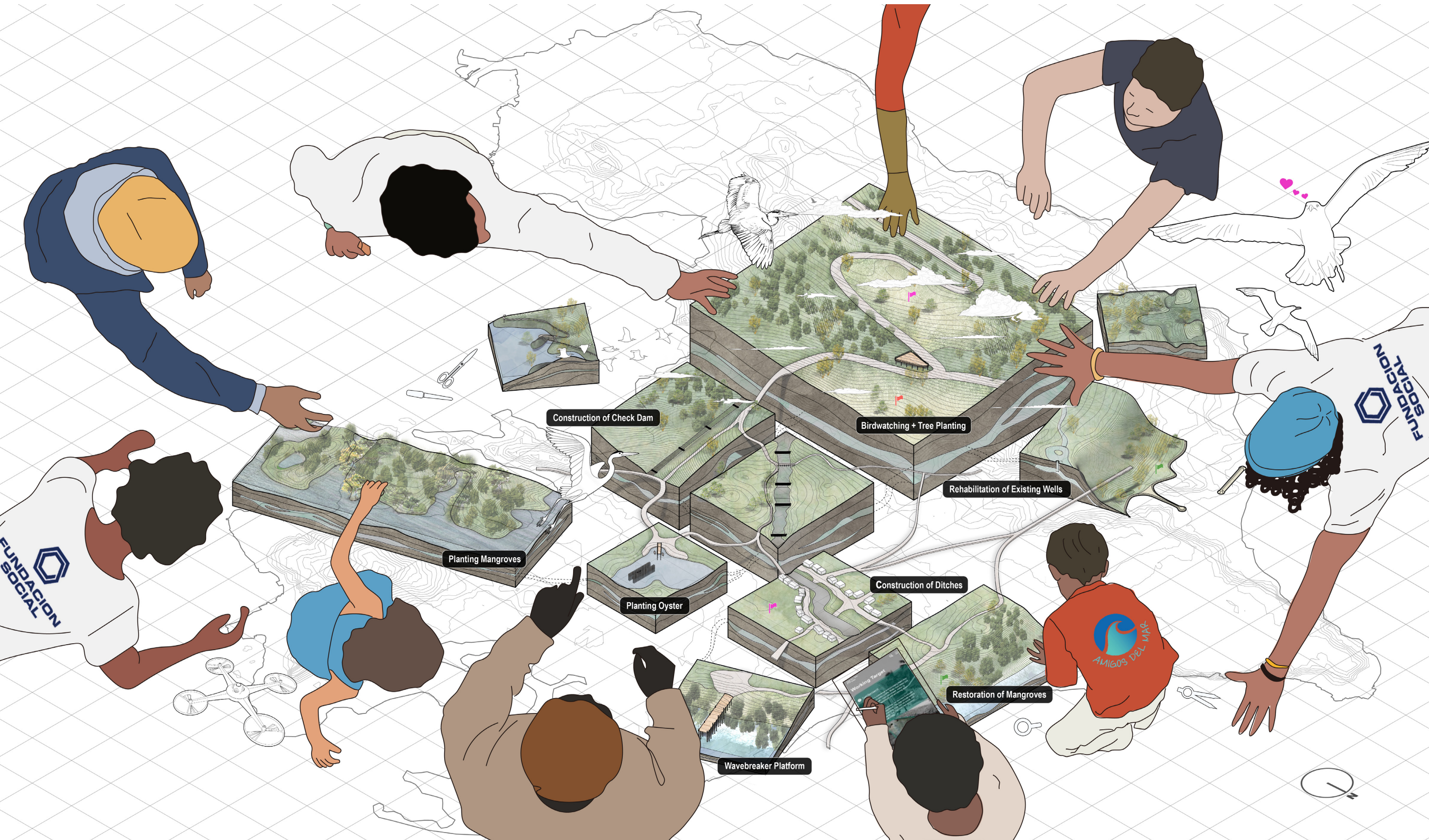
By implementing mangroves and wave breakers platforms, we aim to slow down coastal erosion, restore marine ecosystems with enhanced biodiversity through purification processes, and provide a favorable fishing environment.

EMBRACING SYNERGY



REVITALIZING MANGROVE ECOSYSTEMS







E. SEEDS OF CHANGE

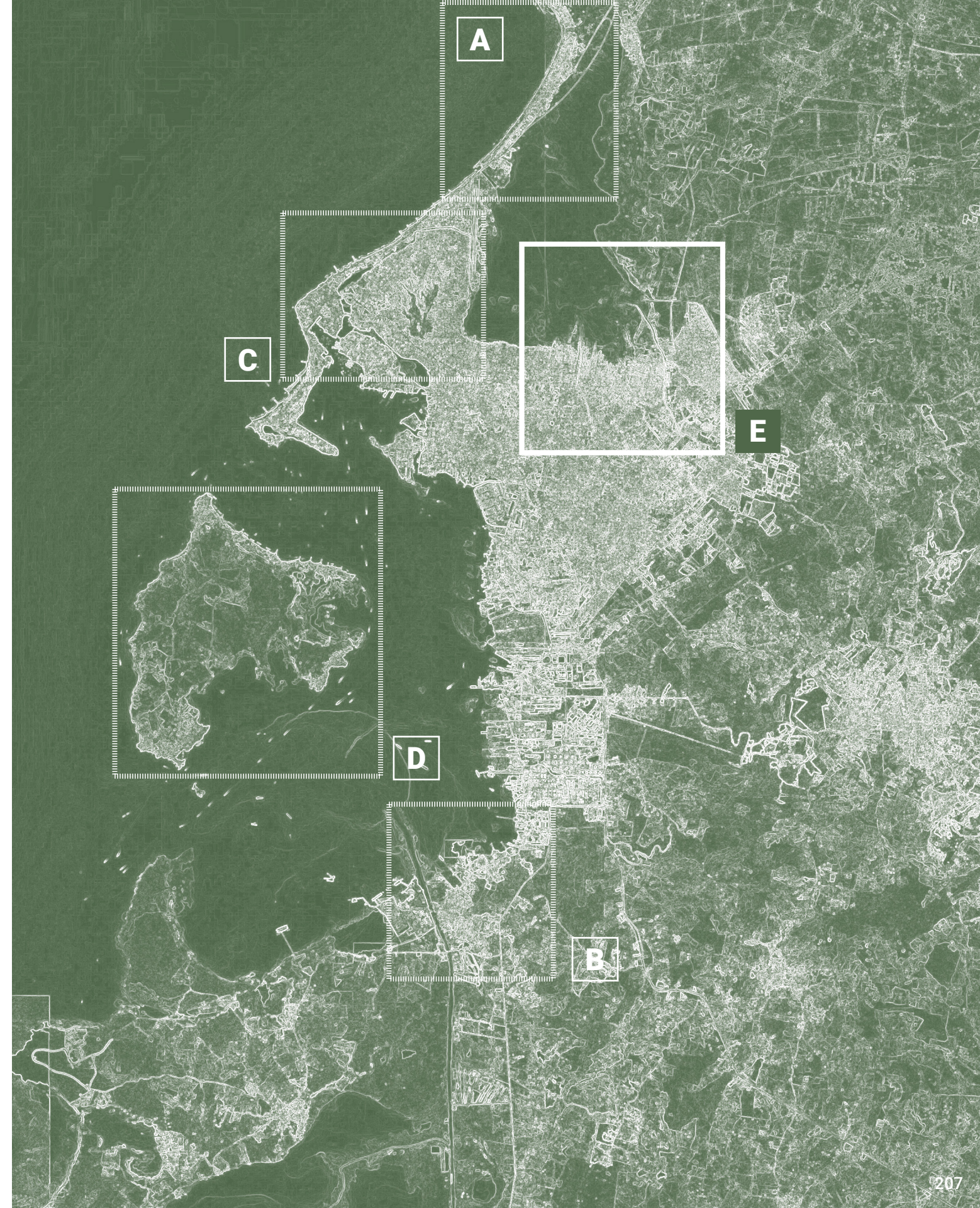
An example of community-led resilience through sustainable practices and education

TEAM: HAMZA JAMJOOM, PALAK SHAH, ROBYN MARBIL, SHREY PATEL

Ciénaga de la Virgen, a vital resource in Cartagena's ecosystem, is choking due to high levels of contamination caused by settlements upstream. The surrounding communities are vulnerable to flooding, damage, and displacement.

Like the terrain of a ciénaga, our design adopts a high-ground and low-ground complementary system that creates temporal gradients rather than distinct edges.

This reading is how we imagine "sowing" the seeds of care, housing, and filtration in the neighborhood, which is fueled by the existing Seeds of Mangrove initiative. Our proposal emphasizes strategies to empower local communities as stewards of their natural resources.



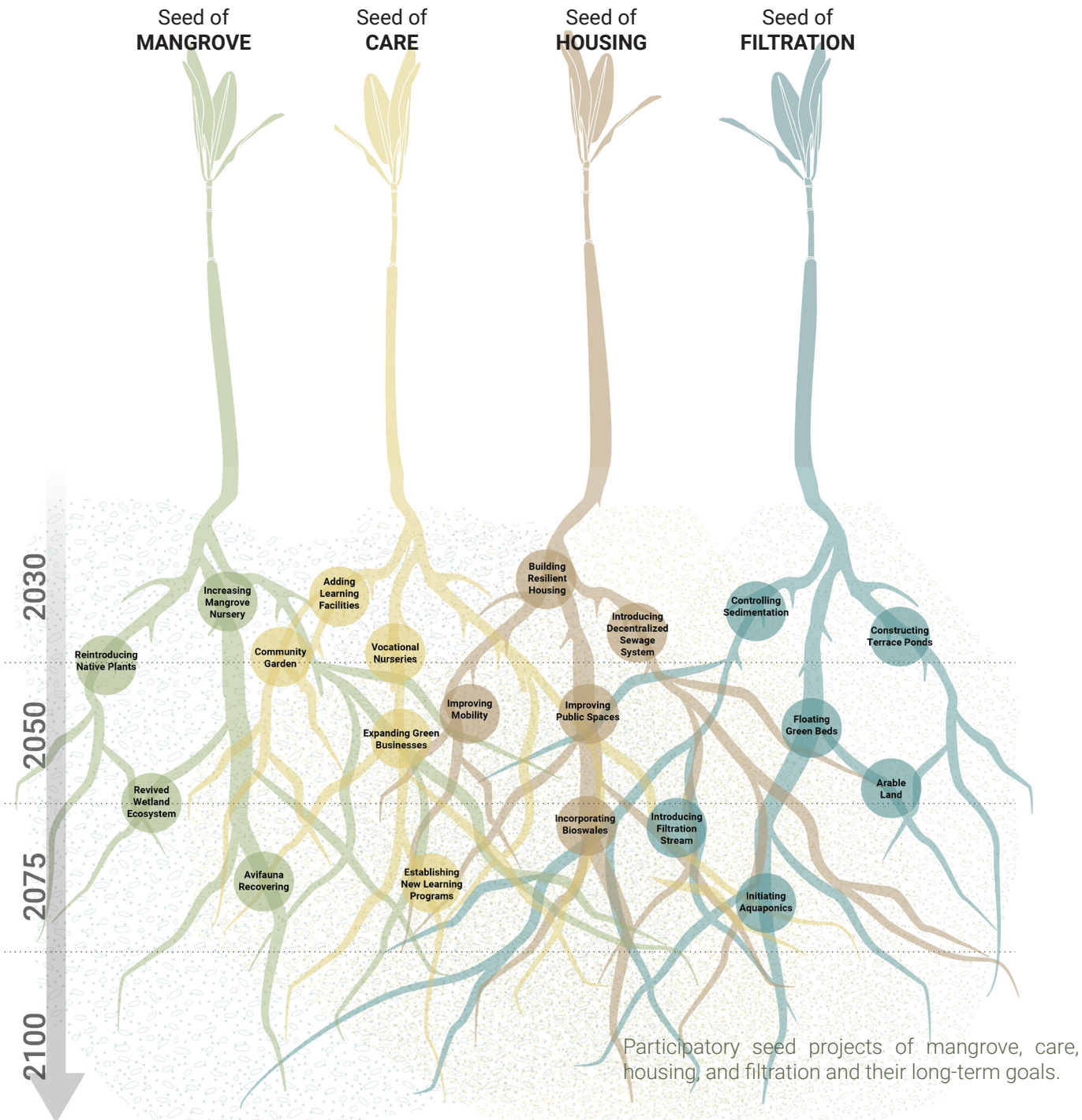
0.1 SEEDS

These four participatory seed projects—mangrove, care, housing, and filtration—are seeds planned to be nurtured in harmony with each other toward long-term goals.

This will result in a sequence of short- and long-term projects that aim to establish a framework for strategic growth.

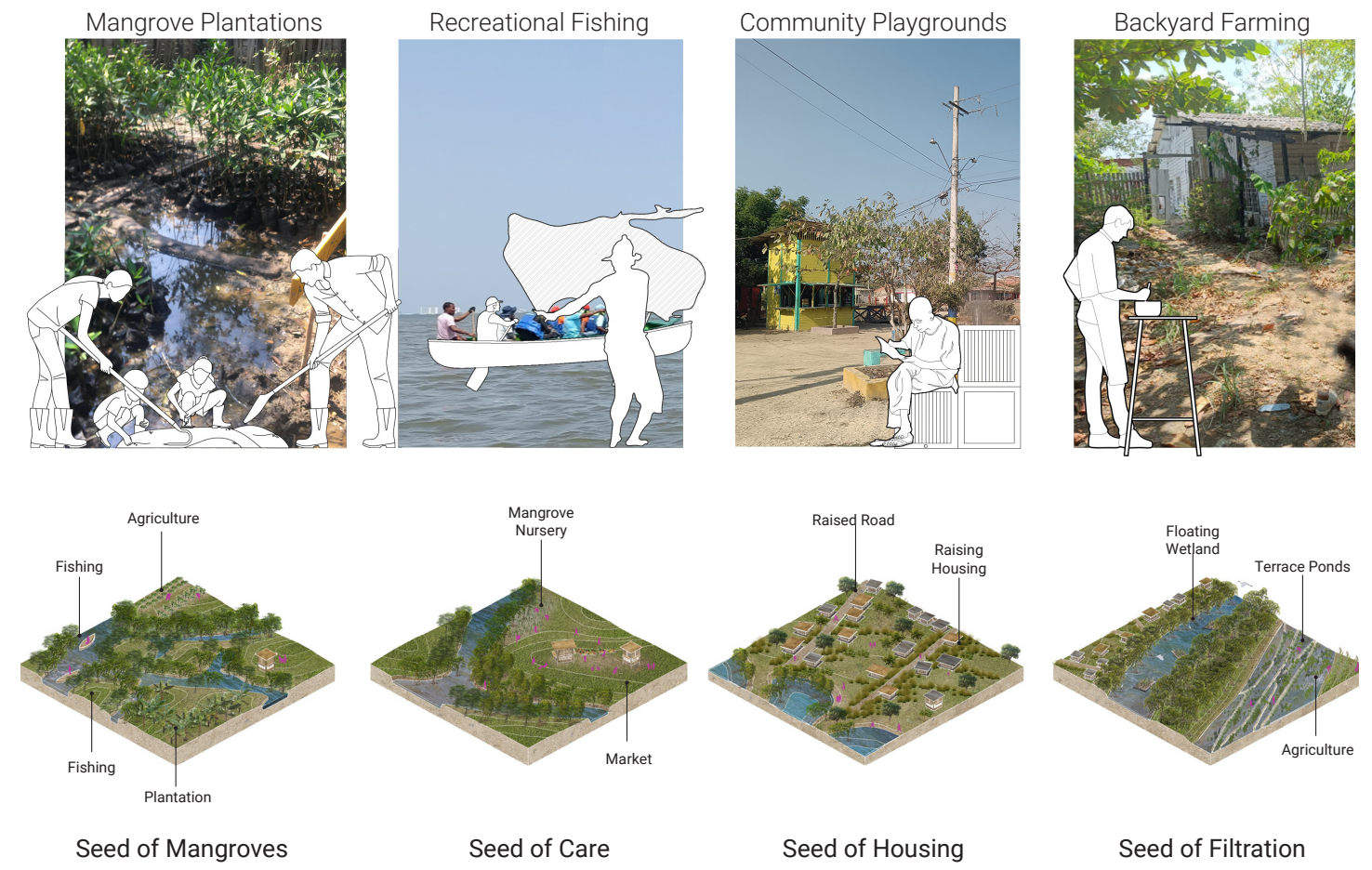
SEEDS

/sēd/
A seed is a starting point where the community plants a new project and cultivates its roots to tackle the people's needs over time.

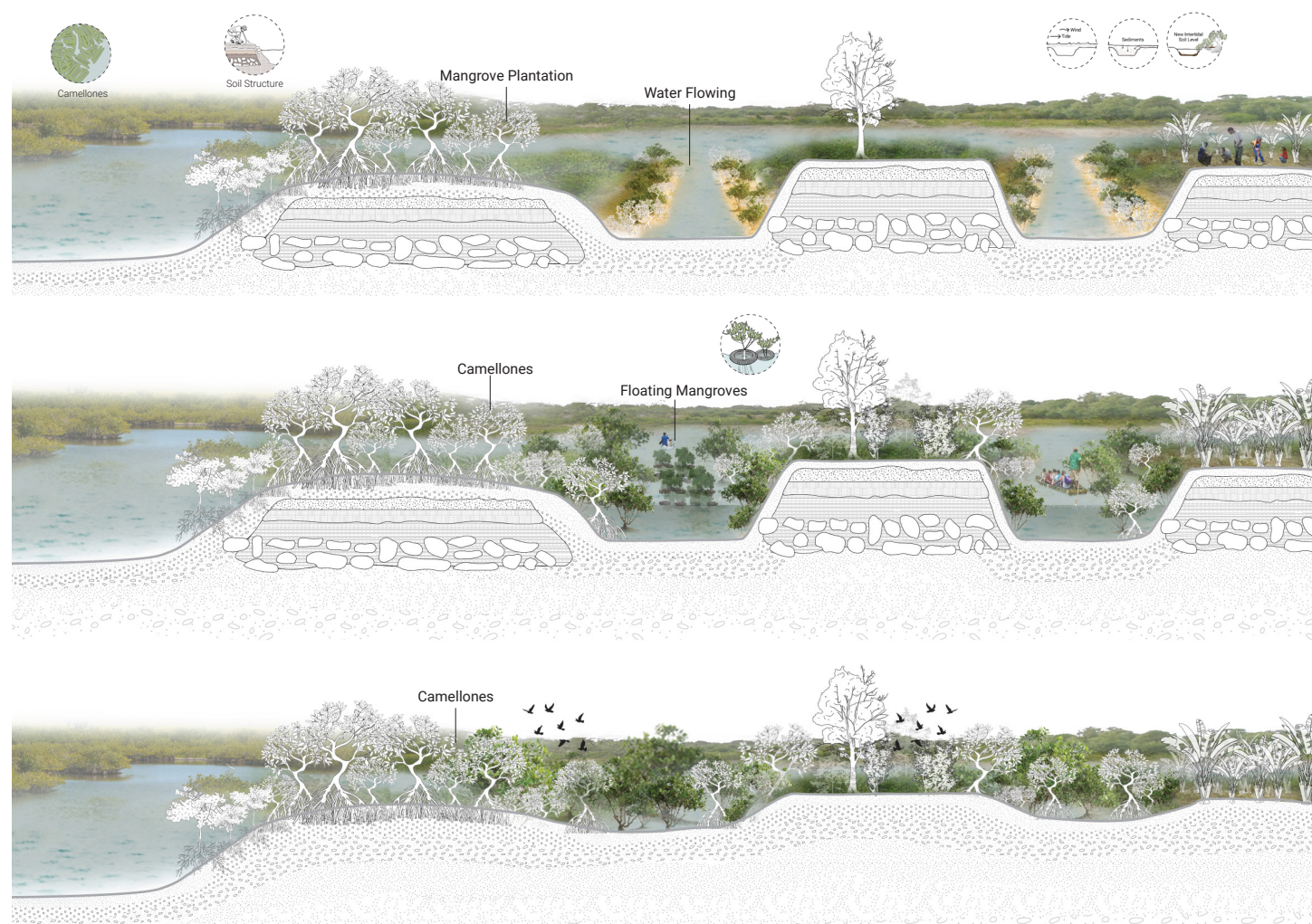


MINGA

/minNGa/
This term relates to collective action and communal work, where people collaborate for the well-being of all. Community members come voluntarily to work on a specific project, such as building a house or repairing infrastructure.



The traditional camellón system serves as staging posts that unify all our seeds, creating a cohesive network that learns from traditional practices while addressing contemporary needs.

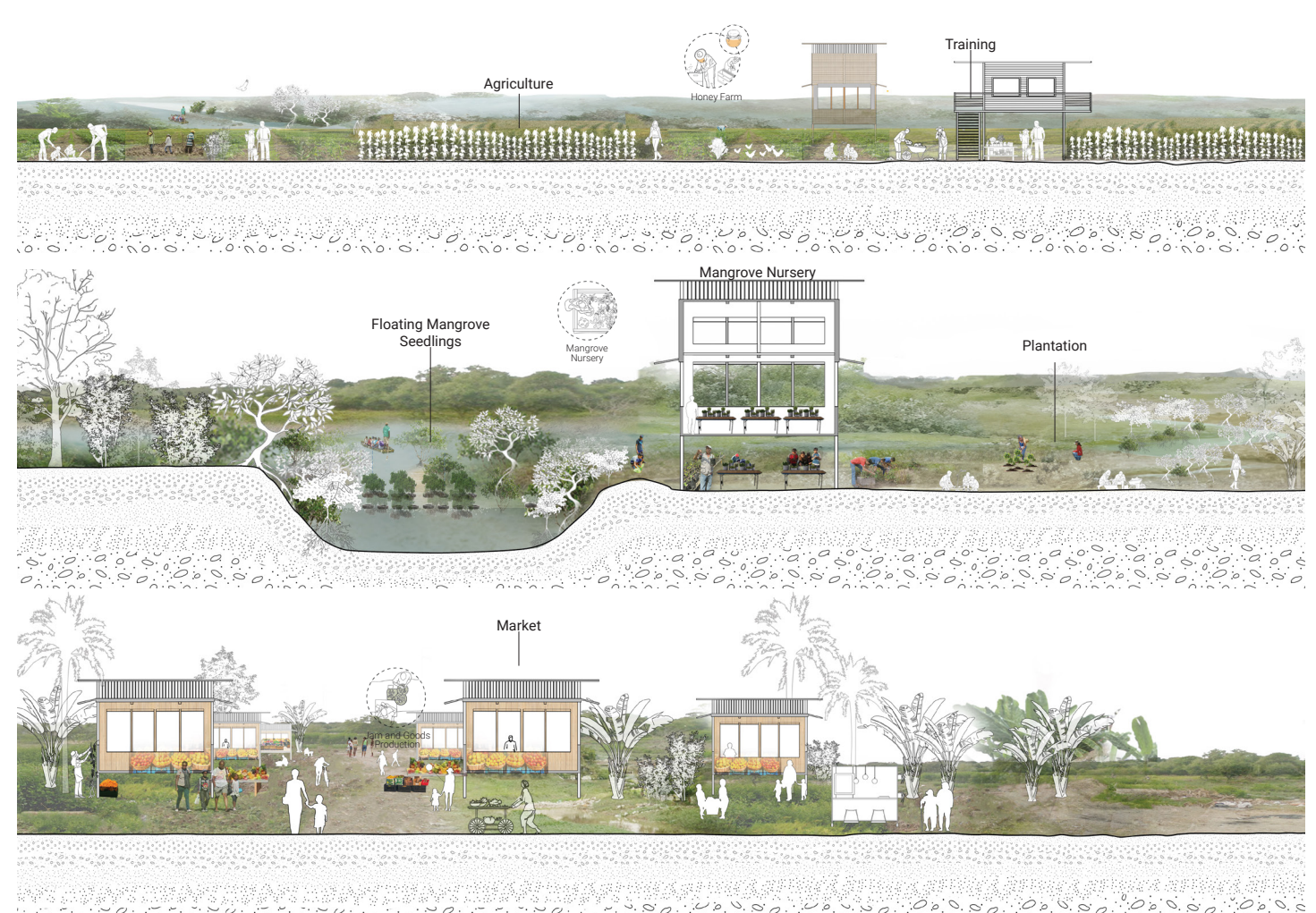


0.2A SEED OF MANGROVE

Community-led mangrove restoration to create green resilient buffers and reintroduce cultures of canoeing and agriculture.



Mangrove restoration utilizing traditional techniques of camellones and floating devices.

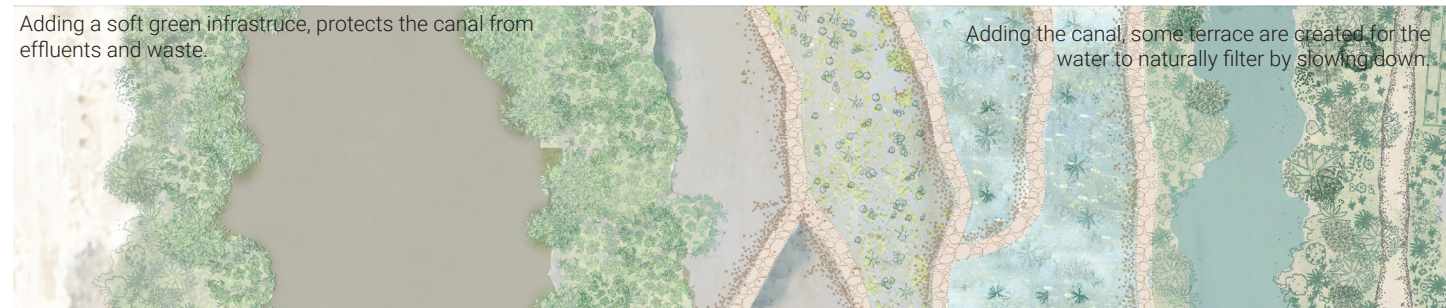
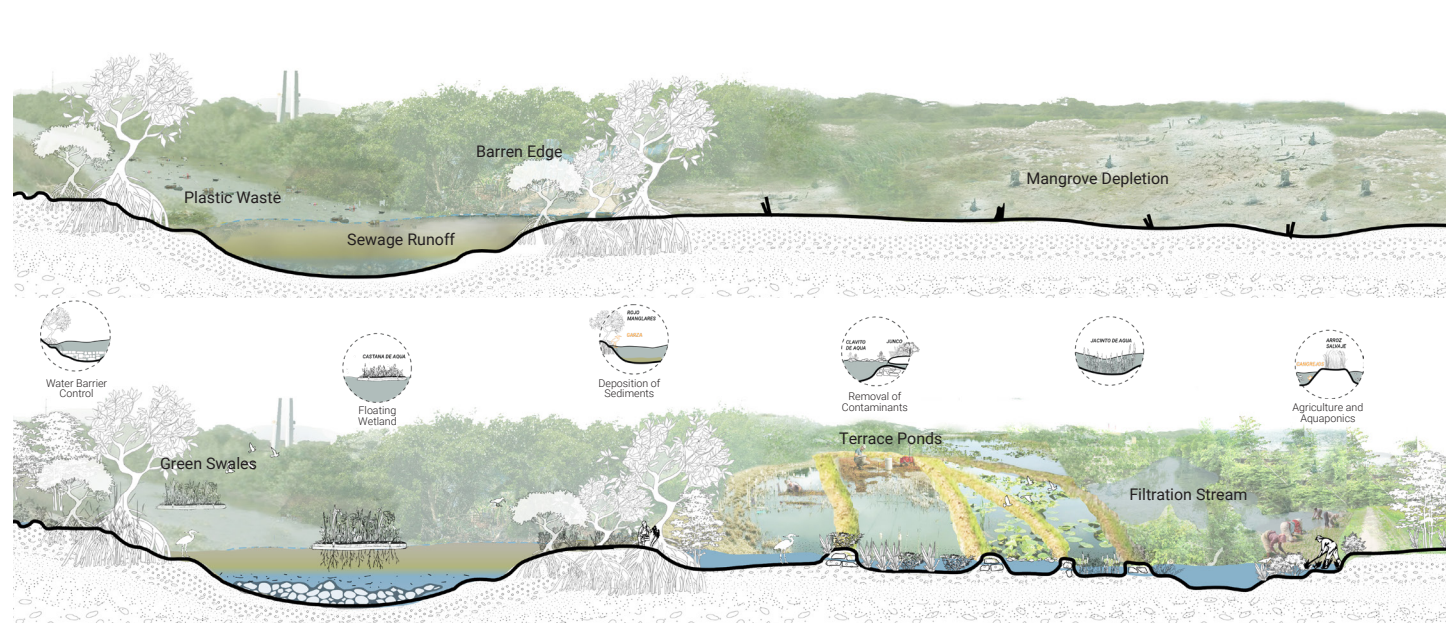


0.2B SEED OF CARE

Adaptable and resilient infrastructure to integrate diverse community needs like mangrove nurseries, markets, and schools.



The interrelation between the seed of care and mangroves is showcased in this dynamic landscape.

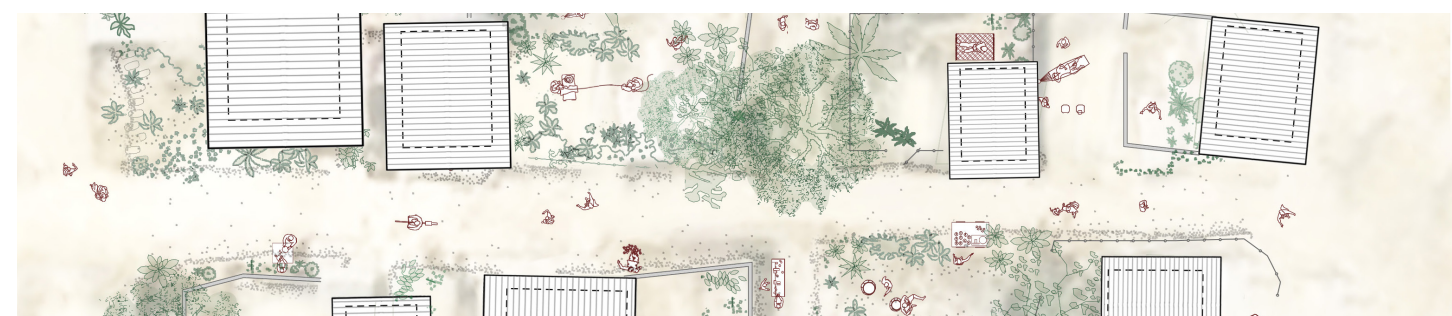


0.2C SEED OF FILTRATION

Filtering polluted water of the canal by introducing floating wetlands that act as biofilters and create terrace ponds.



Filtration terraces are formed to treat and oxygenate wastewater by using native plant species.

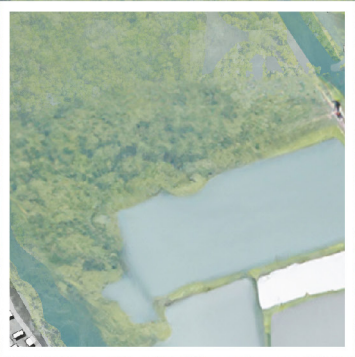


0.2D SEED OF HOUSING

Raised resilient housing built incrementally by community agreements and participation.



The raised resilient housing is designed to follow the floodplain, integrating permeable streets and absorbable landscape.



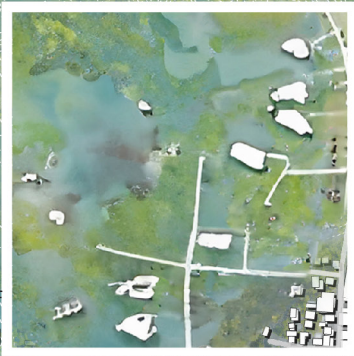
Alternative possibility of terrace ponds and farms



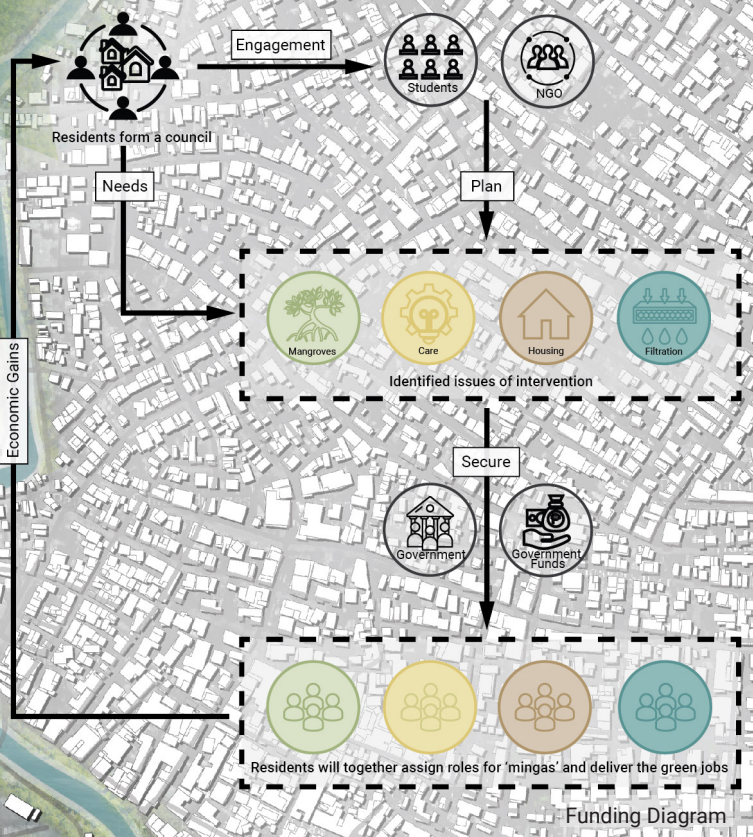
Alternative possibility of filtration and agriculture through camellones



Alternative possibility of area constructed with camellones



Alternative possibility of area occupied by housing



COMMUNITY VOICES



Luis Fernando Sanchez
Director, Fundación Planeta Azul Caribe

“Mangroves connect all the ecosystems here and are the essence of everything—without mangroves, nothing else would exist here.”

“I felt called to care for the mangroves and preserve them. It was a call beyond description. It is something Spiritual...”

...The mangrove is so much more. In the mangrove I see the future, past, and present. The mangrove calls...

...My wish is to have a cultural and ecological park that can teach stewardship and care for the mangroves, biodiversity, and community.”

Edgar H.
Corporacion Ambiental Bosques de Manglar



Guillermo
Fisherman on the Juan Angola Canal

“There have been a lot of changes in the last 22 years in this canal. There used to be 5 different species of fish and now there is only one.”

“When the water rises, we shouldn’t have to leave our homes—we should rise with it. We dream of houses that float with the floods, keeping our families safe while staying rooted in our community.”

Anonymous
Comuna 6 resident



Ariël V.
Eco-mangrove tours

“If you are from the Boquilla, your identity is tied to the fisherman, even if you don’t fish!”



Arseneo V.
Eco-mangrove tours

“The fate of the Mangroves is intertwined with the fate of the communities.”

“We want to be independent, to grow our own food, and to build a future where we rely on our own hands. With backyard farming and productive yards, we can nourish our families, support our community, and thrive together—even when the waters rise.”

Anonymous
Comuna 6 resident



Ariël and Arseneo V.
Eco-mangrove tours

“If a single person destroys a mangrove out of necessity—because they need firewood or wood to build their homes, they will be penalized to the fullest extent of the law. However, the same rules do not apply to the tourism industry who is granted abilities to destroy entire mangrove forests with machines because they receive government permissions to do so.”