

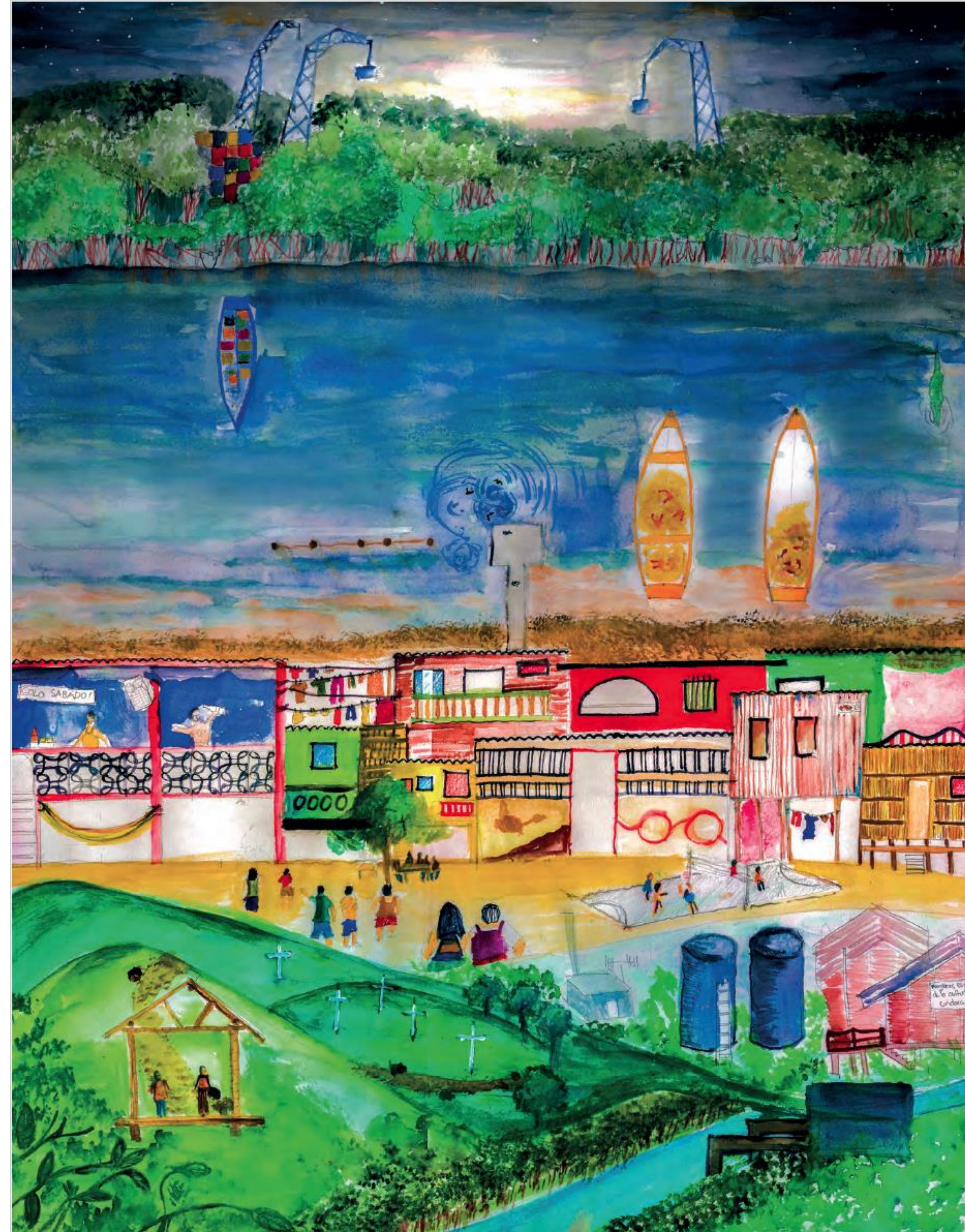
Socio-ecological conflicts and the challenges of climate change.

Case Study: Cerrito de los Morreños,
Gulf of Guayaquil (Ecuador)

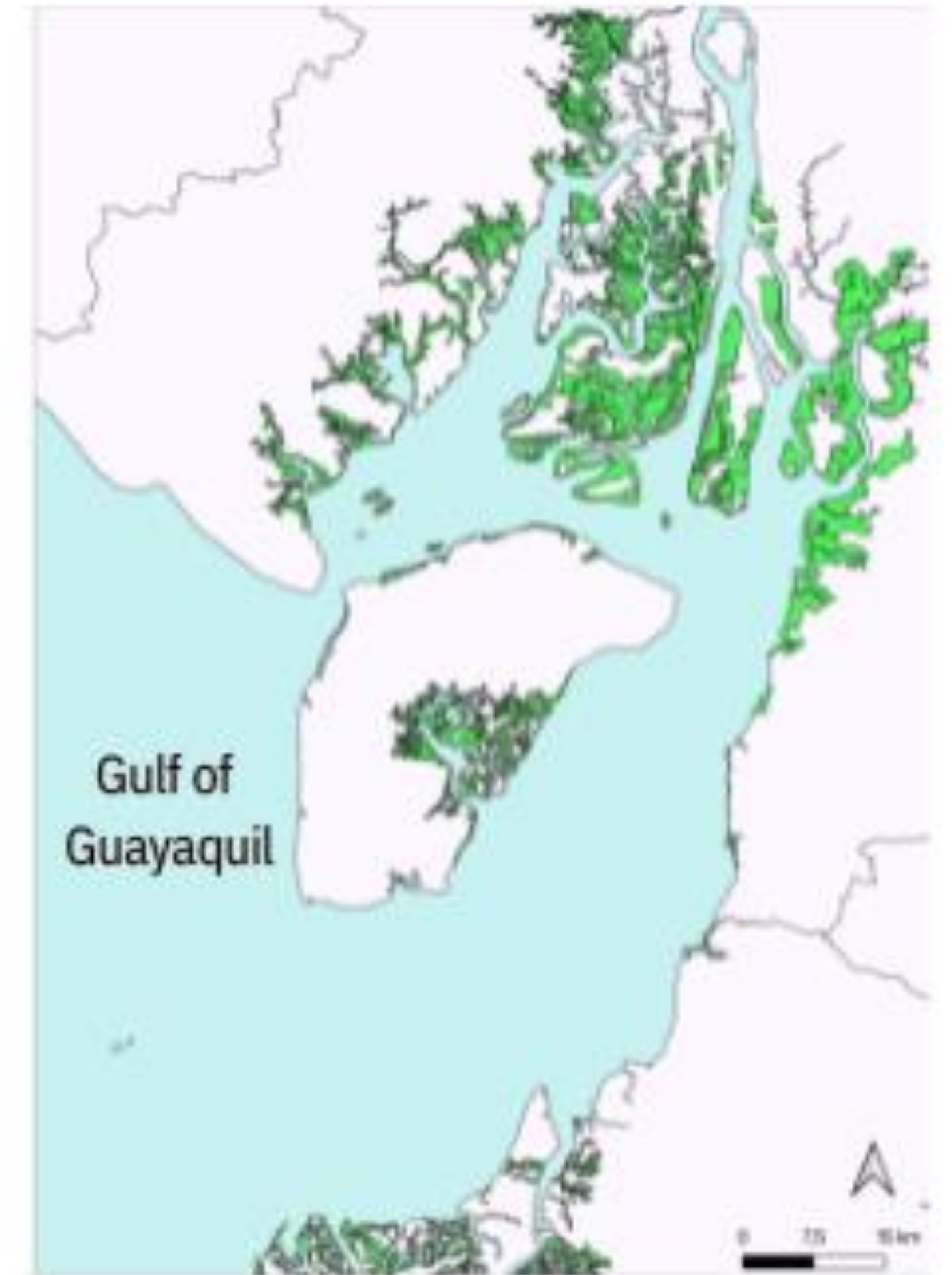


<https://wendychavez.info/>

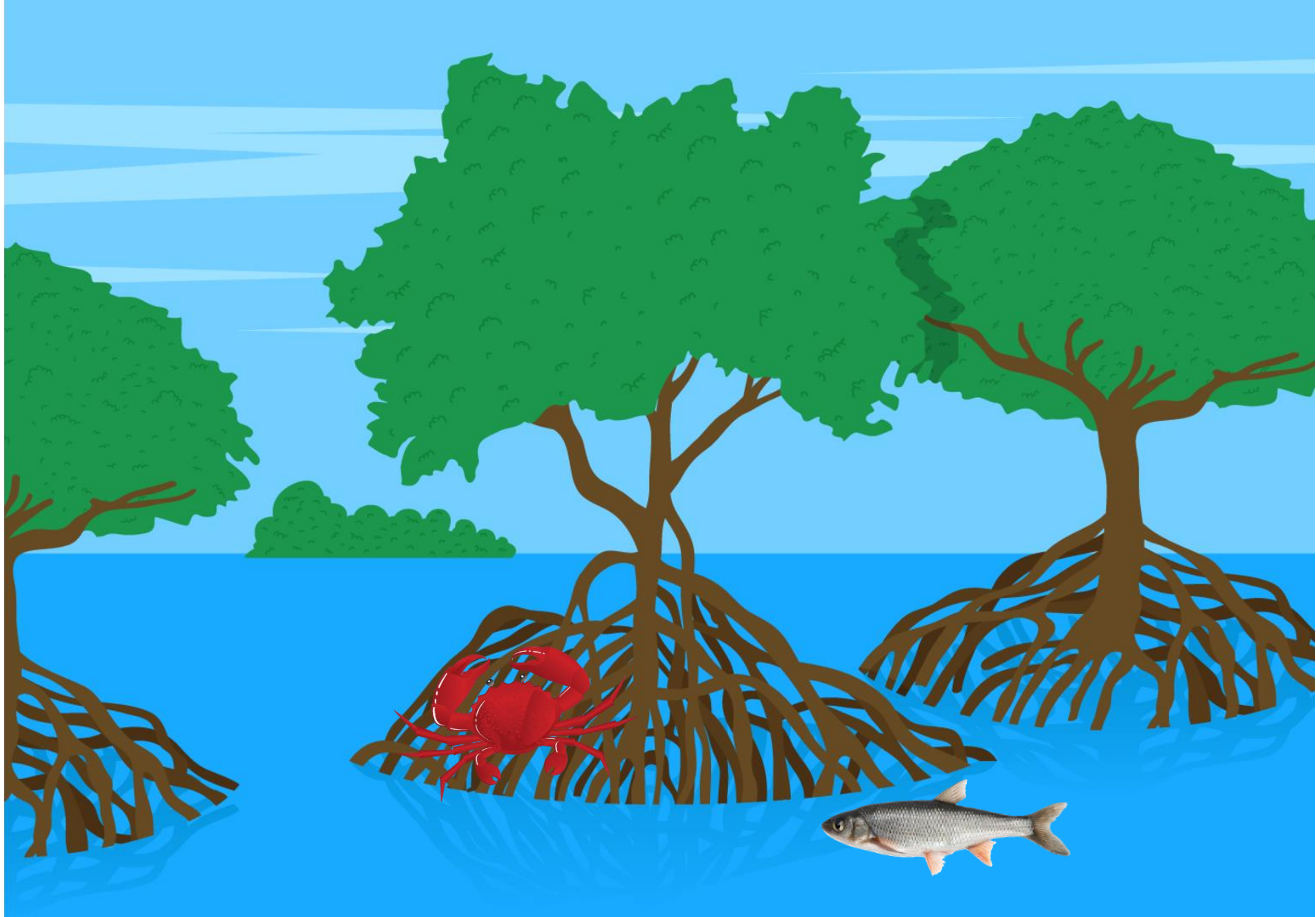
Design by Sheikh, Kaskar and Tomulescu



Location of the Gulf of Guayaquil

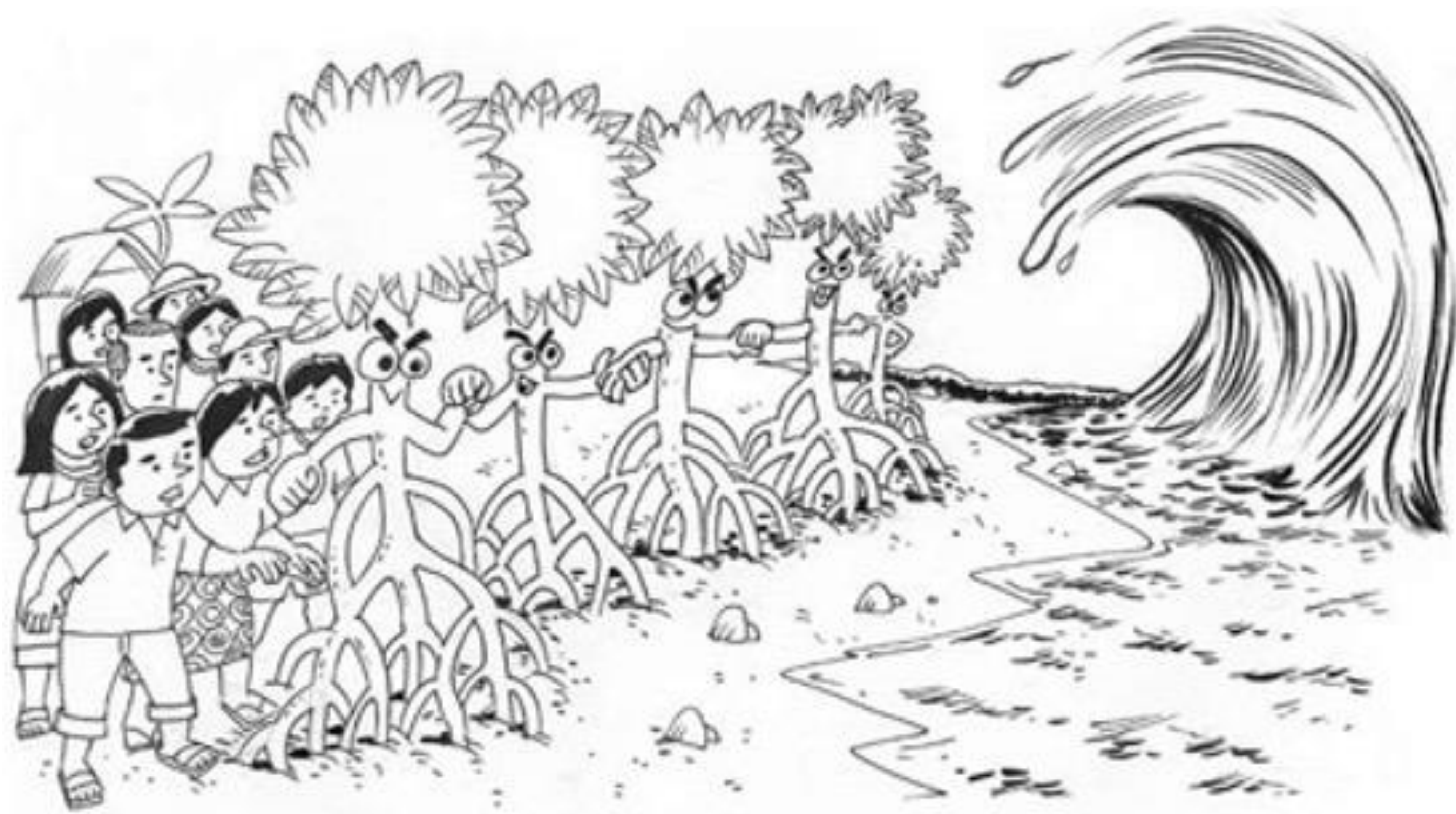




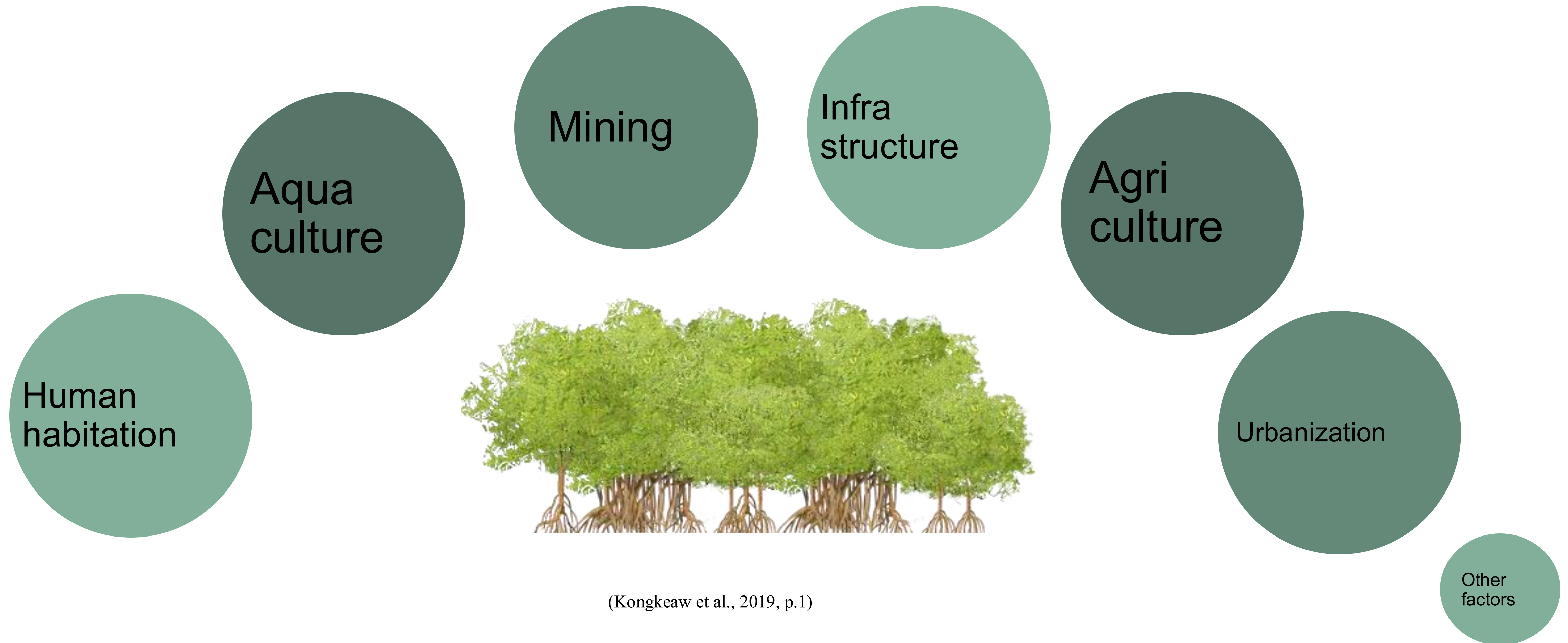


Support ecosystem services,
including fisheries production,
nutrient cycling, coast protection

Murdiyarso, 2012



Despite all this, mangrove forest wetlands worldwide have decreased due to:



(Kongkeaw et al., 2019, p.1)

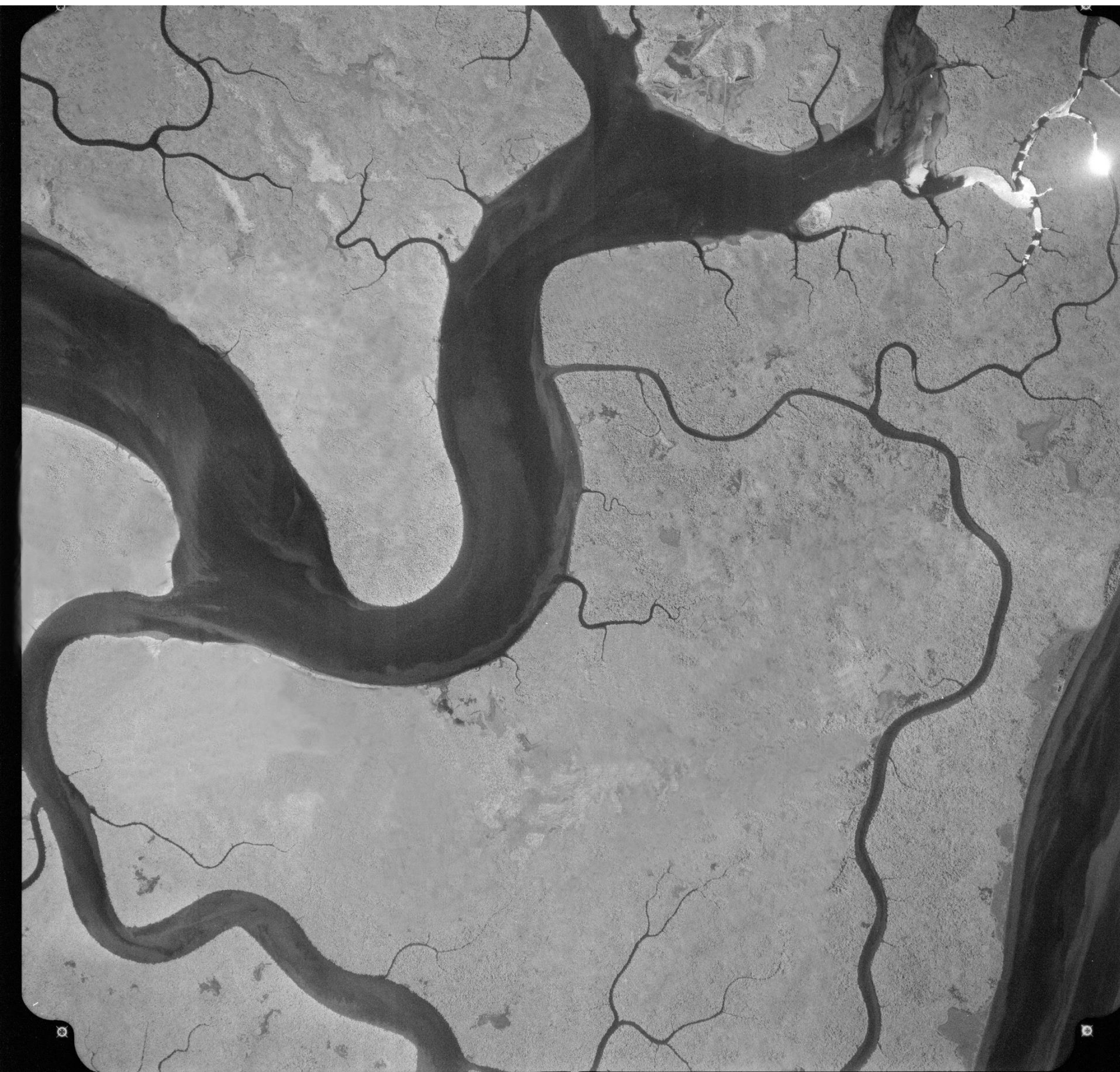
Introduction

**In Ecuador, during the shrimp farm
expansion (1970-2000)
ancestral communities were
displaced from their mangrove land**

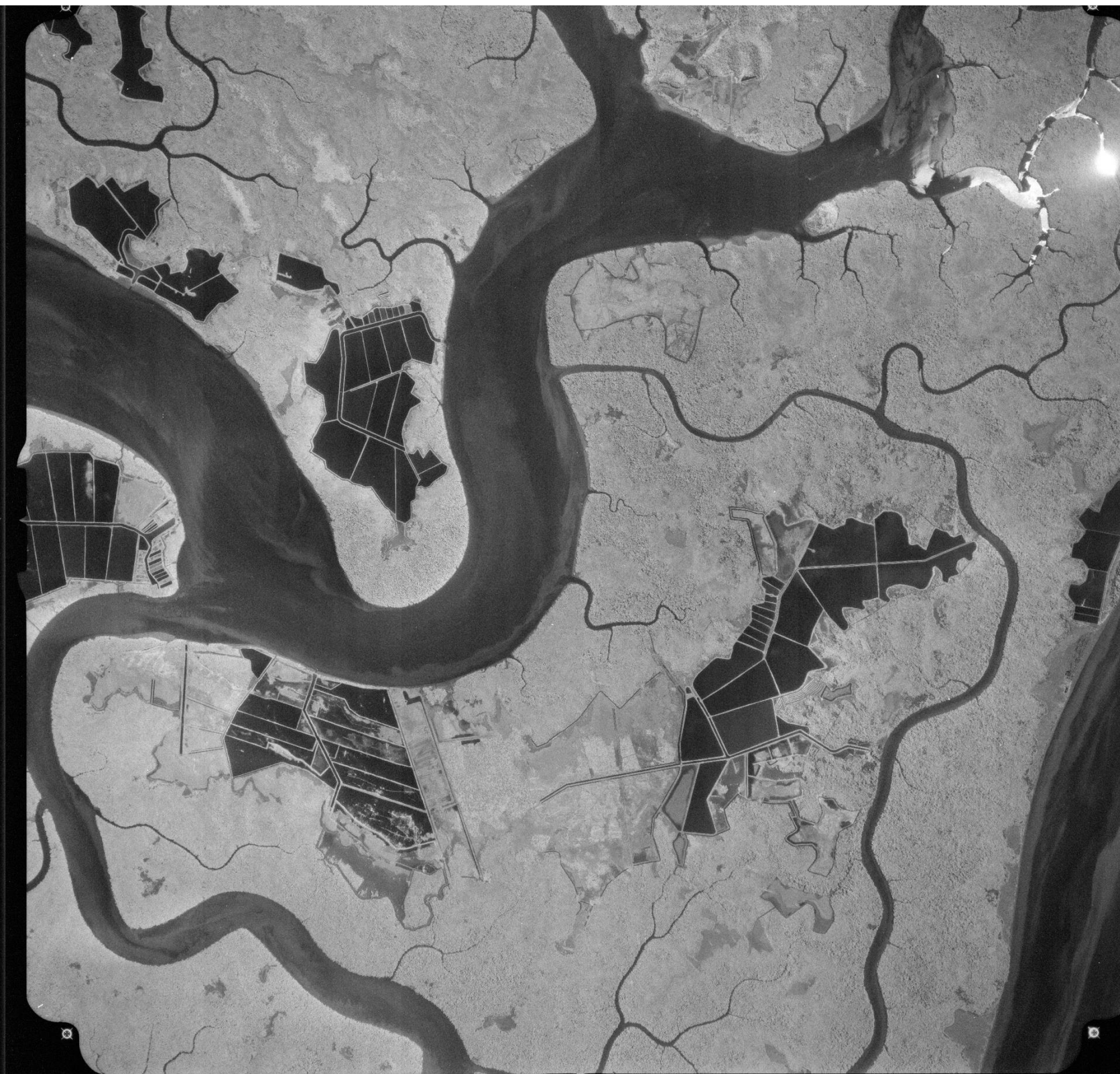
Source <https://www.youtube.com/watch?v=rpZA4slyxbA>

and 57% of the mangrove forest was deforested.

Ocampo & Thomanson, 2006.



1969



1984



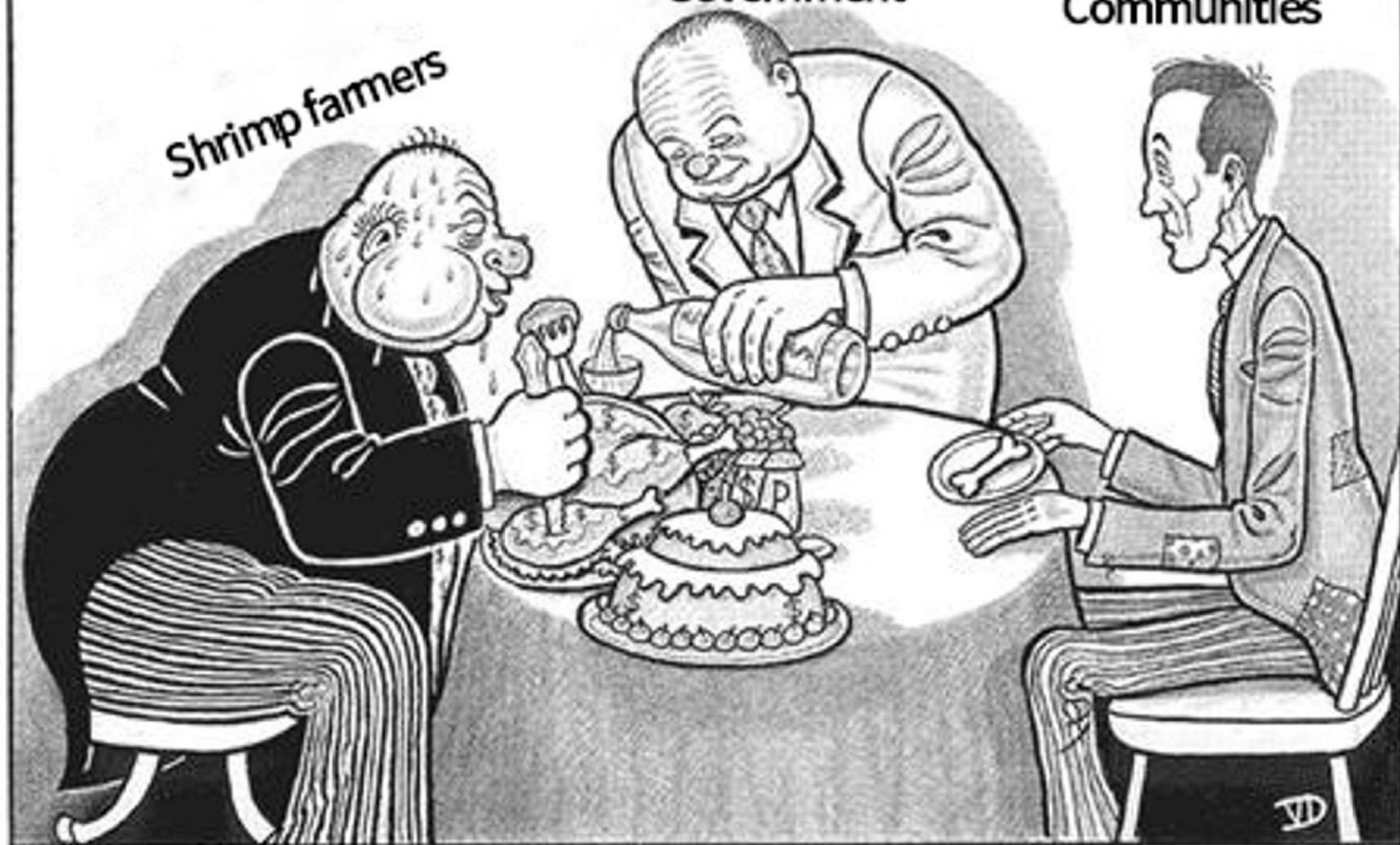
2018

Source. Chávez-Páez, 2018

Shrimp farmers

Government

Communities





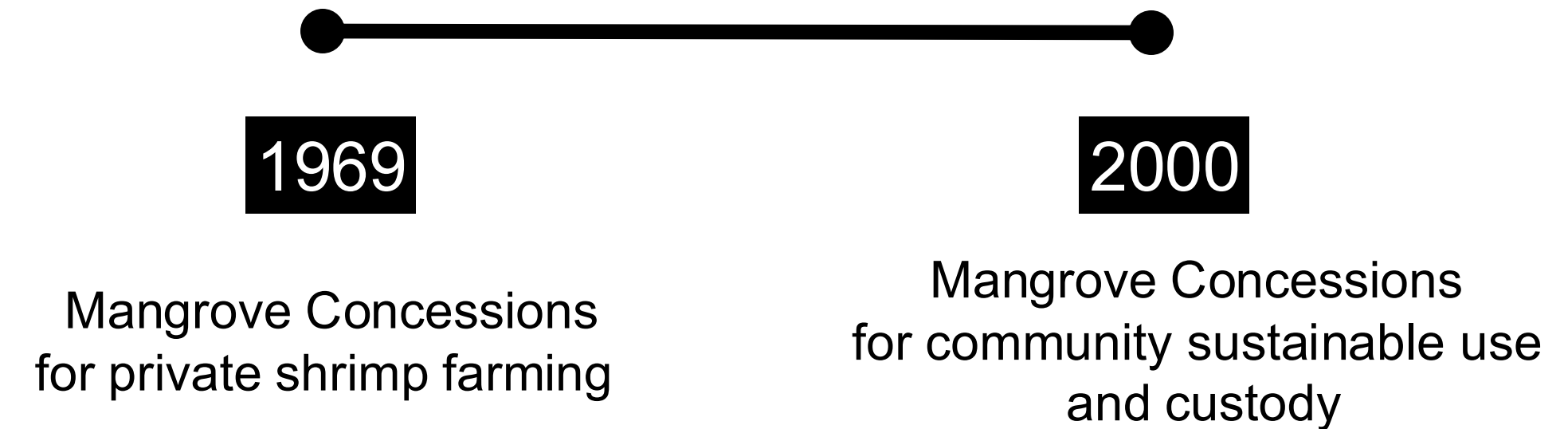
Funding and development discourse



supported aquaculture growth



Ecuadorian coastal communities fought for their rights based on their ancestral occupancy.



Mangrove Ecosystem Sustainable Use and Custody Agreements (MESUCA)

10-year mangrove concessions.

Ministry of Environment, Water and Ecological Transition of Ecuador.

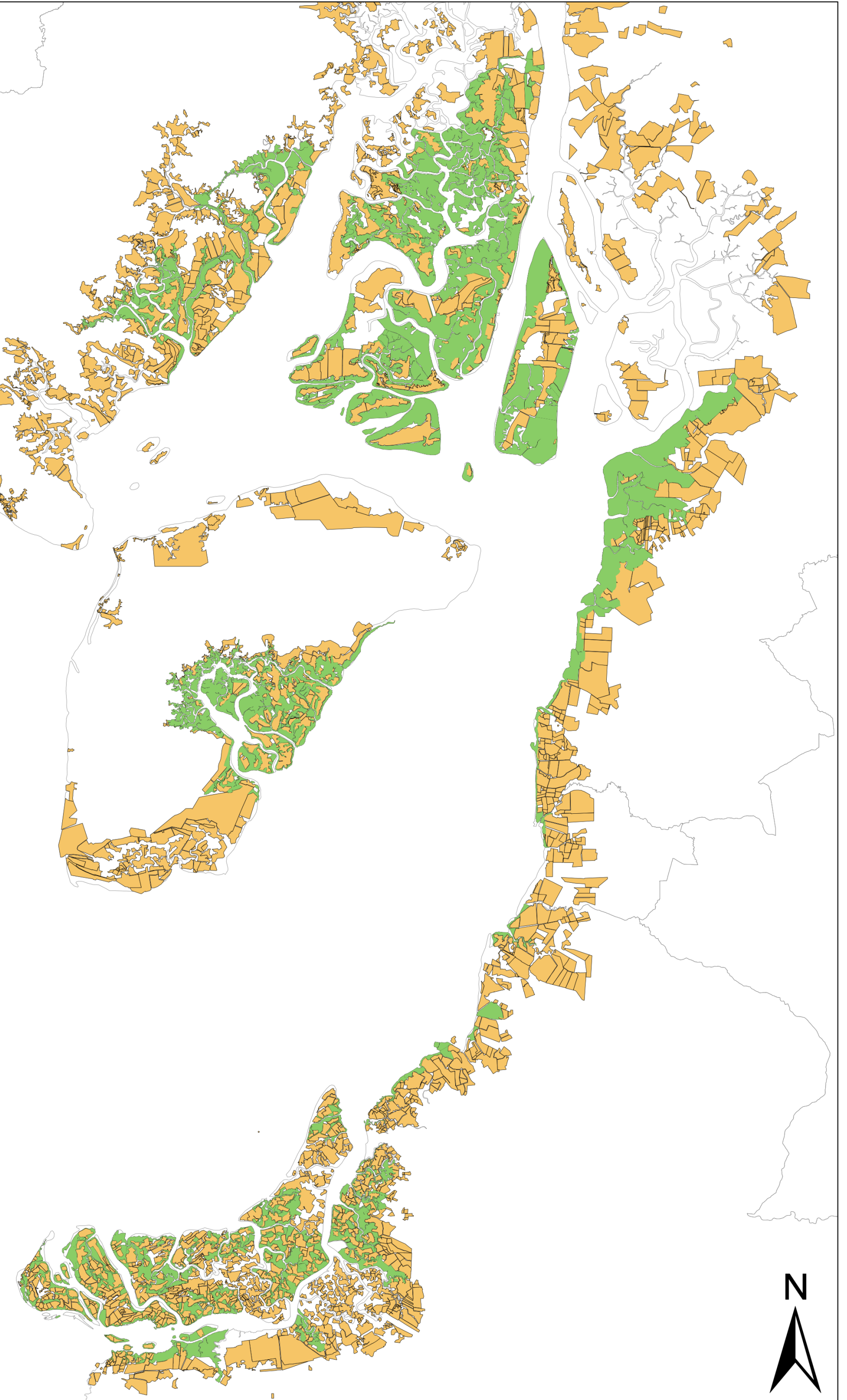
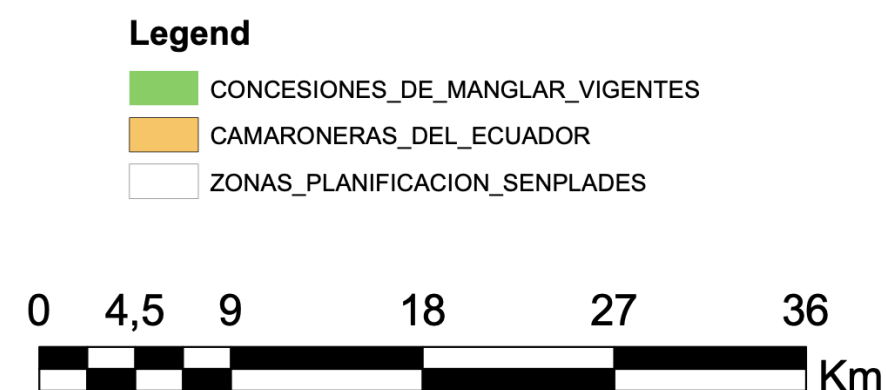
Photographic Source:
Environmental Justice Atlas

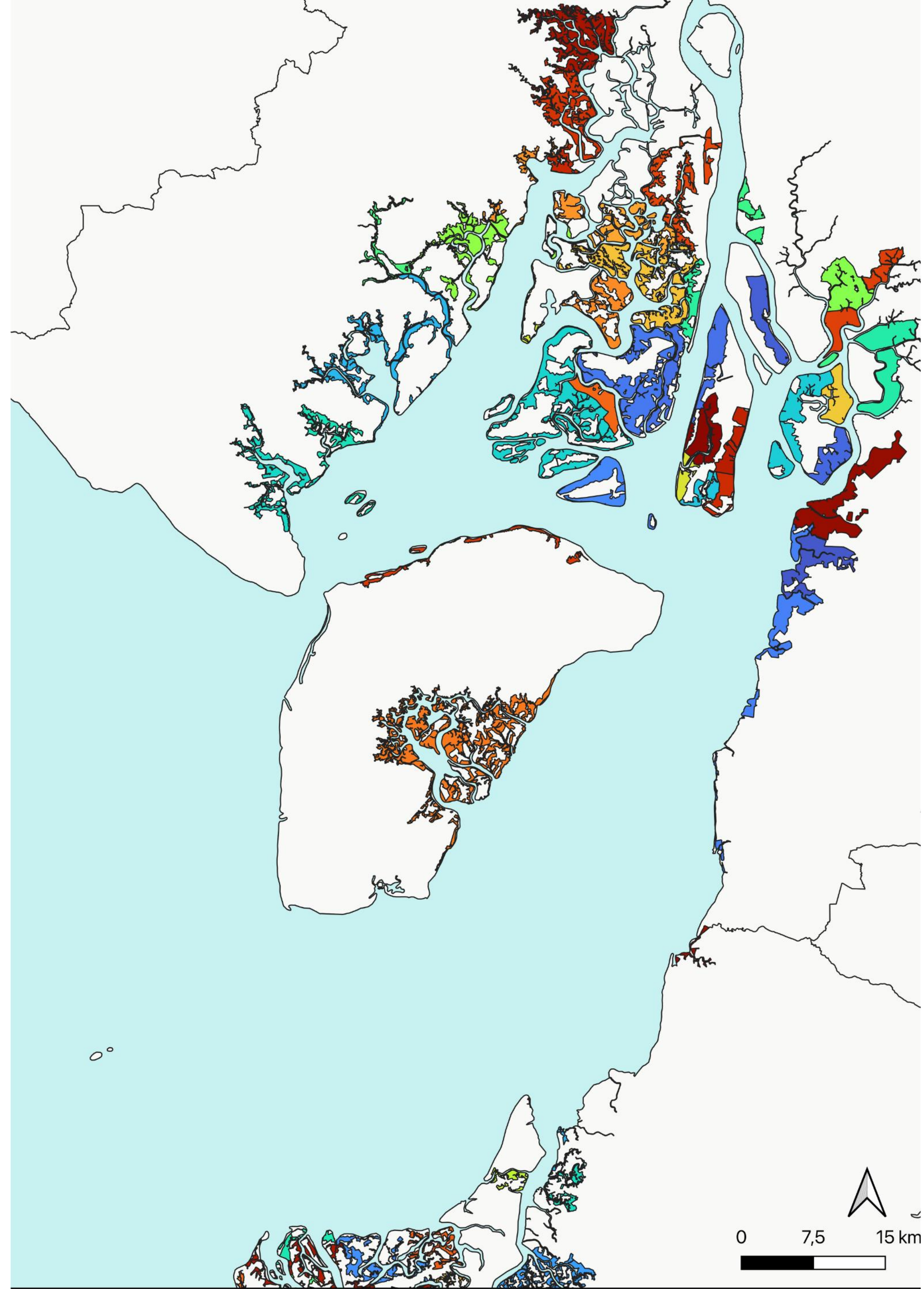
<https://ejatlas.org/conflict/shrimp-farming-in-muisne-ecuador+&cd=2&hl=es-419&ct=clnk&gl=de>

Exports of shrimp **\$6.653 million dollars**
5,7% of the GDP (2022).

National Chamber of Aquaculture.

Gathering and fishing of the communities is
for consumption and the local market.

















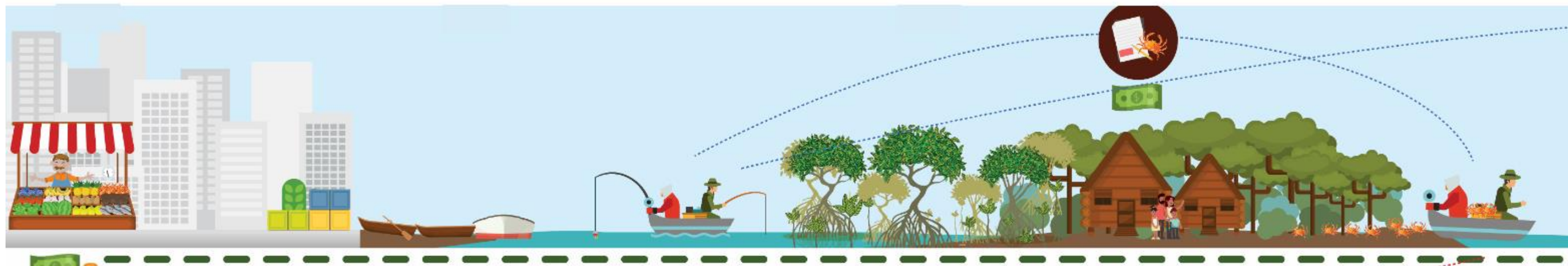






The stakeholders

ion of shrimp farming and mangrove defores
exacerbated conflicts between
ancestral associations and
the independientes



Average Annual Loss (AAL)

Table 1 | City ranking by risk (AAL) and relative risk (AAL in percentage of GDP) for 2005.

Ranking by AAL (US\$ million)					Ranking by relative AAL (percentage of city GDP)				
	Urban agglomeration	100 year exposure	AAL, with protection (US\$ million)	AAL, with protection (percentage of GDP)		Urban agglomeration	100 year exposure	AAL, with protection (US\$ million)	AAL, with protection (percentage of GDP)
1	Guangzhou	38,508	687	1.32%	1	Guangzhou	38,508	687	1.32%
2	Miami	366,421	672	0.30%	2	New Orleans	143,963	507	1.21%
3	New York—Newark	236,530	628	0.08%	3	Guayaquil	3,687	98	0.95%
4	New Orleans	143,963	507	1.21%	4	Ho Chi Minh City	18,708	104	0.74%
5	Mumbai	23,188	284	0.47%	5	Abidjan	1,786	38	0.72%
6	Nagoya	77,988	260	0.26%	6	Zhanjiang	2,780	46	0.50%
7	Tampa—St. Petersburg	49,593	244	0.26%	7	Mumbai	23,188	284	0.47%
8	Boston	55,445	237	0.13%	8	Khulna	2,073	13	0.43%
9	Shenzen	11,338	169	0.38%	9	Palembang	1,161	27	0.39%
10	Osaka—Kobe	149,935	120	0.03%	10	Shenzen	11,338	169	0.38%
11	Vancouver	33,456	107	0.14%	11	Hai Phòng	6,348	19	0.37%
12	Tianjin	11,408	104	0.24%	12	N'ampo	507	6	0.31%
13	Ho Chi Minh City	18,708	104	0.74%	13	Miami	366,421	672	0.30%
14	Kolkata	14,769	99	0.21%	14	Kochi	855	14	0.29%
15	Guayaquil	3,687	98	0.95%	15	Tampa—St. Petersburg	49,593	244	0.26%
16	Philadelphia	22,132	89	0.04%	16	Nagoya	77,988	260	0.26%
17	Virginia Beach	61,507	89	0.15%	17	Surat	3,288	30	0.25%
18	Fukuoka—Kitakyushu	39,096	82	0.09%	18	Tianjin	11,408	104	0.24%
19	Baltimore	14,042	76	0.08%	19	Grande_Vitória	6,738	32	0.23%
20	Jakarta	4,256	73	0.14%	20	Xiamen	4,486	33	0.22%

A comparison with a ranking by exposure is proposed in the Supplementary Information.

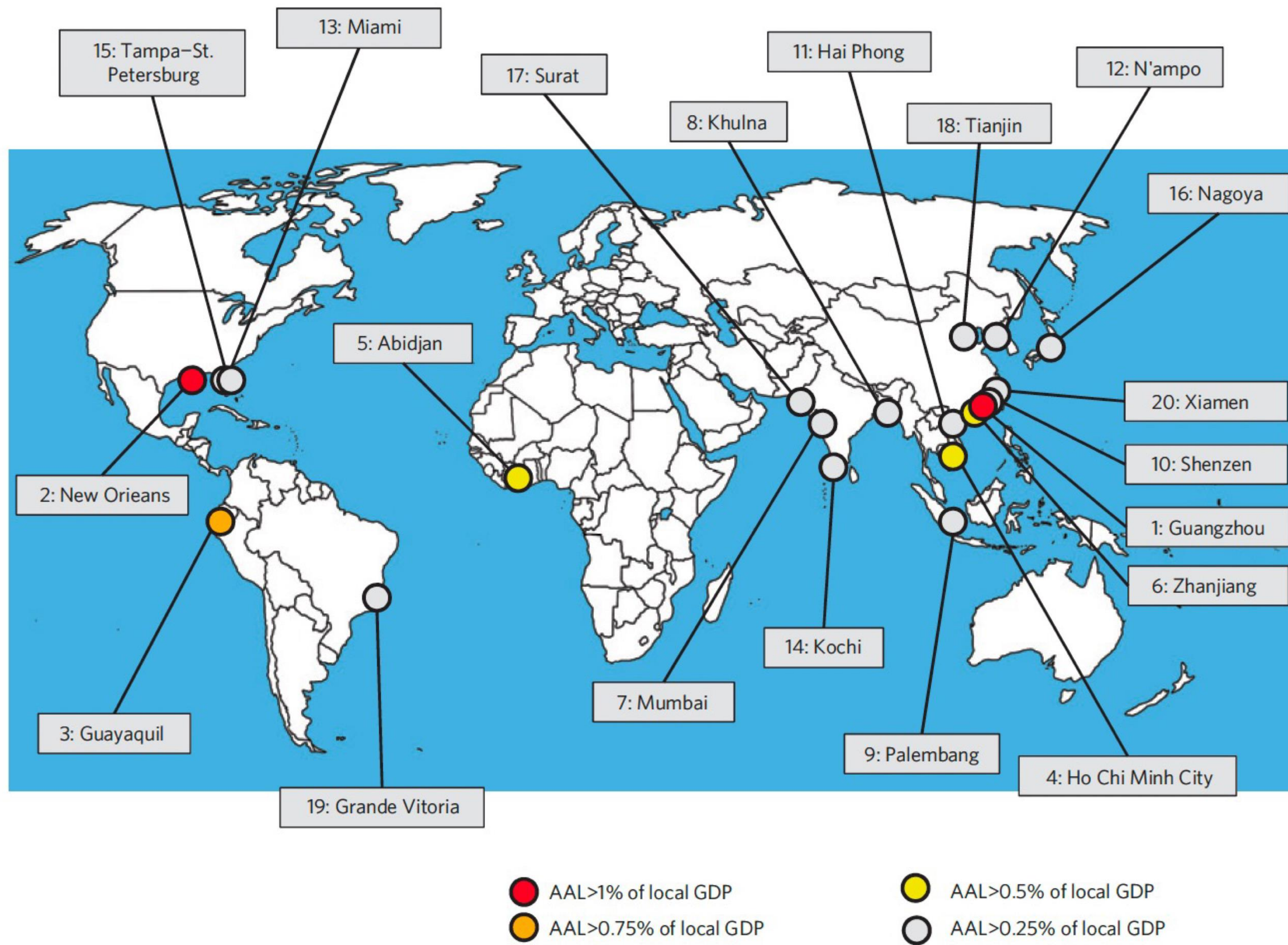
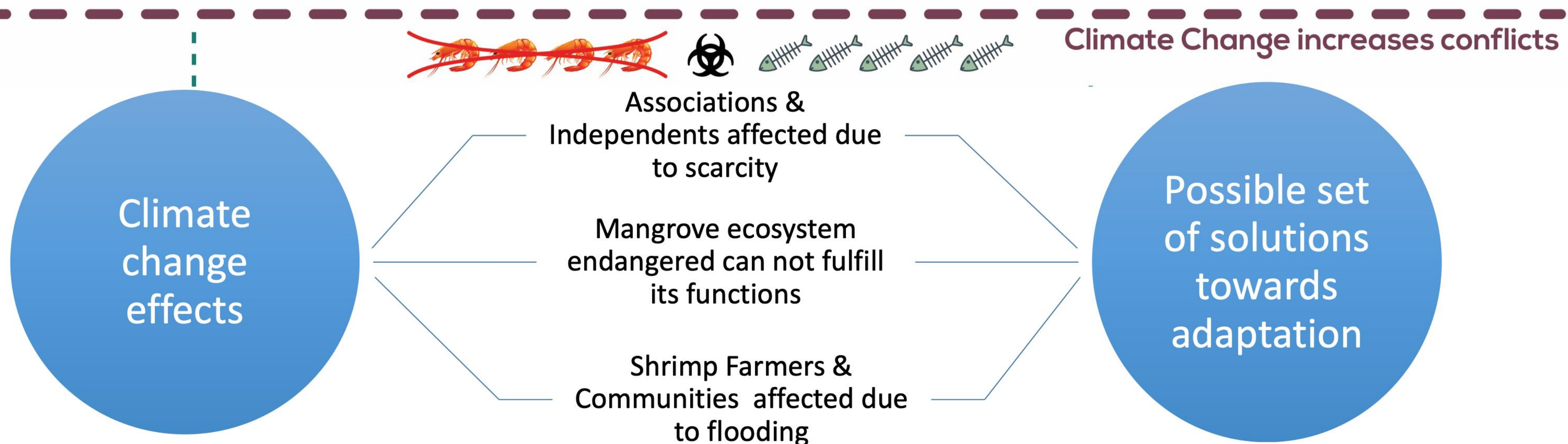


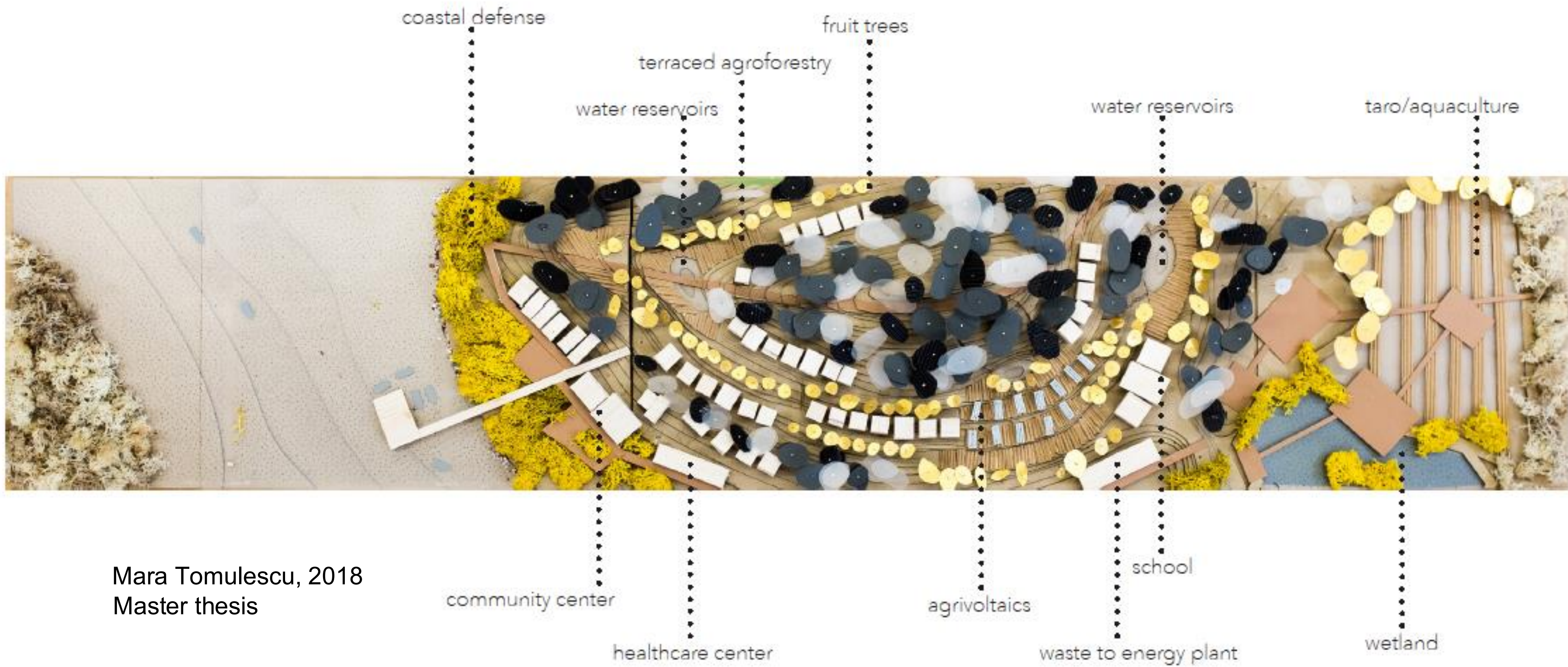
Figure 1 | The 20 cities where the relative risk is larger in 2005, that is, where the ratio of AAL with respect to local GDP is the largest. More information in Table 1.

Climate Change increases conflicts



Proposals
(Architects KU Leuven,
Human Settlements Program)





Mara Tomulescu, 2018
Master thesis

(Ancient Origins, 2014)



(<http://slideplayer.com/slide/7580843/>)

(Ancient Origins, 2014)



(<http://www.pulsodf.com.mx/la-fao-reconoce-a-las-chinampas-como-patrimonio-agricola-mundial/>)

Amina Kaskar, 2018
Master thesis

'Chinampas' and waste management systems

The Aztecs disposed of all organic wastes in the chinampas, such as food leftovers and agricultural residues, which fertilized the crops. Further, the most valuable fertilizer used on the chinampas was human excrement. The excrement was so valued that the city had a network of public latrines from which it was collected and eventually sold at the city's main market. By using human excrement to fertilise the crops, the Aztecs were also able to create a healthier living environment as the city's wastewater would have also been treated (Medina, 2014).



Fotos de
Xavier Cornejo



Fotos de
Xavier Cornejo



Fotos de
Xavier Cornejo

(<https://www.lespanol.com/deportes/futbol/>)



(Windapo, 2015)

(<https://www.nytimes.com/2013/07/01/world/asia/floating-schools-in-bangladesh.html>)

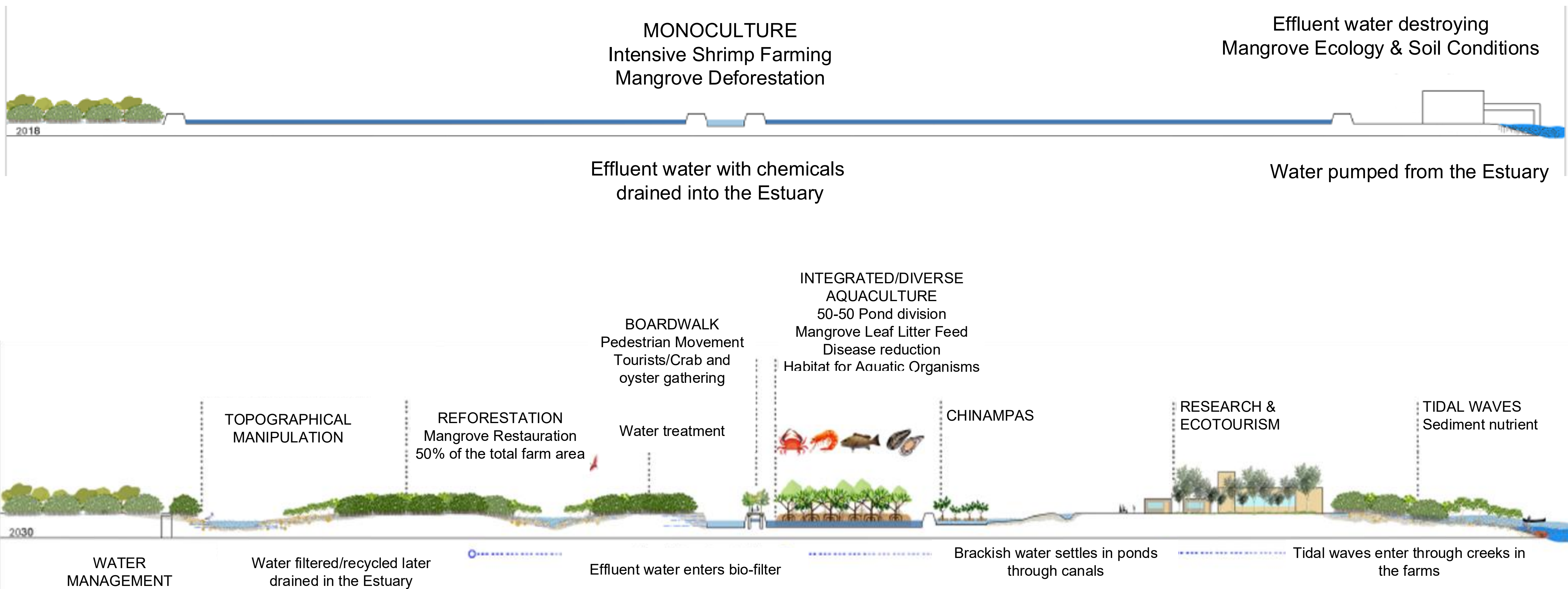


(<http://www.bangkok.com/magazine/5-floating-markets.htm>)

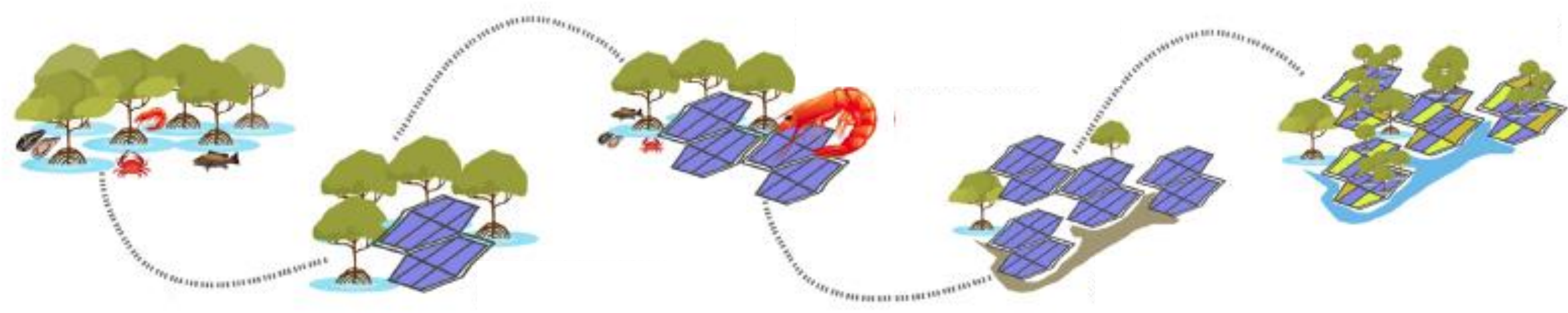
Amina Kaskar, 2018
Master thesis

Floating Infrastructure

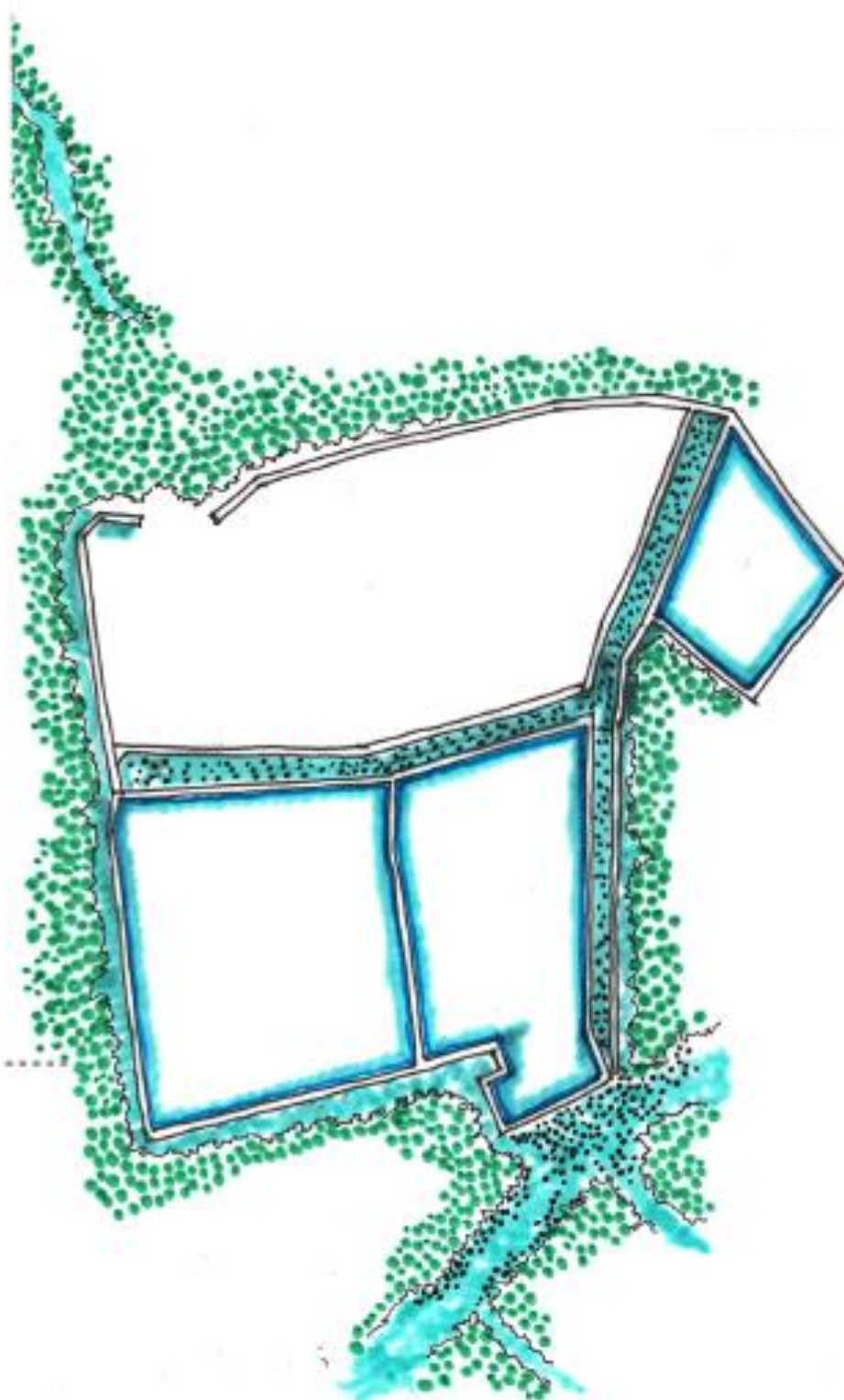
Soft infrastructure helps in blurring the boundary between city and water. It has an ability to house a diversity of functions, using a multifunctional approach to infrastructure that responds to contemporary society, mostly in disadvantaged contexts. It can be used for service delivery to settlements who lack basic water, electricity, sanitation. This provides long term measures to climatic conditions integrating the built environment and water to employ ideas of liquid urbanism (Windapo, 2015). The built environment can be integrated with water for public spaces, urban farms, tourist centres, markets, schools and other special programmes. For instance, the floating school in Bangladesh tackles the disruption of school caused by annual flooding (Yee, 2013).



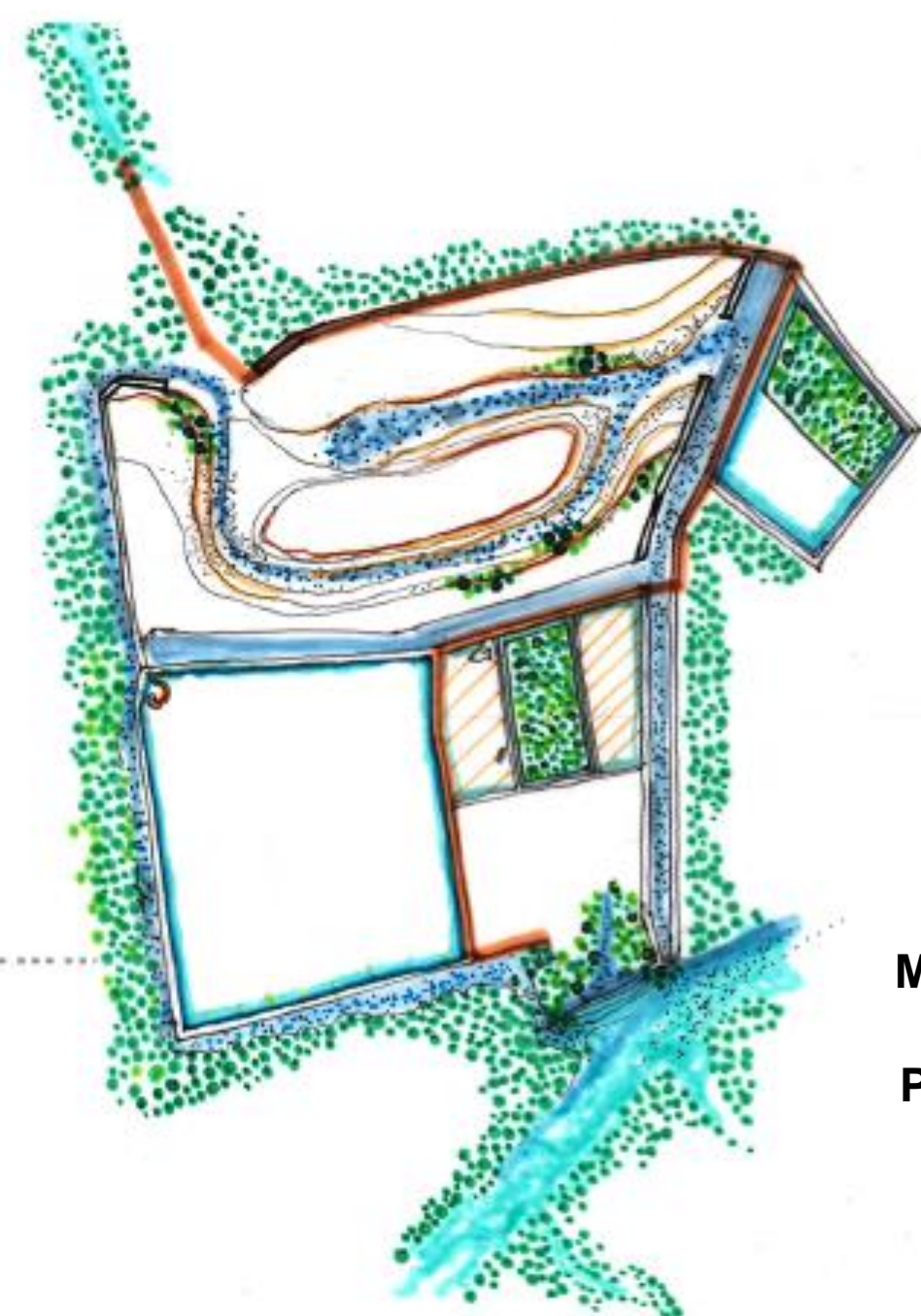
Reverse colonisation:



PHASE 1
Water penetrates
through
strategically
ruptured dykes



PHASE 2
Sedimentation process
Conversion to separate
pond system
Mangrove-Aquaculture

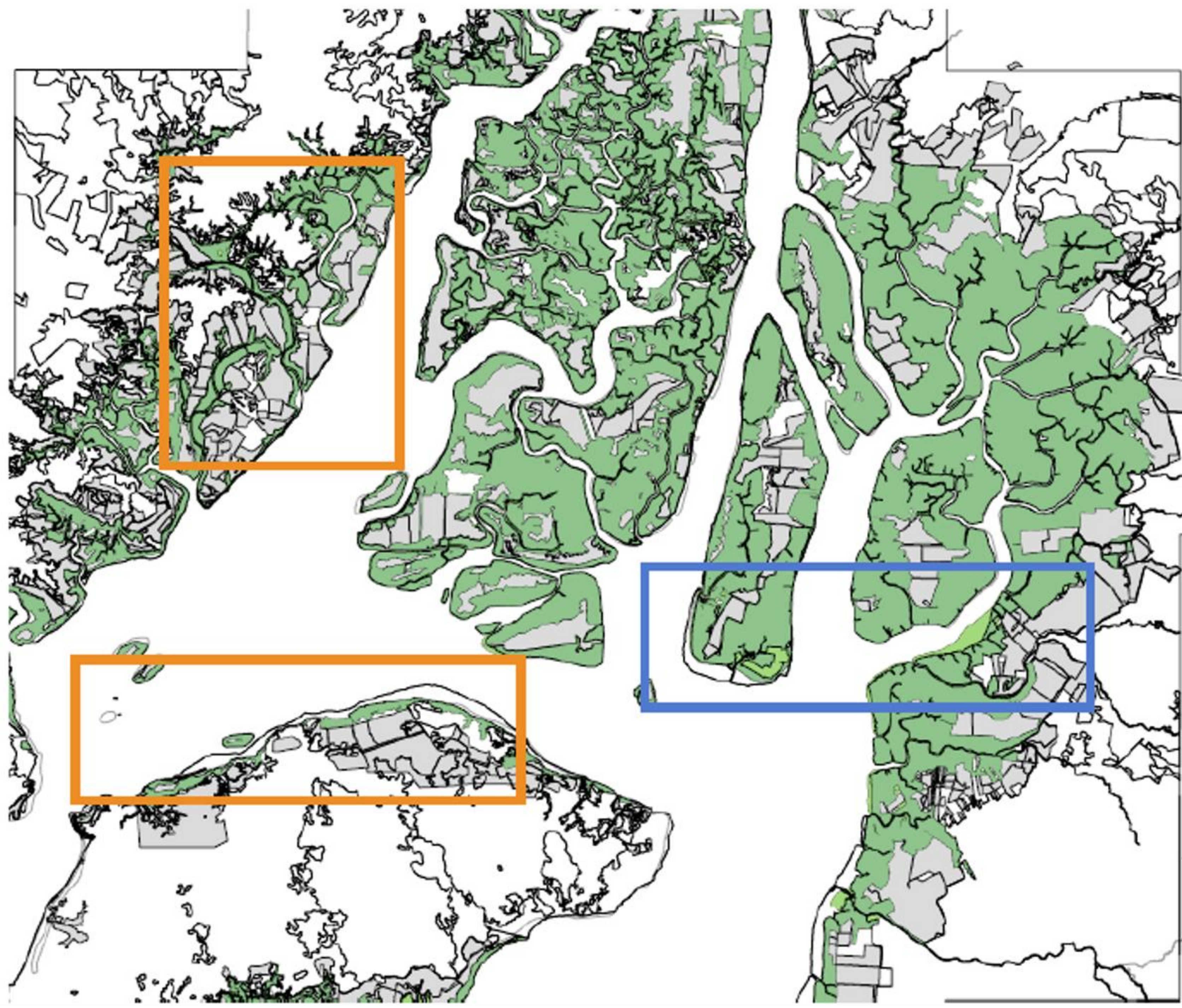


PHASE 3
Naturally restored
Mangroves (5 to 10 years)
Tourism & Research
Pedestrian/Public Routes
New livelihoods



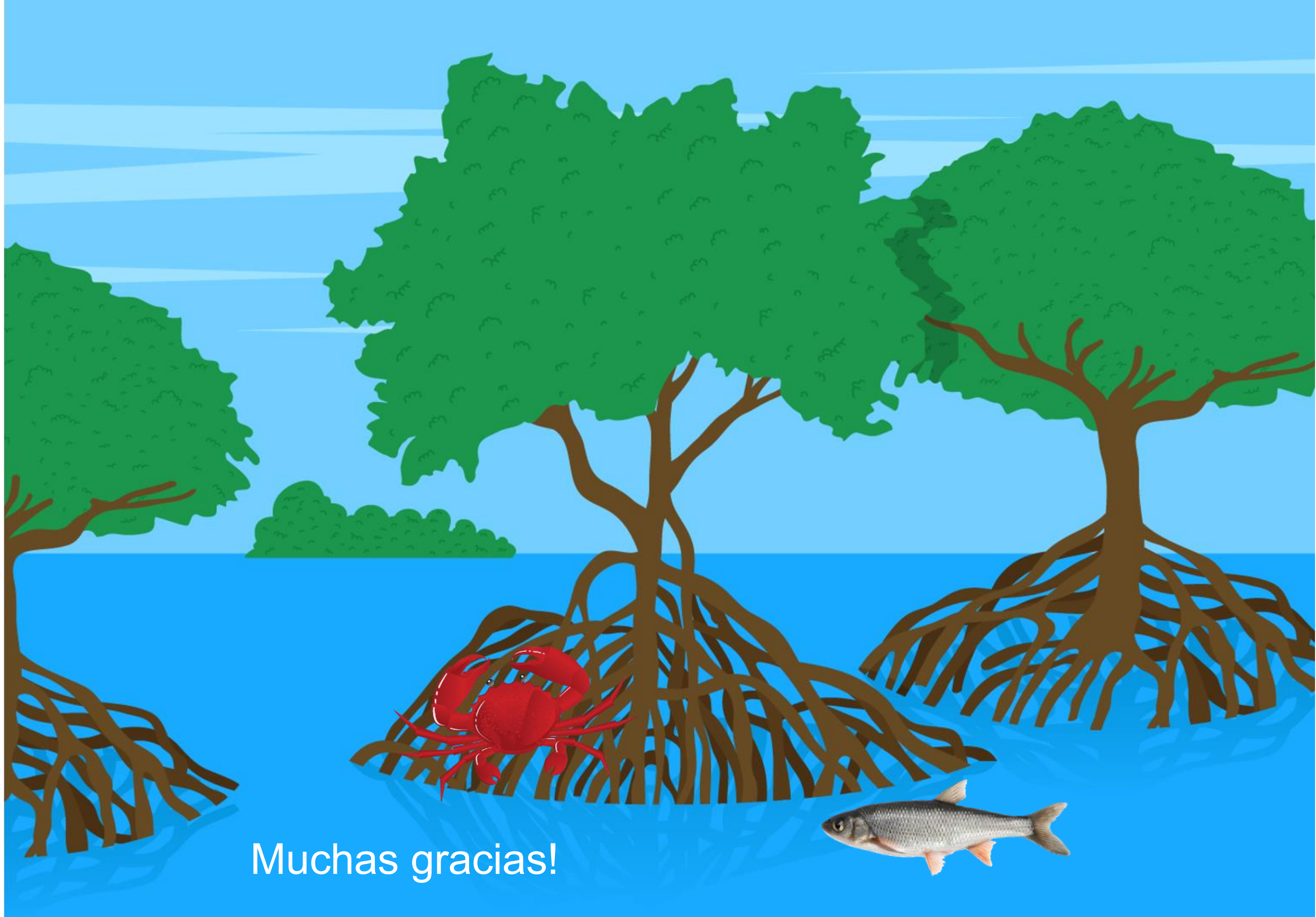
New Logic for Shrimp Farming Concessions:

- (1) Concessions would no longer be exclusively dedicated to monoculture.
- (2) Each concession would be zoned into areas for diversified production, mangrove reforestation, and activities like research or ecotourism.
- (3) Water used in shrimp farming processes must be treated before being released back into the estuary.

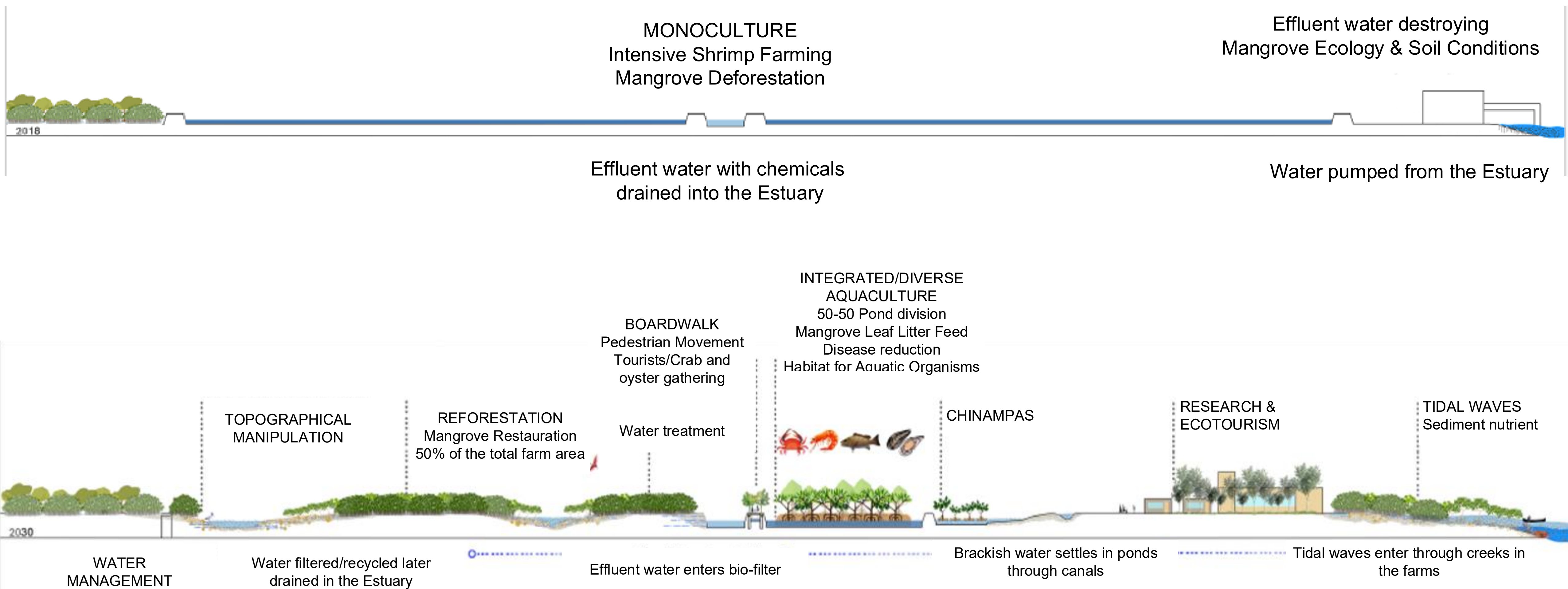


Power relations...

- First constitution in the world granting rights for nature
- 2024 President Lasso: in the name of climate change proposed to privatize mangrove land given in concession, so the owners of the shrimp ponds can invest in climate adaptation (since the country does not have the money)
- We MUST be vigilant for nature's and our rights
- Using information about the AAL we can be conscious about the importance of mangrove reforestation and implement solutions: the creation of buffer zones outside shrimp farms, investment in climate change adaptation for communities, connection of local communities in Ecuador with international funding for infrastructure adaptation, etc.



Muchas gracias!



Who has the power?

**Lessons drawn from the Ecuadorian Conservation Instrument:
Mangrove Sustainable Use and Custody Agreements**

Wendy Chávez and the Artificial Intelligence