

Country / City ... **United States of America, Philadelphia** .....

University / School ... **University of Pennsylvania, School of Design** .....

Academic year ... **2016 / 2017** .....

Title of the project ... **Hybrid Ecologies: Bridging the Natural, Urban and Pro** .....

Authors ... **Daniel Fachler - Masters of Architecture, Shuwen Ye - Masters of Landscape Architecture, Aubrey Jahelka - Masters of City Planning** .....



# PERFORMATIVE NATURE

Barcelona International Landscape Architecture Biennial

September 2018 **Barcelona**

SCHOOL PRIZE

X International Landscape Architecture Biennial

Máster d'Arquitectura del Paisatge -DUOT - UPC  
ETSAB - Escola Tècnica Superior  
d'Arquitectura de Barcelona  
Avenida Diagonal, 649 piso 5  
08028 Barcelona-Spain

## TECHNICAL DOSSIER

Title of the project	<u>Hybrid Ecologies: Bridging the Natural, Urban and Productive Landscapes</u>
Authors	<u>Daniel Fachler, Shuwen Ye, Aubrey Jahelka</u>
Title of the course	<u>Rebuilding for Resilient Landscapes</u>
Academic year	<u>2016 - 2017</u>
Teaching Staff	<u>Maria Altagracia Villalobos, David Gerard Gouvenuer Malakoff, Oscar Grauer</u>
Department/Section/Program of belonging	<u>Department of Landscape Architecture</u>
University/School	<u>University of Pennsylvania, School of Design</u>

Written statement, short description of the project in English, no more than 250 words

Ecuador is one of the most bio-diverse countries in the world. As mono-crop industry has taken hold of the economy, many of the native ecosystems are now at risk, none more so than the coastal mangrove ecosystem. Over 70% of Ecuador's mangrove forests have been lost since 1990 when industrial shrimp farming was introduced. Additionally, much of the Ecuadorian population still rely on artisanal fishing, shellfish & shrimp collecting, whose stocks have depleted due to habitat loss, jeopardizing entire region's economies & well being of communities. Currently, the landscape is intentionally segregated for production or urban development and is often in conflict with natural systems. Hybrid Ecologies is a design & planning process by which conflicting ecosystems & unsustainable practices are manipulated to work in tandem between the natural, urban and productive environments. It is unrealistic to believe that ecological restoration can be completed to the original state, & it is most likely that industries that produce large revenues will remain in place. This project focuses on combining shrimp farming & mangrove restoration that work in harmony, still provides revenue, and blends seamlessly with an urban backdrop. Essential to their survival mangroves need cultural & monetary appreciation. We attempt to show that mangroves & their accompanying wetlands can be harnessed for monetary production and designed into natural urban spaces that are beautiful and complement the surrounding urban fabric through parks & food production utilizing silvofishery methods of shrimp farming & chinampas as the foundation of design & mangrove restoration.

For further information

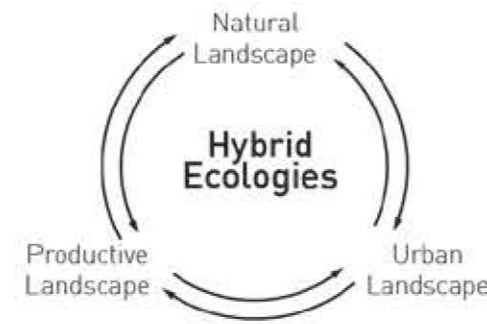
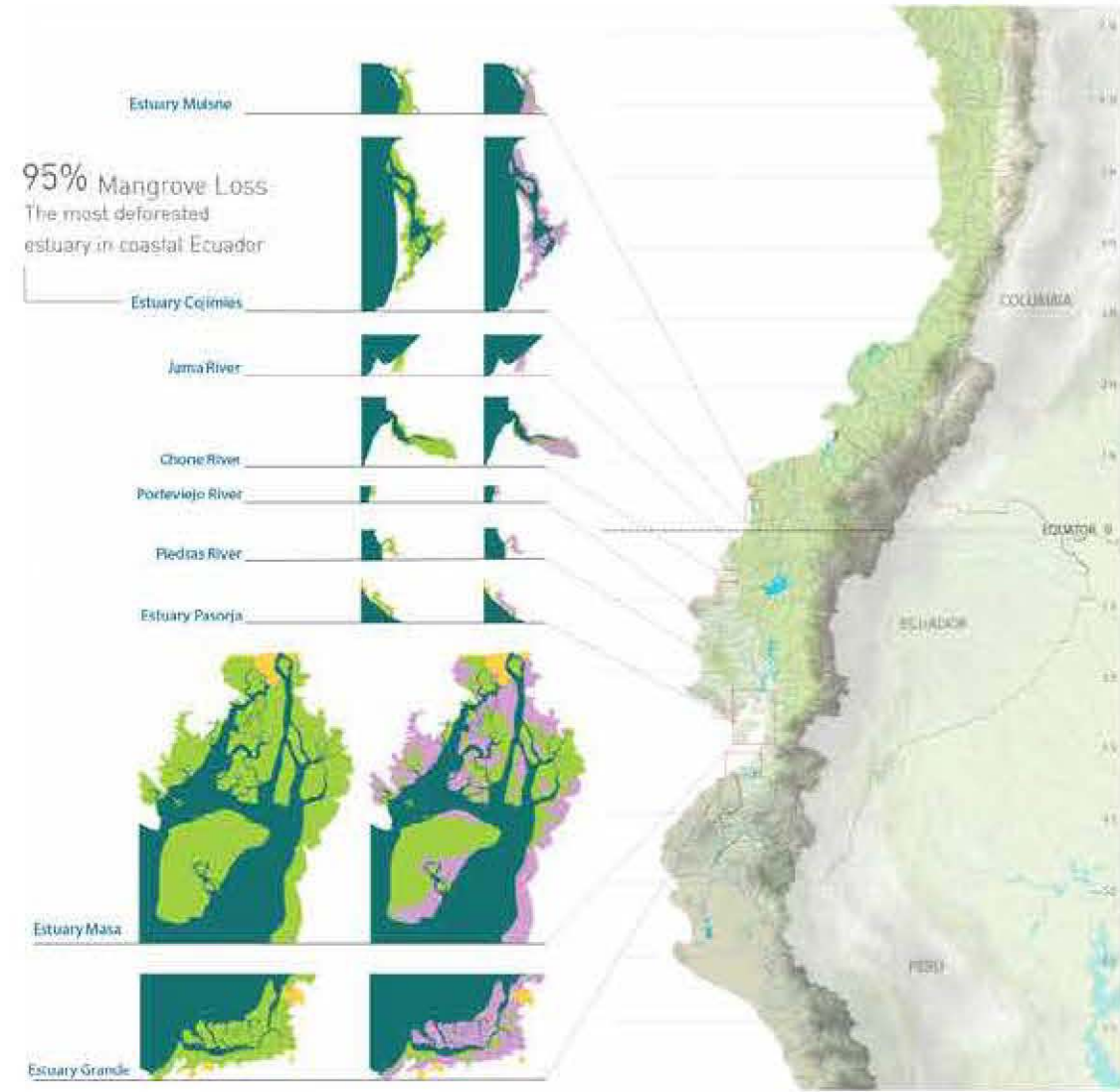
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Consult the web page <http://landscape.coac.net/>

# Hybrid Ecologies: Analysis and Concept

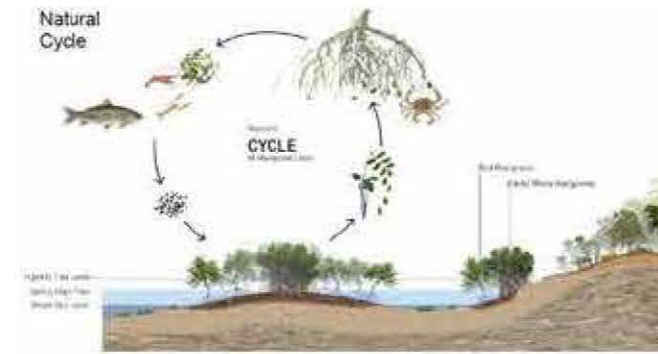


## Goals:

- Provide Buffers between conflicting land uses
- Rethink unsustainable management by hybridization
- Merging Urban, Natural, and Productive Landscapes

## Strategies for Hybrid Ecologies:

- Educate residents in sustainable farming and aqua farming practices
- Design less intensive, but still productive aqua-farming practices
- Develop artificial ecosystems combining productive & artificial natural preserves
- Develop protected area system considering both vulnerable, currently protected and unlikely to be protected areas. Educate about artificial ecosystem & farm symbiotic benefits
- Develop incentives to preserve natural environments Long term land use & mitigation plan
- Identify low cost mitigation to curb risk or curb habitat destruction



Mangroves are often not appreciated as a monetary commodity, but they are necessary, Mangroves are worth:

- Erosion Control \$3,679/ha
- Storm Protection \$8,966-\$10,821/ha
- Food & Raw Material \$484-585/ha
- Offshore Fishery Production: \$708-\$987/ha

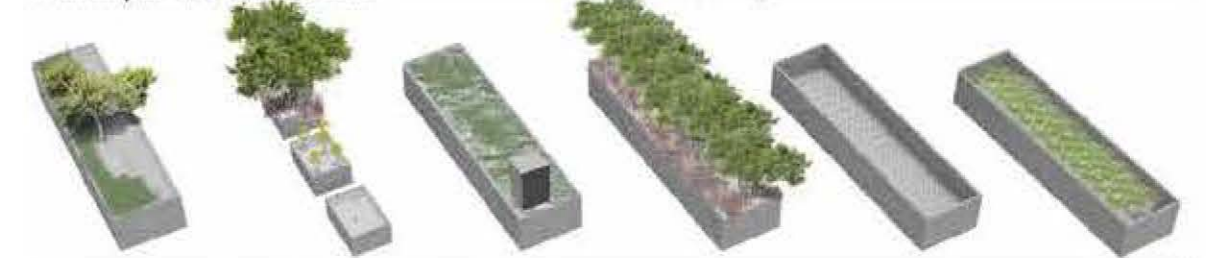
## Chinampas as Restoration



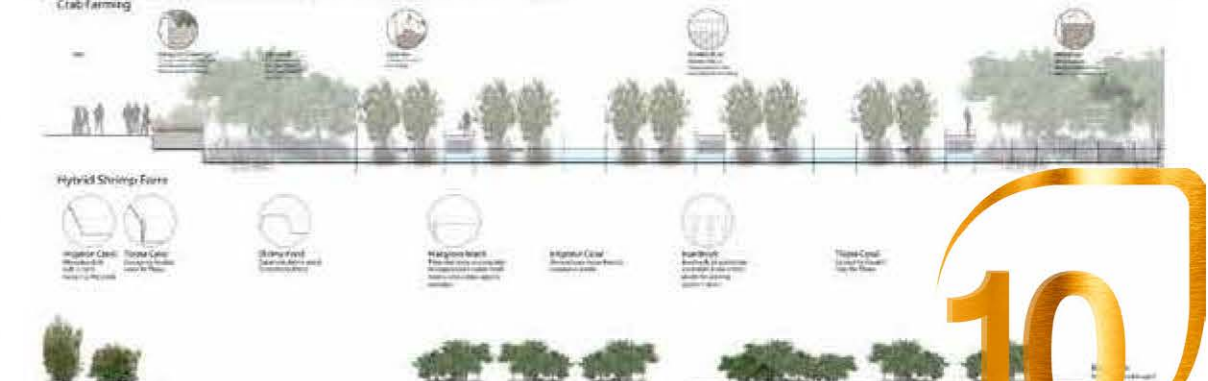
Chinampas increase restoration success rates by 40%. When placed further apart they provide more habitat and surface area for wildlife and aerobic/anaerobic cleaning cycles.



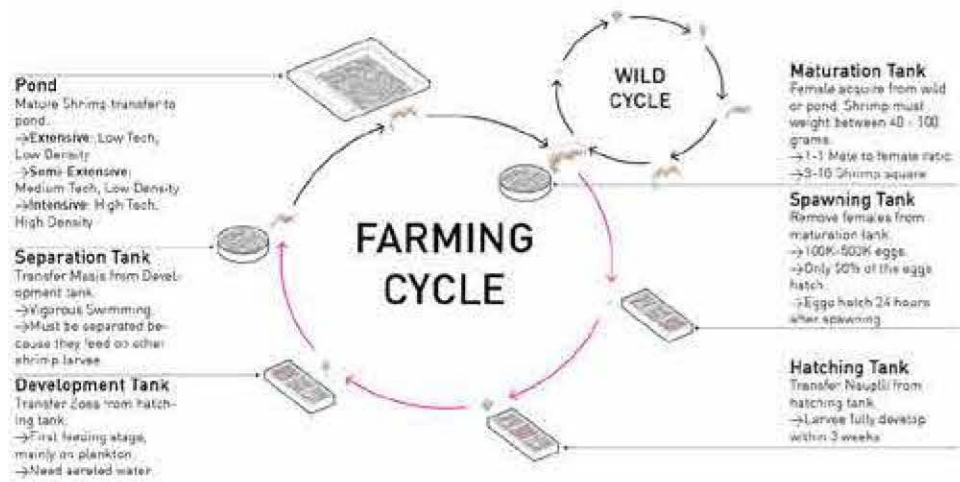
## Chinampas as Urban Fabric



## Chinampas as Base for Silvofishery Farms



# Hybrid Ecologies: Natural & Productive Landscapes



Current shrimp farming model



Natural - Productive Hybrid || Modified Shrimp pond utilizing mangroves & natural wetlands.



Natural - Productive Hybrid || Modified constructed wetlands to clean shrimp-pond waste water and human waste

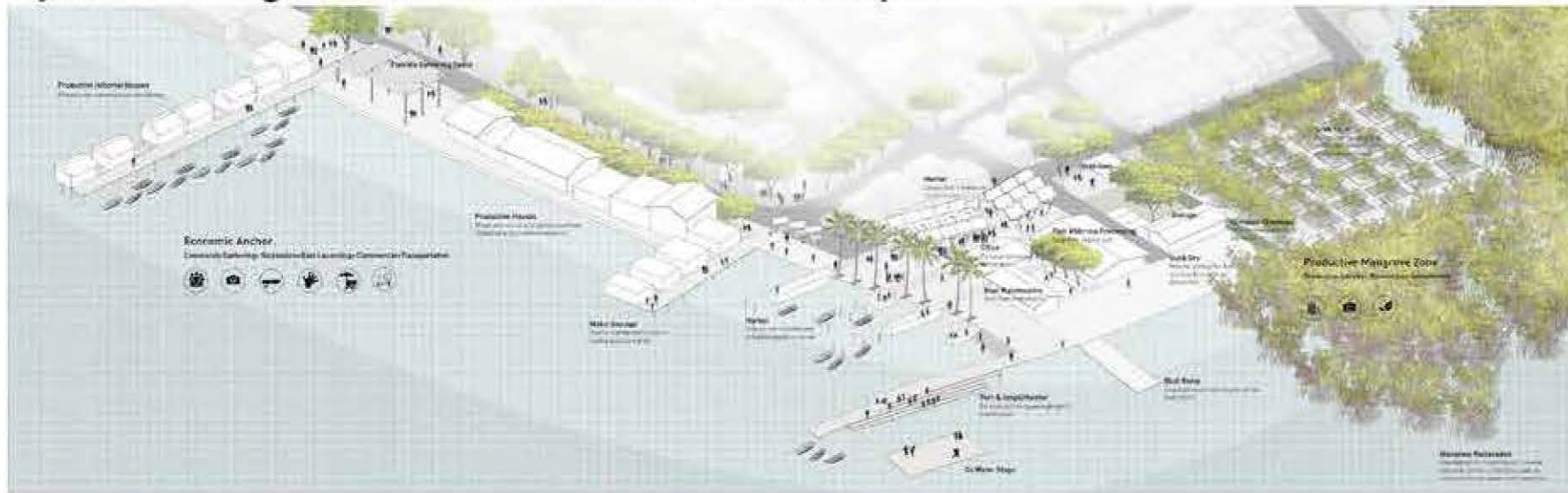


Proposed resilient shrimp farming model reincorporating mangroves and additional crops and activities

Shrimp farms are the main cause for mangrove deforestation in Easuary Cojimies and along the Pedernales river system, however they are also the main source of wealth production. The river travels through different landscapes and socio-economic conditions, therefore the productive landscape must adapt to these different conditions. The coastal region is rich with tourism and we invite tourists to visit the farms. The inland farms are focused on mangrove reforestation and research facilities to further understand a resilient relationship between shrimp farming and the mangrove environment.



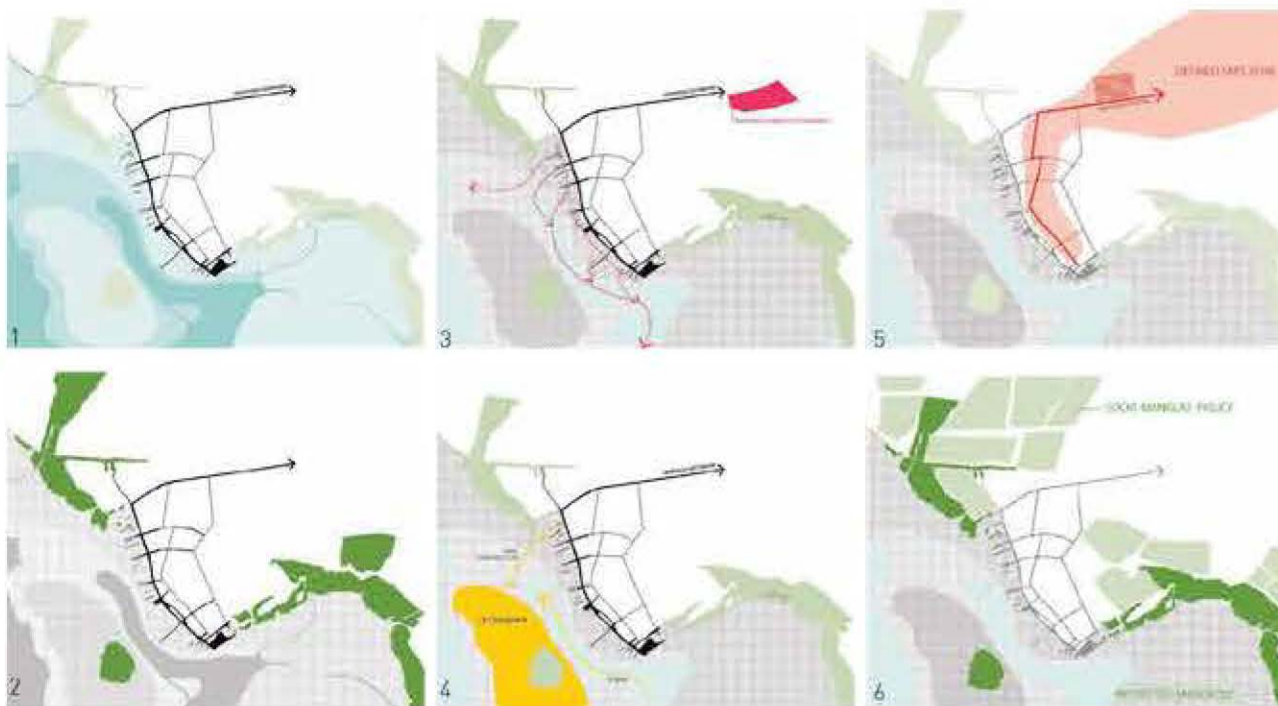
# Hybrid Ecologies: Natural & Urban Landscapes



Natural-Urban-Productive Hybrid || terraced gardens used for soil retention and food production

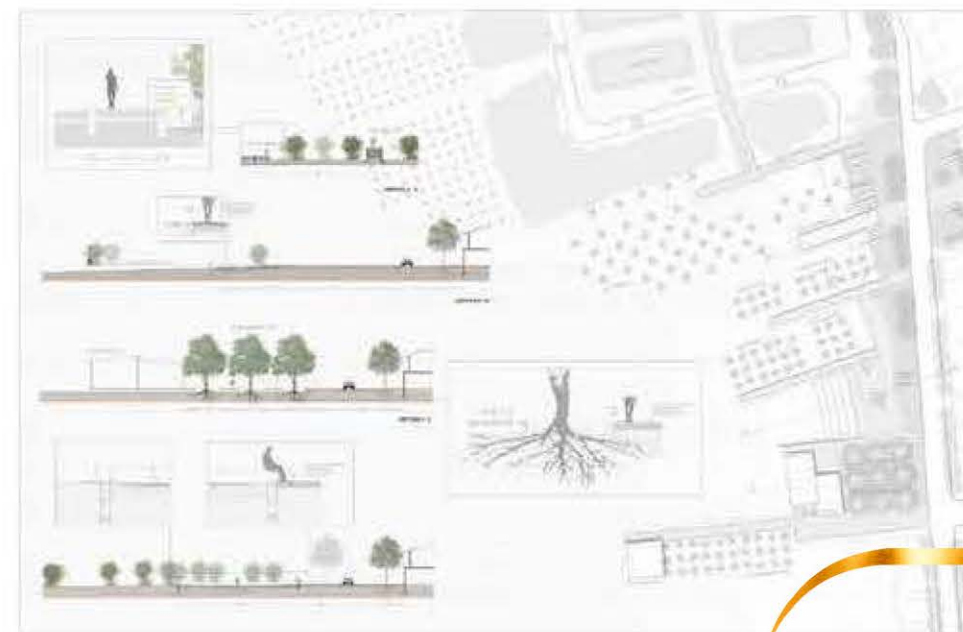


Productive-Urban-Natural Hybrid || Entrance to a mangrove silvofishery park and shellfish collecting, serving as the gathering/recreation space to the town



After a devastating earthquake, San Jose de Chamanga was struggling with environmental degradation, physical destruction, and government proposals to remove the fishing community from the waterfront and prioritizing shrimp farms over artisanal fishermen. The proposal envisions a new type of shrimp farming model and mangrove habitat restoration that encourages habitat recovery, growth in fishing stocks, and a cultural harmony between natural, productive and urban landscapes. As a result, long-term economic stability will assist in recovery.

- Site Analysis
1. Tidal Water System
  2. Existing Mangrove in Estuary
  3. Artisanal Fishing
  4. Shellfish Collecting
  5. Official Relocation
  6. Environmental Protection



Productive-Natural-Urban Hybrid || Retrofitted shrimp processing port, artisanal fisherman and mangrove based-crab pens for extra income