

A Novel Model for Mangrove Agroforestry to Provide Livelihoods and Biofuel Feedstock

Riley Encased Methodology®

Mangrove Forests

- Coastal hardwood forests
- Littoral or intertidal zones of tropical and subtropical regions
- Trees are halophytes that thrive in the saline conditions of oceans, bays, estuaries and intracoastal waterways
- Form diverse & highly productive ecosystems
- Harvesting of mangroves:
 - Construction materials
 - Fuel stock
 - Derived products

Mangrove destruction and degradation a worldwide issue



British Virgin islands



Clearing of mangroves for coastal development or agriculture use



Mangrove Reforestation Failure



“How many times have you heard about a good idea applied wrongly which backfired and caused more harm than good? This is exactly the case with one of the world’s most intensive efforts to restore coastal mangrove forests.”

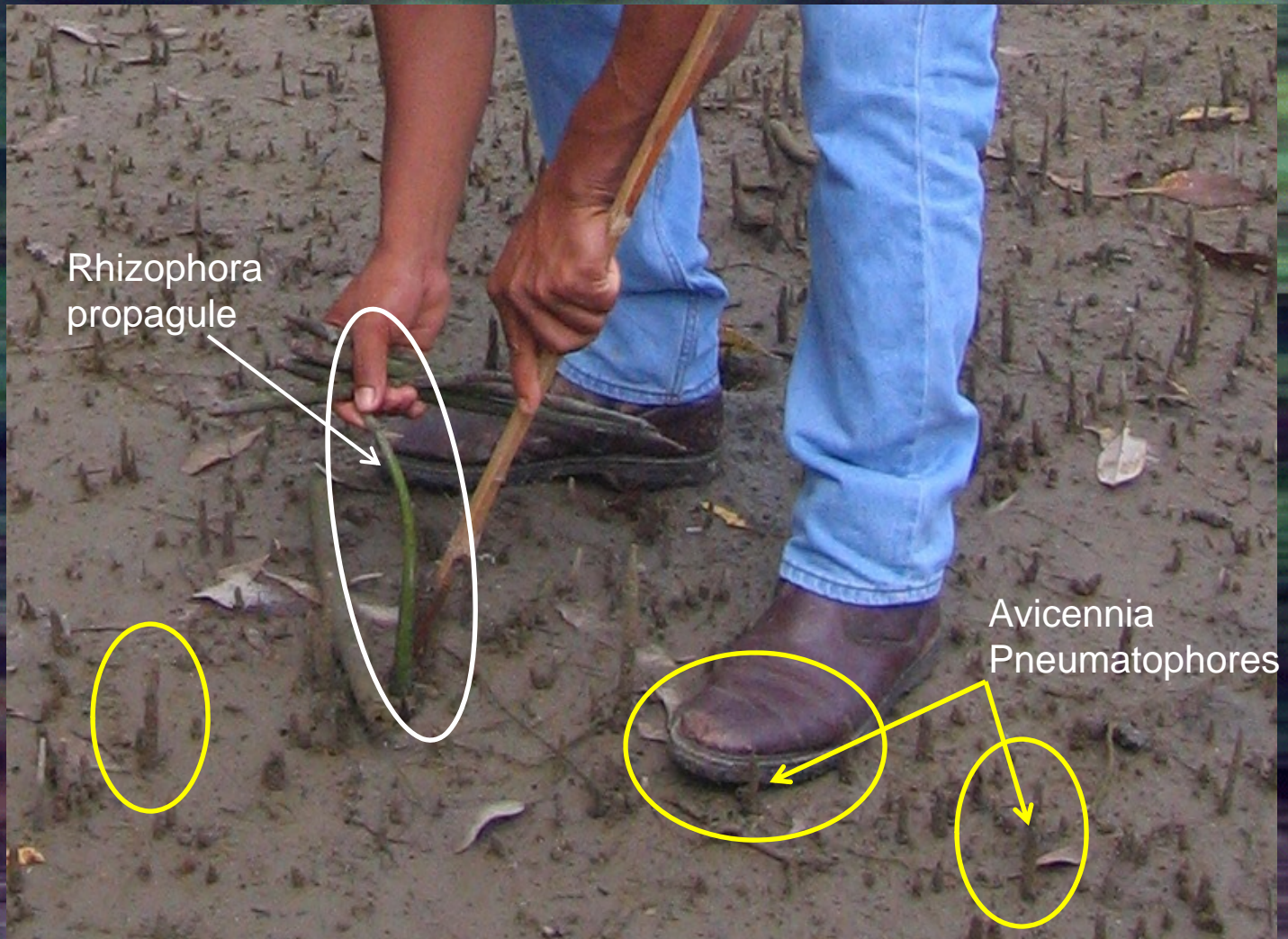
University of the Philippines
Quezon City

Conventional Reforestation



“Through a cash-for-work project, villagers in Thailand, harvest and plant mangrove seedlings”

Law of Unintended Consequences



Rhizophora propagules being conventionally planted within the pneumatophore root system of Avicennia

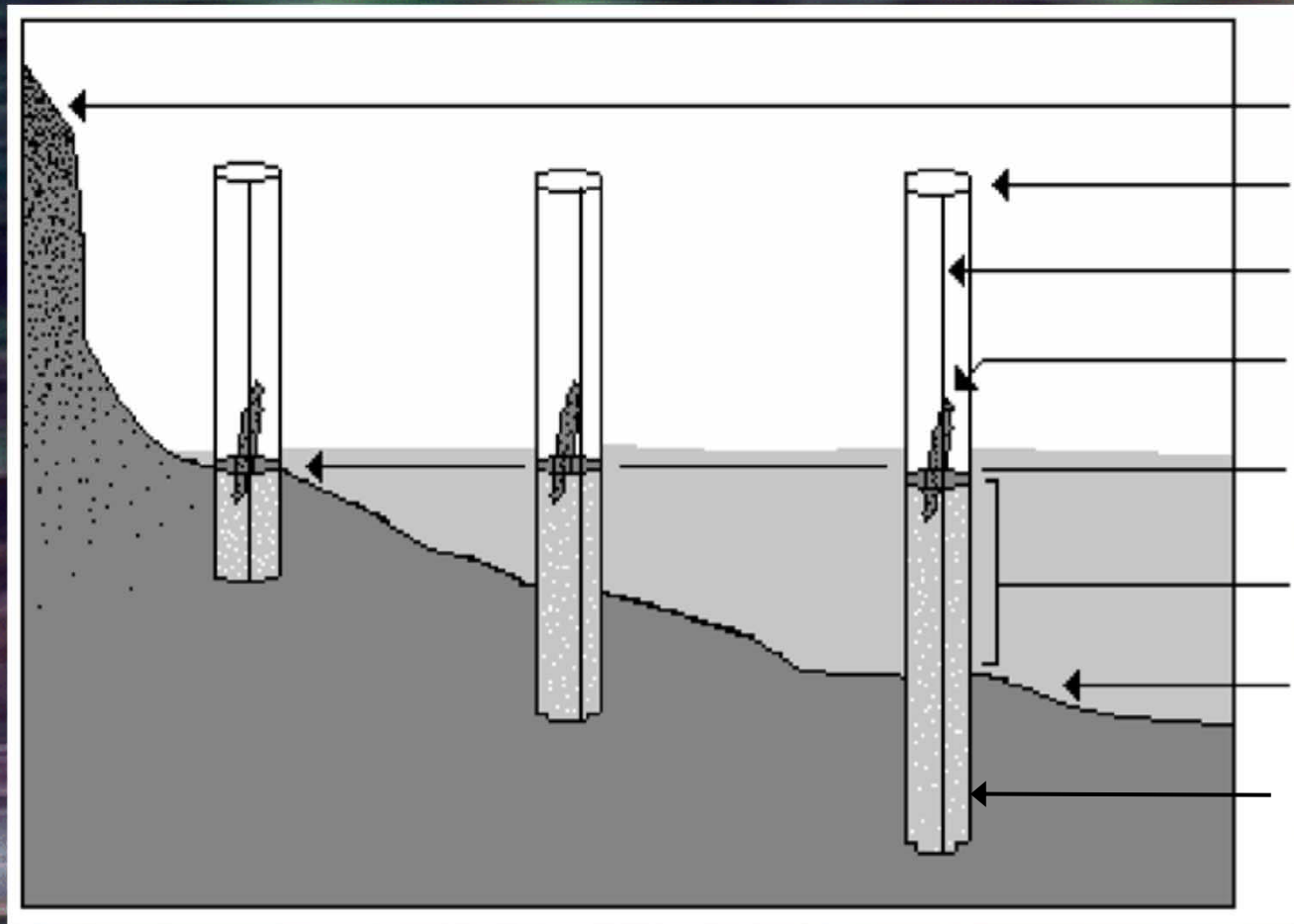
Riley Encased Methodology (REM)

Principles of Isolation & Adaptation



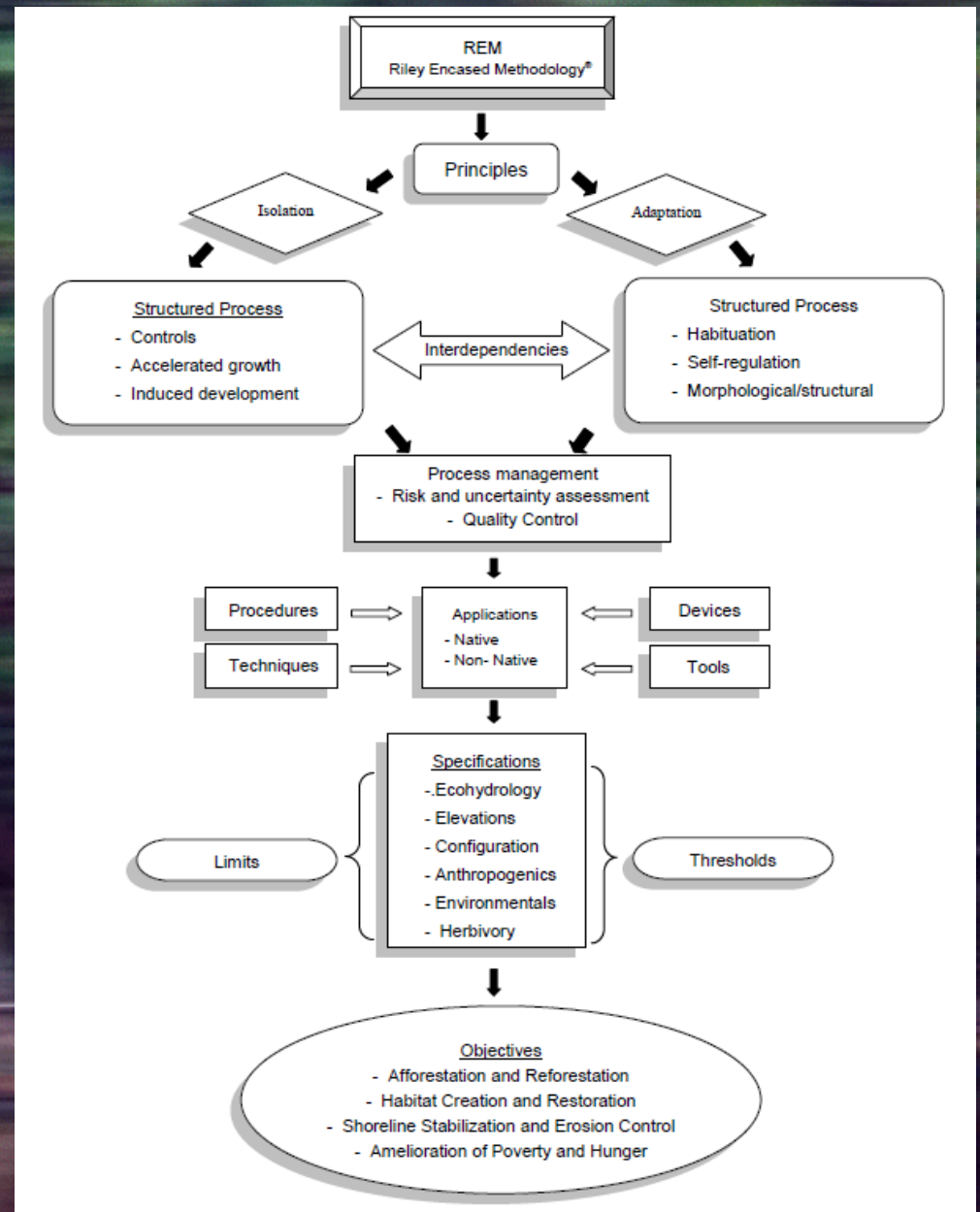
REM Encasement Device

- Protects seedling from environmental factors
- Maintains proper hydrology
- Facilitates adaptation



Riley Encased Methodology[®] Ecological Engineering

- ❖ Principles
- ❖ Processes
- ❖ Specifications
- ❖ Technology
- ❖ Devices
- ❖ Tools
- ❖ Procedures
- ❖ Applications



Isolation & Adaptation time lapse



[Play Video](#)
[Click Here](#)

Adaptation process complete

REM
Device



Success Criteria - reproductive maturity



Successful REM reforestation

Water view



Shore view



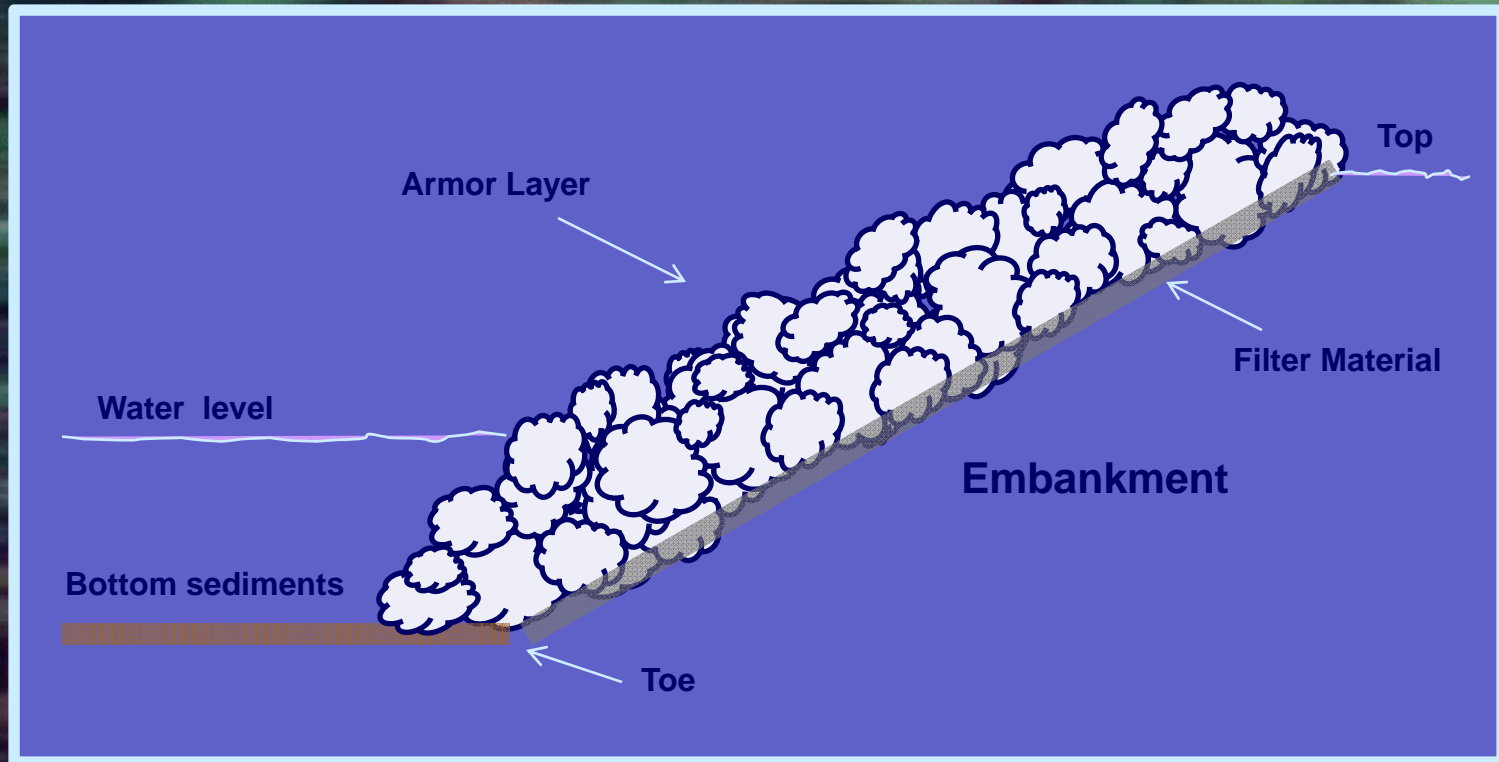
Clearing mangroves from agricultural lands, severe erosion and direct economic loss Costa Rica



Armoring for shoreline stabilization



Rock Revetments

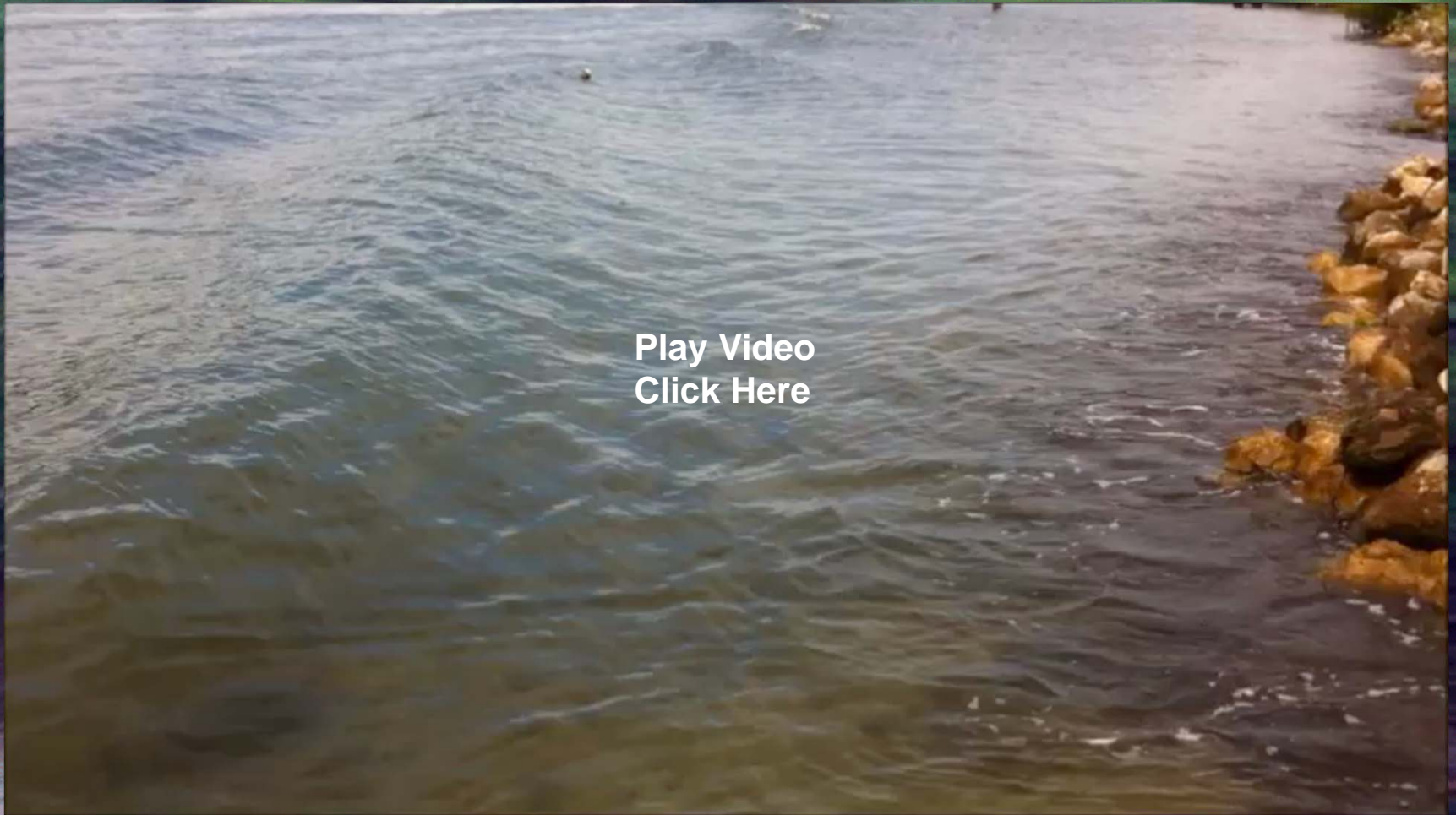


High-energy wave impact zone

- Prevents natural regeneration
- Conventional reforestation is ineffective



Mangrove Mitigation



Play Video
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Mangroves removed & revetment installed

Belize, CA



Mangroves replaced by seawalls

Meritt Island Florida



REM Device
Shoreline revegetation with
Rhizophora mangle

Sustainable Development



Restored /
mangroves