



## Consideration of Well-being Implications and Ecosystem Service Trade-offs in the Lorentz Lowlands

the world's most productive mangrove and lowland swamp forest landscape

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Presented by Ben Brown & Rio Ahmad

International Conference on Sustainable Mangrove Ecosystems

Bali, April 18-21, 2017



# Introducing the Lorentz Lowlands

**Mangrove Forest (570,000 ha)**

- 6 major community associations

**Lowland Swamp Forest (954,000 ha)**

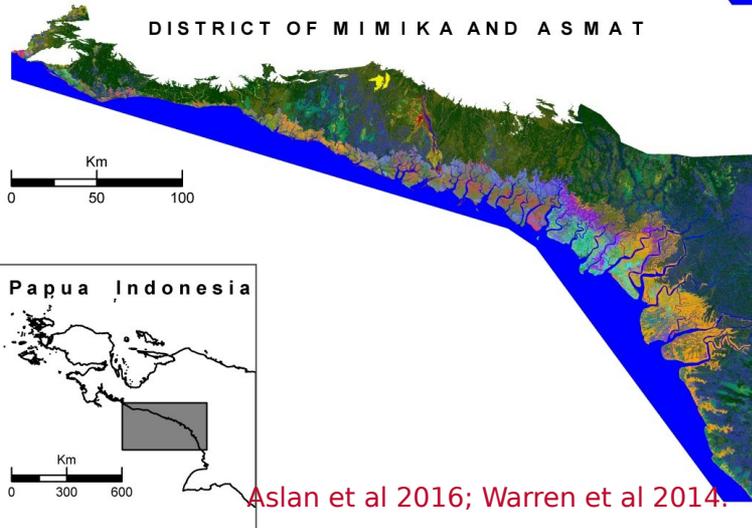
- 14 major community associations



## Coastal Land Cover Map of Mimika and Asmat Districts

### Land Cover Class:

Dryland/Riparian Forest	Barren Land - Soil
Swamp Grassland	Rhizophora Dominated Forest
Swamp Scrubland	Avicennia/Sonneratia Forest
Sago Palm Dominated Forest	Bruguiera Dominated Forest
Mixed Swamp Forest	Mixed Mangrove Forest
Grassland/Scrubland	Transitional Landward and Coastal Forest
Settlements/Roads	Nypa Palm Forest
Palm Oil Concession	Not classified/Cloud
Open Water	



Aslan et al 2016; Warren et al 2014.





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# Carbon storage

## *Bruguiera / Rhizophora / Lumnitzera*

Basal Area (m<sup>2</sup>/ha): 33.35  
±7.44

Aboveground Biomass (Mg/ha): 416.79  
±175.41

Soil Organic Carbon (MgC/ha): 1072.44  
±108.73

Stem Density (#/ha): 786  
±215

Aboveground Carbon (MgC/ha): 200.06  
±74.50

**Total Carbon (MgC/ha): 1275.78**

Aslan et al, 2016; Warren et al, 2014



# Ecosystem valuation direct, indirect, options & intrinsic

- Total annual value: US \$417,201,456
- Total value/ha/yr: US \$2,240

Smith et al., *in prep*



# Degradation & Threats

- Oil palm
  - Hydrological impact
  - Direct replacement
- **Rezoning for infrastructure development**
- Mining tailings (Aijkwa Delta)
- **Illegal logging**



KAJIAN LINGKUNGAN HIDUP STRATEGIS  
RENCANA TATA RUANG WILAYAH KABUPATEN MIMIKA 2011-2031  
Perda No. 15 Tahun 2011

JUNI 2014



# LESTARI - Overarching Goals & Strategy

Goal 1: Reduced GHG Emissions from Landuse Sector

Goal 2: Carbon-rich forests, peatland, mangrove and key biodiversity conserved

## **Strategy**

- 1) Awareness & advocacy
- 2) Operationalize Strategic Environmental Assessments (SEA's) & Landscape Conservation Plans (LCP's) to improve land use governance
- 3) Sustainable landscape governance**
- 4) Co-management (social-forestry)**
- 5) Protected areas management
- 6) Green enterprises
- 7) Private sector Best Management Practices (BMP's)
- 8) Innovative financing for sustainable land and forest management

# Resilience Assessment

## Objectives:

- To inform mitigation [and adaptation] activities;
- To prepare communities for engagement in collaborative management;
- To inform indicator development and develop a database of thresholds.



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Kajian Ketahanan Sosial-Ekonomi-Ekologi (*Resilience Assessment*)  
di Mimika dan Asmat dan Pengembangan Rencana Aksi  
Lorentz Lowlands Landscape (Mimika – Asmat)

16 Mei 2016



Laporan ini disusun oleh Tetra Tech ARD untuk dikaji oleh United States Agency for International Development.

# Methodology

1. Select a focal system and bound the system
  2. Develop timelines for environmental and social change
  3. Develop a table of stressors and disturbances
  4. Identify thresholds
  5. Analyze cycles of change
  6. Describe system regimes including attractors
  7. Develop alternate scenarios
  8. Develop interventions/action plans
- Methods in each of 10 villages included informal interviews, observation, village transects walks, FGD's, and multi-stakeholder analytical workshops

## Assessing and managing resilience in social-ecological systems: A practitioners workbook

Version 1.0 June 2007



# Results

## Atuka Village:

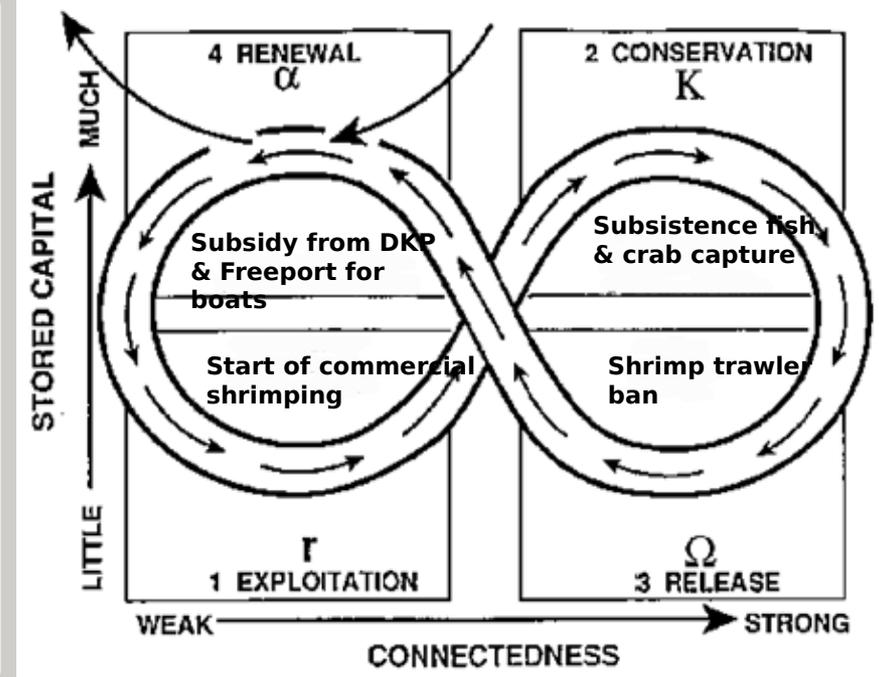
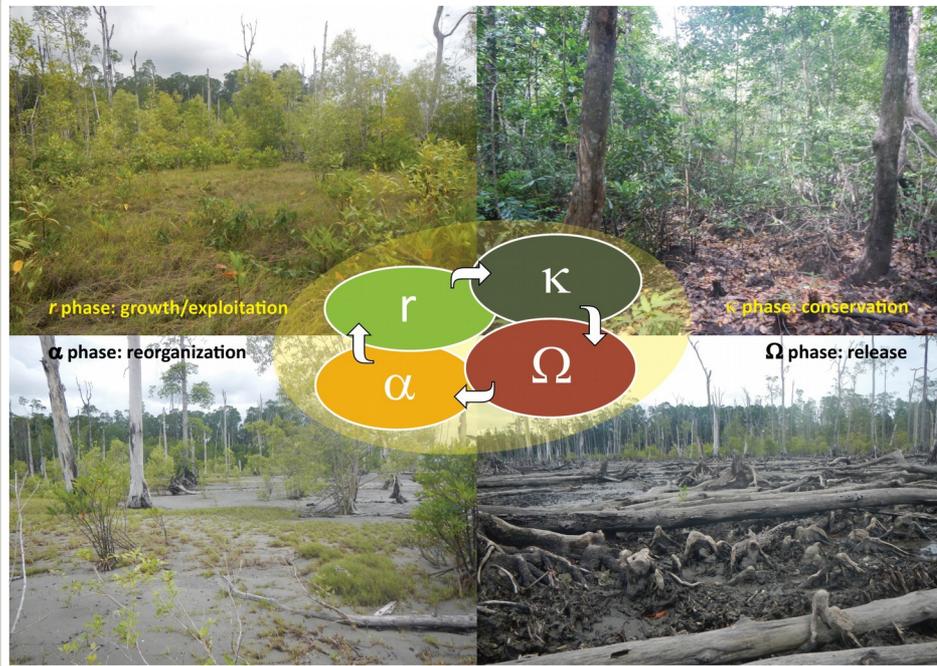
- Ecology – Conservative (K)
- Social-economy – Reorganization



## Notes:

- Ecology – natural system, full compliment of biodiversity and abundance
- Economy and social systems are changing – used to just fish and catch crabs Now – since the moratorium on shrimp trawlers – Atuka fisherfolk are meeting the market demand by engaging themselves – leading to increased income generation, but changing social fabric (less attention to *Taparu* – larger rift between economic classes in village, less volunteerism)

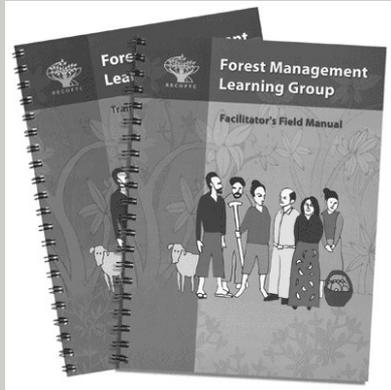
# Ecological and Social Dynamics Depicted as Adaptive Cycles



# Action-planning based on RA results

Ecology	Social	Economy	Village	Intervention strategy	Actions/activities
<b>Conservative (K)</b>	Conservative (K)	Conservative (K)	Syuru, Ohotya	Enhancement, building resilience	<ul style="list-style-type: none"> <li>• <b>Identify, reproduce and institutionalize traditional knowledge systems and management</b></li> <li>• <b>Improve monitoring system in conservative forest areas</b></li> <li>• Capacity building for Traditional Organizations &amp; Customary Law (LMDH)</li> <li>• Work with Department of Fisheries to regulate fisheries imported to Asmat to promote local fish sales</li> </ul>
<b>Conservative (K)</b>	Release (Ω)	Conservative (K)	Keakwa, Nayaro	Enhancement, building resilience	<ul style="list-style-type: none"> <li>• Environmental education for youth</li> <li>• Improve monitoring system in conservative forest areas</li> <li>• Capacity building for Traditional Organizations &amp; Customary Law (LMDH)</li> <li>• <b>Develop social forestry agreements, and/or Land Sea Plans</b></li> </ul>
<b>Conservative (K)</b>	Conservative (K)	Reorganization(α)	Yepem	Enhancement, building resilience in social-ecological systems  Buffer economic change,	<ul style="list-style-type: none"> <li>• Improve current livelihood practices through Coastal Field Schools</li> <li>• Capacity building for Traditional Organizations &amp; Customary Law (LMDH)</li> <li>• Conserve and regulate critical natural resources (fresh water, forests, fisheries)</li> </ul>
<b>Conservative (K)</b>	Release (Ω)	Release (Ω)	Nakai, Ewer	Enhancement, building resilience in ecological systems  Buffer social-economic change,	<ul style="list-style-type: none"> <li>• Improve current livelihood practices through Coastal Field Schools</li> <li>• Develop co-management related to key commodities</li> <li>• Small business development in Ewer</li> <li>• Extension work on crab capture and marketing in Nakai</li> </ul>
<b>Conservative (K)</b>	Reorganization (α)	Reorganization (α)	Pigapu, Atuka	Enhancement, building resilience in ecological systems  Buffer social-economic change,	<ul style="list-style-type: none"> <li>• Environmental education for youth</li> <li>• Coastal field schools for capture fisheries</li> </ul>
<b>Release (Ω)</b>	Reorganization (α)	Reorganization (α)	Atsj	Buffer ecological, social-economic change,	<ul style="list-style-type: none"> <li>• Coastal field schools for fisheries, forestry and carving</li> <li>• Eco tourism development</li> </ul>

# Collaborative Management Social Forestry



Curriculum for developing Social Forestry plans and agreements.

Also for preparing communities to provide bottom-up inputs to Forest Management Units (KPH-L) 15 Year Plans (RPHJP)

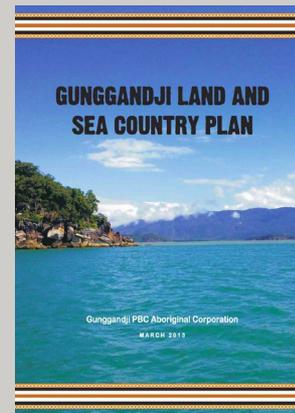
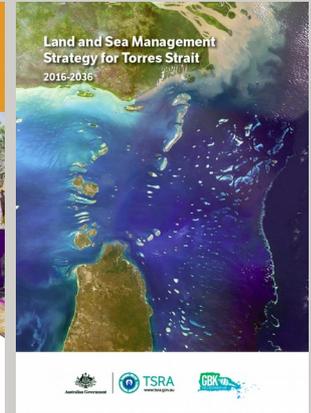


# Collaborative Management

## New Thought: Land & Sea Mgmt Plans



- Native Title Act of 1993 in Australia similar to Hak Ulayat of Papua (2008).
- Development of IPA (Indigenous Protected Area) Plans
- Ex) Land & Sea Country Plans (recognizing the integrated nature of coastal areas.
- Emphasis on Adaptive & Collaborative Management



# Nimao!

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