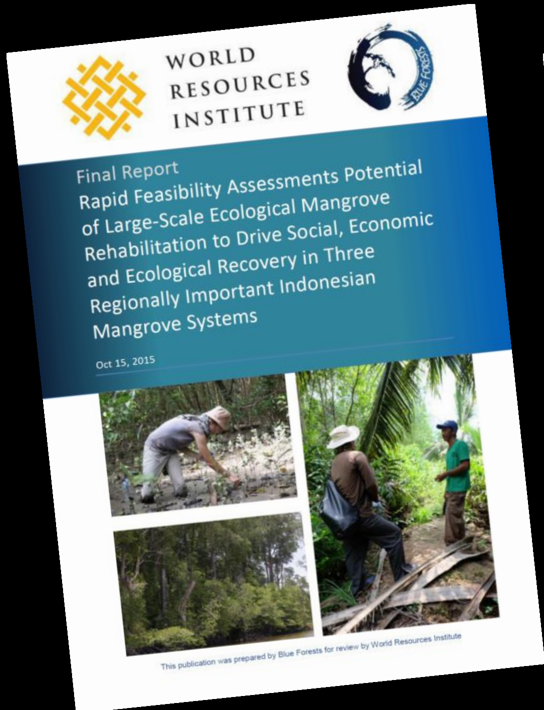
Assessing Resilience, Adaptability, and Transformability in Indonesian Mangrove Social-ecological Systems

Ben Brown

Presentation at MMM4 – St Augustine, Fla. 2016

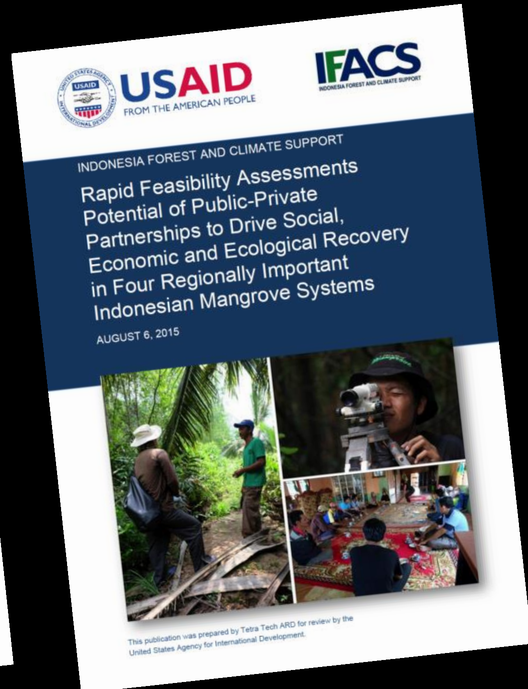

WORLD RESOURCES INSTITUTE

Final Report

Rapid Feasibility Assessments Potential of Large-Scale Ecological Mangrove Rehabilitation to Drive Social, Economic and Ecological Recovery in Three Regionally Important Indonesian Mangrove Systems

Oct 15, 2015

This publication was prepared by Blue Forests for review by World Resources Institute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INDONESIA FOREST AND CLIMATE SUPPORT

Rapid Feasibility Assessments Potential of Public-Private Partnerships to Drive Social, Economic and Ecological Recovery in Four Regionally Important Indonesian Mangrove Systems

AUGUST 6, 2015

This publication was prepared by Tetra Tech ARD for review by the United States Agency for International Development.

Feasibility Assessments

Resilience Assessments


Building with Nature Indonesia

Securing Eroding Delta Coastlines

Completed Baseline Study

Towards system understanding


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LESTARI

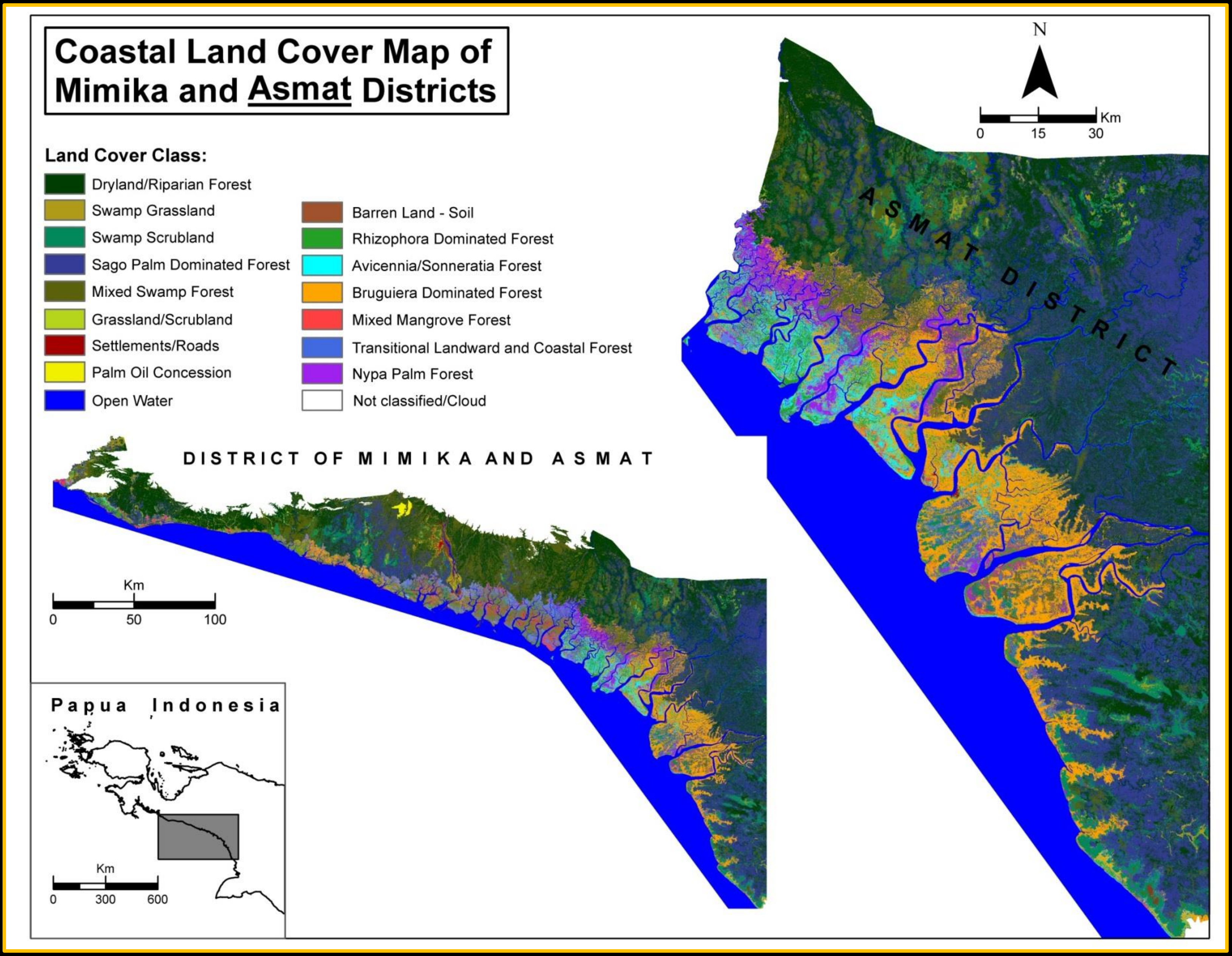
Kajian Ketahanan Sosial-Ekonomi-Ekologi (*Resilience Assessment*) di Mimika dan Asmat dan Pengembangan Rencana Aksi Lorentz Lowlands Landscape (Mimika – Asmat)

16 Mei 2016

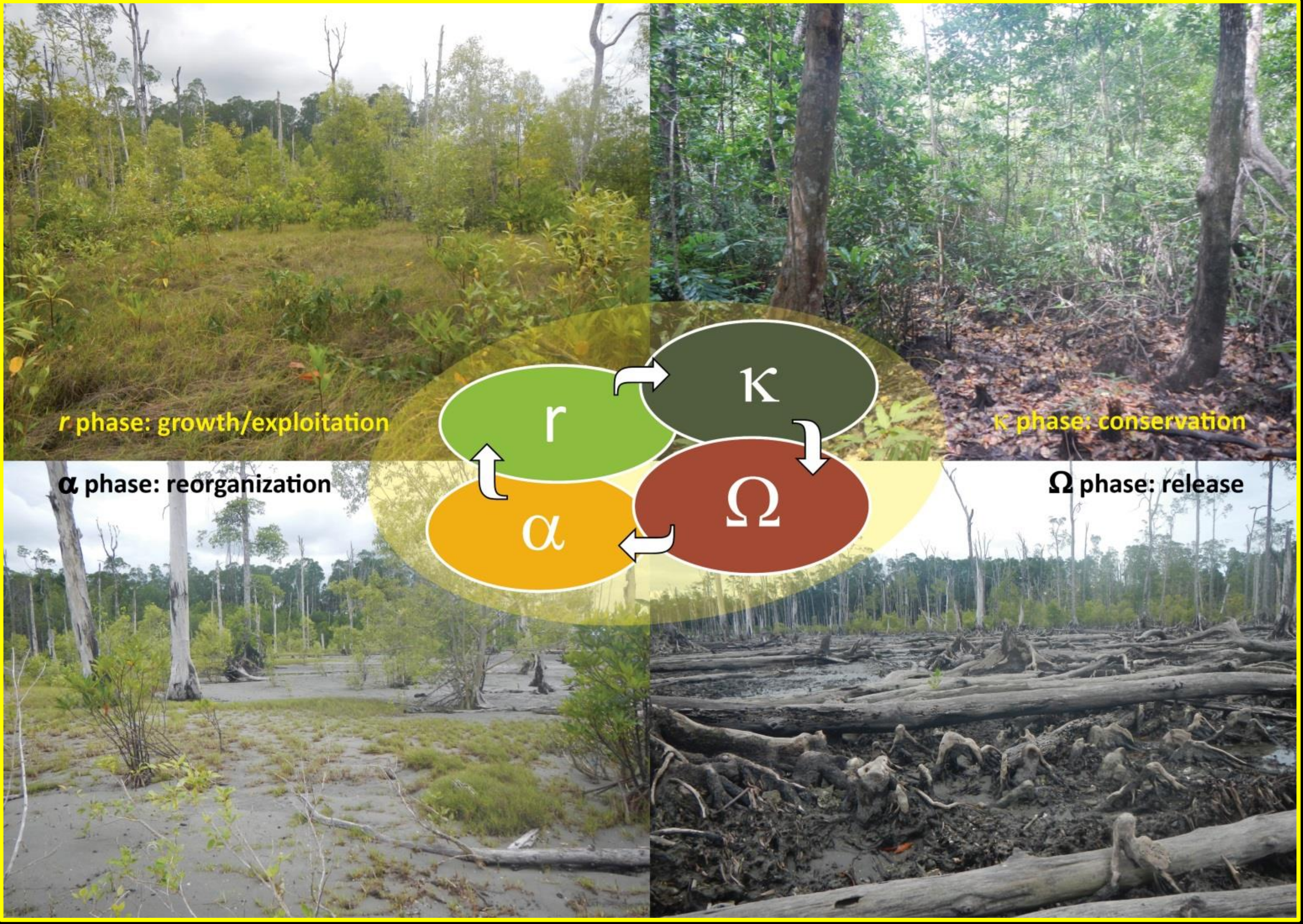
Laporan ini disusun oleh Tetra Tech ARD untuk dikaji oleh *United States Agency for International Development.*

Typology of Mangrove Rehabilitation Systems

Type 1: Nearly Pristine System - Lorentz Lowlands



Type 1: Lorentz Lowlands – Adaptive Cycle

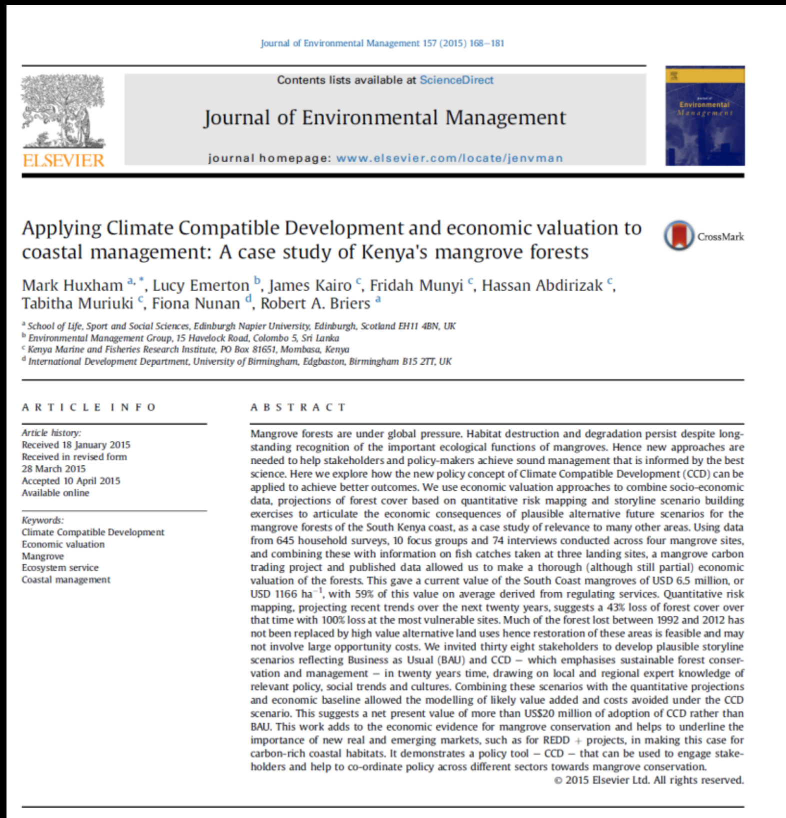


Type 1: Lorentz Lowlands

Development Threats

Erosion of Traditional Management

Research/Collaboration Opportunity



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ELSEVIER

Applying Climate Compatible Development and economic valuation to coastal management: A case study of Kenya's mangrove forests

CrossMark

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A R T I C L E I N F O

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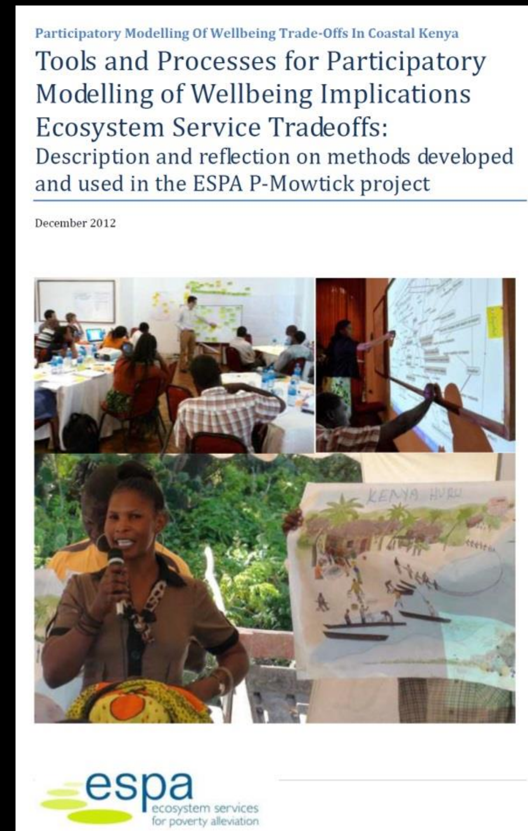
Economic valuation
Mangrove
Ecosystem service
Coastal management

A B S T R A C T

Mangrove forests are under global pressure. Habitat destruction and degradation persist despite long-standing recognition of the important ecological functions of mangroves. Hence new approaches are needed to help stakeholders and policy-makers achieve sound management that is informed by the best science. Here we explore how the new policy concept of Climate Compatible Development (CCD) can be applied to achieve better outcomes. We use economic valuation approaches to combine socio-economic data, projections of forest cover based on quantitative risk mapping and storyline scenario building exercises to articulate the economic consequences of plausible alternative future scenarios for the mangrove forests of the South Kenya coast, as a case study of relevance to many other areas. Using data from 645 household surveys, 10 focus groups and 74 interviews conducted across four mangrove sites, and combining these with information on fish catches taken at three landing sites, a mangrove carbon trading project and published data allowed us to make a thorough (although still partial) economic valuation of the forests. This gave a current value of the South Coast mangroves of USD 6.5 million, or USD 1166 ha^{-1}, with 59% of this value on average derived from regulating services. Quantitative risk mapping, projecting recent trends over the next twenty years, suggests a 43% loss of forest cover over that time with 100% loss at the most vulnerable sites. Much of the forest lost between 1992 and 2012 has not been replaced by high value alternative land uses hence restoration of these areas is feasible and may not involve large opportunity costs. We invited thirty eight stakeholders to develop plausible storyline scenarios reflecting Business as Usual (BAU) and CCD – which emphasises sustainable forest conservation and management – in twenty years time, drawing on local and regional expert knowledge of relevant policy, social trends and cultures. Combining these scenarios with the quantitative projections and economic baseline allowed the modelling of likely value added and costs avoided under the CCD scenario. This suggests a net present value of more than US$20 million of adoption of CCD rather than BAU. This work adds to the economic evidence for mangrove conservation and helps to underline the importance of new real and emerging markets, such as for REDD + projects, in making this case for carbon-rich coastal habitats. It demonstrates a policy tool – CCD – that can be used to engage stakeholders and help to co-ordinate policy across different sectors towards mangrove conservation.



Participatory Modelling Of Wellbeing Trade-Offs In Coastal Kenya

Tools and Processes for Participatory Modelling of Wellbeing Implications Ecosystem Service Tradeoffs:

Description and reflection on methods developed and used in the ESPA P-Mowtick project

December 2012

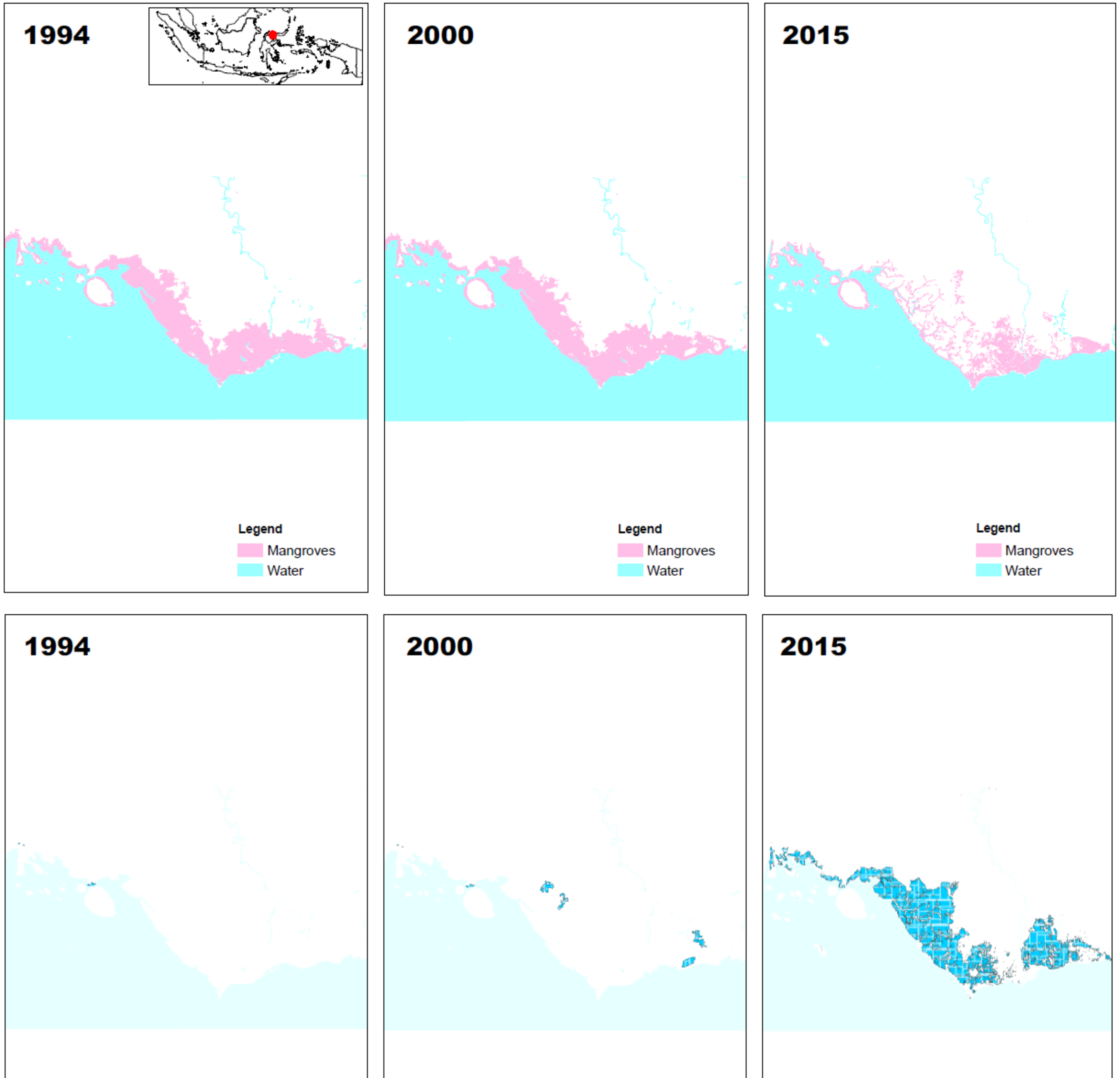
espa
ecosystem services for poverty alleviation

Ecosystem Valuation >>> Conceptual Models – Drivers Analysis – Shocks Analysis >>> Scenario Development >>> Trade-off Analysis >>>

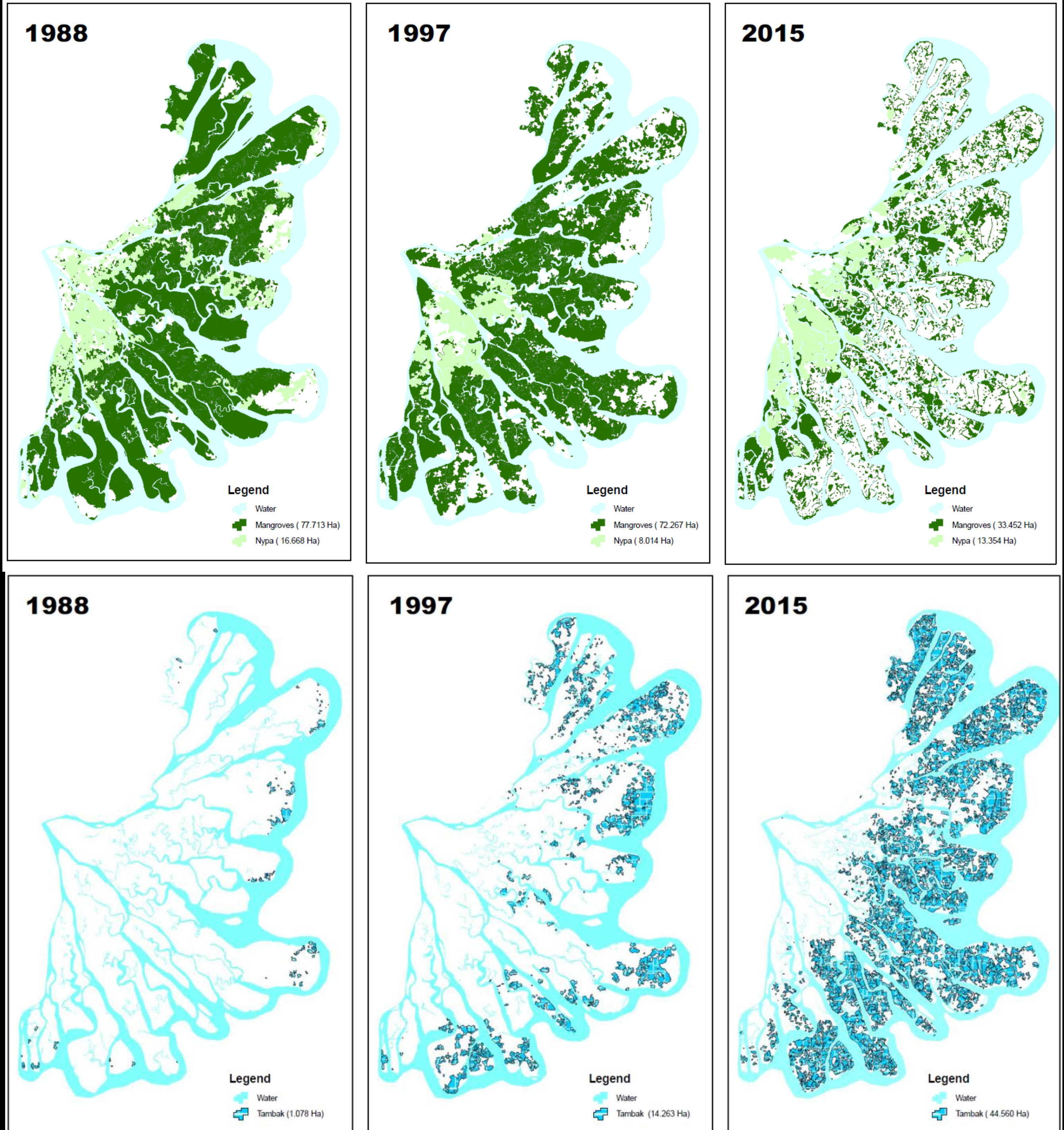
Formal government commitment to Climate Compatible Development

Research Need: Appropriate Livelihoods Development

On-going Action-Research: Rekindling *Adat*



Type 2: Aquaculture Dominant System – Stable
(ex. TP-Gorontalo & MD-East Kalimantan)


1988
Legend
Water
Mangroves (77.713 Ha)
Nypa (16.668 Ha)
1997
Legend
Water
Mangroves (72.267 Ha)
Nypa (8.014 Ha)
2015
Legend
Water
Mangroves (33.452 Ha)
Nypa (13.354 Ha)
1988
Legend
Water
Tambak (1.078 Ha)
1997
Legend
Water
Tambak (14.263 Ha)
2015
Legend
Water
Tambak (44.560 Ha)

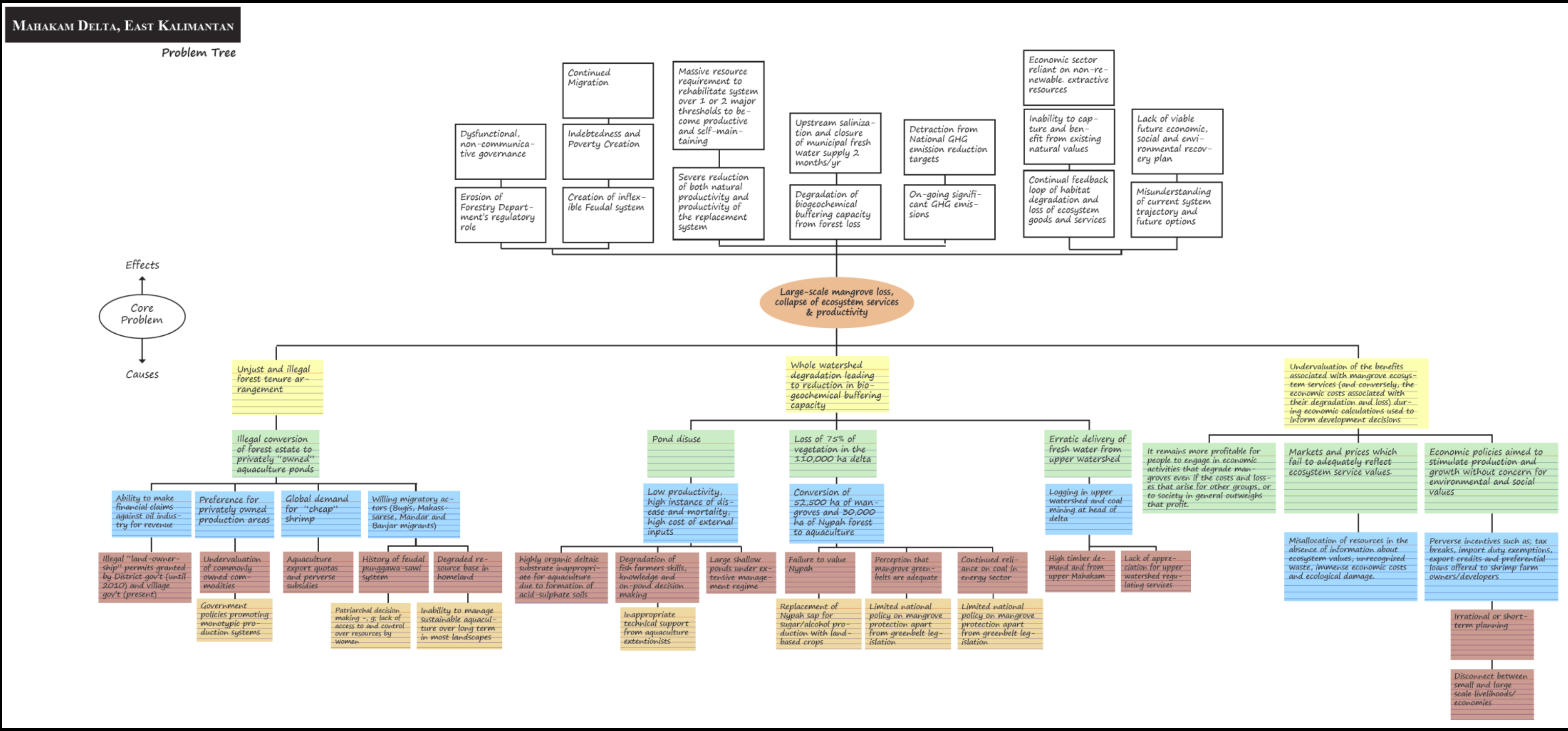
Biophysical Rehabilitation Capital

Biophysical Rehabilitation Capital


KURANGI KECEPATAN
JALAN PELAN PELAN
ADA TAMBAK


LIPUTAN XVII

Biophysical Rehabilitation Capital



Rehabilitation and investment in sustainable industrial development including *Punggawa* (Bosma et al. 2012, Brown et al., 2015, Davie et al., 2012, Visser et al., 2016)

Research Need: Sustainable Economic Development

diletakkan dalam ruangan selama 4 jam sehingga larutan nira di dalamnya menjadi dingin. Setelah larutan dalam baki sudah dingin, kertas penutup baki dibuka dan larutan nira dalam baki fermentasi ditambahkan 200 ml starter (inokulasi dengan *A. xylinum*) yang sudah diinkubasi (berumur) 7 hari. Permukaan baki fermentasi ditutup kembali dengan kertas koran dan diletakkan dalam ruang dengan suhu 28 –30° C sehingga proses fermentasi berlangsung. Setelah proses fermentasi berlangsung selama 9-11 hari, nata lembaran terbentuk dan hasil produksi nata lembaran dapat dipanen.

Nira (1 lt) + ZA (2,5 gr) + Asam cuka 25 % (20 ml)

↓ Rebus sampai mendidih dan masukkan 800 ml ke dalam baki fermentasi

Larutan Nira panas 800 ml dalam baki fermentasi

↓ Tutup dengan koran dan dinginkan 4 jam

STARTER → Masukkan 200 ml → Larutan Nira dingin 800 ml dalam baki fermentasi

↓ Tutup dengan koran dan fermentasi 9 s/d 11 hari

Nata Lembaran

Alur Produksi Nata Fruticans Lembaran

3. Produksi nata fruticans kemasan


Pemutihan nata lembaran dengan cara merendam di dalam air

Nata lembaran yang baru dipanen mengandung asam yang tinggi dan berwarna kekuningan, sehingga untuk memutihkan dan mengurangi keasamannya, maka nata lembaran tersebut direndam di dalam air selama tiga hari dengan cara mengganti air rendaman setiap hari. Setelah itu nata lembaran kemudian dipotong menjadi ukuran lebih kecil (sekitar 1x1x1 cm) sehingga berbentuk dadu.


Pemotongan nata lembaran menjadi ukuran kecil (1x1x1 cm)

Potongan-potongan nata yang berukuran kecil tersebut ditiriskan selama 3 jam dan dicuci dengan air bersih, kemudian direbus sampai mendidih dan selanjutnya ditiriskan lagi selama 3 jam. Irisan nata yang sudah direbus dan ditiriskan selanjutnya dicuci dan dibuat adonan. Pembuatan adonan nata dilakukan dengan mencampurkan bahan-bahan dengan komposisi sesuai

Tabel 1. Komposisi bahan untuk adonan nata fruticans

Bahan	Satuan (*Unit*)	Volume atau berat
Nata	kg	10
Air	lt	10
Gula pasir	kg	4
Garam	gr	50
Asam sitrat	gr	25
Natrium benzoat (*Sodium benzoat*)	gr	12
Essence (Vanilla)	gr	125

Adonan nata direbus sampai mendidih dan selanjutnya dikemas. Pada pengemasan yang menggunakan wadah yang terbuat dari bahan kaca, misalnya stoples , maka adonan nata dapat dikemas dalam keadaan panas. Untuk pengemasan yang menggunakan wadah yang terbuat dari bahan plastik (cup plastik), adonan nata didinginkan lebih dahulu sebelum dimasukkan kedalam cup. Cup yang sudah berisi adonan kemudian ditutup dengan seal menggunakan alat pres Sealer machine. Nata yang sudah dikemas menggunakan cup selanjutnya dipanaskan (pasteurisasi) dengan cara merebus di dalam dandang/panci. Perebusan dilakukan dengan menggunakan panas yang agak rendah (kurang dari 100 °C) agar seal penutup kemasan tidak terbuka. Setelah dipanaskan sekitar 15 menit, kemasan nata dalam cup plastik dikeluarkan dari panci perebus dan dianginkan hingga bagian luar kemasan kering.


Produk Nata dalam kemasan stoples

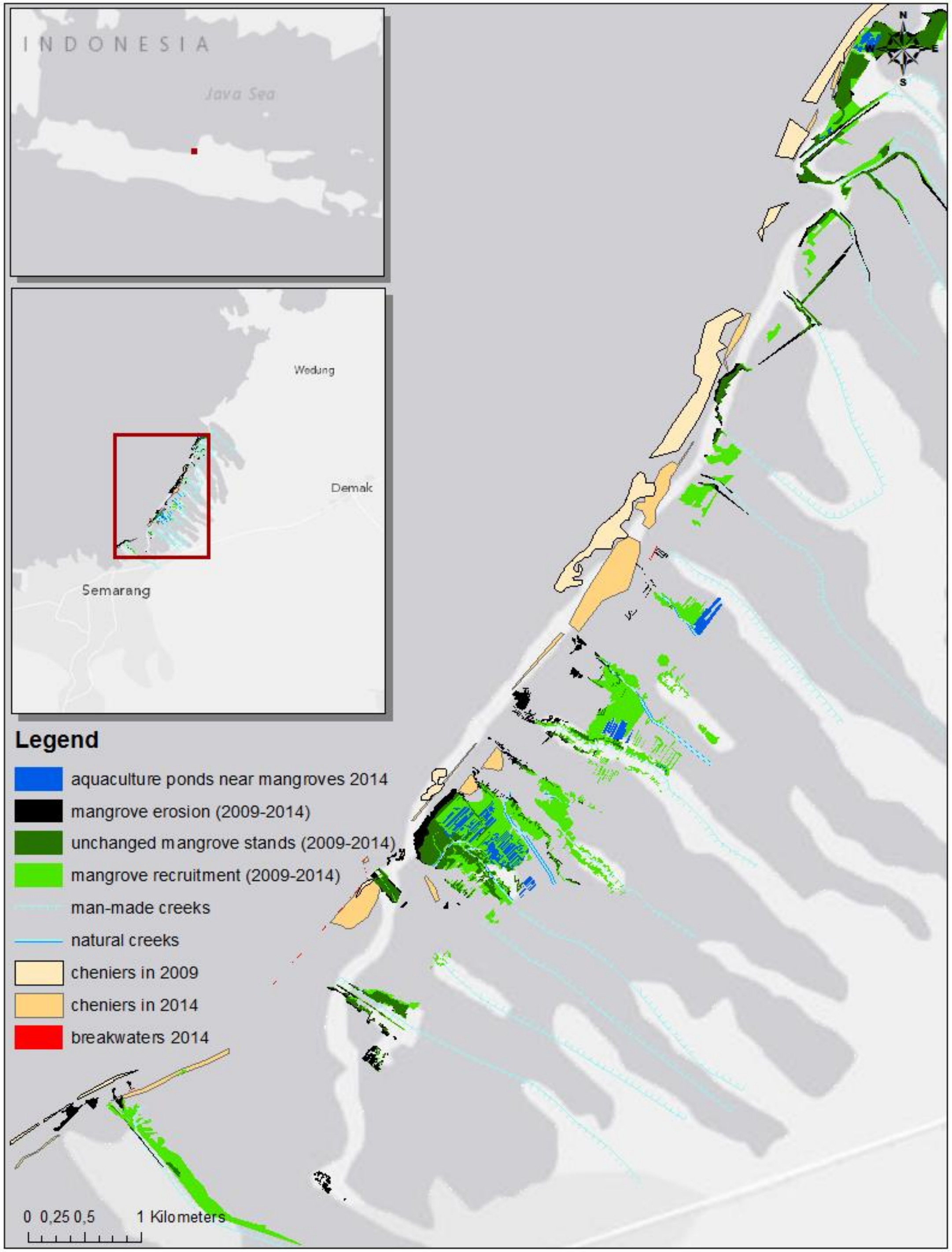

Produk Nata dalam kemasan cup plastik

Informasi lebih lanjut dapat menghubungi:

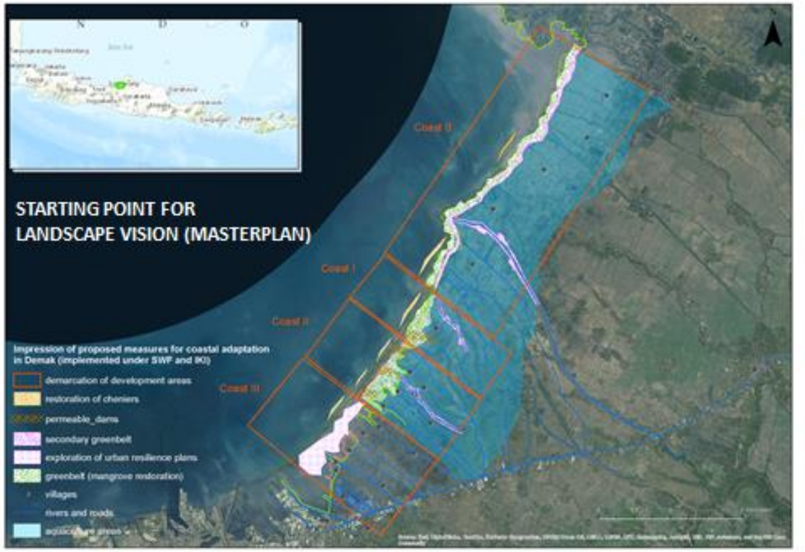
Balai Penelitian Kehutanan Makassar
Jl. Perintis Kemerdekaan Km. 16,5, Sudiang – Makassar.
Telepon: 0411-554049, Fax: 0411-554058

Teknologi Pengolahan Nira Nipah untuk Produk Nata Fruticans

KEMENTERIAN KEHUTANAN
BADAN PENELITIAN DAN PENGEMBANGAN KEHUTANAN
BALAI PENELITIAN KEHUTANAN MAKASSAR

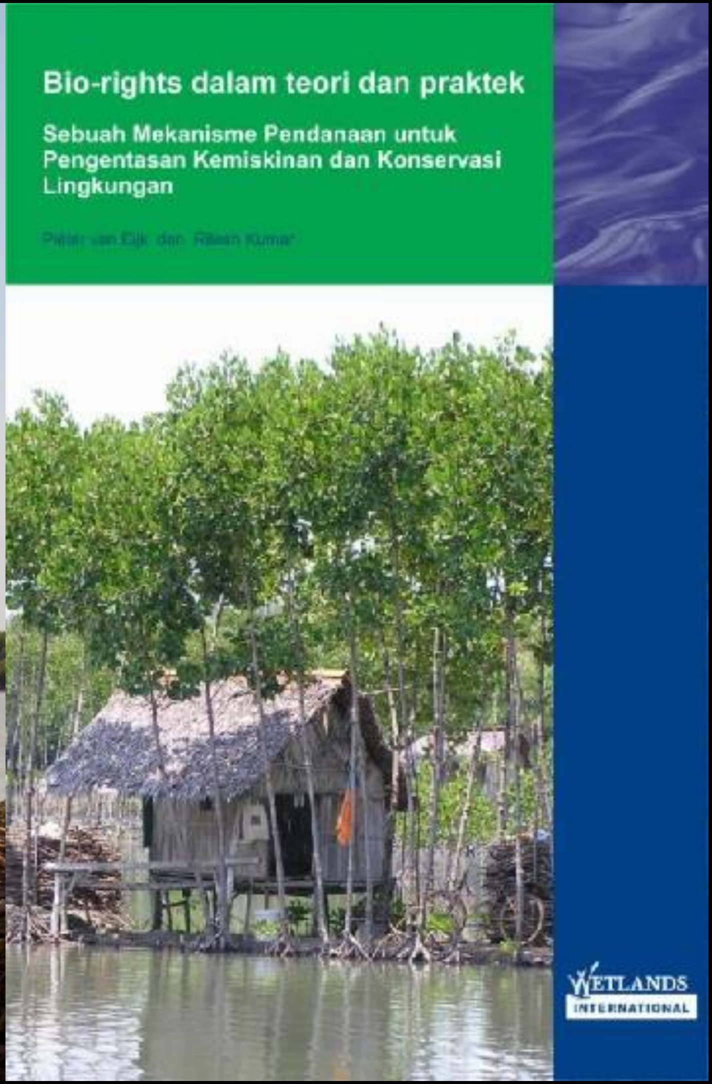


Type 3: Aquaculture Dominant System – Eroding/Subsiding (ex: Demak – Central Java)



Loss of biophysical and social rehabilitation capital


Research Need: Cost Analysis


Bio-rights dalam teori dan praktek
Sebuah Mekanisme Pendanaan untuk Pengentasan Kemiskinan dan Konservasi Lingkungan
WETLANDS
INTERNATIONAL

Research Need: Review of Erosion Control Methods

8.7.8 Erosion Control - Low Shell Breakwater
Site: Pelican Island, Sebastian, Florida, USA

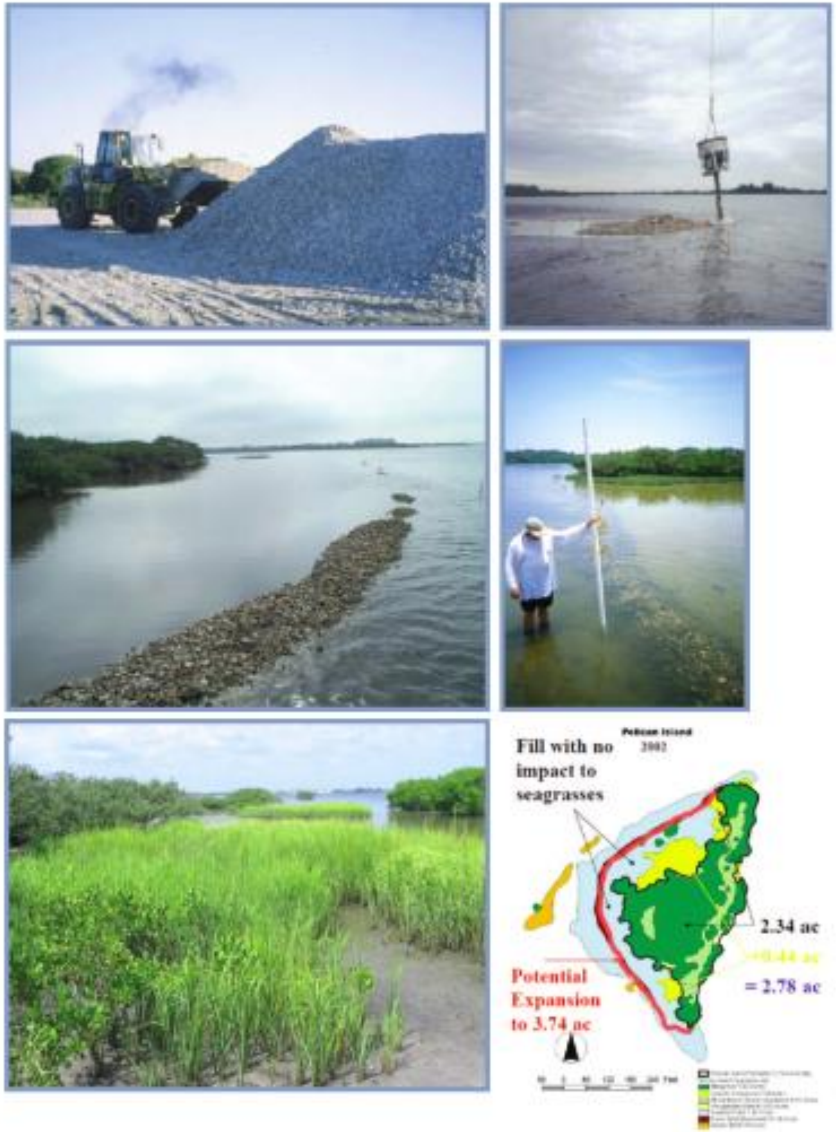
Overview: Pelican Island shrank by 50% over the past century and a half (2 ha to 1 ha), due to a mangrove die-off of the natural oyster bed protecting the island, and subsequent erosion, leading to lowered elevations. Capture of sediment was required, in order to re-establish mangroves.

A pair of activities took place in phases to rehabilitate mangroves. The first step included planting of smooth cordgrass and Rhizophora mangle at appropriate elevations, and the anchoring of oyster bags around stressing mangroves as an attempt to increase substrate elevation.

A second stage involved "cresting" a natural wave break off the NW (windward) side of the island. This was achieved by airlifting 250 cubic meters of oyster shell (weighing 450,000 lbs) with a helicopter and enhancing the natural "sand-bar, oyster reef." The resultant low-relief shell breakwater was permeable in nature, but reduced wave energy allowing for sediment deposition over time on the leeward side of the wall. (Figure 8.30).

Expansion to 1.3 ha of salt marsh and mangrove forest took place within 2 years after the intervention and totaled 1.5 ha within 4 years.

Fig: 8.30: Loss of mangrove and salt marsh coverage over time on Pelican Island (a). A low rock break-wall was constructed (airlifted by helicopter) in 2001 (b-d), resulting in the deposition of sediment on the lee side of the breakwall (e), and subsequent increase of mangrove and salt-marsh coverage (f-g).



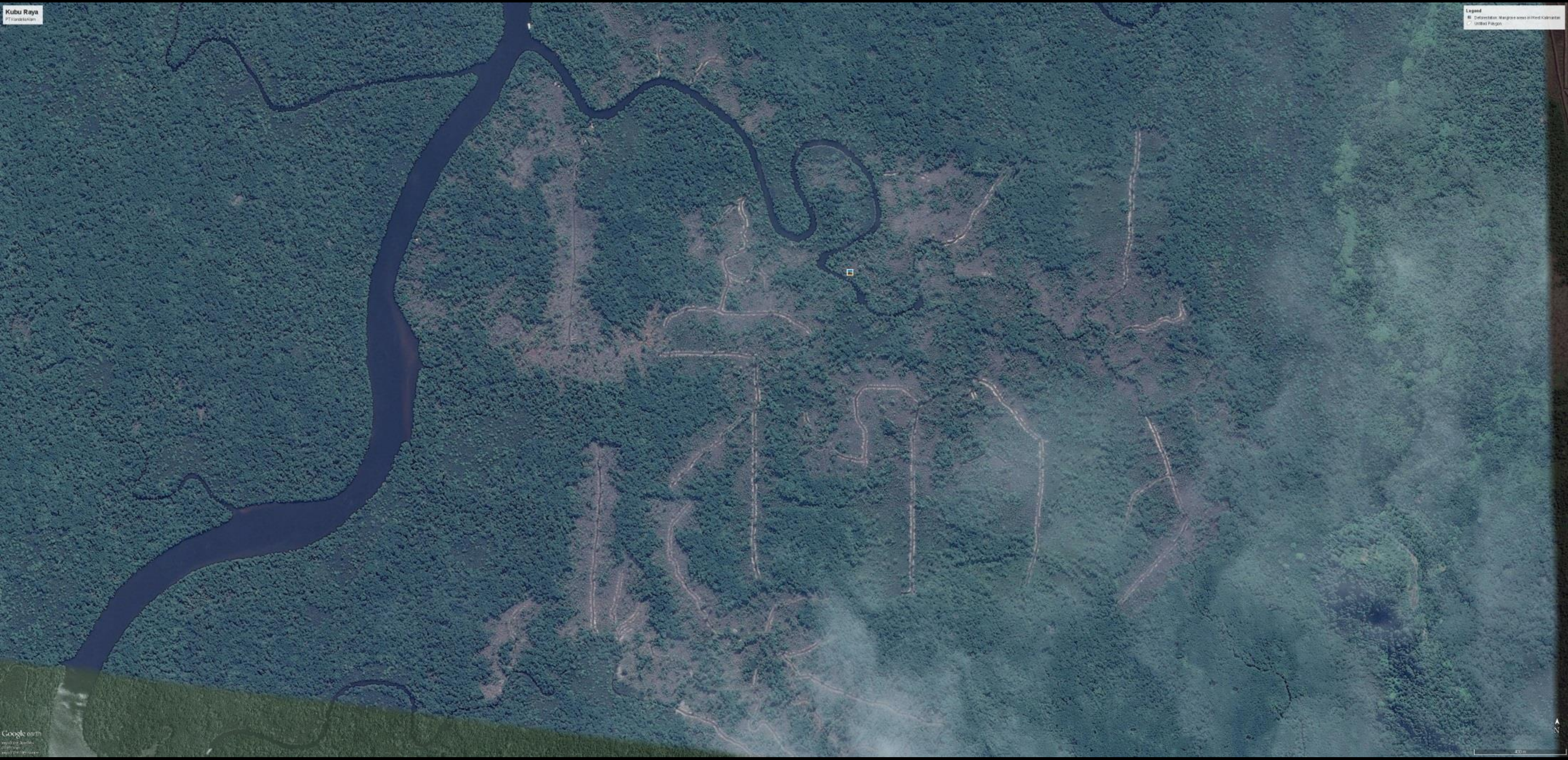
Hillsborough Bay, Tampa, Fla
Cargill Fertilizer Inc.

Type 4: Silvaculture landscapes


Bintuni Bay, West Papua


Kubu Raya, West Kalimantan

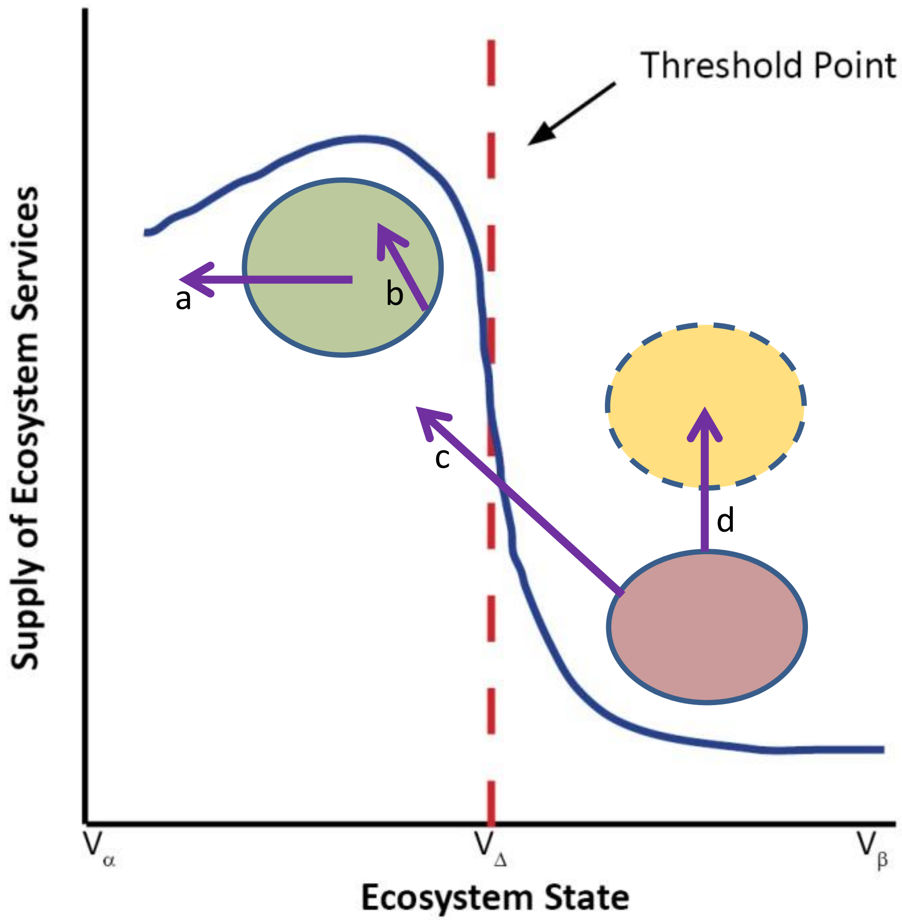
Harvest Canals – Change in Tidal Prism



Lewis III et al., 2016 – MPB

“Cryptic ecological degradation” (Dahdouh-Guebas et al., 2005a)

System Regimes v. Optimal States



V = LAI, Surface Elevation, % of floral diversity, etc.

a) Resilience building

b) Enhancement

c) Rehabilitation

d) Intentional transformation

Thank You

seagrassroots@gmail.com