TOWARD FUTURE MANAGEMENT OF MANGROVE IN MAHAKAM DELTA FMU, EAST KALIMANTAN

Deddy Hadriyanto

Center for Climate Change Studies,

The University of Mulawarman, Samarinda, Indonesia

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Introduction

Forested Wetlands– Why do we care?

- Forested wetlands provide critical ecosystems services to humanity
- Peatlands cover 3%of the Earth’s land area but contain about 30% of the planet’s soil carbon (C) and about 20%of the global terrestrial fixed C.
- Ecosystem C pools of tropical peat forests and mangroves are among the largest terrestrial C pools on Earth; some sites exceed 2000 Mg/ha.
- These unique ecosystems are especially vulnerable to loss via land use and climate change.

Ecosystem services of tropical wetlands – freshwater peat and mangroves

- Biological diversity
- Water quality and timing
- Flood and storm damage
- Forest and non-timber forest products
- Aesthetic and ecotourism values
- Fish and Shellfish
- Carbon Sinks (of great importance with respect to REDD+ and other mitigation strategies

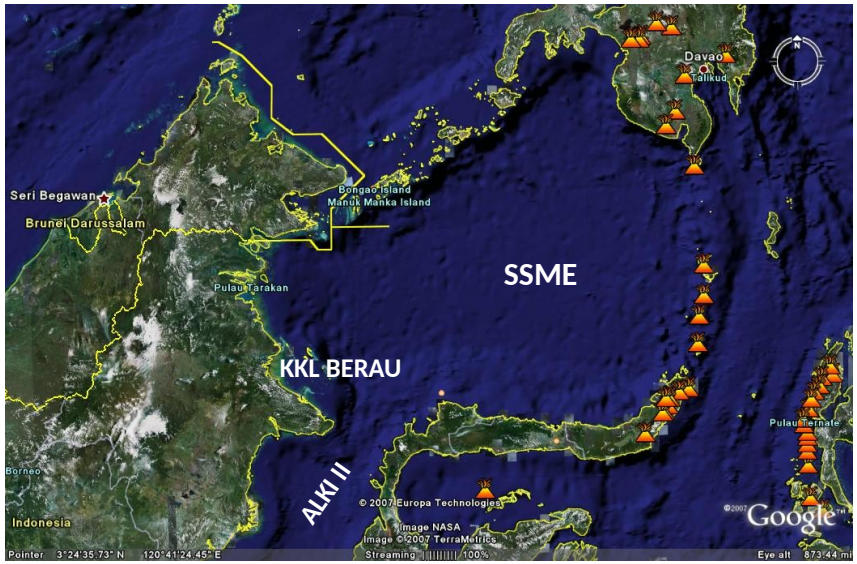
Vulnerability of tropical wetland forests: Issues of global concern

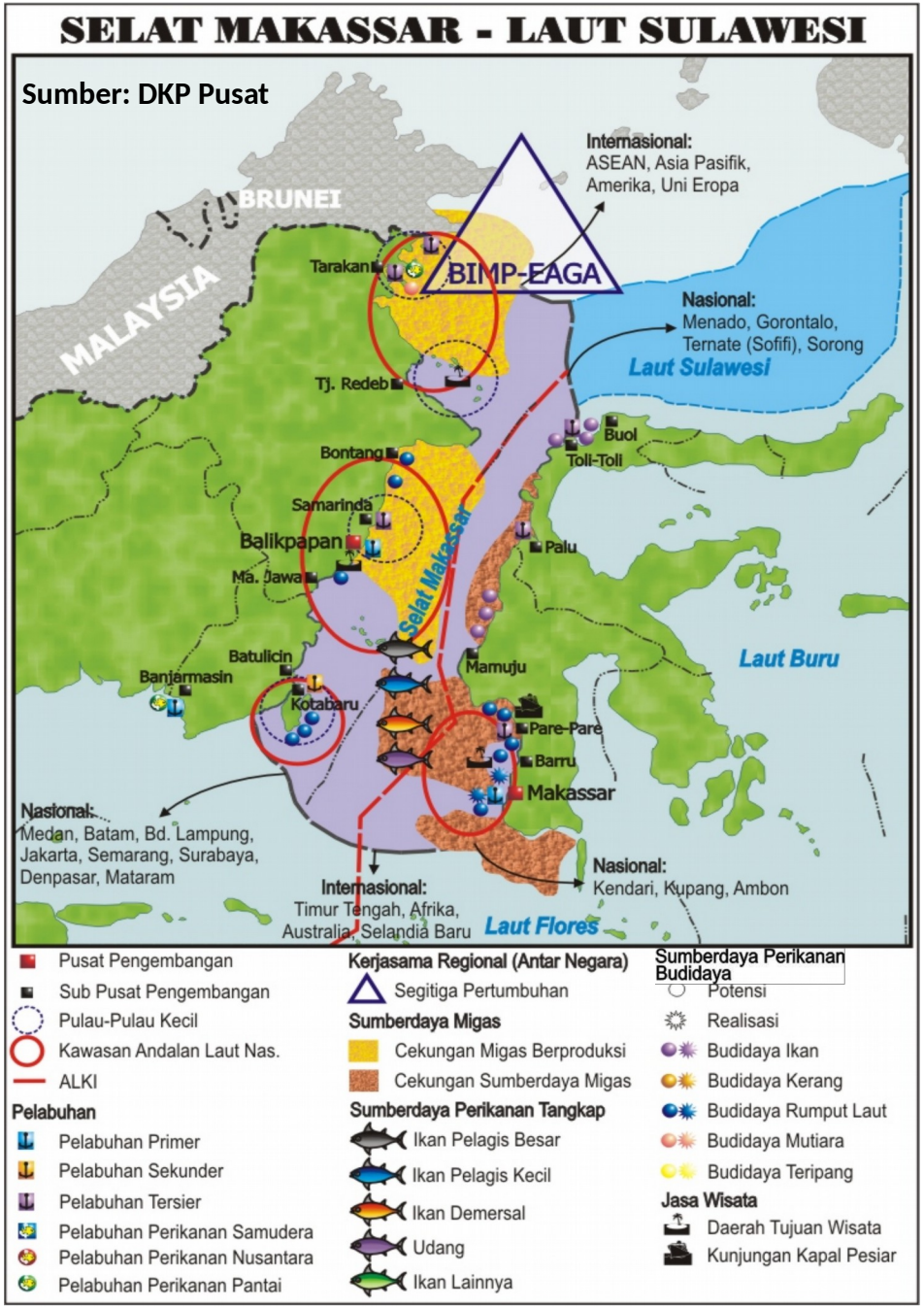
- Deforestation rates in Southeast Asia tropical forests are among the highest in the world.
- Annual deforestation rates as high as 8% are occurring in mangroves and as high as 2.2% in peat forests.
- Shifts in climate or land uses that result in the shift of wetland forests from sources to sinks is a significant global climate concern.
- Sea level rise, changes in ENSO, ppt patterns, and other effects of climate change may disproportionately affect wetlands
- Mahakam Delta is one of the largest delta and heavily deforested area.

Mahakam Delta
Kalimantan Timur
Indonesia

STRATEGIC ZONES

- ALUR LAUT KEPULAUAN INDONESIA II (ALKI II) – INTERNATIONAL CONTIGOUS ZONE
- ECONOMIC EXCLUSIVE ZONE (EEZ)
- SULU-SULAWESI MARINE ECOREGION (SSME)
- BORDER ZONE
- BERAU MARINE CONSERVATION AREA (BERAU MPA)
- NATIONAL PRODUCTIVE FISHING ZONE
- OIL AND GAS PRODUCTION ZONE





Three sub-district (Muara Jawa, Anggana dan Muara Badak) in Mahakam Delta FMU

No	Kecamatan	Desa di dalam KPHP		Luas desa di dalam KPHP Delta Mahakam	
				Ha	%
1.	Anggana			14.481,42	12,75
		1.	Tani Baru	12.859,95	11,32
		2.	Muara Pantuan	33.170,24	29,21
		3.	Sepatin	15.476,74	13,63
		4.	Kutai Lama	8.665,45	7,63
		5.	Handil Terusan	205,05	0,18
		6.	Anggana		
Jumlah 1				**84.808,94**	**74,73**
2.	Muara Badak	1.	Saliki	11.550,67	10,17
		2.	Muara Badak Ulu	1.296,08	1,14
		3.	Salo Palai	1.516,87	1,34
Jumlah 2				**14.363,62**	**12,65**
3.	Muara Jawa			12.861,56	11,33
		1.	Muara Kembang	603,30	0,53
		2.	Muara Jawa Tengah	336,41	0,30
		3.	Muara Jawa Ulu	529,92	0,47
		4.	Muara Jawa Pesisir		
Jumlah 3				**14.331,19**	**12,62**
	Jumlah 1 + 2 + 3			**113.553,66**	**100,00**

Sumber: Hasil Analisis Peta Administrasi Desa dan Kecamatan di Kabupaten Kutai Kartanegara, 2016

MAHAKAM DELTA FMU

Geographic position:

Latitude : 0°21’21” S - 1°10’06” S
Longitude : 117°15’40” E - 117°40’43” E

NUMBER OF VILLAGES: 11 VILLAGES

TOTAL DISTRICT AREA : 225.573 ha

DELTAIC PLAIN AREA : 107.222 ha

POND AREA : 59.912 ha

Bappeda Kab. Kutai Kertanegara

Hystorical of deforestation and degradation

ESTIMATION OF MANGROVE DEFORESTATION AT THE MAHAKAM DELTA

1986	1992	1996	1998	1999	2000	2005
< 500	3.700	15.000	18.000	67.000	85.000	>85.000

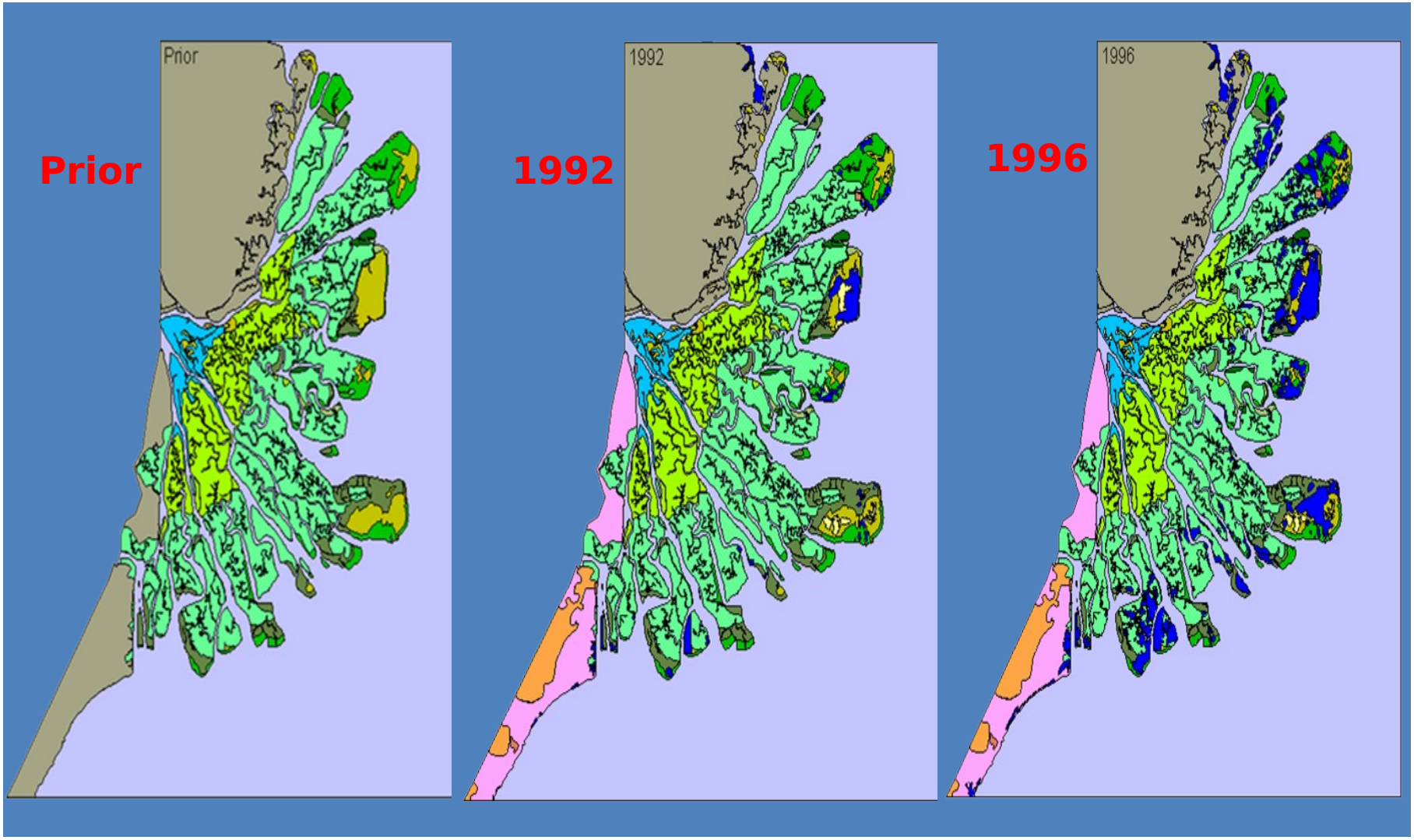
Remaining mangroves

2003

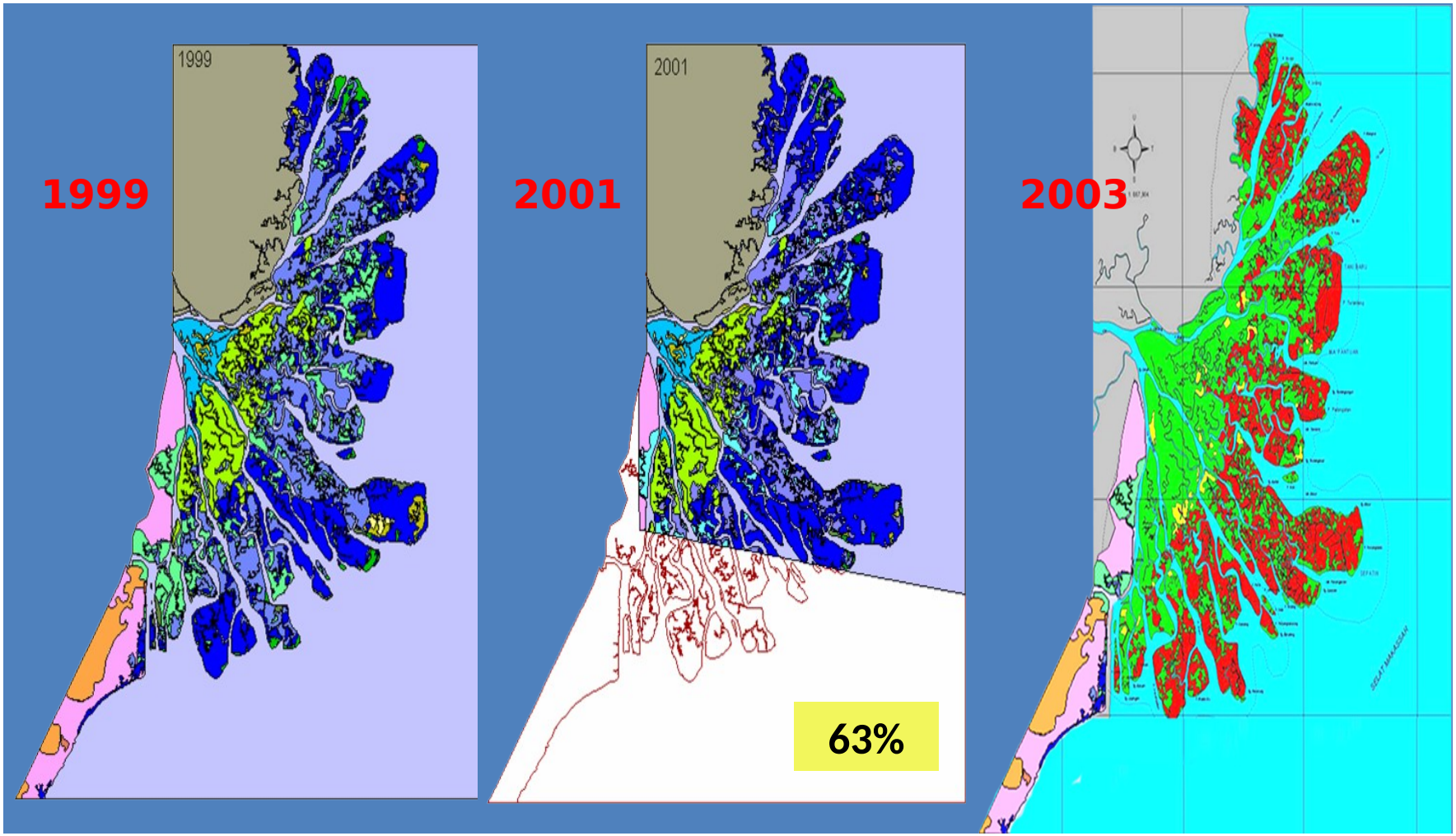
- 60,818.4 ha (Noryadi et al., 2006)

2006

- 47,513.75 ha (Dinas Perikanan dan Kelautan Kab. Kukar, 2008) ± 44% of the delta

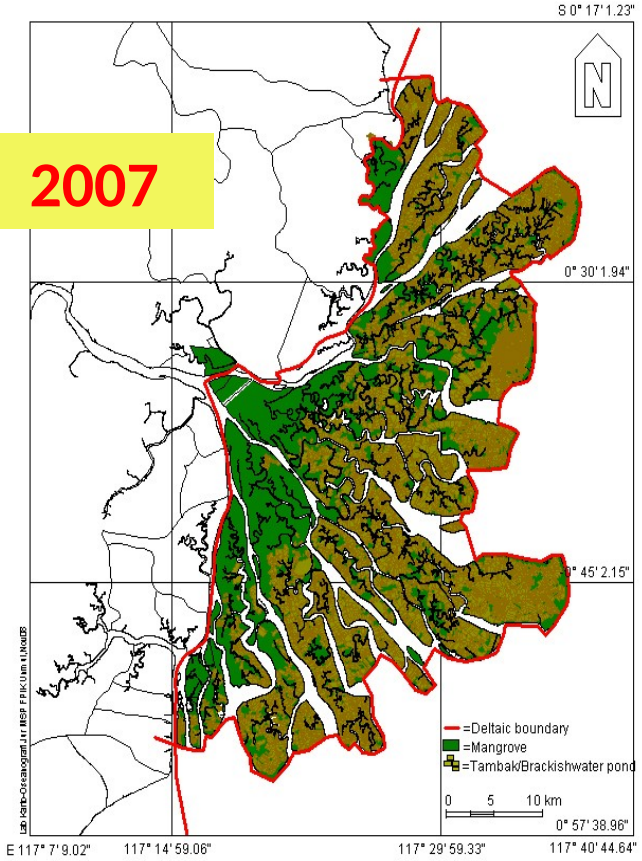


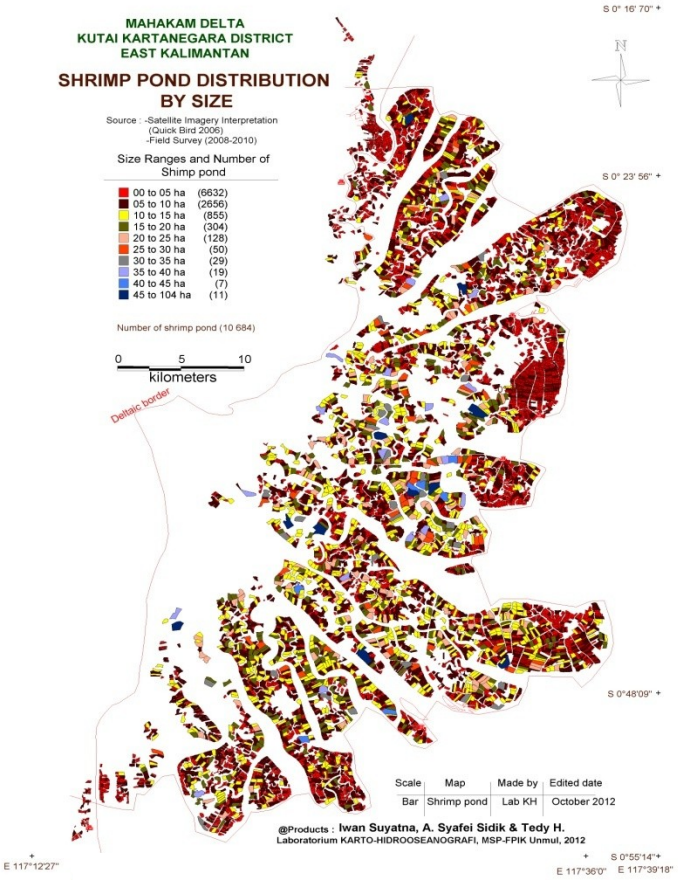
The changes of mangrove ecosystem by years in Mahakam Delta (Bourgoeis *et al*., 2002)
(blue colour – shrimp ponds development)



Changes of mangrove ecosystem by years in Mahakam Delta years 1992-2001 (Bourgeois *et al*., 2002); and year 2003 (Noryadi *et al*., 2006)

(bule and red – shrimp ponds development)





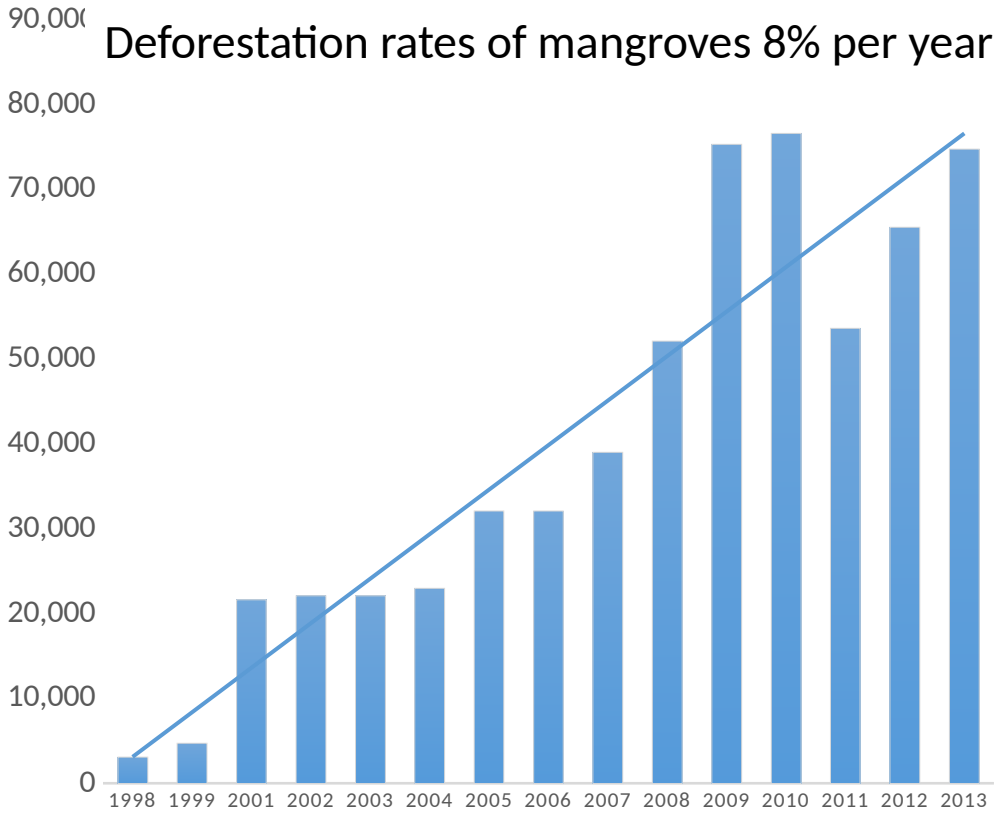
54%

Deltaic area: 107,222 ha ; Pond area: 59,912 ha
Number of ponds: 10,645; Mean pond size: 5.4 ha

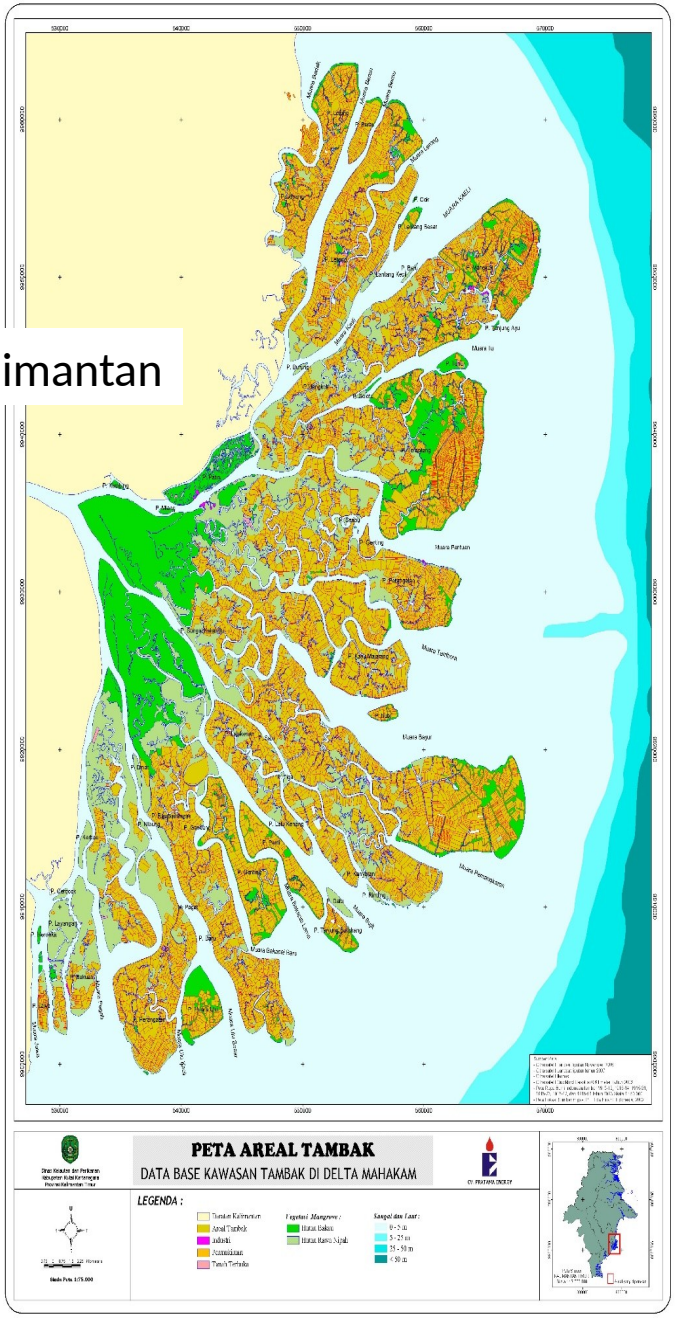
Shrimp ponds occupied 54% vegetative area of the deltaic plain of Mahakam Delta from Quick Bird Image 2007 (Digitized by FPIK-Unmul, 2008; green – vegetation; yellow – ponds)

Shrimp ponds development in the Mahakam delta, East Kalimantan. Indonesia

Deforestation rates of mangroves 8% per year in Kalimantan



Total deforested mangrove area by 2001 reached 75,000 ha or about 80% of the total delta area

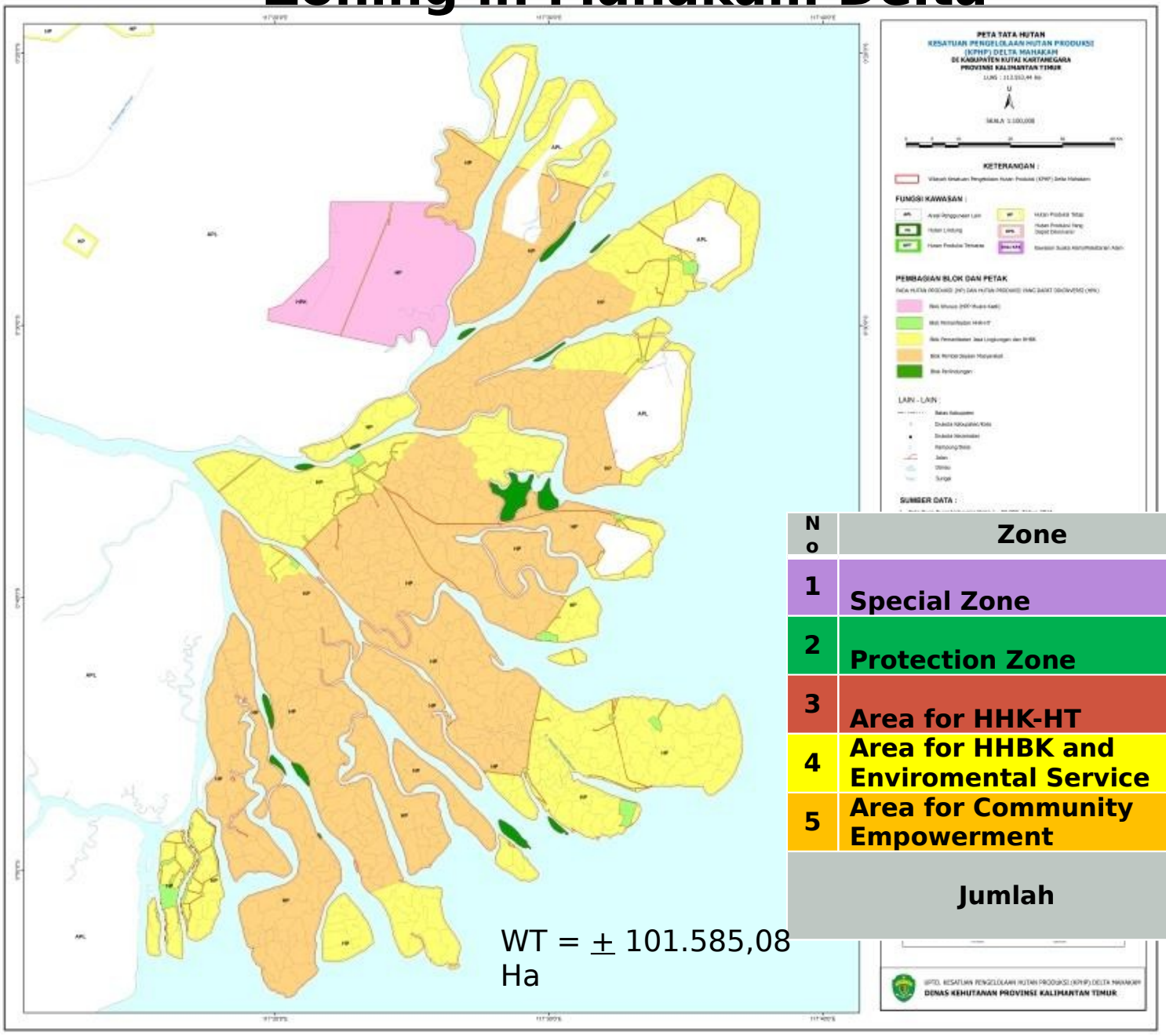


Land use in Delta Mahakam FMU

No.	Tutupan Lahan (Landcover)	Luas Ha	Luas %
1.	Bush Vegetation	216,01	0,19
2.	Swamp Bush	10.432,23	9,19
3.	Primary Forest	388,54	0,34
4.	Secondary mangrove	25.429,89	22,39
5.	Secondary swam (Hutan Rawa Sekunder)	6.264,27	5,52
6.	Plantation Forest	102,47	0,09
7.	Mineral land agriculture	482,43	0,42
8.	Open area	881,66	0,78
9.	Mixed agriculture area	3.002,46	2,64
10.	Settlement Area	122,31	0,11
11.	Farming Area	1.032,65	0,91
12.	Ponds	61.506,67	54,17
13.	Mining area	58,83	0,05
14.	Water body	3.608,92	3,18
15.	Swamp Area	24,32	0,02
	Jumlah Besar	113.553,66	100,00

Sumber : Analisis Peta Tutupan Lahan Propinsi Kalimantan Timur (BPKH Wil. IV Samarinda), 2016)

Zoning in Mahakam Delta



WT = ± 101.585,08 Ha

No	Zone	Luas (ha)
1	Special Zone	8.791,20
2	Protection Zone	1.251,44
3	Area for HHK-HT	1.925,94
4	Area for HHBK and Enviromental Service	35.652,75
5	Area for Community Empowerment	65.932,33
	Jumlah	113.553,66

Rehabilitation of Mahakam Delta: Role of Social Forestry

Initial problem

- No restriction of aquaculture since early time of deforestation
- Economic interest dominate the investor compared to environment issue
- Local government has no control to the development of shrimp ponds and other infrastructure
- Rapid population increase from outer Kalimantan, contributing more deforestation

Effort combating problems in Delta Mahakam FMU :

Intensive socialization to unify the perception and commitment of Mahakam Delta Role:

- Prawn pond holder and policy makers to establish cooperation
- Ecological approach to restore the cultivation of the ponds, such as green zone
- Community are not eligible to own the area,
- Land rezoning and avoid conflict
- Rehabilitation and reforestation
- Apply social forestry

SOCIAL VULNERABILITY

1. CONFLICT OF LAND OWNERSHIP
2. CONFLICT OF AUTHORITY
3. SOCIAL CONFLICT
4. CONFLICT OF IDENTITY

FRAGILE LIFE

CHILDREN WORKERS

SUBSISTENCE FISHERIES

GENDER INVOLVEMENT

UNTIL ELEMENTARY SCHOOL

GENERAL FEATURES OF COMMUNITY LIVELIHOODS IN THE MAHAKAM DELTA

Desa Saliki Kec. Muara Badak

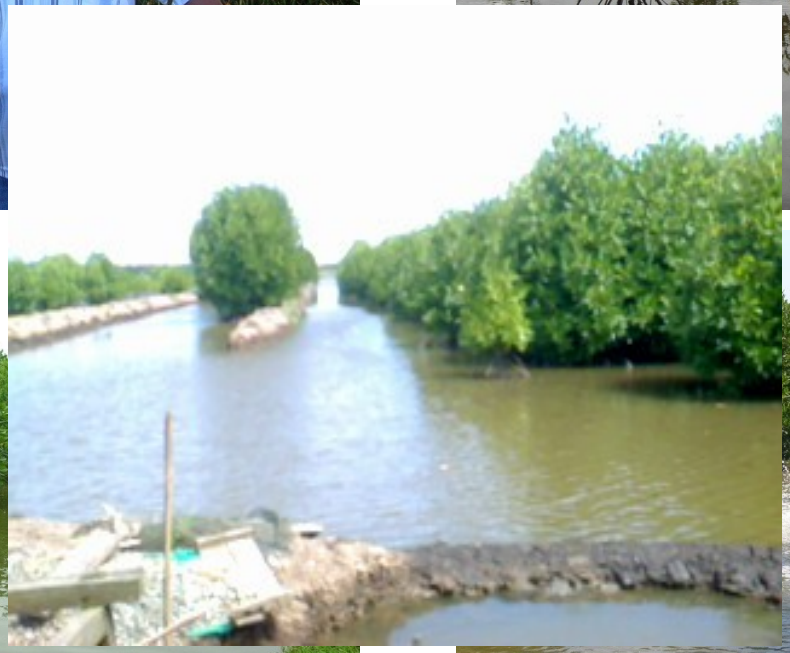
Desa Tani Baru Kec. Anggana

Sodalization of Rehabilitation

Desa Sepatin Kec. Anggana

Desa Muara Pantuan Kec. Anggana

Preparation Activities for Regeneration



SECTORAL EFFORTS TO RESTORE THE MANGROVE ECOSYSTEM THROUGH SILVOFISHERY

POND-MANGROVE IN MUARA JAWA

MANGROVE REPLANTING IN MUARA PANTUAN, MUARA BADAK DAN ANGGANA

Fishpond Silvofishery

SOSIAL CONFLICT SOLUTION

Summary

1. Mangrove has exceptionally large Carbon stocks and C sinks
2. Mahakam delta has high rates of land conversion and degradation
3. Develop an intensive communication with the local community
4. High deforestation and forest degradation
5. Critical ecosystem services both globally and locally
6. Need further approach in rehabilitating mangrove

SUGGESTION (1)

1. Need to develop a special task force with integrated management Program for Climate Change Adaptation and Mitigation , need coordination across various government institutions
2. Stakeholders involve local government, NGO, local community, academicians, private companies, central government, and international institutions.
3. Reducing the vulnerability and exposure of local communities to the effects of coastal erosion, sea level rise and degradation of mangrove forests;
4. Building the socio-economic resilience of local households and communities through enhancement and development of aquaculture livelihood systems and supporting seafood processing activities;

SUGGESTION (2)

5. Clarify land status, create another type of land management (not ownership)
6. Support local community and authorities in their efforts to sustainably manage the delta (Integrated Coastal Zone Management, ICZM) and relate to food security of the local community (rice, sugarcane, corn and pastoral activity)
7. Contribute to climate change mitigation through carbon storage (reforestation) and carbon stocks management (protection and conservation of natural mangrove forests)
8. Conduct research programs with Indonesian and international universities and share the lessons learned with other projects in the ASEAN region