Mangrove forests and conservation their services in the Coral Triangle Eco-region, Southeast S esi, Indonesia

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INTRODUCTION

Mangroves are among the most important biodiversity in the coral triangle eco-region, and play very important role as "blue carbon and nutrients sources" in the coastal zones.

About 3 million hectares of mangrove forest grow along Indonesia's coastline. This is 23 percent of all mangrove ecosystems in the world (Giri et al., 2011).

INTRODUCTION

Southeast Sulawesi

Southeast Sulawesi is center of CTE, and mangrove forests cover about 74.384,82 Ha (BP DAS-Sampara, 2007)

Mangroves forests support the existence of several conservation sites :
Rawa Aopa Watumohai National Park, Tiworo Archipelago,
North Buton wildlife conservation area, and Wakatobi Marine Nasional Park

Enhances coastal productivity

Provide several goods for local community life

1. Rapid degradation of mangroves forests (about 23.708,04 ha or 31.89%) due to land conversion for aquaculture (BP DAS-Sampara, 2007)

Land-use change (2003 - 2013)

Landsat7 ETM+ (19.May/2003)

Landsat8 (20.Apr/2013)

Light green:	Mangrove
Transparency:	Fish pond
Yellow:	Grass land
Blue:	Creek and ocean

	2003	2013
Fish pond	258.75km^2	549.18 km^2
Mangrove area	708.03km^2	459.54 km^2

2. Sedimentation and pollution

SOLUTION

1. Management of ex-ponds or unproductive ponds areas

2. Artificial revegetation on degraded mangroves areas

I Turner

Young mangrove trees planted on Rodrigues Island as part of a large scale forestry programme in the late 1990 s to stabilise sediment movement and increase fish nursery areas.

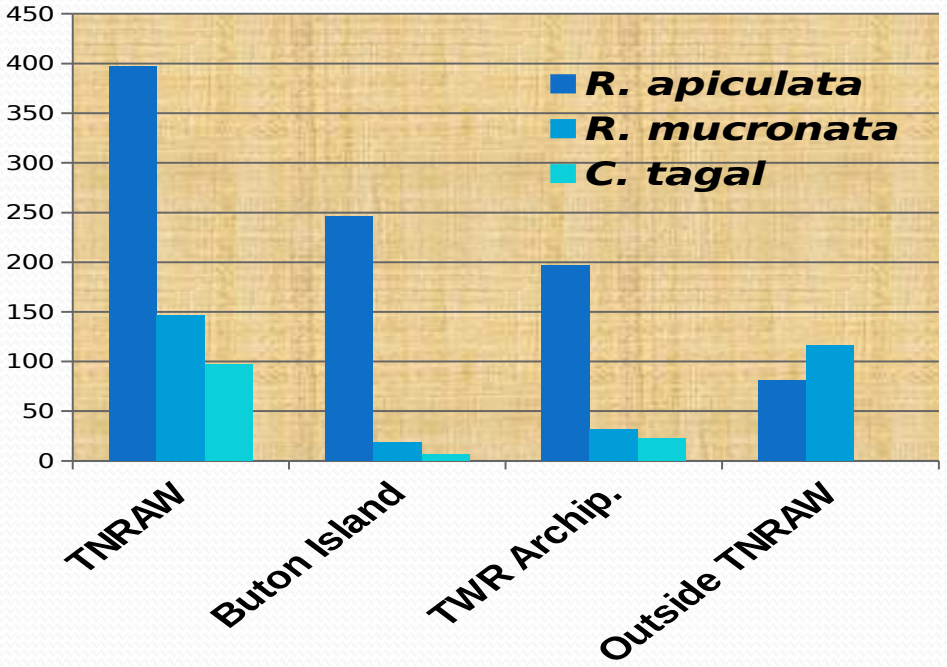
Solution 3. Management of natural regenerated

Solution 4. Conservation of natural mangrove

Aboveground Biomass stocks SE:

R. apiculata **stands (615.60 ton/ha)**
R. mucronata **stands (452.25 ton/ha)**
R. stylosa **stands (326.61 ton/ha)**
L. racemosa **stands (109.77 ton/ha)**
C. tagal **stands (162.61 ton/ha)**
(Analuddin et al. 2015; 2016)

Blue carbon stocks (ton/ha),
Analuddin et al. 2016



Solution 5: Conservation of mangroves services

Support local community life



Support coastal productivity

Annual litter production (ton ha-1 yr-1) 14.412 for *R. apiculata*, 13.161 for *R. mucronata*, 10.811 for *L. racemosa*, 13.678 for *C. tagal* and 12.62 for *R. stylosa* stands.

Bio filter of coastal pollutant: Mangrove have high capacity to accumulate heavy metals pollutant

- Habitat and food source for endemic ani mal of Anoa (Andi et. al. 2016, MAB)


Support various birds (33 species, Jamili et al. 2014)

Solution 6:
INOVATION FOR NEW POTENTIAL USES OF MANGROVES

1. **Bio-prospect of mangroves as antioxidant source in Southeast Sulawesi**
   (Tannin, anthocyanin, alkaloids, Vitamin C, Andi et al. 2016, MAB Journal))

2. Green tea material from mangrove leaves SE

Mangroves	Cathechin (%)	Simple Polyphenol (%)	Flavonoid (%)	Tea-flavin (%)	Reduction of Anthy-cholesterol (%)
Ceriops tagal		2.97			50,33
R. apiculata	0.81	4.81			
B. parviflora		10.27		0.6	53,67
B. gymnorrhiza		8.21	1.62		
R. stylosa		7.07	0.73		52,33
R. mucronata	1.14	6.41			42,33
Lumnitzera racemosa	1.71	6.81			33,33
Ceriops decandra	1.83	5.58	1.13		49,33

Mangroves might be high possibility as sources of antioxidant and green tea material of anthycholesterol (Andi Septiana and Analuddin, 2016)

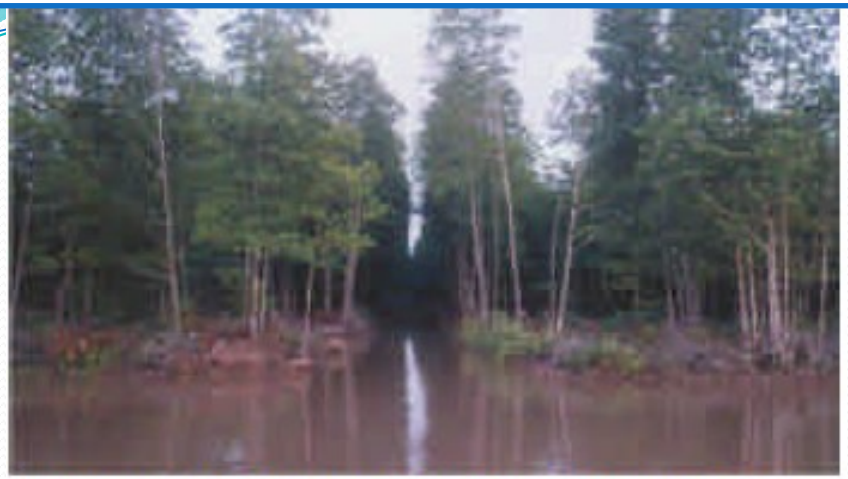
INOVATION OF MANGROVES FRUITS AS NUTRITIONAL SOURCE

The six food produced from mangrove fruits-based, such as *pia apapi*, *dodol munto*, sweet *munto* stick, salty *munto* stick, *Soneratia* crackers and munto flour.
These products were made from three mangrove species *Avicennia alba* (apapi), *Bruguiera gymnorrhiza* (Munto), and *Sonneratia alba* (**BADERAN et al. 2015)**

Recommendation 1:

SAVE MANGROVES FOR FUTURE GENERATION

Recommendation 2.
Management of mangroves for sustainable aquaculture system



Mangrove-hatchery shrimp farming system in Ca Mau province

Mud crab is stocked with shrimp in mangrove areas in Ca Mau province

Recommendation 3.
Development of mangroves as ecoturism sites

Mangrove forests as ecoturisms activities :

Educational

Research

Recreation

Recommendation 4: Establishment of Local, National, Regional and International Collaborations

International research collaboration :

Prof. Dr. Kazuo Nadaoka, Dr. Atsushi Watanabe, Dr. Takashi Nakamura Tokyo Inst. of Technology, Japan

International research collaboration :

Dr. Reich McKenzie (US Forest Service) and Dr. Sahadev Sharma, Hawaii University, Hawaii, USA)

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