



UNFCCC COP22 Japan Pavilion Side Event



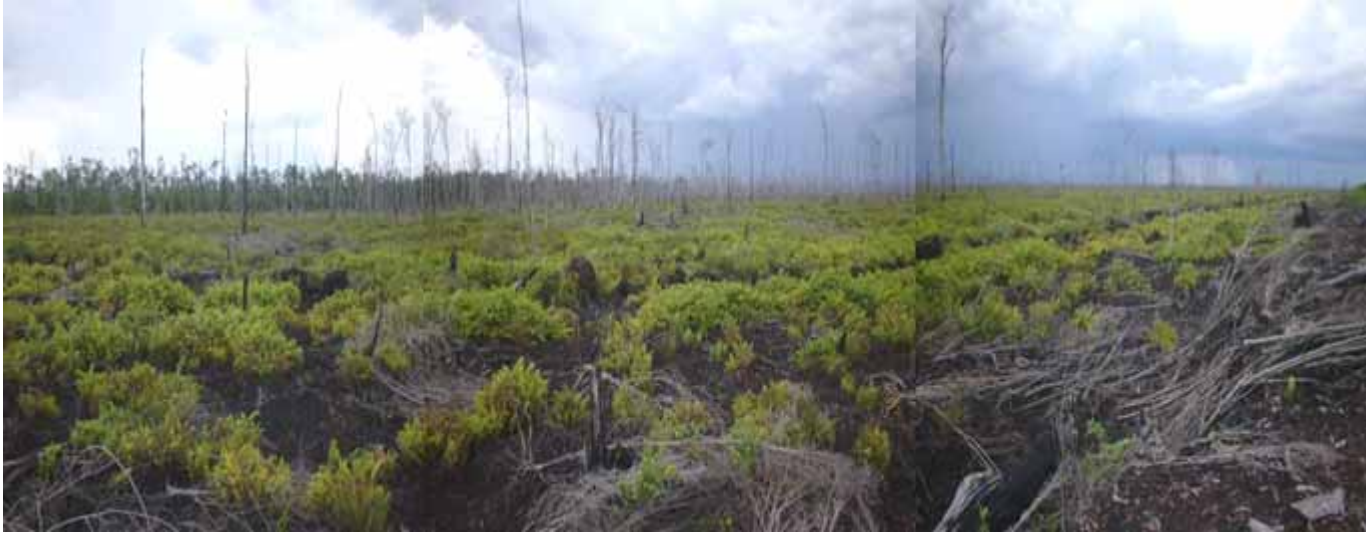
Challenges for Peatland Restoration

~Cooperation between Indonesia and Japan~

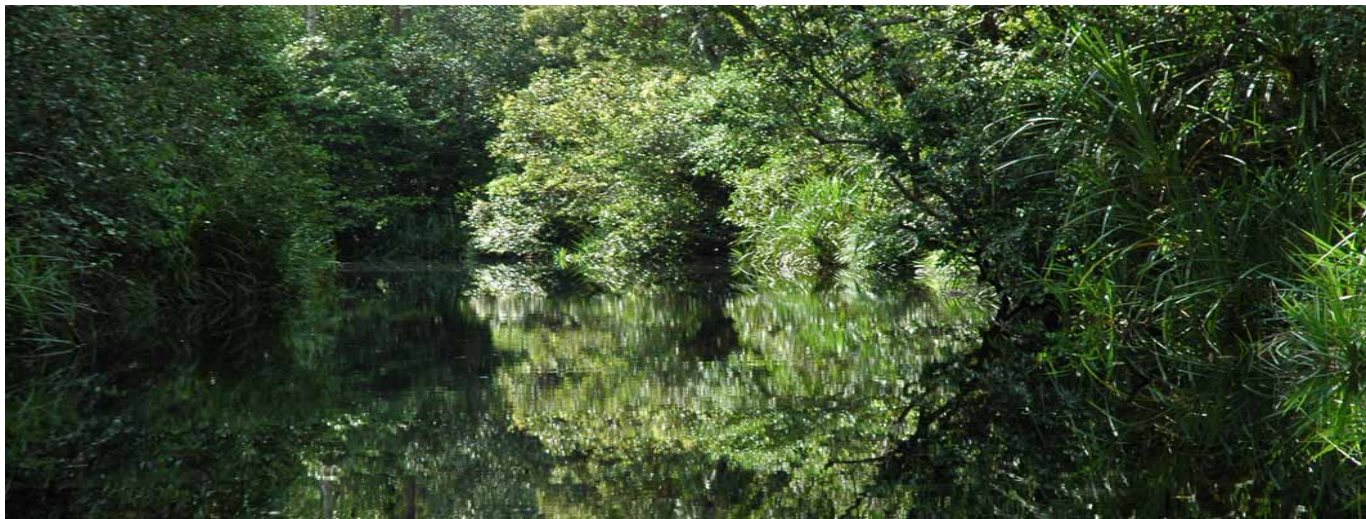
Co-Organized with Peatland Restoration Agency, Japan International Cooperation Agency (JICA)

“Peatland Monitoring” for Peatland Restoration

Prof. Mitsuru Osaki:
Research Faculty of Agriculture, Hokkaido University
President of Japanese Peatland Society



**Collaborated among Hokkaido University-
JICA- Indonesia Institutions**



Main Project Sites

• JSPS Core University Program (1997-2006):

Environmental Conservation and Land Use Management of Wetland Ecosystem in Southeast Asia

• JST-JICA Project (SATREPS) (2008-2014):

Wild Fire and Carbon Management in Peat-Forest in Indonesia

• JICA Project as follow-up of SATREPS (2015-2016):

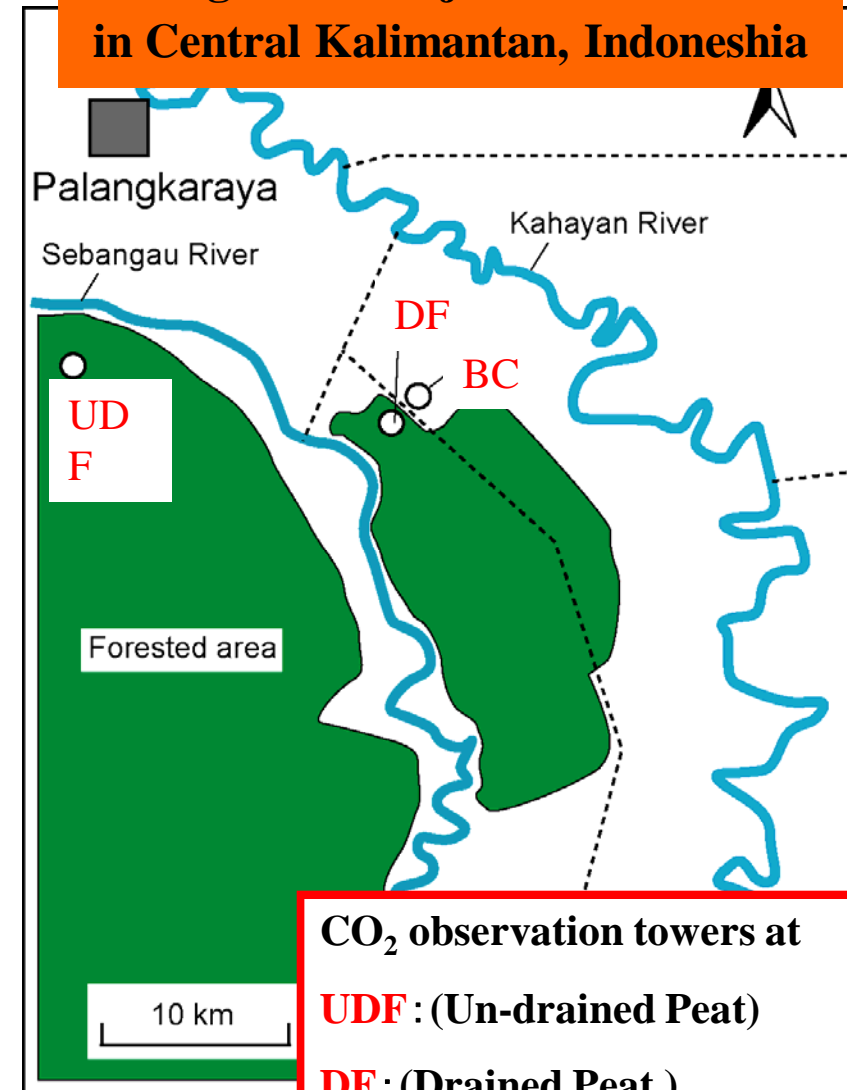
Formulation of a Manual and Trial Calculation of GHG Emission from Peatland in Central Kalimantan



Various Study Topics:

- **GHG Flux (CO_2 , CH_4 , N_2O) measuring**
- **Fire Detection and Protection**
- **Water Table Monitoring and Management**
- Peatland Ecology
- Soluble Carbon Monitoring
- Peatland Subsidence Monitoring

Mega Rice Project of Peatland in Central Kalimantan, Indonesia



CO₂ observation towers at

UD : (Un-drained Peat)

DF : (Drained Peat)

BC : (Burned Peat)

Mitsuru Osaki · Nobuyuki Tsuji *Editors*

Tropical Peatland Ecosystems

 Springer

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Tropical Peatland Ecosystems

Editors: **Osaki**, Mitsuru, **Tsuji**, Nobuyuki
(Eds.)

Parts: 9

Chapters: 41

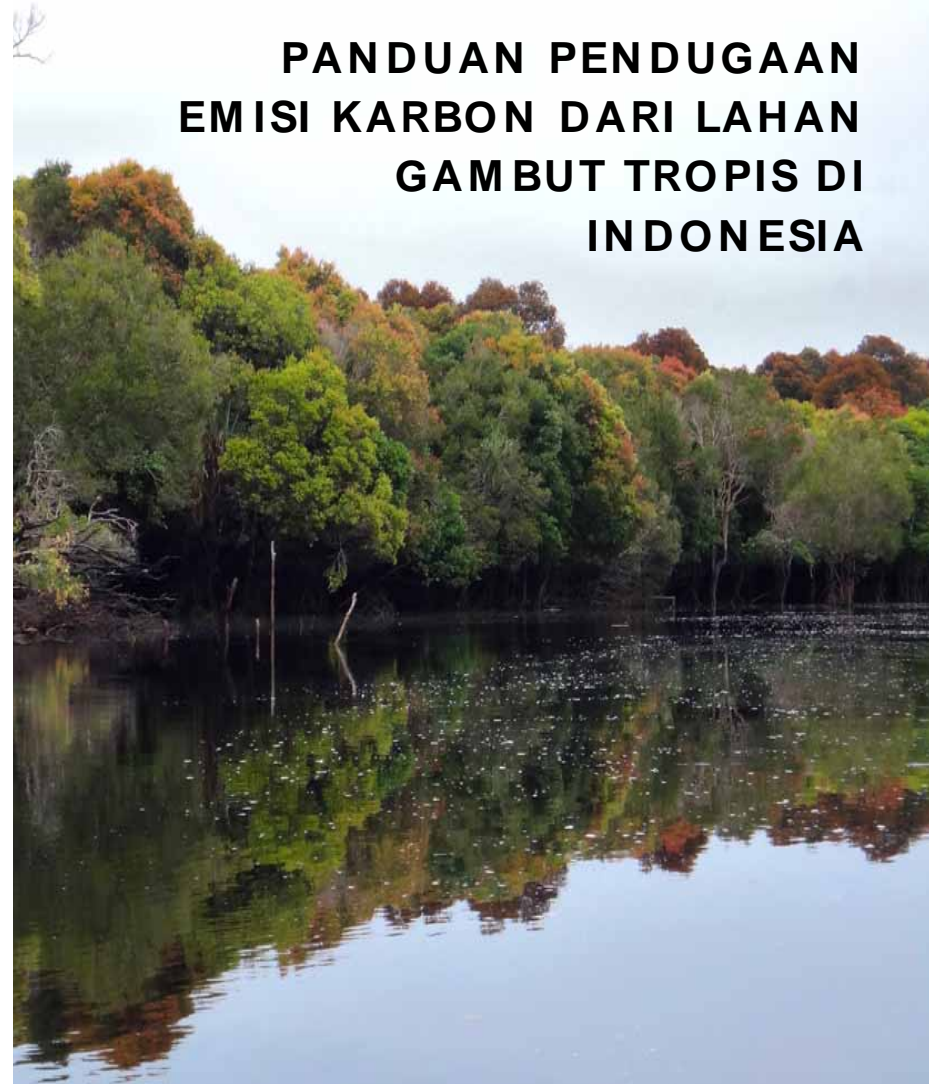
Pages: 651

Authors: 160

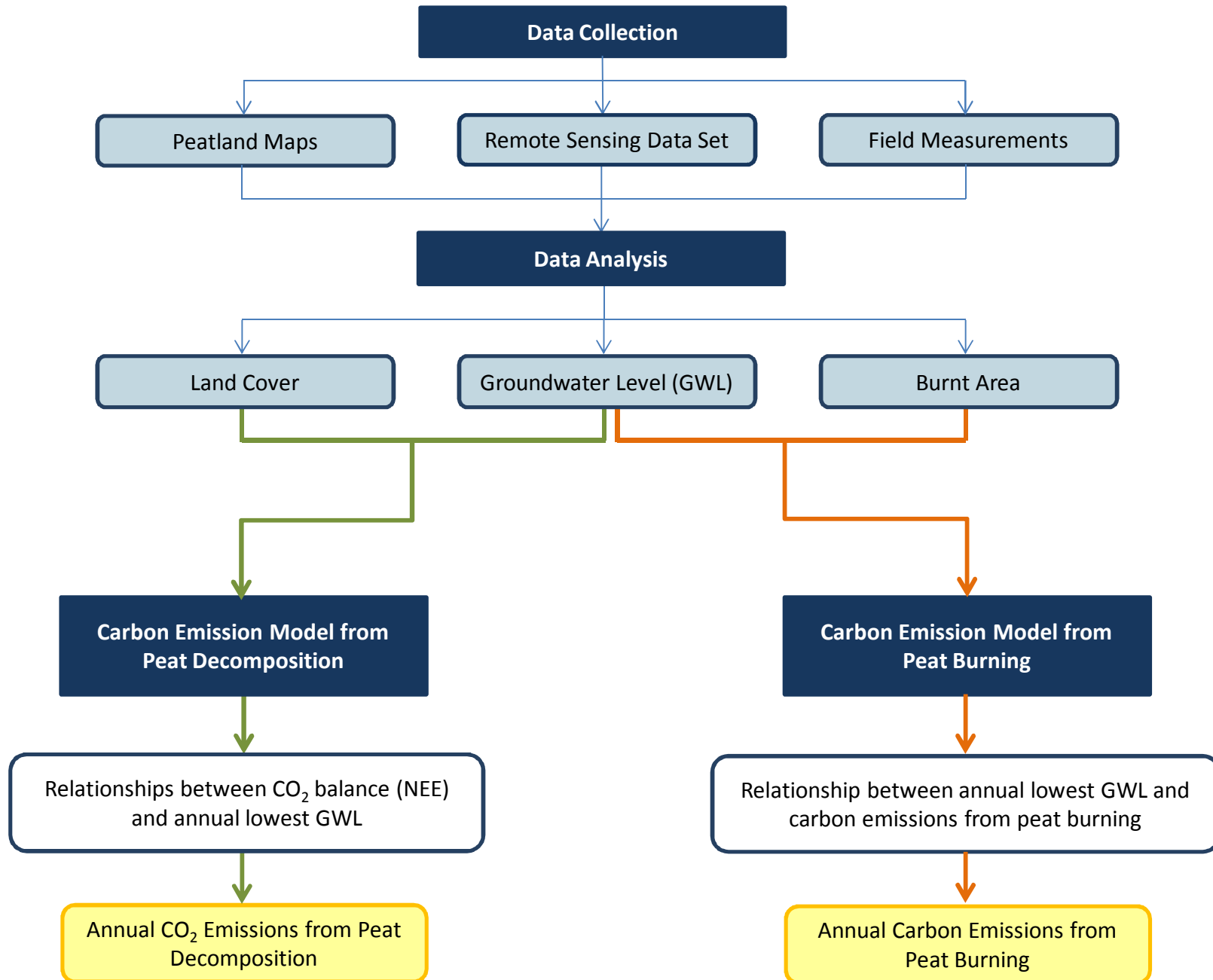
GUIDEBOOK FOR ESTIMATING CARBON EMISSIONS FROM TROPICAL PEATLANDS IN INDONESIA



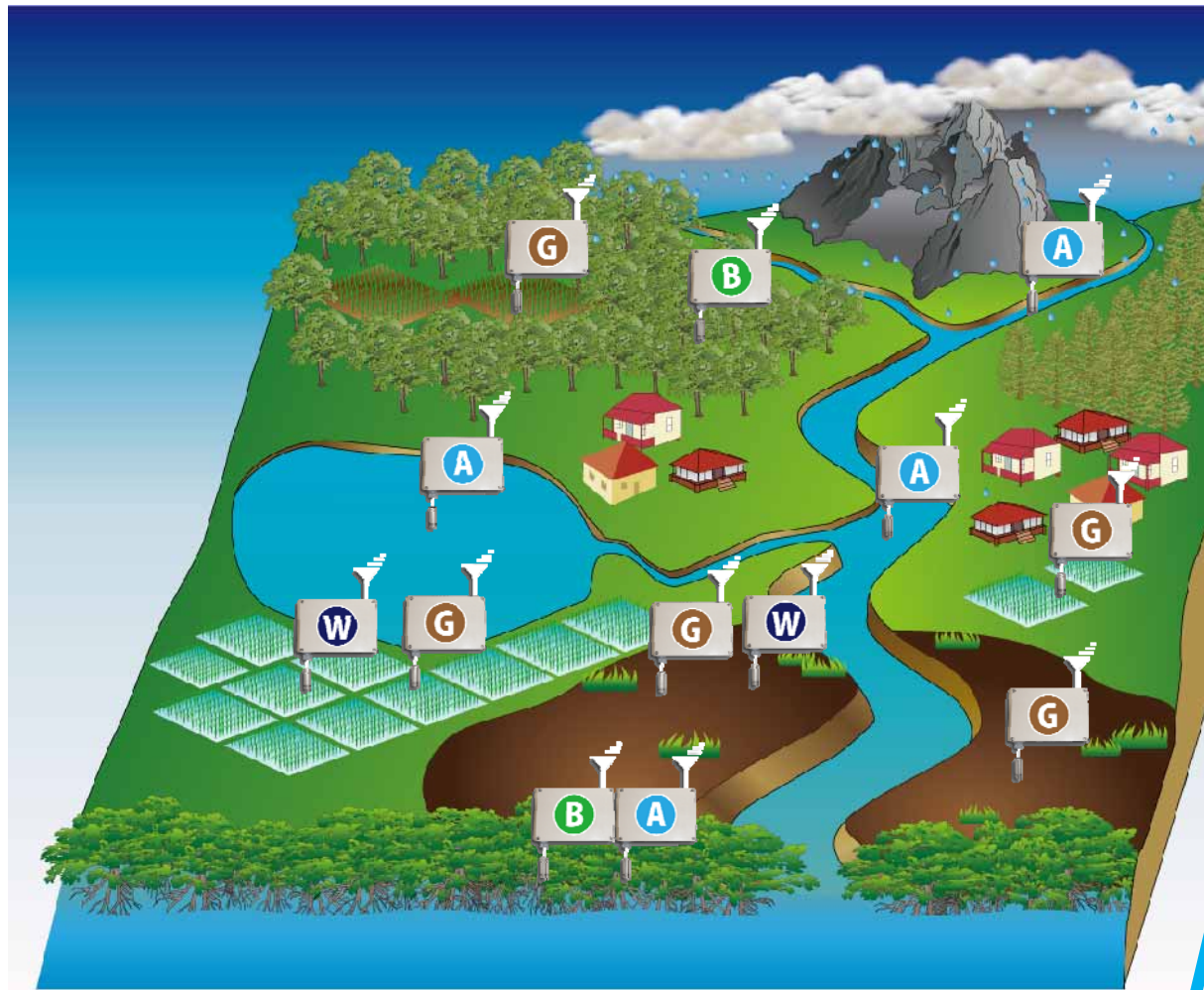
PANDUAN PENDUGAAN EMISI KARBON DARI LAHAN GAMBUT TROPIS DI INDONESIA



Manual of Tropical Peatland Management



Informatics System



Big satellite
(HISUI, PALSAR,
GOSAT)

— 600km —



Micro satellite
(Hyper-spectral)

— 300km —



— 300m —

Drone
(Hyper-spectral)

Sensing

Monitoring



SESAME
with sensor network
ZigBee

Atmosphere (Weather)

Bio-sphere

Sensors

Geo-sphere

Aqua-sphere

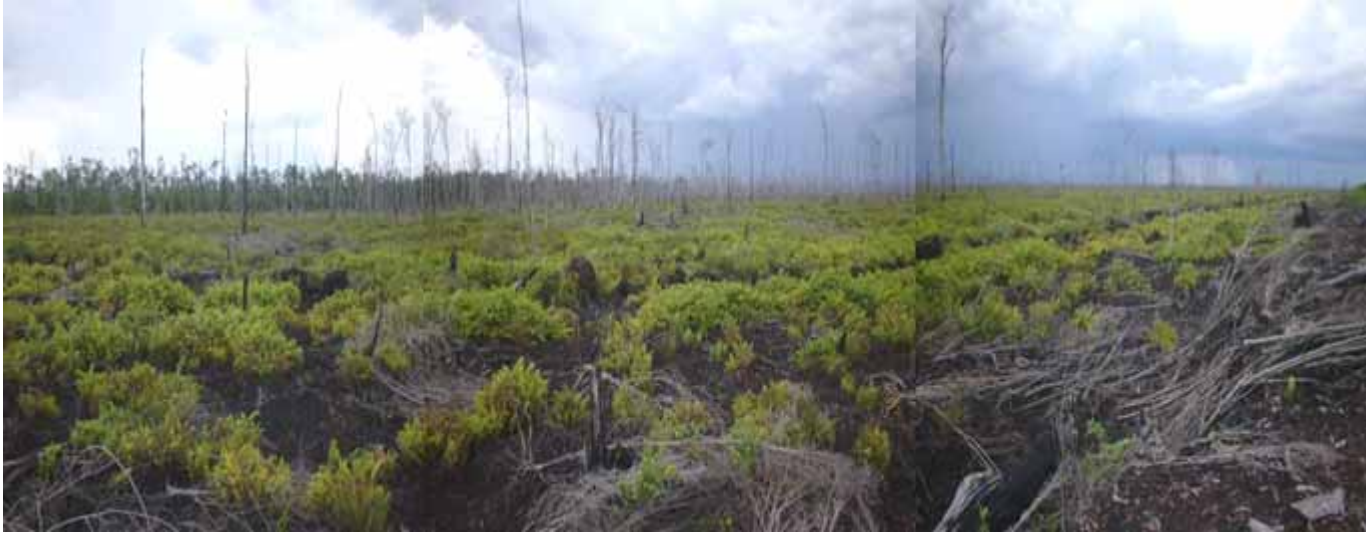


Mega data analysis

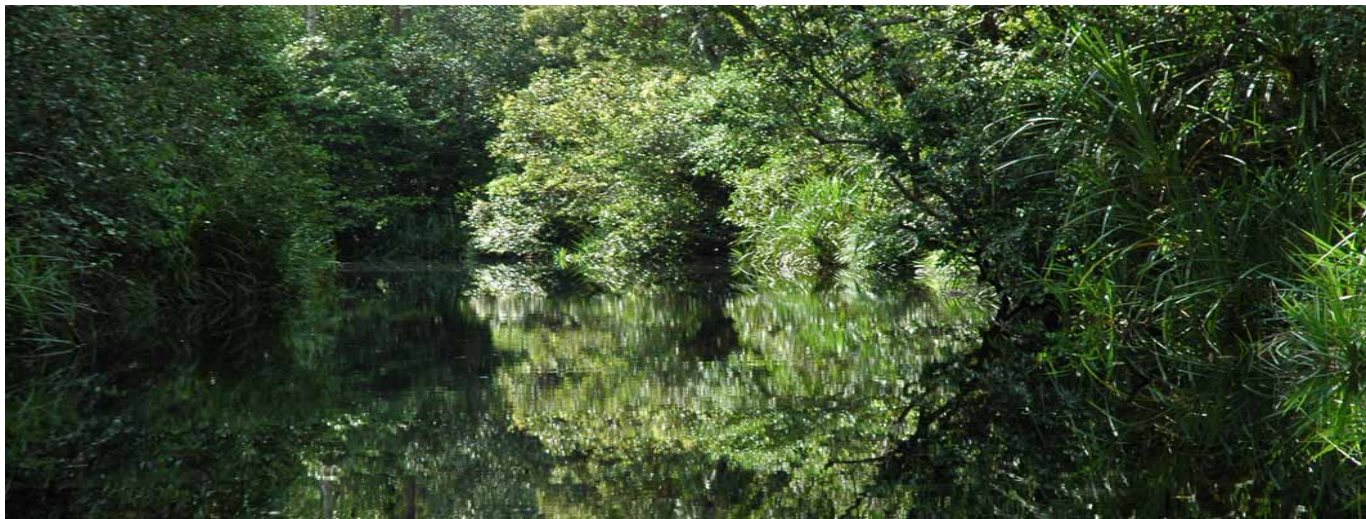


Data library





Key Concept on Future Collaboration



Natural Peatland as Natural Capital

- High Carbon Reservoir
- High Water Reservoir
- High Biomass Productivity
- High (Bio)diversity

Drain/Low water table

(Re-)Wetting/High water table

Dry-peatland In case of Oil Palm

- Decline of CDEFs security
- Low goal marks of Paris Agreement @ COP21 & SDGs
- Decline of Sustainable National Economy

Wet-peatland In case of Sago Palm

- Enhancement of CDEFs security
- High goal marks of Paris Agreement @ COP21 & SDGs
- Enhancement of Sustainable National Economy

National Strategy for **CDEFs** Securities as Sago based Ecosystem

- Climate Change security: Mitigation as Carbon Emission Reduction & Adaptation as High Biomass Production (enough water) against El Niño
- (bio)Diversity security: High biodiversity by mix-planting and nature-conservation around peat dome
- Energy security: Biomass energy from sago starch and residuals, and other biomass materials in Sago based Ecosystem
- Food/Feed security: Sago starch for food and feed (animal husbandry and fish culture)
- social security: PES and CSR&CSV by several Credit (REDD+, JCM) and Foundation (GCF, CIFOR-Japan, FAO, so on)



Sago based- Peatland Restoration **@** **SEI TOHOR VILLAGE, MERANTI** **DISTRICT, RIAU PROVINCE**

Ideal Sago Production

1) Semi-natural Conditions

***High Water Table**

***Mixed Forest**

***Production of 100 sago stand/ha/year**

2) High Starch Production

300kg starch/ sago stand, then 30ton starch
/ha/year (more than 10 time of rice)

3) High Biomass Productivity

1 ton biomass/one sago stand, then 100 ton
biomass/ ha/year

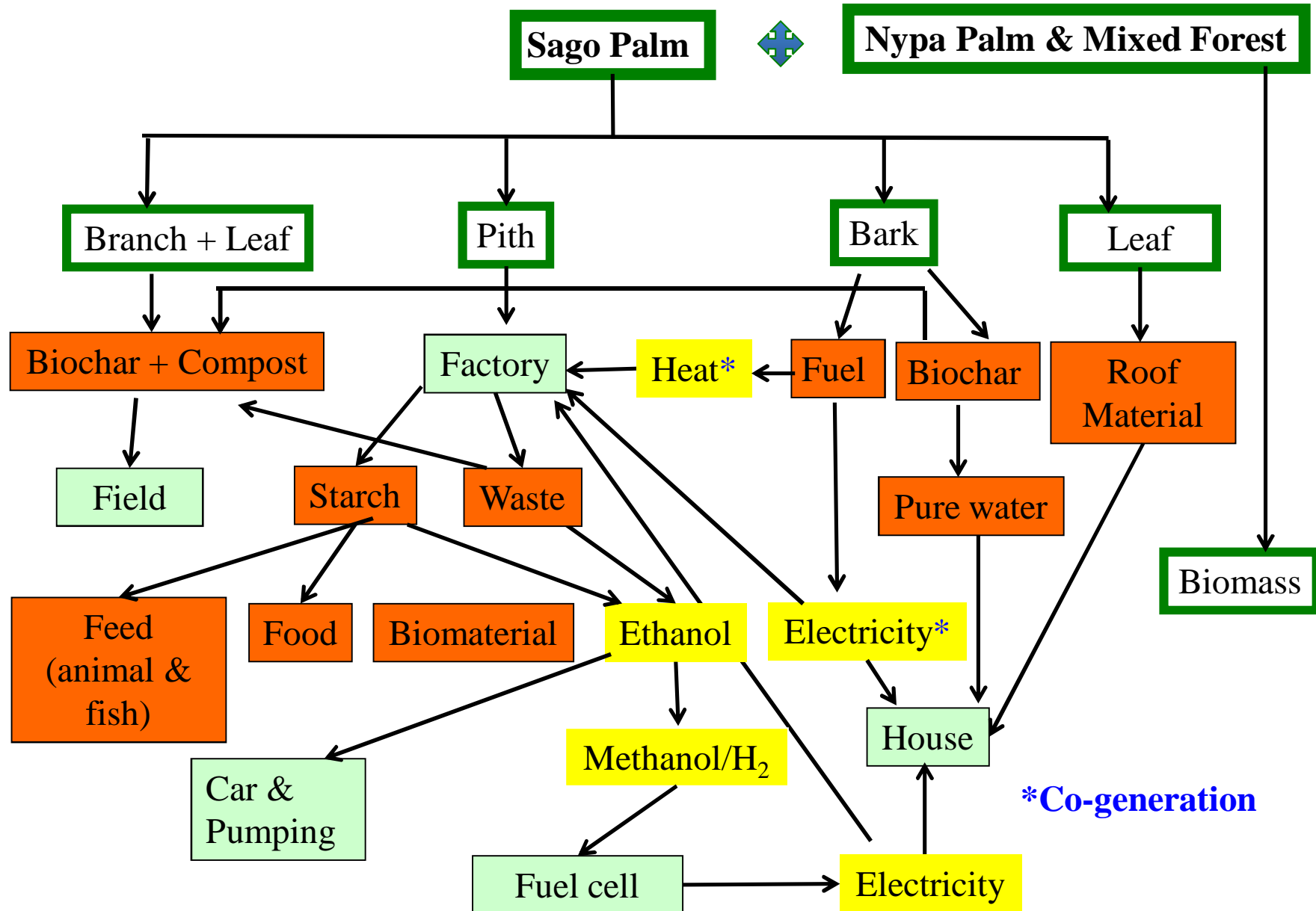


Sago based- Peatland Restoration
@
SEI TOHOR VILLAGE, MERANTI
DISTRICT, RIAU PROVINCE

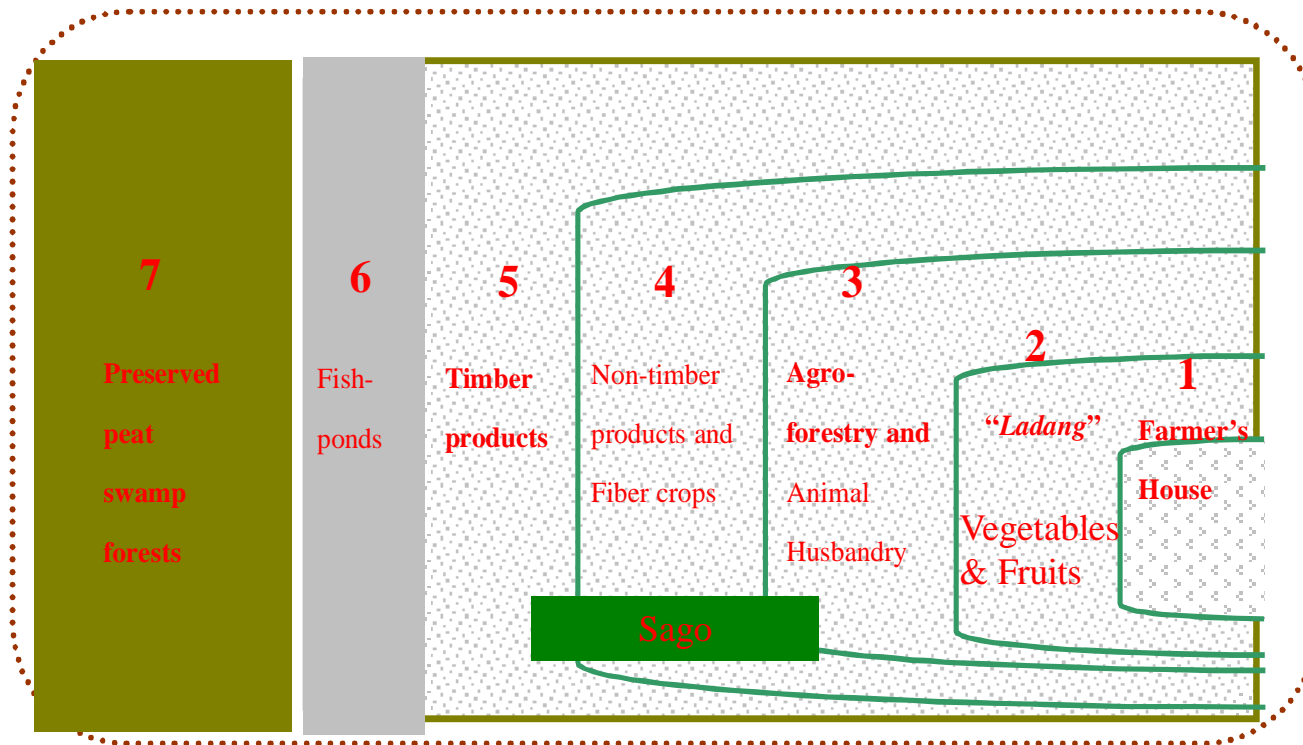
Sago Characteristics

- 1) Submerge Tolerance
- 2) N₂ Fixing
- 3) Low P
- 4) Na Tolerance (saline tolerance)
- 5) Acid Soil Tolerance
- 6) Perennial Crop

Whole Usage of Biomass in “Sago based Ecosystem”



Satoyama Model on Sago based- Peatland Restoration

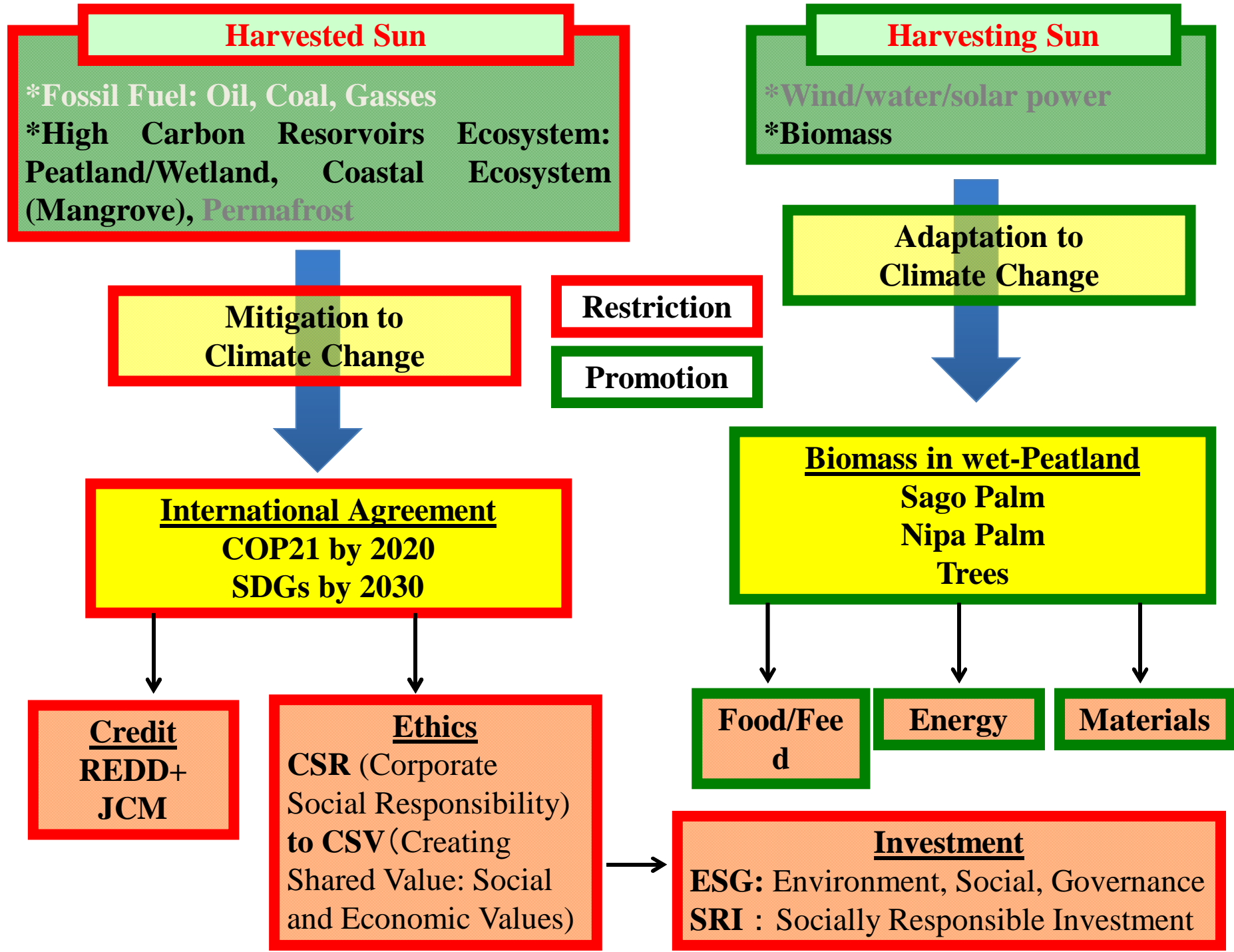


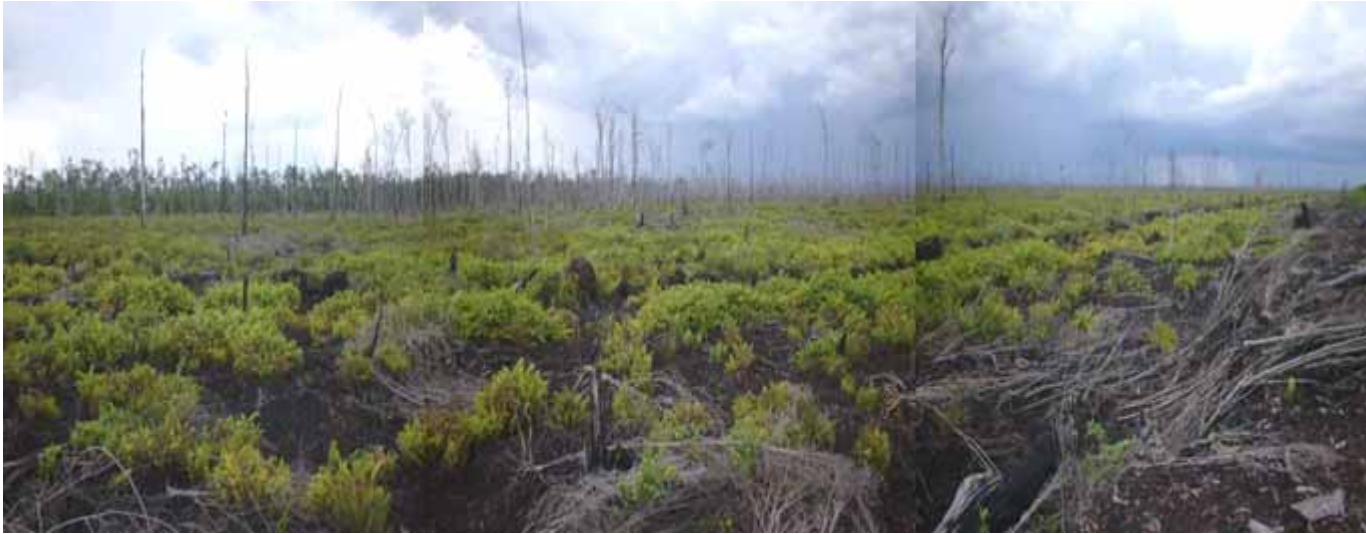
Sago Feed



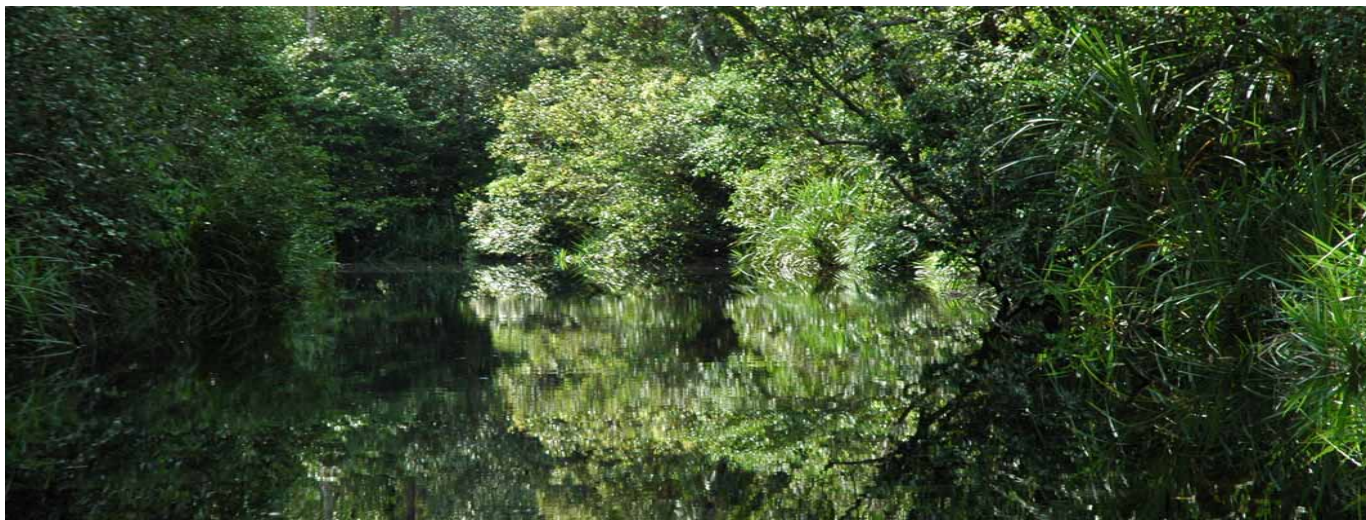
Biochar Composts

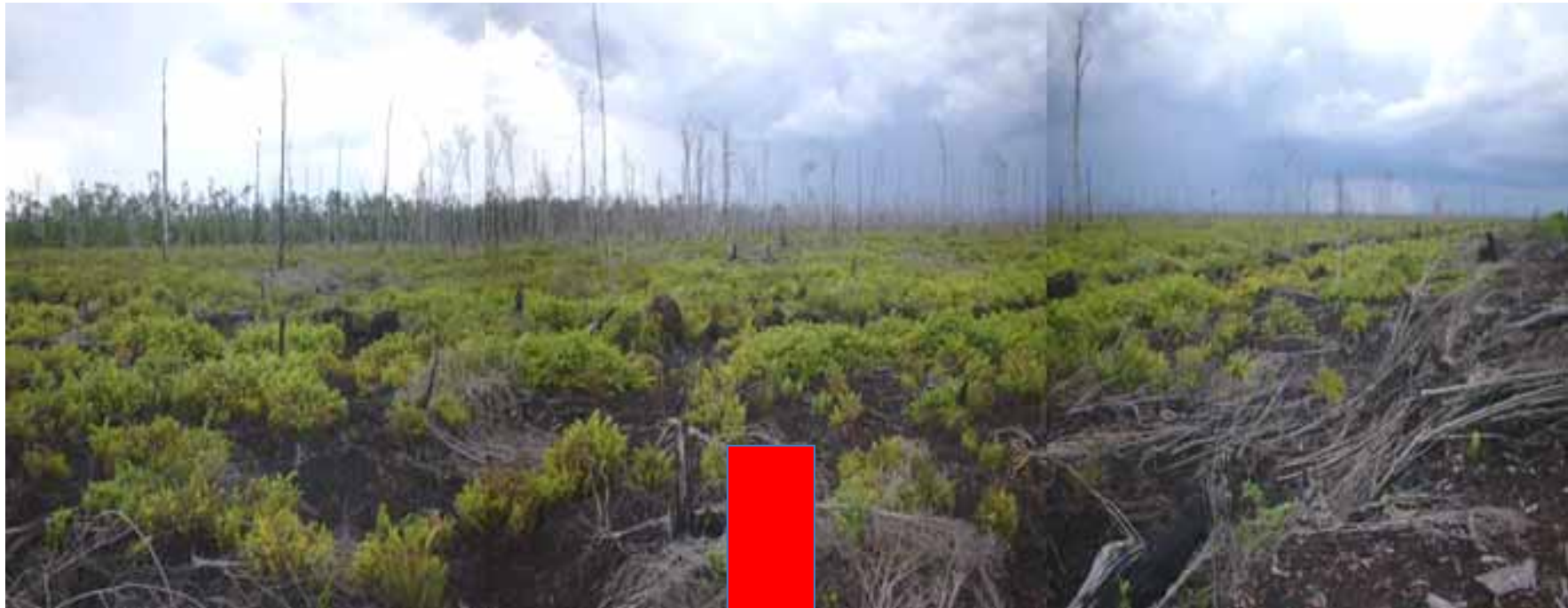






Action Plan on “Tropical Peatland Restoration”





Rewetting

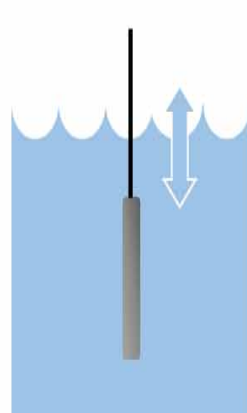
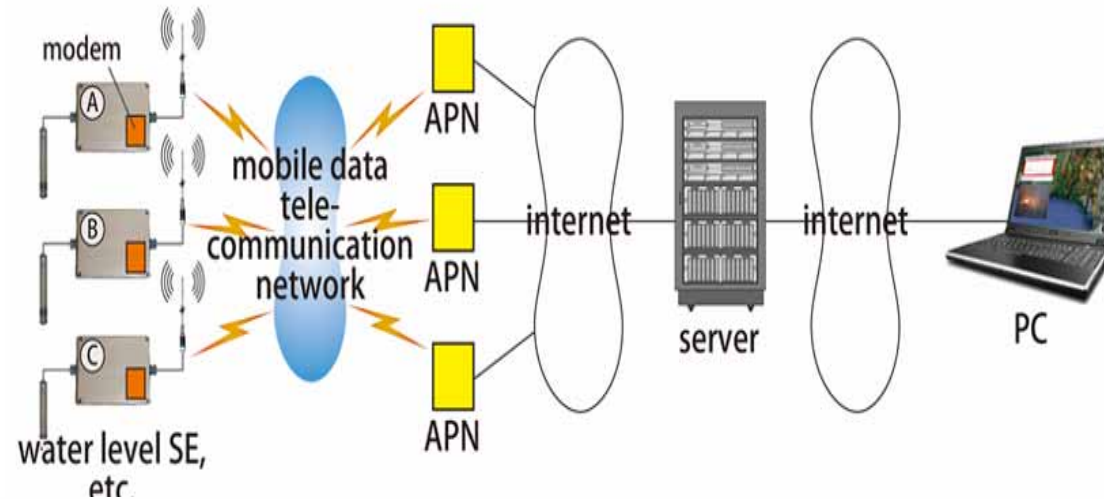
Reforestation

Peat fire prevention

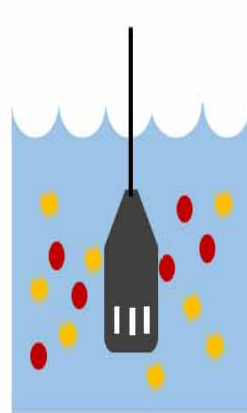
**Measurement,
Reporting and
Verification**

- 1: Rewetting**
- 2: Peat fire prevention**
- 3: Reforestation**
- 4: Comprehensive MRV**

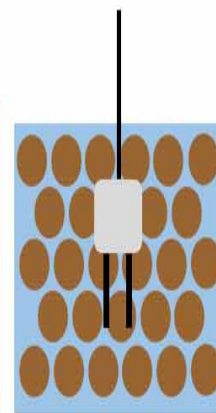
SESAME is a semi real-time data transfer system which uses mobile phone network.



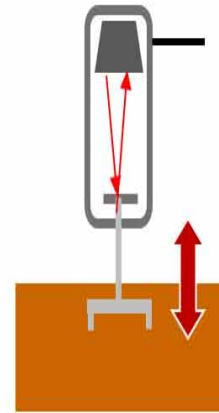
Water level
(groundwater, river, dam lake etc.)



Water quality
(EC, pH, ORP, DO, TDS, TURB etc.)



Soil moisture
(water content, moisture tension)



Ground surface elevation

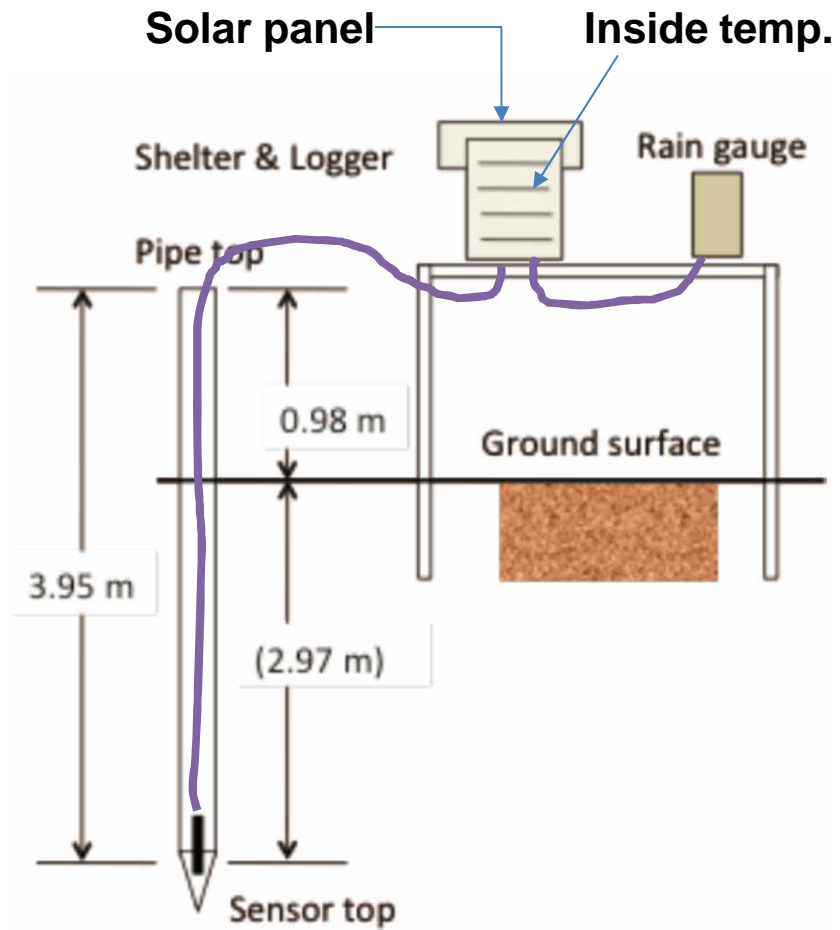


Dendrometer
(Diameter of tree trunk)

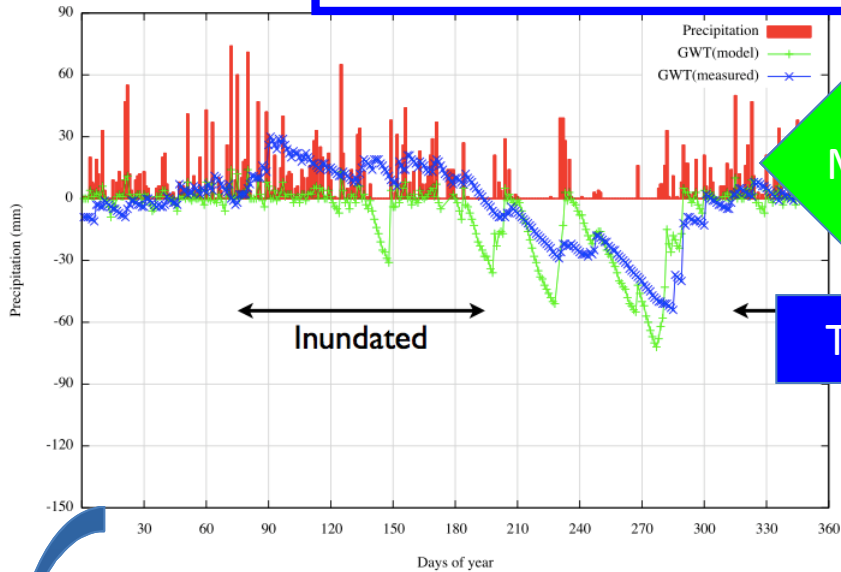


Total weather
(Wind, Rain, Solar, Temp. Humid. Etc.)

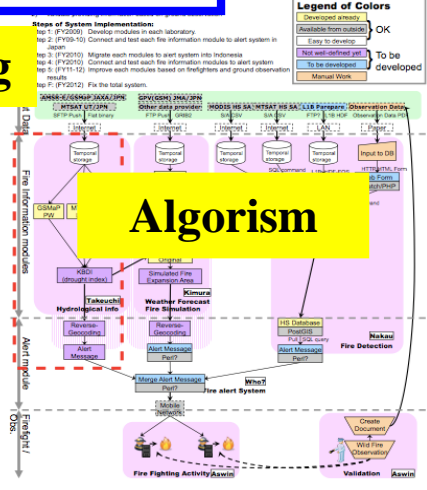
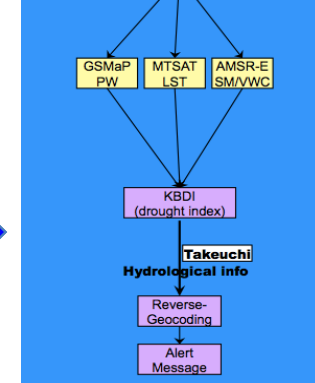
Field settings of a SESAME monitoring station



Water Table Monitoring & Mapping

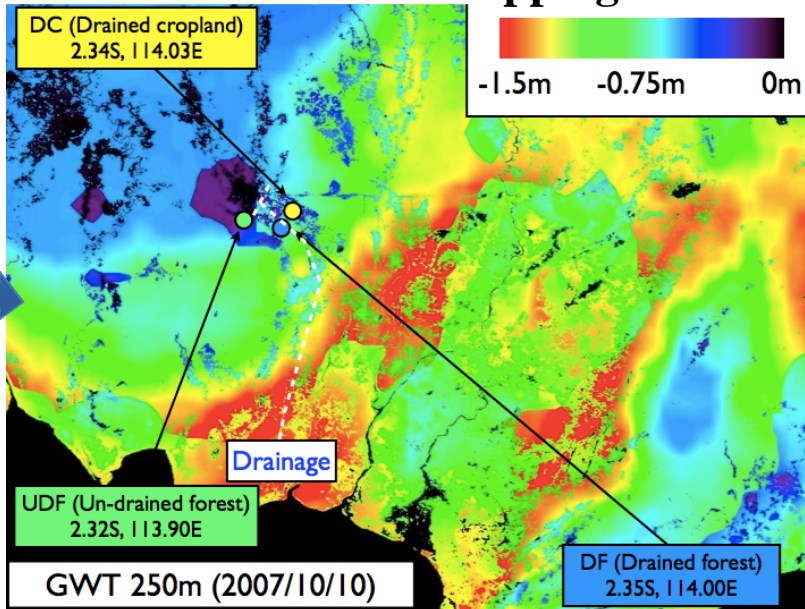


Satellite Sensing



By Wataru Takeuchi, University of Tokyo, Japan

Water Table Mapping



Input

Coefficiency between Water Table Level and

- 1) CO2 emission by Oxidation
- 2) CO2 emission by Fire Factors

Output

Mapping of

- 1) CO2 emission by Oxidation
- 2) CO2 emission by Fire Factors



TERIMA KASIH