UNFCCC COP22 Japan Pavilion Side Event

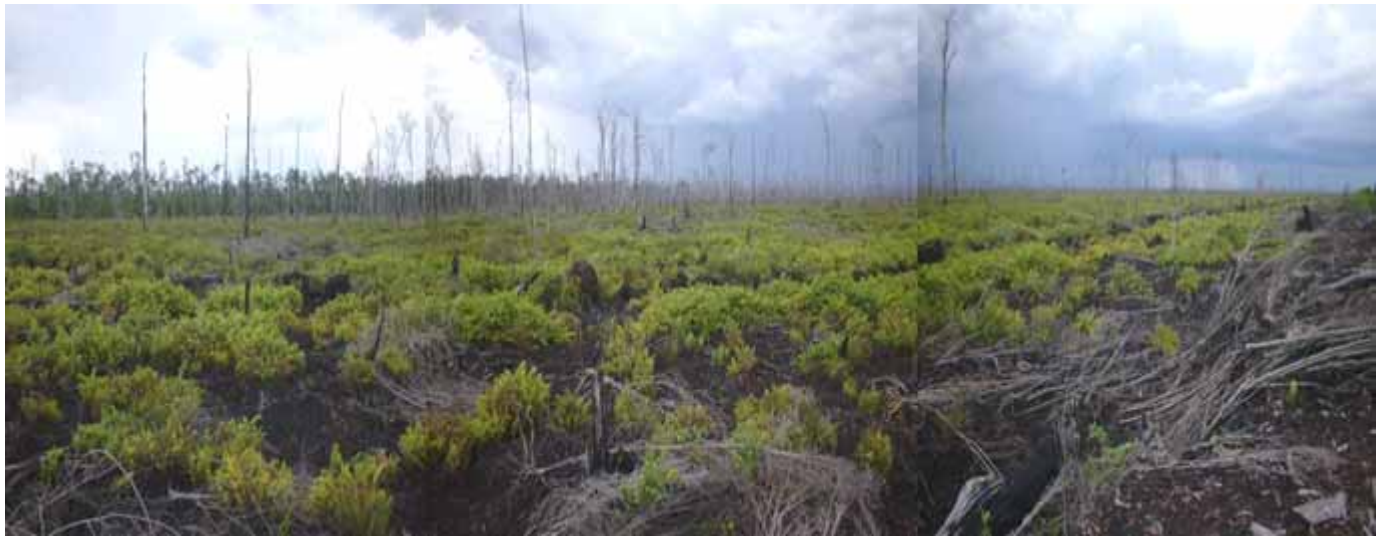
# Challenges for Peatland Restoration

## ~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**

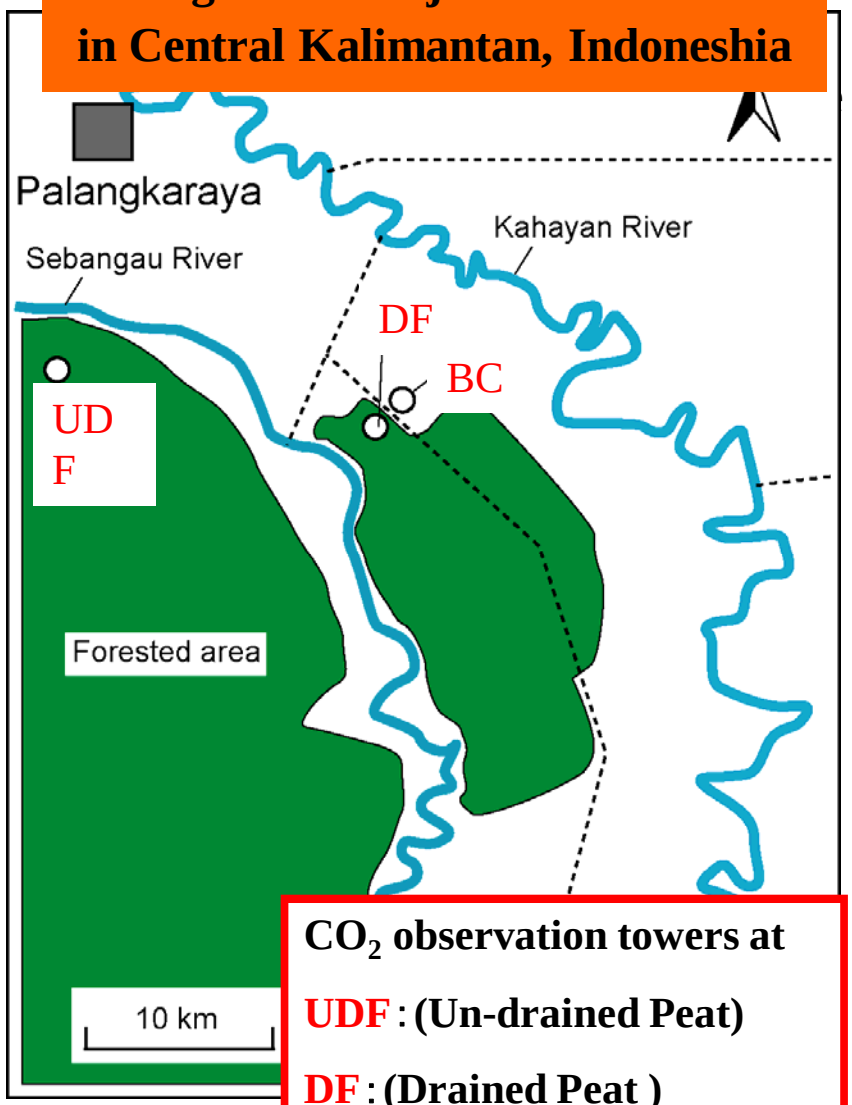
**・JST-JICA Project (SATREPS) (2008-2014):**
**Wild Fire and Carbon Management in Peat-Forest in Indonesia**

**・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, Indoneshia

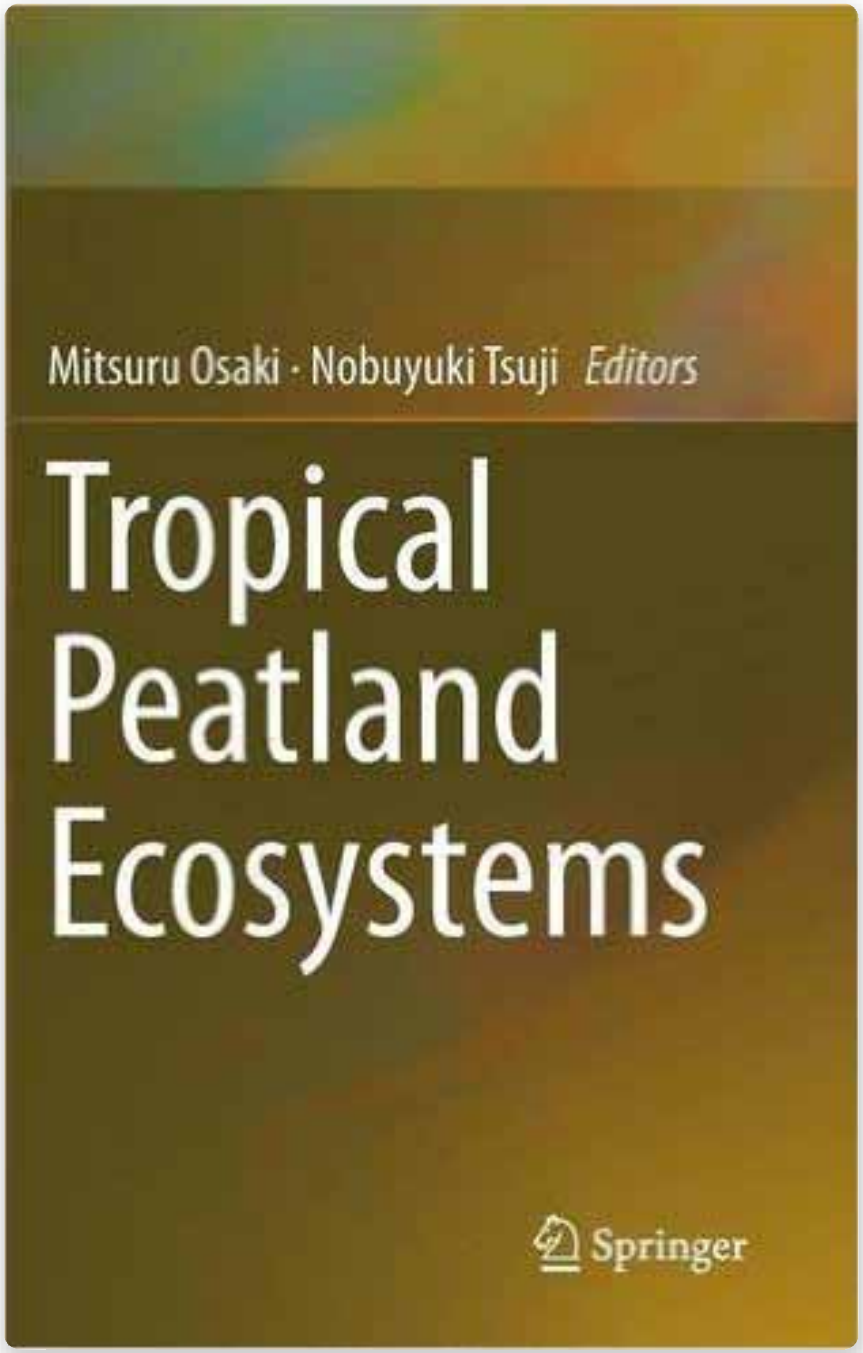



**$CO_2$ observation towers at**

**UDF : (Un-drained Peat)**

**DF : (Drained Peat )**

**BC : (Burnet Peat)**






**Tropical Peatland Ecosystems**

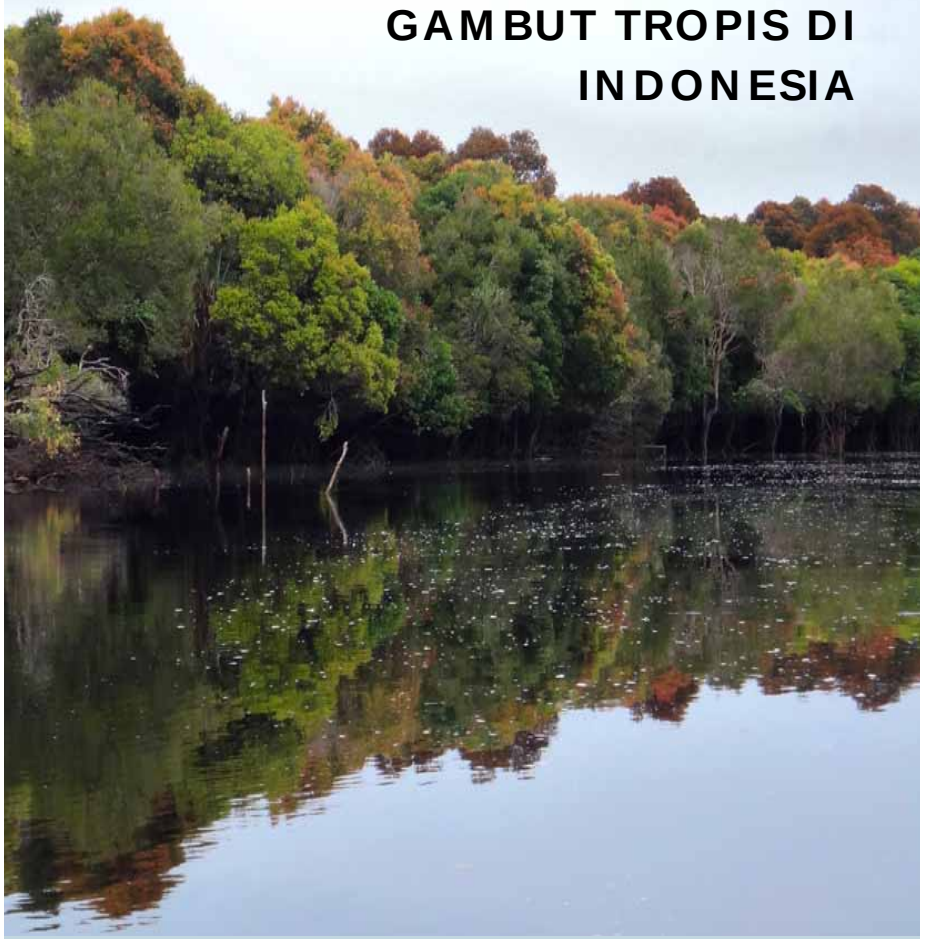
Editors: **Osaki**, Mitsuru, **Tsuji**, Nobuyuki (Eds.)

Parts: 9
Chapters: 41
Pages: 651
Authors: 160

# GUIDEBOOK FOR ESTIMATING CARBON EMISSIONS FROM TROPICAL PEATLANDS IN INDONESIA

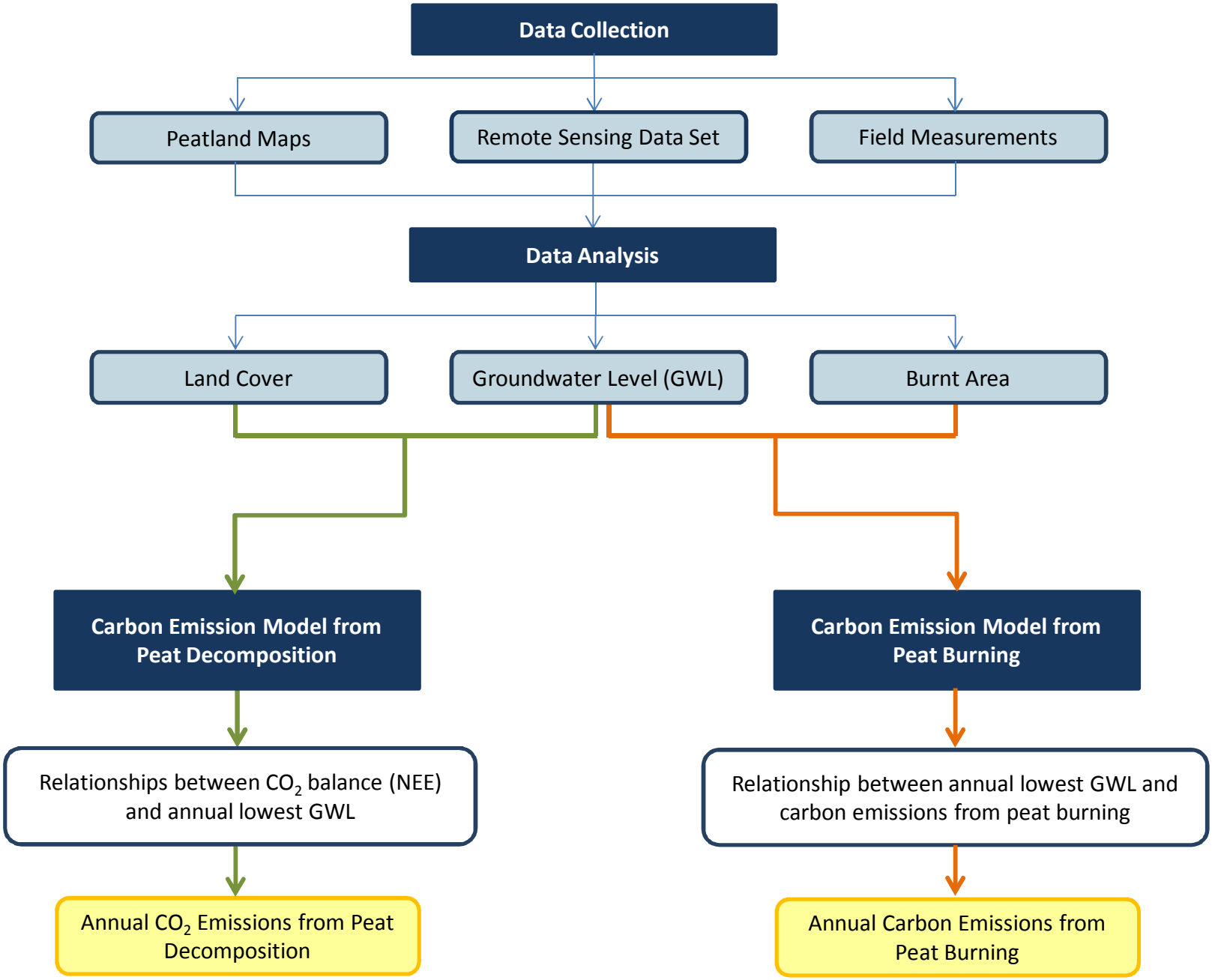
IJ-REDD+ PROJECT
Indonesia-Japan Project for Development of REDD+ Implementation Mechanism
JICA

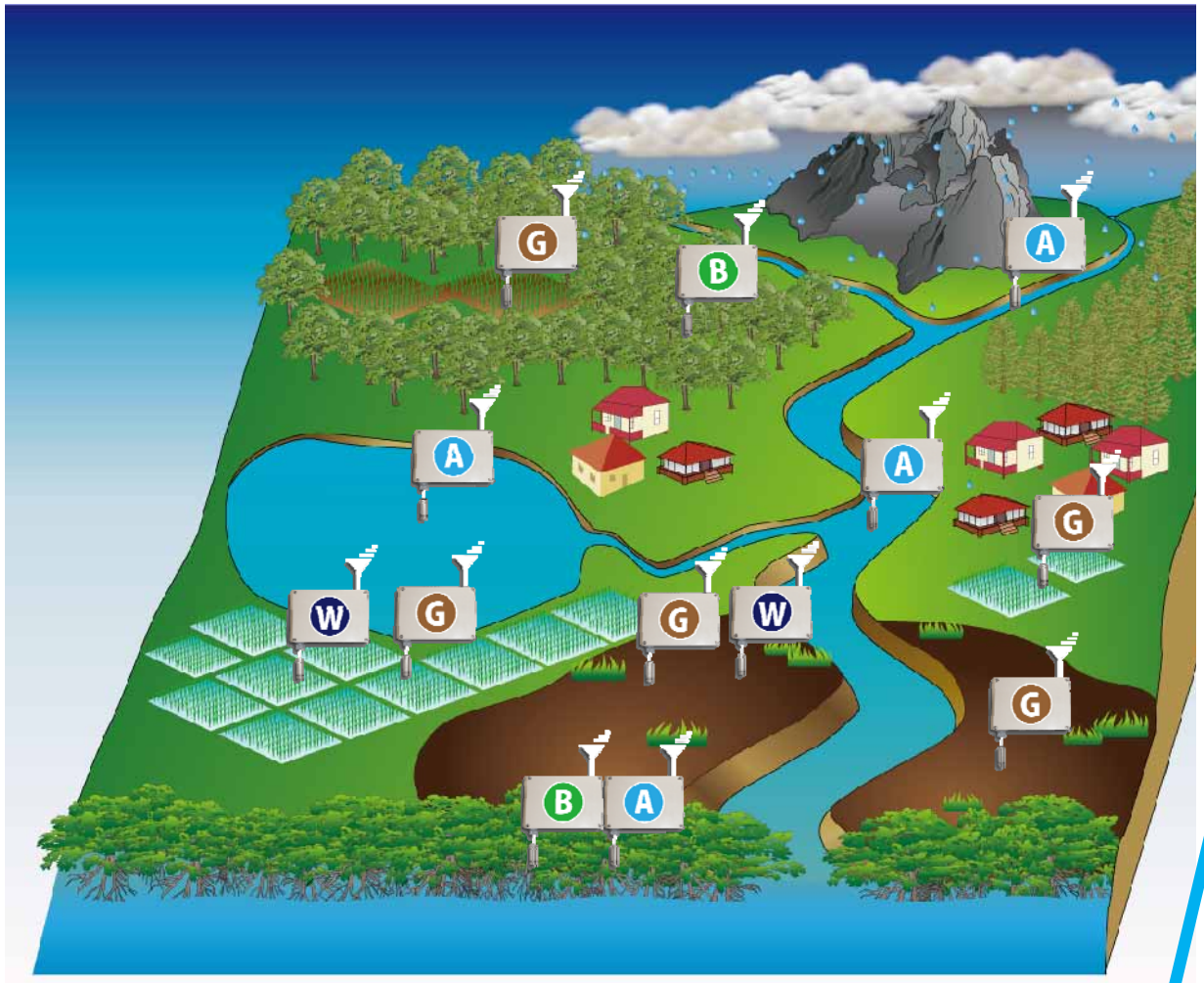
# PANDUAN PENDUGAAN EMISI KARBON DARI LAHAN GAMBUT TROPIS DI INDONESIA



IJ-REDD+ PROJECT
Indonesia-Japan Project for Development of REDD+ Implementation Mechanism
JICA

# Manual of Tropical Peatland Management






# Informatics System

Big satellite
(HISUI, PALSA, GOSAT)

600km

Micro satellite
(Hyper-spectral)

300km

300m

Drone
(Hyper-spectral)

Sensing

Monitoring

SESAME
with sensor network
ZigBee

Atmosphere (Weather)

Bio-sphere

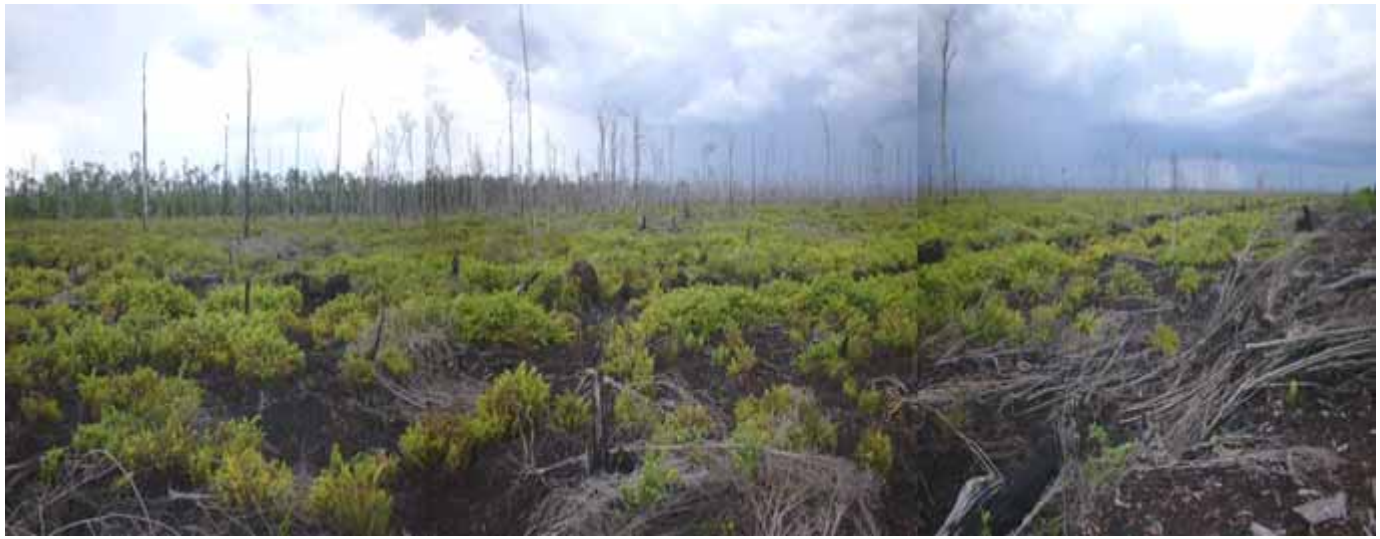
Sensors

Geo-sphere

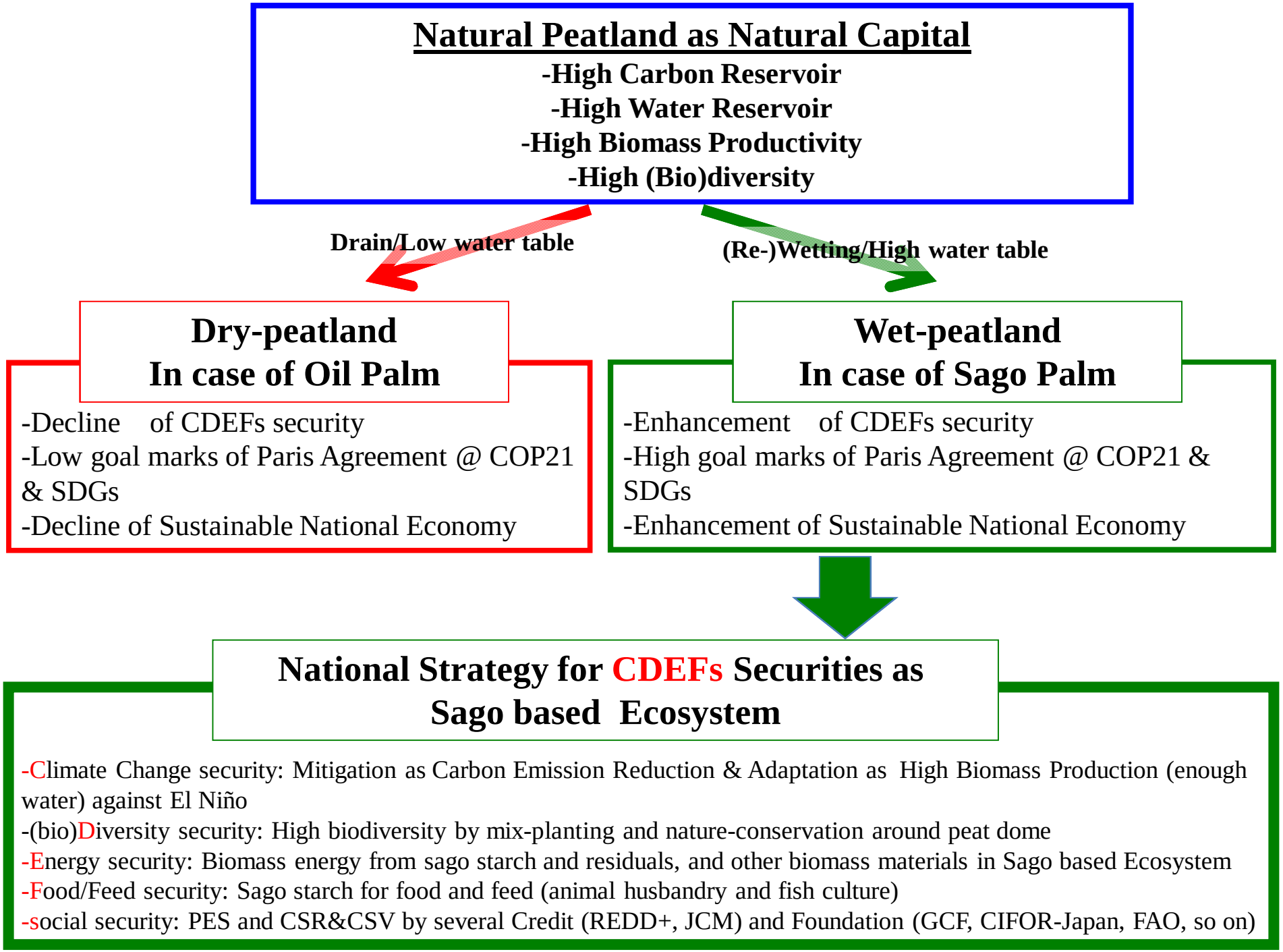
Aqua-sphere

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)

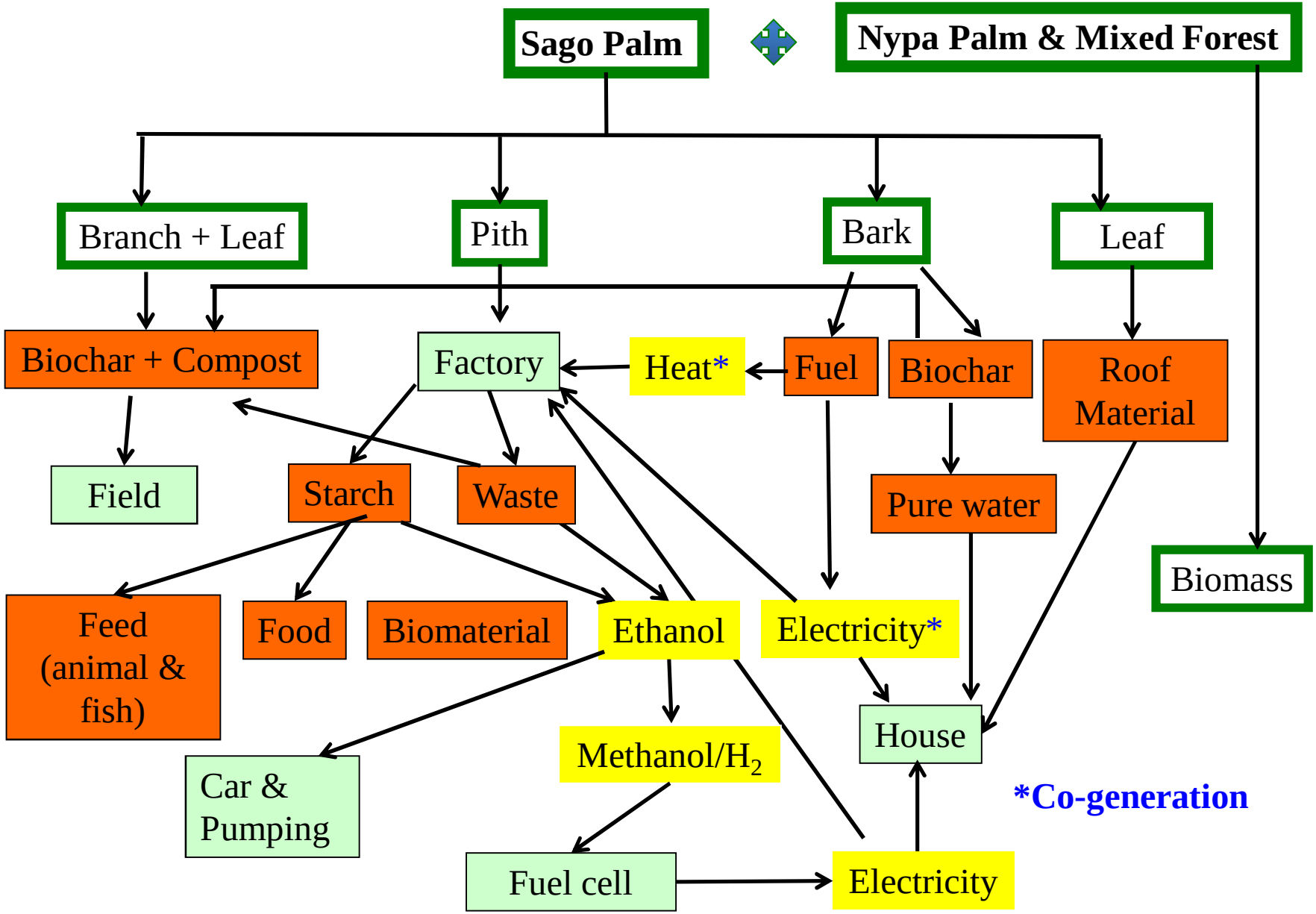
3) High Biomass Productivity
1 ton biomass/one sago stand, then 100 ton biomass/ ha/year

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

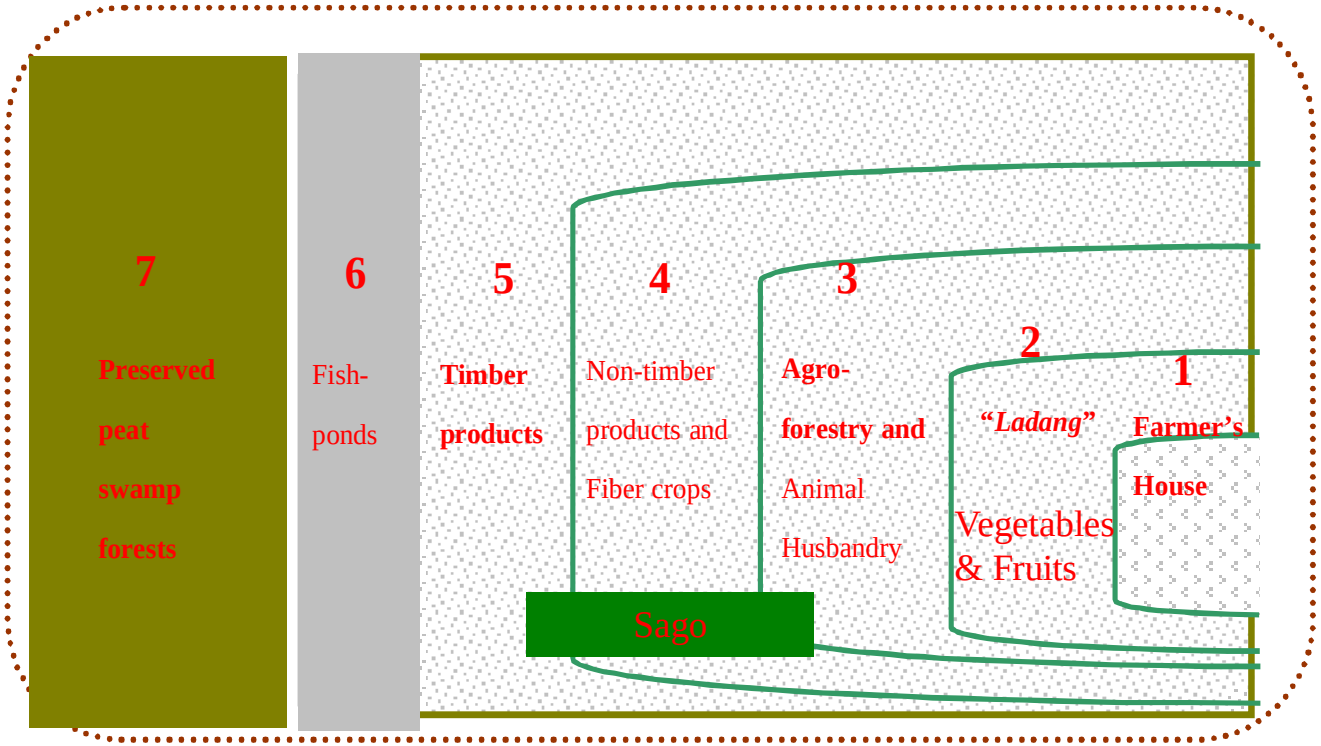
**Sago Characteristics**

1) Submerge Tolerance
2) $N_2$ 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

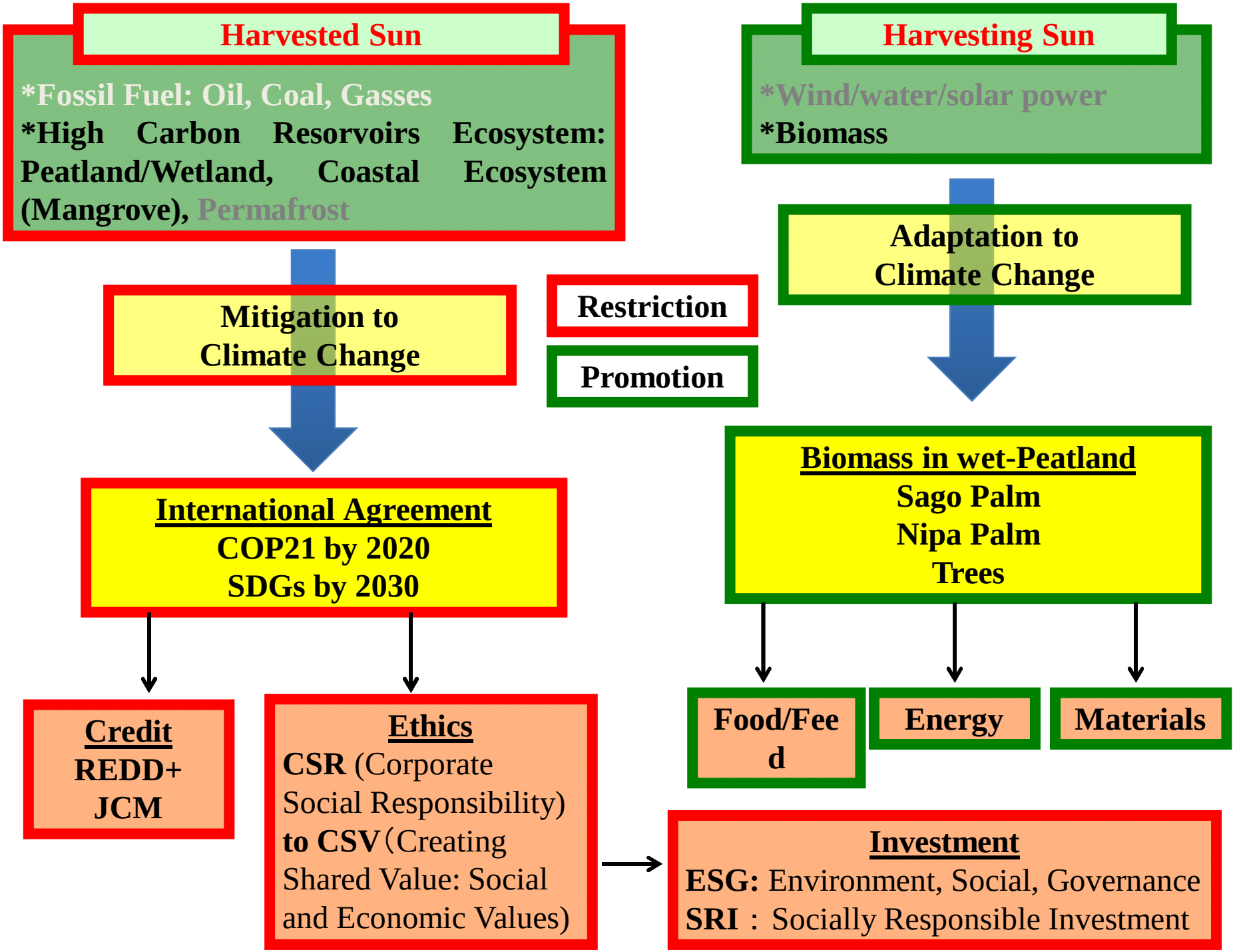


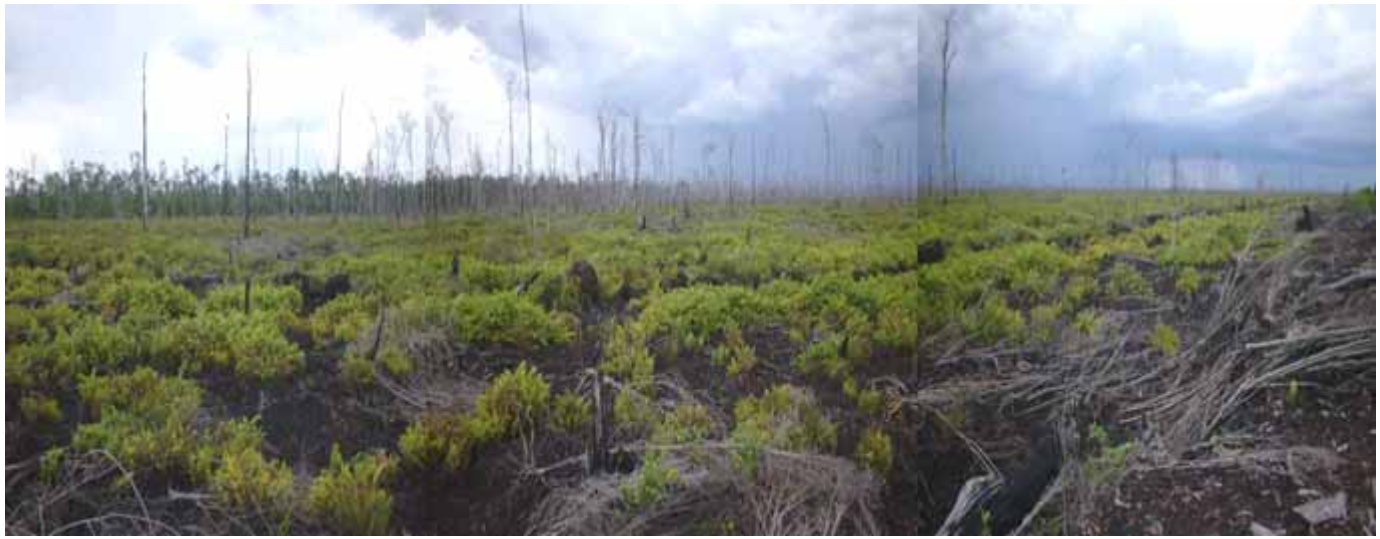



**Biochar Composts**

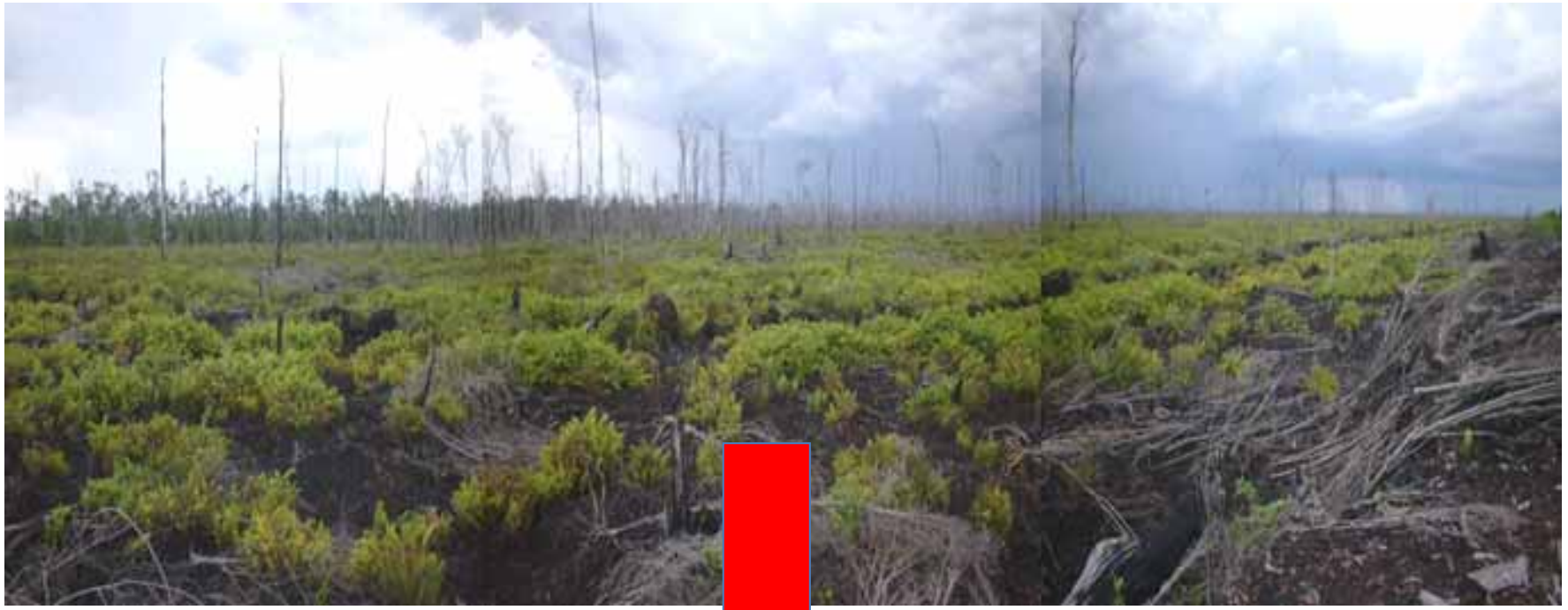
**Sago Feed**




Harvested Sun
*Fossil Fuel: Oil, Coal, Gasses
*High Carbon Resorvoirs Ecosystem: Peatland/Wetland, Coastal Ecosystem (Mangrove), Permafrost
Harvesting Sun
*Wind/water/solar power
*Biomass
Adaptation to Climate Change
Mitigation to Climate Change
Restriction
Promotion
International Agreement
COP21 by 2020
SDGs by 2030
Biomass in wet-Peatland
Sago Palm
Nipa Palm
Trees
Credit
REDD+
JCM
Ethics
CSR (Corporate Social Responsibility) to CSV（Creating Shared Value: Social and Economic Values)
Food/Feed
Energy
Materials
Investment
ESG: Environment, Social, Governance
SRI ： Socially Responsible Investment



# Action Plan on “Tropical Peatland Restoration”



Rewetting

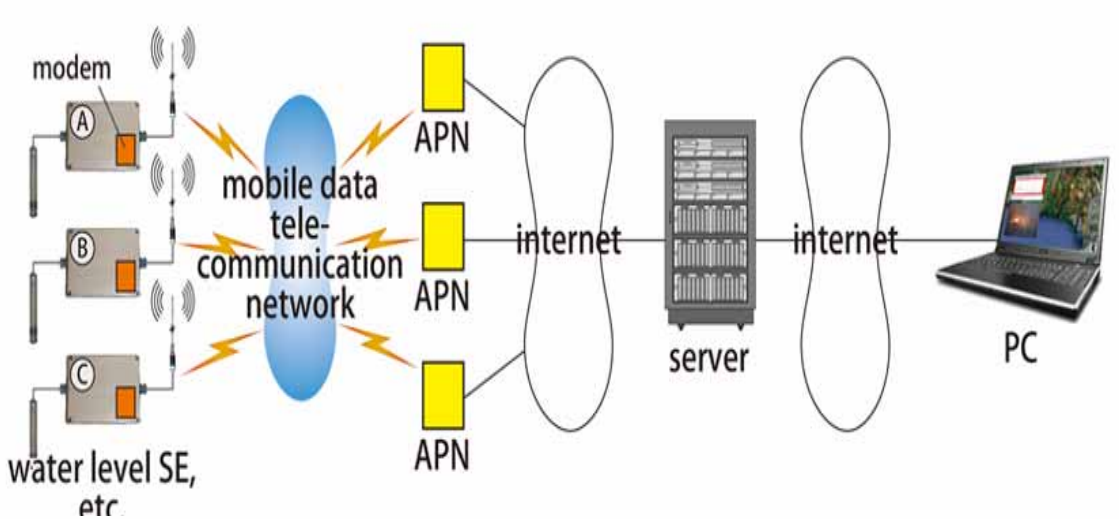
Reforestation

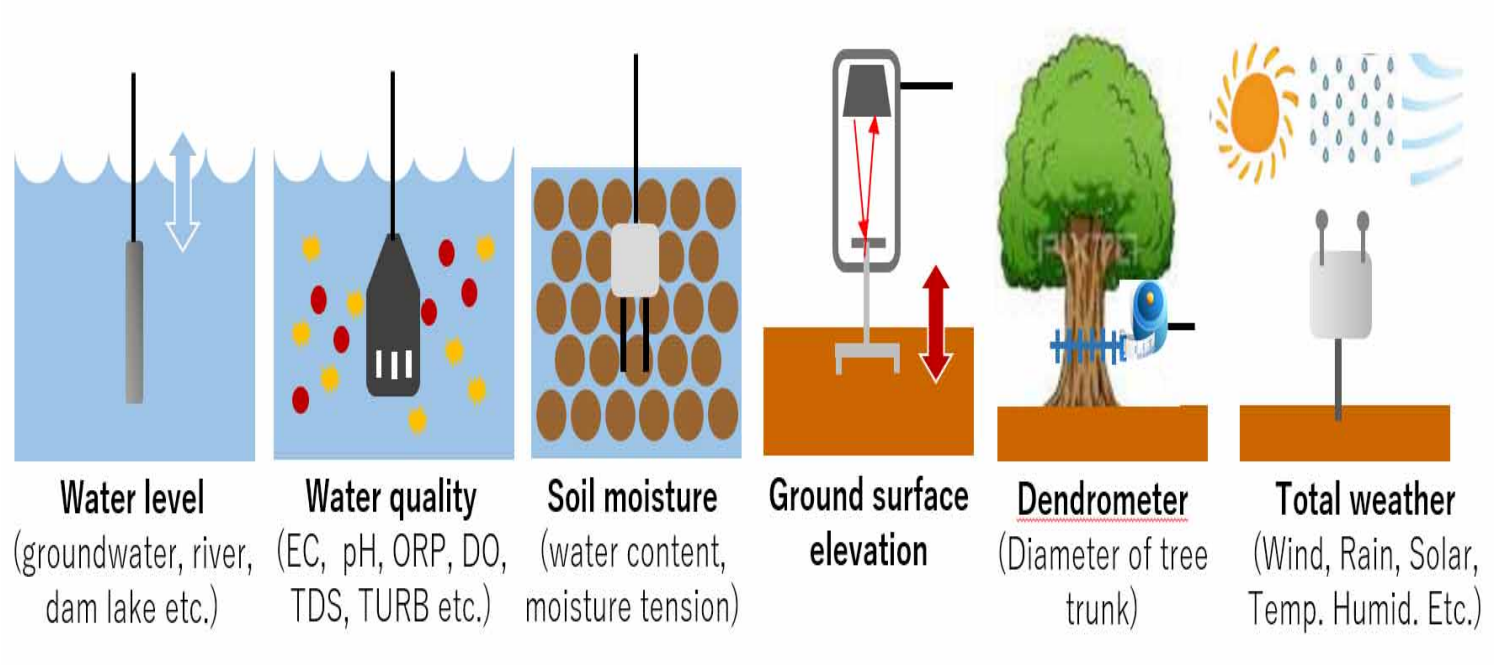
Peat fire prevention

Measurement, Reporting and Verification

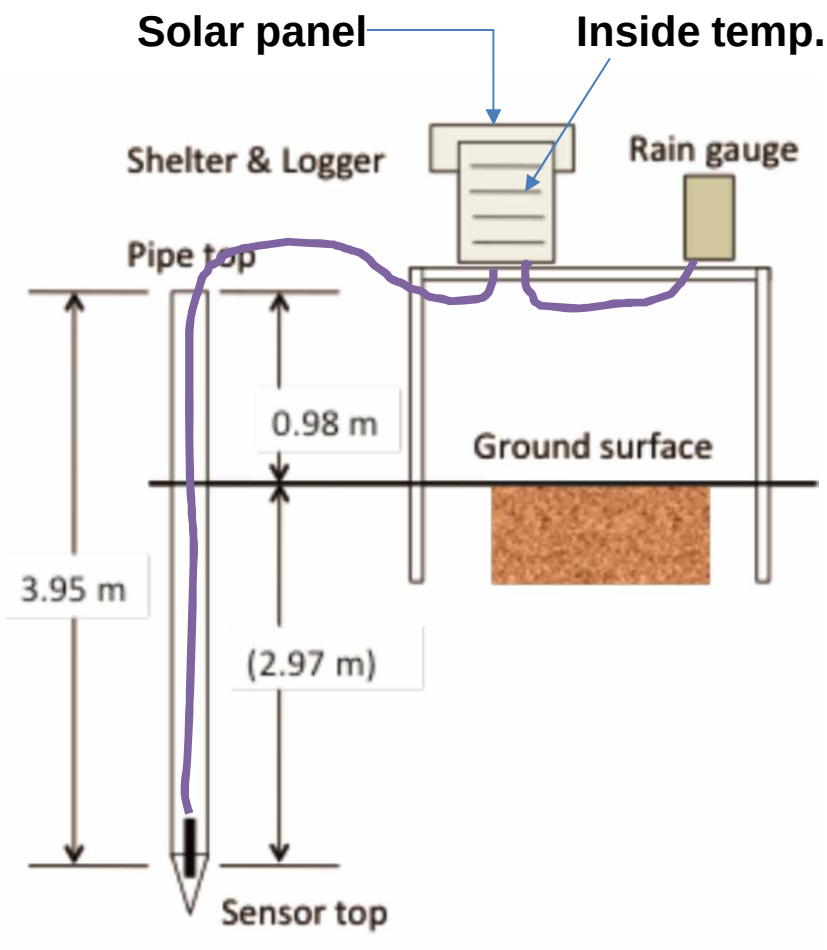
**1: Rewetting**
**2: Peat fire prevention**
**3: Reforestation**
**4: Comprehensive MRV**

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

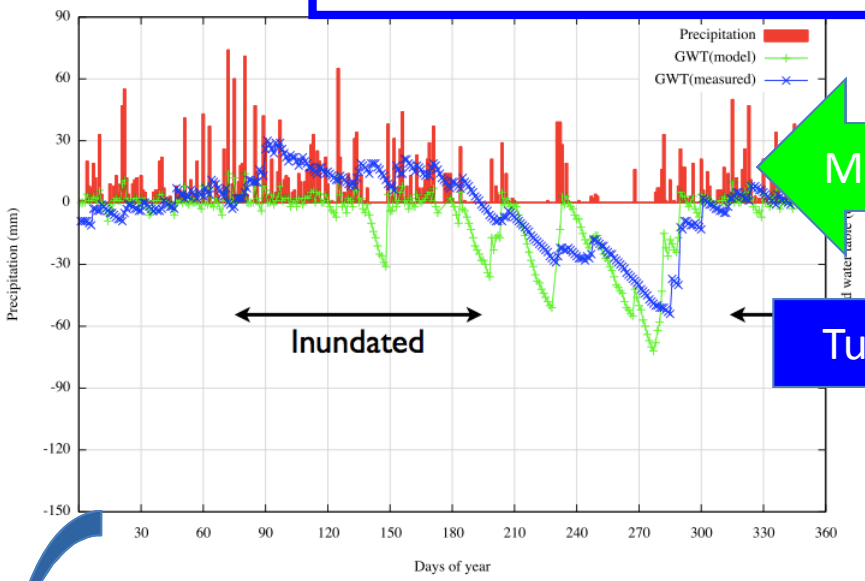


# Field settings of a SESAME monitoring station



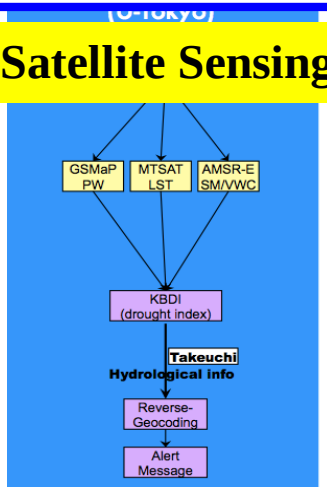

# Water Table Monitoring & Mapping



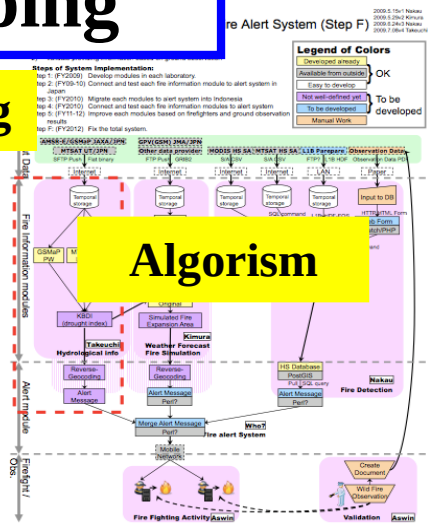

Modeling

Tuning

**Satellite Sensing**

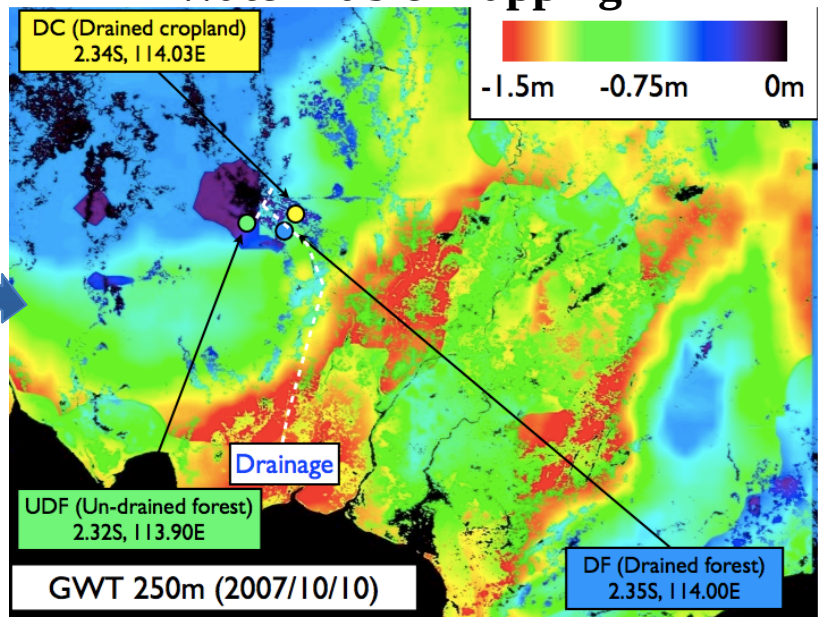



**Algorism**




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**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TERIMA KASIH