REDD-ALERT project
Report field trip to Jambi 3-6 November 2006

Participants

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This report presents our activities during our field trip to Jambi, Sumatra. The objectives were to pre select sites for field measurements and organize future laboratory work in the University of Jambi. The report presents the sites and their characteristics, our visit and contacts at the University of Jambi and concludes with a summary of the sites and planed measurements.

A_ PRE SITE SELECTION

1. Peat soil

1.1. Oil palm plantation

Location:
Petaling, Sumber Agung
2 hours driving SouthEast from the city of Jambi.

Coordinates:
01° 43'02.7" South, 103° 52' 52.8" East.

Elevation:
24 m

Description:
The oil palm plantation is owned by the company Bahari Gembira Ria (BGR).

Aswandi Idris from the University of Jambi, in collaboration with the SDWA (Singapore Delft-Hydraulic Water Alliance), is studying peat subsidence rate as a function of drainage depth. Their measurements started in January 2009, will take place for 3 years and include:
- Water table level (hourly with automatic sampler and additional weekly manual sampling),
- Subsidence (every year),
- Bulk density (surface),
- Ash content (surface),
- Water budget, discharge,
- Peat depth.

The studied transects have the following characteristics:

Table 1: Transects studied according to age and drainage depth in the oil palm plantation in Petaling.

Age (y)	Palm density (palms ha^{-1})	Peat depth (m)	Min; Max drainage canal depth (cm)
16	132 (8m x 9m)	5-7	-100; -150
16	132	5-7	-100; -150
16	132	5-7	-100; -150
10	132	7-9	-50; -100[*]
5	132	7-9	-50; -70
0	No palm	7-9	-50; -70
10	132	9-11	-20; -50
7	132	9-11	-20; -50

* Probably the one where we would work given that 1) mean optimal and generally practiced drainage depth in oil palm plantations on peatland is -60cm and 2) we should not work in a too young plantation.

A digital meteorological station is available in both plantations; rainfall is also recorded by manual sampling.

The palms are N-fertilized 3 times a year (when?, form fertilizer: urea?), at an annual rate of x kg N ha^{-1} y^{-1}. The fertilizer is applied circularly around the palm trunk (radius of ~1m).

Future action:

To decide in which treatment/subtreatment we would like to work.

1.2. Forest

We could not find any intact peat forest close to the oil palm plantation in Petaling.
We tried to reach one in the South Sumatra province (2 hours South East from Petaling) but got stuck in the mud with the 4×4 so we decided it was probably not the best option.

We saw a patch of forest in Parit (1 hour ½ South East from Jambi, $01^{°}$ 41'20.9" South, $103^{°}$ 48' 04.3" East, altitude 18 m) but had no time to explore it.

We also went to the 'protected peat forest area', in the North of Jambi.

Location:
Garagai (2 hours from Jambi).

Coordinates:
$01^{°}$ 14'14.8" South, $103^{°}$ 37' 19.7" East.

Elevation:
14 m

Description:
Despite of being in a protected area the forest is over logged. Very few tall trees remain (photo left) and many ferns have invaded the forest (photo right).

Future action:
In January, to go and see if the patch of forest in Parit would be convenient.
If not, to look for other accessible intact peat forest not too far from Jambi.

1.3. Rubber plantation

Rubber seems to grow not very well on peat so we wonder if it is relevant to study this land cover type on peat soils. There are some small plantations in Parit, close to the forest patch mentioned previously.

Future action:
To decide if we study rubber plantation on peatland.
If yes, in January, to have a look at he small plantations in Parit.

1.4. Acacia plantation

The large area of Acacia plantations on peat is in the north of Jambi. We have located an interesting potential plot, at the side of the road, very easily accessible.

Location:
Danau Lamo, District 7 (40 km from Jambi, 1 hour from Jambi).

Coordinates:
01° 22'08.7" South, 103° 40' 52.3" East.

Elevation:
13 m

Description:
The Acacia plantation is owned by the company WKS. The plantation density is about 1m $\times$ 1.5 m and the age around 8 years. Peat depth is 12-15 m.

Future action:
Aswandi will contact the company to get its agreement for working in the plantation.

2. Mineral soil

2.1. Oil palm plantation

Location:
Muhajirin, PTPN VI
20 minutes driving SouthWest from Jambi.

Coordinates:
01° 42' 56.8" South, 103° 24' 42.0" East.

Elevation:
71 m

Description:
The oil palm plantation is owned by the government which will facilitate an agreement for us to work in the plantation. It is very easily accessible. Palms are 7 years old.

Future action:
Aswandi will contact the manager to get the authorization for working in the plantation.

2.2. Forest

The best option would be to work in the campus of the University of Jambi since intact forests on mineral soil are quite far away. Additionally we could access to tree species and diameter inventories and soil surveys achieved by students of the University. Another advantage is that there is a meteorological station in the campus.

Location:
UNJA Campus, Jambi.

Coordinates:
01° 36' 34.9" South, 103° 31' 07.8" East.

Elevation:
59 m

Description:
Secondary forest of 4-5 ha relatively well maintained. A meteorological station is installed in the campus.

Future action:
Aswandi will look for all the studies related to soil and biomass achieved by students or researchers of the University of Jambi.
We have to check that the soil is of the same type as the one in Muhajirin, where would be located all the other plots on mineral soil.

2.3. Rubber plantation

The potential rubber plantation plot is located very close to the oil palm plantation.

Location:
Muhajirin
20 minutes driving SouthWest from Jambi.

Coordinates:
01$^{°}$ 40' 40.2" South, 103$^{°}$ 27' 22.6" East.

Elevation:
26 m

Description:
The rubber plantation is owned by small farmers and located in a tiny pleasant village.

<u>Future action:</u>
Aswandi will contact the owner to get the authorization for working in the plantation.

2.4. Acacia plantation

The potential Acacia plantation plot is in the same village as the rubber plantation.

<u>Location:</u>
Muhajirin
20 minutes driving SouthWest from Jambi.

<u>Coordinates:</u>
01° 40' 37.6" South, 103° 27' 31.8" East.

<u>Elevation:</u>
34 m

<u>Description:</u>
The Acacia plantation is owned by small farmers. The trees are already 7-8 years old so the farmers are planning to cut them soon. However there would be a possibility to rent a small area (In my point of view, 0.2 ha would be enough for soil greenhouse gases measurements), for a 2 years period.

<u>Future action:</u>
Aswandi will contact the owner to negotiate the price for renting 0.2 ha of Acacia for 2 years.
Tree diameter inventory should take place as soon as possible.

B_ LABORATORY

We visited the soil laboratory of Jambi Unviversity, managed by Pak Ermadani.
Among the available equipments that the students of the REDD-ALERT project could use are: auger for mineral and peat soils, ovens (4) and balances (precision 10^{-3}).

One room (photo) would be available for the gas chromatograph. This room would however need some improvements. If we want the room to be air-conditioned, the walls should be extended up to the ceiling and some electricity work should be done. The cost for this would be around 7 million Rph (700$). Then we would have to buy an AC plus equipment for protecting the GC and computer from power cuts (which are apparently common there).

The dean of Jambi University agreed with hosting the GC laboratory and allowing the students of the REDD-ALERT project to use the available equipments of the University. This arrangement will be formalized by 2 years partnership between the project and the University.

Summary of REDD-ALERT site pre selection and planed activities in Jambi

Soil Type	LUT[1]	Location	Future action	Measurements planed (Who)
Peat	F	Parit	Check if not logged, not drained	- GHGs[2] (Angelica, PhD student)
		Garagai	Over logged F	- Soil CO_2 flux as a function of water table depth[3] (ISRI?)
	OP	Petaling	Select age, drainage depth	- Effect of N addition on peat decomposition (Etik, Post Doc)
	A	Danau Lamo	Obtain company agreement	- Peat C & N stock[4] (Setiari, Ms student)
	R	Parit	Relevant LUT?	- Properties top soil[5]
				- Rainfall & air T°C monitoring[6] (?)
				- Biomass abvgrd C stock[7] (ISRI?)
				- Litterfall, root growth rate and partitioning soil respiration autotrophic/heterotrophic, soluble & physical removal[8] (Jenny, PhD student)
Mineral	F	UNJA Campus	Check soil type	- GHGs[9] (not yet selected PhD student)
	OP	Muhajirin	Obtain company agreement	- Soil C stock[10] (Oliver, Post Doc)
	A	Muhajirin	Negotiate rental w/ owner	- Biomass abvgrd C stock[7] (Jasnari?)
	R	Muhajirin	Obtain owner agreement	- Rainfall & air T°C monitoring[6] (?)

[1] LUT: Land-use type (F: Forest, OP: Oil Palm, A: Acacia, R: Rubber).

[2] GHGs includes measurement of soil fluxes of CO_2, CH_4, N_2O, NO, soil temperature, moisture and N mineral content, on a monthly time step (daily during the 2-3 weeks following N fertilization in OP) for a 1 year period. Monthly litterfall rate during 1 year for the A plantation because N inputs to the soil from the litterfall may be an important explanatory factor of N_2O flux variation.

[3] Soil CO_2 flux would be much less intensive that for [2] but would include a broader range of water table depth.

[4] Includes measurement of bulk density; C & N content (CN Analyzer or LOI and Kjeldahl digestion) along the entire peat profile.

[5] Soil Properties of the top 10 cm: bulk density, pH, ash & C & N content, C.E.C., texture, particle density, etc. (to determine). Soil sampled for [4] can be used for the analysis.

[6] Meteorological station available only in the OP plantation for peat soil and in the forest for mineral soil.

[7] Includes tree species inventory (F), DBH and height measurement.

[8] Measurements for assessing soil C loss arising from LUC using the IPCC gain-loss approach. Measurement of litterfall rate on a monthly time step for one year, analysis of litter C & N content. The methods for measuring root growth rate, partitioning of soil respiration and soluble & physical removal have to be defined.

[9] Same as [2].

[10] Includes measurement of bulk density and C content until a 3 m depth.

Comments:

Suggestion of Fahmuddin for WP2: Assessment of aboveground spatial variation.

Map
(Zoom to see in more detail)

1. Oil palm plantation on peat soil
2. Forest on peat soil (Parit)
3. Rubber plantation on peat soil (Parit)
4. Acacia plantation on peat soil
5. Forest on peat soil (Garagai)
6. Forest on mineral soil
7. Rubber plantation on mineral soil
8. Acacia plantation on mineral soil
9. Oil palm plantation on on mineral soil

PETA
RENCANA LOKASI PENELITIAN