

Project responsible	Claude Hammecker-Siwaporn Siltecho

Title Field experiment and vertical drainage

LMI partners (French)	Eco & Sols BIOEMCO

LMI partners (Asian)	KKU, LDD

Others Partners	
Western Countries	UMR LEHNA (ENTPE, CNRS)
Asian Countries	

Type of support	Amount (€)
Deadline (14 th of February)	
Student support	
Student research expense	
Student mission	
Support to project building	
Collective training expenses	
Field support	500
Exploratory project	
Beside project support (link to a bigger one)	
Equipment	
Others	2000

Asian Countries involved (put an x)

Thailand	Vietnam	Laos	Others
x			

Working package involved (put an x)

WP1 Soil fertility and the dynamics of mineral nutrients	WP2 Soil and water functional biodiversity	WP3 Carbon storage in plant biomass and soil	WP4 Regulation of water flow and erosions
x			x

General context of the proposal

This application responds to a minor contribution to the PHC project involving LUSES partners in setting up an important field experiment aimed to evaluate the efficiency of vertical drainage.
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Objective of the proposal

The aim of this proposal is to contribute to the field experimentation set up in BNT and proposed in a PHC project involving LUSES partners (KKU and LDD). The cooperation project has already been validated and has been granted for 3 years. The objective of this study is to determine the possibilities of vertical drainage to release the excess of water in soil during the rainy season and to store it in underlying layers. The possibilities of this technical solution will be evaluated both experimentally during large scale infiltration experiments and numerically with water flow modeling. This field experiment is also aimed to train Master students of KKU, but also to give an open training for staff of LDD, KKU and any other local LMI partner about : unsaturated soil hydrodynamics, geophysical measurements (radar and ERT)

Link with the LMI project (regional aspect, partnership, working package)

The project is directly linked to the research themes developed in WP1 and WP4 as the dynamics of water movements in soils control the water flow at the watershed scale but also the physicochemical conditions for the nutrient uptake by the plants. This project also will be the opportunity to deliver specific training to KKU master students and LDD staff about the measurements of soil hydraulic properties and to get an introduction about water flow modeling and geophysical methods aimed to describe the soil profile and the dynamics of water infiltration.

Project description (one page maximum)

The goal of this study is to assess the feasibility of the vertical drainage as a cheap way to improve the water management in the north east of Thailand where the soils are shallow and prone to water-logging. By reducing the water-logging the conditions for rubber tree development will be increased, the possibilities for water storage in deeper layers improved and the risks of land soil erosion and land-sliding reduced. In order to assess the feasibility of this technique it has been tested experimentally and numerically in order to be able to evaluate its efficiency and its cost. A part from the scientific results about the dynamics of water infiltration in these soils with the presence of vertical drains, this study will also provide more practical outputs like recommendations to farmers about the density and size of drains.

The experiment will start on 20th of March and will take place during two to three weeks, in the experimental site of BNT, near Khon Kaen.

It will start by a theoretical training about soil water flow and its consequences on soil conservation and agricultural soil management, as well as a training about the geophysical techniques used to monitor the infiltration of water into soil.

The measurements will be performed in different positions along the slope in order to take into account the heterogeneity of the soil physical properties. These measurements will be performed both with and without the presence of a vertical drain in order to define large scale hydrodynamical properties, to be used for modelling and test the validity of this technique to improve the hydric status of the soil and the trees.

Budget description including identify amount budget from co-funding if it is available

Equipment	Euros
pump	150 €
Water meter	100 €
Water tank 1-2 m ³	150 €
Steel ring (1 m diam)	50 €
Rubber tubing + tap	50 €
HYDRUS 3D License for LDD 5 and KKU	2000 €
Travel expenses	Taken in charge by PHC project
- 2 Thai researchers coming to Montpellier	3600
- 3 French researchers coming to Thailand	2700
Physical and chemical analysis	Taken in charge by LDD 5
Total	2500 €