LUSES

International Joint laboratory (IJL)

Laboratoire Mixte International (LMI)

DYNAMIC OF LAND USE CHANGES AND SOIL ECOSYSTEM SERVICES (LUSES)

Report of Year 2014

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LMI LUSES directors

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A] LMI LUSES IN SHORT

A1-DEFINITION

Entitled LUSES for « Dynamic of Land Use changes and Soil Ecosystem Services », the international joint laboratory is an initiative of the "Institut de Recherche pour le Développement" (IRD – Research Institute for Development), which associates French and South-East Asian partners from various universities and research institutes.

An international joint laboratory (LMI – Laboratoire Mixte International) is an operational structure dedicated to research and trainings, contributing to the implementation of projects around a scientific platform (laboratories and fields platforms). This platform has a regional and international dimension: seven Asian partners, from Laos, Thailand and Vietnam are associated to this project with French researchers (cf. table 1)

Table 1: list of LMI Institutions

Acronym	Full Title	Countries	Keyword	Director	Contact
iEES Paris	Institute of Ecology and Environmental Sciences	France, Paris	Environmental sciences, Soil Science, Functional Ecology, Water resources	Dr. Christian Valentin (IRD)	Dr Christian Valentin (IRD)
UMR ECO&SOLS	Functional Ecology and Biogeochemistery of Soils and Agrosystems	France Montpellier	Soil Science, Functional Ecology, Biogeochemical cycles in agrosystems	Dr. Jean-Luc Chotte (IRD)	Dr Jean-Luc Chotte (IRD)
UMR GET	Geosciences Environement Toulouse	France, Toulouse	Environmental sciences, Soil Sciences, geochemical cycles, water resources	Dr. Sylvain Bonvalot (IRD)	Dr Olivier Ribolzi
DALAM	Department of Agricultural Land Management	Lao P.D.R.	Agriculture and forestry research activities	Mr Sisavang VONGHACHAK	Mr Oloth Sengtaheuanghoung
NUOL Faculty of Agriculture	The Faculty of Agriculture of the National University of Laos	Lao P.D.R.	Agriculture Science	Prof. Silinthone Sacklokham,	Prof. Silinthone Sacklokham,
LDD	Land Development Department	Thailand	Soil Sciences, Soil biodiversity, agriculture	Mr. Apichat Jongskul (DG)	Mr. Apichat Jongskul
KKU Faculty of Agriculture	Khon Kaen University	Thailand	Soil Biodiversity, Soil fauna,	Prof. Dr. Monchai Duangjinda	Prof. Dr. Yupa Hanboosong
KU Faculty of Agriculture	Kasetsart University	Thailand	Ecophysiology, tree plantation, C seq,	Prof. Sornprach Thanisawanyangkura (Vice President of KU)	Prof. Poonpipope Kasemsap
SFRI (VAAS)	Soils and Fertilizers Research Institute. Vietnamese Academy for Agriculture Science	Vietnam, Hanoi	Environmental sciences Soil sciences, impact of fertilizers	Dr. Nguyễn Xuân Lai (DG)	Dr. Toan Tran Duc Dr. Tran Minh Tien
ICH (VAST)	Institute of Chemistry of Hanoi Vietnamese Academy for Science and Technology	Vietnam, Hanoi	Water organic matter, soil and water pollution	Prof. Dr. Nguyen Van Tuyen (DG)	Dr. Trinh Anh Duc, Dr Luu Thi Ngueyt Minh

GOALS

This project aims to consolidate local skills in fields related to the conservation of soil ecological functions and soil environmental services.

A2- OBJECTIVE

SCIENTIFIC: The LMI will stimulate high quality research and team complementarities, on the impact of agriculture on soil ecosystem services linked to land use change. During the kick off meeting of LUSES in 2012, given the unprecedented expansion of perennial plantations in the Mekong area (*Acacia mangium* in Vietnam, *Teak* in Laos, Rubber tree in Laos and Thailand), we decided to focus on the transition from annual to perennial crops (and conversely). *In 2014, LUSES has focused on 3 scientific projects (see appendix F): Effect of land use on stream-ground water interactions (Ecofilter), Organic matter management (OMM) and Environmental impact of tree plantations (TREE). Reports of activities conducted in 2014 within the framework of these projects are available under § A4 and appendix F.*

Scientific goal: To establish the environmental consequences of rapid land use change which has lead to agricultural intensification on natural or already degraded environments (TREE and Ecofilter projects).

Applied Goal: To identify management techniques that improve ecosystem services and which could benefit from subsidies in the near future to improve environmental quality, income and the well being of farmers and the South-East Asian population (OMM project).

CAPACITY BUILDING: This project will help reinforcing capacity of local academic institutions in the domain of soil sustainability and functional ecology. This objective will be achieved by:

- Developing common scientific facilities (laboratories and fields experiments) in the field of soil ecological science.
- Sharing access to laboratories and instruments of the institutions involved in the LMI.
- Training researchers and technical staff through short individual or collective thematic schools
- Improve the quality of soil analysis in the 3 countries via the development of a laboratory network

A3- DID LUSES FULFILL THESE OBJECTIVES IN 2014?

A3.1- STIMULATION OF HIGH QUALITY-RESEARCH:

Since the launching of LUSES nine research projects were accepted for a total budget of 1.688.320 € (2,134,010US $) six being led by LMI LUSES scientists and two led by CIRAD colleagues from UMR ECO&SOLS who have strong interactions with LUSES. In 2014, two projects were accepted;

1. The French ANR Heveadapt[1] led by Philippe Thaler (HRPP-ECO&SOLS), in which LMI LUSES scientists lead half of the WP (2/4) and which involves all the Thai partners of the LMI (KKU, KU and LDD). An abstract of this project is given in appendix H.
2. A Young Research team project (JEAI ECO-RUBBER) funded by IRD, which involves Lao (NUOL and DALAM) and Thai partners (University of KKU and LDD region 5). *We should highlight that this project benefits from a substantial financial support from KKU (25k €).* An abstract of this project is given in appendix H.

[1] Sustainability and adaptation of rubber plantation systems in a changing socio-economic and climatic environment.

This success is first due the (i) high scientific capacity of LUSES members in finding research funding (ii) the higher visibility of the scientific network of Asian and French scientists around soil ecological science (iii) the development of laboratories, field and scientific facilities such as the LUSES-LDD regional soil microbiology platform. It must also be highlighted that LUSES' own dynamics benefited significant leverage of other research networks involving IRD, CIRAD and Asian partners such as the Regional Pilot Program (PPR) SELTAR, the Multi-Scale Environmental Change (MSEC) observatory, the Thailand International Cooperation Agency (TICA) projects (KU and LDD) and HRPP (Hevea research Platform in Partnership).

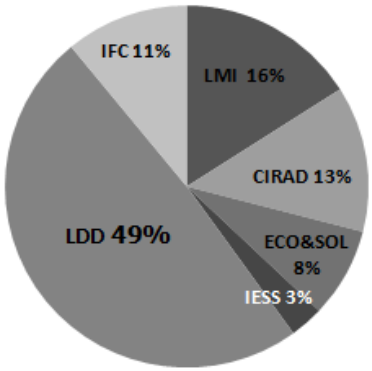
A3.2- CAPACITY BUILDING

This item represents one the main goals of LUSES; it has been achieved through:

- **The setting up of a new soil microbiology platform** within the department of Biotechnology of the LDD. This laboratory has been allocated nearly 141,800 € of equipment (see list in appendix E) partly from LUSES (16%) but essentially from diverse partners (LDD; ECO&SOLS, IFC projects, CIRAD, TICA LDD). It was officially commissioned on the 22 of May 2014 by LDD's DG Mr. Apichart Jongskul (see the journal of the ceremony in appendix G). This laboratory is under the responsibility of Dr. Didier Lesueur (CIRAD, LMI LUSES) and Mrs. Supaporn Junrungreang from LDD. It has been reinforced by the posting in 2014 of an International Volunteer from IRD (Mr. Pascal Alonso) in charge of the setting up the different labs techniques and quality protocols.

Table 2 List of institutional contribution to the LMI-LDD Platform

	Equipment (€)	%
LMI	23 500	16%
CIRAD	18 300	13%
ECO&SOL	11 000	8%
IESS	4 800	3%
LDD	71 200	49%
IFC	16 000	11%
TOTAL	144 800	



- **The implementation of a soil laboratory network entitled SEALNET** (South East Asia Laboratories NETwork) between the 3 countries of LUSES is a first step. The main objective of this network was to implement a soil quality control that involves the main LUSES partners to improve their performances through inter-laboratory sample exchanges and a statistical evaluation of the analytical data (see report SEALNET in appendix K). This project is leaded by Mrs. Nopmanee Suvannang, co-director of LMI and director of Soil Analysis Technical Group, and by Mr. Christian Hartmann, soil scientist form IRD posted in DALAM (Lao PDR). Mr. Pascal Alonso, IRD-LDD Bangkok (Thailand) provides a technical assistance. This project is also shared with the LMI CEFIRSE and we benefit from the expertise in quality control of Mr. JL Duprey, IRD posted in Bangalore (India). In 2014, the first action was a visit of the main soil laboratories of the LMI LUSES partners by Mr. JL Duprey and Mrs. N. Suvannang (see mission report SEALNET in appendix K); their objective was to evaluate their strengths and weaknesses in the organization and management of the soil/plant/water analysis.

- **Support to individual researcher and students** (10) with lab fees, tuition fees, field expenses etc. Support from LUSES to students and individual researchers in 2014 was of about 12.000 € (33% of co-funding) (See § D5 for this aspect)

- **Organization of collective trainings.** Twelve collective trainings (7 in 2014) involving more than 215 trainees (96 in 2014) were organized since 2012 (see § D.3 of this report).

A4- SCIENTIFIC PROJECT: A MAJOR CHANGE IN 2014

WHY DID WE CHANGE THE SCIENTIFIC STRUCTURE OF LUSES?

The LMI objective is to promote synergies between partners in order to implement international research programs on the impact of intensive agriculture practices on soil ecosystem services, in relation to land use changes. To achieve this objective, LUSES was, in the first two years, organized in 4 Work Packages related to main ecosystem services (WP1: nutrient cycling, WP2: biodiversity, WP3: C sequestration and WP4 the water cycle and erosion). But during the LMI LUSES meeting of the steering committee in 2013 (Hanoi), it appears that:

1. Structuration around WPs was not operational as no specific budget was dedicated to WPs.
2. During the first two years, LUSES focused on partner's capacity building via the organization of collective trainings and the implementation of a biological platform. Now this capacity has been strengthened, LUSES has to move forward and needs to reinforce its research component at a regional scale.
3. Based on these findings, we proposed that in 2014 more than half of the IRD budget would be used to support 3 projects involving most of the partner institutions.

TITLE	Organic Matter Management	Env. Impact of Tree plantation	Ecofilter (Land uses and stream ground) water)
ASIAN Leader	**Tran Duc Toan** **(***SFRI Vietnam)*	**Yupa Hanboonsong**	**Oloth Sengtahevanghoung** *(NAFRI Laos)*
France Leader	**Christian Hartmann** (IRD IESS)	**Alain Brauman** (IRD ECO&SOLS)	**Olivier Ribolzi** (IRD GET)

A5-SHORT DESCRIPTION OF EACH PROJECT

NB: A full report of each project could be found at the Appendix F

A5.1- ECOFILTER: EFFECT OF LAND USE ON STREAM-GROUND WATER INTERACTIONS

- **Title**

Effect of land use on stream-ground water interactions, overland flow genesis and the related ecosystem services of the critical zone in tropical agro-ecosystems [ECOFILTER]

- **Leader: Asian and French**
  i. Oloth Sengtaheuanghoung, Laos, Department of Agricultural Land Management (DALAM) Agricultural Land Use Planning Centre (ALUPC) - Ministry of Agriculture and Forestry (MAF)
  ii. Olivier Ribolzi, France, Institut de Recherche pour le Développement (IRD) - Géosciences Environnement Toulouse (GET)

- **Partners Asian and French**

Thailand	Vietnam	Laos	France	Others: India
LDD, DNP	SFRI	DALAM, NUoL	UMR IESS; UMR GET	CEFIRSE

- **Short context**

The long-term sustainability of tropical agro-ecosystems is at risk. This is due to a combination of biophysical factors (e.g. intense rainfall events or climate change), and of human-induced constraints such as rapid land-use change. In this context, a prerequisite to maintain functional biodiversity and associated ecosystem services of these production systems is to design and implement innovative agricultural practices that limit soil and fertility losses by overland flow, stream water contaminations and favour rainfall infiltration and storage in the soil ("green water").

- **Objective(s)**

The objective of the project is to provide new scientific knowledge on the filtration of overland flow ("grey water") by soil and vegetation along hill slopes and in the riparian zone in tropical agro-ecosystems.

The research will cover three converging scientific actions: **(1)** comparative study of the hydrological behaviour of studied catchments (i.e. overland flow genesis, groundwater inflows…) during storm and inter-storm periods; **(2)** estimation of the export of carbon in dissolved, particulate and gaseous forms at the outlet of the catchments, and quantification of the amounts trapped in the riparian zone depending on the vegetation cover types; **(3)** Study the dissemination during floods of free and particle-bound faecal contaminants (i.e. *E. coli)*.

In addition to these scientific questions, it is our objective to enhance capacity building through the training of colleagues from Thailand, Laos, Vietnam and India on the research methodologies implemented during the project and their interpretation (i.e. water quality measurements, geophysical-based and tracer-based approaches).

A5.2-OMM :ORGANIC MATTER MANAGEMENT

- **Title**

  Organic Matter Management [OMM]: respective effect of compost and vermi-compost on soil and plant.

- **Leader: Asian and French**
  - Toan Tran Duc (soil scientist): Soils and Fertilisers Research Institute (SFRI)
  - Christian Hartmann (soil physicist) : Institut de Recherche pour le Développement (IRD), UMR IEES-Paris, LMI LUSES, DALAM (Vientiane)
  - Pascal Jouquet (soil biologist), Institut de Recherche pour le Développement (IRD), UMR IEES-Paris, LMI CEFIRSE, IIS (Bengalore).

- **Partners Asian and French**

Thailand	Vietnam	Laos	France	Others: India
LDD Region 10 & 5, KKU	SFRI, ICH	DALAM, NUOL	UMR GET; ECO&SOLS, IESS	ISS, UAS (CEFIRSE)

- **Short context**

It is currently considered that soil biological activity stimulation resulting from organic matter addition is an efficient way i) to rehabilitate cultivated soils degraded by decades of intensive mining agriculture, ii) to maintain soil productivity in the context of peri-urban agriculture and iii) to recycle urban organic wastes. Indeed, the relations between organic matter addition, biological activity, and ultimately soil characteristics and plant development are complex, because they are multifactorial and encompass a wide range of interaction and feedback processes.

Organic matter is often added to soil under the form of compost (COMP) or vermi-compost (VCOMP). Most agronomical experiments only use one of these two products and rarely compare their respective characteristics and benefits. Few experiments, if any, compared simultaneously the biological, physical and chemical changes induced by COMP or VCOMP addition. Thus, it is still difficult to generalise published results on Organic Mater Management (OMM) and to finally make relevant recommendations to farmers or environmental managers.

- **Objectives**

Our practical objectives are:

1. To compare the characteristics of compost and vermicompost when made from similar organic products;

2. To measure the effect of compost and vermicompost when made from similar organic products on (i) soil physical, biological and chemical characteristics and thus on (ii) the development of a cultivated plant; the control will be same soil and plant with addition of chemical fertilisers.

3. To put a specific focus on plant response in the case of water stress or water deficiency when VCOMP is used because a significant positive effect of VCOMP was suggested by previous experiments.

In addition to these scientific questions, our objective is also to enhance capacity of researchers on some research methodologies and specific techniques that will be implemented during the project.

A5.3-TREE: TREE PLANTATION PROJECT

- **Title**

Impact of tree plantation on soil function and soil biodiversity

- **Leader: Asian and French**
  - Pr. Yupa Hanboonsong (KKU), Vice professor of Entomology, faculty of Agriculture of Khon Kaen.
  - Alain Brauman Institut de Recherche pour le Développement (IRD) – UMR ECO&SOLS, Land Development Department. Bangkok. Thailand

- **Partners Asian and French**

Thailand	Vietnam	Laos	France
LDD Biotech Soil Science + Region 3, 5 and 11, KU, KKU, PSU	SFRI	NUoL	UMR ECO&SOLS, UR 34 CIRAD, UMR CEFE

- **Short context**

South East Asia concentrates more than 92 % of the world production of natural rubber. In the last decades rubber plantations replaced many farming systems as traditional subsistence agriculture or commercial crops, but also encroached into and replaced large areas of natural forests, especially in the Greater Mekong Subregion (GMS). Despite the economic and ecological [U3]importance of rubber, studies on the influence of rubber trees plantations on the environment and more specifically on the main soil ecosystem services remains scarce

- **Objective(s)**

This proposal has a dual scientific and methodological objective

1- SCIENTIFIC OBJECTIVE

General: To characterize the impact of rubber tree plantations on soil biodiversity and related soil ecosystems services such as nutrient cycling and C sequestration, in Thailand and Laos.

Specific in 2014: To characterize and assess the impact of agriculture practices on soil functional biodiversity, C sequestration and nutrient cycling.

2- Methodological Objective

Why a methodological objective? The scientific objective involves the comparison of a wide range of agro-ecosystems under different pedo-climatic conditions. To this end, we propose to develop a set of time and cost-effective techniques (so-called BIOFONCTOOL) to assess functional parameters related to the targeted soil functions

Methodological objective: to set up a set of functional tests to characterize the following functions: OM mineralization, (lamina baits), nutrient cycling (resin), soil fauna activities (humus index).

We also aim to increase the capacity building on Asian partners in soil ecology and biology

B] PARTNERSHIP

The LMI LUSES includes 73 partners from the 4 countries, 32 French (9 of which posted in the 3 SEA countries), 15 Laotian, 21 Thai and 5 Vietnamese. They are all involved in the 3 scientific projects (see figure below)

The strength of the LMI LUSES is rooted in its international dimension: because LUSES is a complex project involving seven major Asian institutions (Table 1) and large French research units (UMR), the organization of an annual meeting and the visit of the different partners by LUSES director is an important clue to preserve the regional dynamics of the project

1. LMI ANNUAL MEETING AND EXECUTIVE COMMITTEE MEETING

After Bangkok in 2012 and Hanoi in 2013, the annual meeting of the LMI LUSES took place in Vientiane, Laos this year from October 13th to 15th. The meeting was organized and hosted by the Department of Agricultural Land Management of Laos (DALAM) jointly with the National University of Laos (NUoL). It gather more than 50 scientists originated from the 4 countries involved in the project (France, Laos, Thailand, Vietnam). This meeting was the opportunity for LUSES partners to reinforce the partnership and the relationships between the 2 French and 7 Asian institutions. The objective was to gather and update each other on the ongoing projects conducted by LUSES teams, to make statements one year after the last annual meeting (Hanoi 2013) and to determine the main priorities for 2015. The meeting lasted 2 days (see program and short report in appendix C) and was followed by the Executive committee (EC) meeting on the 16th of October (see report in appendix D). The EC approved the scientific report of LUSES 2014 and the budget proposed by the two directors for 2015, which is in line with the previous budget with a clear priority to research actions (> 70% of the budget). The EC was satisfied with the scientific and governance orientations of the LUSES project in 2014. This project has now gained momentum through effective sharing between participant institutions and despite the inherent complexity of LUSES, it is becoming a recognized scientific actor in the field of soil ecology in the 3 countries involved in this project. For 2015, the EC recommend to:

- Foster the involvement of Vietnamese partners in 2015,
- Promote scientific production
- Increase the interactions between the 3 projects.

2. VISIT IN LAO PDR OF LMI LUSES COORDINATORS IN APRIL 2014

- **Program and objective**

Date	Time	Meeting details	Location	Object
17/3	Morning			
		Visit of 2 NuoL lecturers (Mr Avakat et Phimmason.	DALAM NAFRI	• Determine what must be done for finalizing their registration at KKU as PhD students • Define their work schedule in 2014
		Visit of DP CANSEA (Pascal Lienhard and colleagues)	DALAM NAFRI	Potentiel linkage beween Cansea and LUSES
	Afternoon			
		Meeting with Pr. Siilinthone	NuOL	Determine the organization of LMI LUSES annual meeting 2014 in Vientiane,Lao
				Determine study plan for NuOL Phd students Avakat and Phimmasone. Plan the organization of LMI LUSES meeting with NUOL and DALAM
		meeting with French ambassy Jérôme DUBOIS-MERCENT	French Embassy	• Present LMI LUSES projects • Inform the date of LMI LUSES annual meeting and request the support for workshop of annual meeting • find support for Lao Phd students ; Avakat and Phimmasone
18/3	Morning	Meeting with CIAT staff ; Adrian Bolliger, Tassilo Tiemann and Aparna Man)	CIAT Office NAFRI	Present the LMI LUSES project to CIAT. See potential linkage with their research Topic
		Meeting with Oloth	DALAM	Selnet network and Dalam: how can LUSES could increase soil quality analysis
	afternoon	meeting with AFD	AFD house	Funding opportunities
		Departure to Bangkok through Udan tani		

- **LMI LUSES visiting team**
  - Mrs Nopmanee Suvannang: LDD, Director of LUSES. Thailand
  - Mr. Alain Brauman: IRD, Director of LUSES
  - Mr. Christian Hartmann, IRD, DALAM, Lao PDR
  - Mr. Alain Pierret, IRD, DALAM, Lao PDR

- **Main output of the visit**
  - Involvement of 2 NuOl lecturers and 2 Dalam researchers[2] in PhD studies under the framework of LUSES and the JEAI ECO RUBBER lead by Christian Hartman
    - NUoL
      - Mr. Avakat Phasouysaingam, lecturer confirmed his willing to begin a PhD thesis on the impact of agricultural practice on soil functioning rubber plantation in Lao. His supervisor will be Dr. Anan Photanee, Professor at KKU, Pr. Silinthone (NUOL) and Isabelle Vigneron (CIRAD).
      - Mrs Phimmasone Sisouvanh, lecturer will also be involved in a PhD thesis on the impact of vermicompost on soil physical and biological characteristics. Under the supervision, Ass.Prof. Dr. Vithaya Trelo-Ges (KKU) and Dr. Christian Hartman (IRD).
    - DALAM
      - Mr. SAYAVONG Saysongkham Current position: Land Use Planning/ GIS Specialist at DALAM. Title of thesis "The extension of tree plantations in Nothern Laos by remote sensing and impact on Land Sustainability" supervised by Dr. Roengsak Katawatin (KKU), Olivier Ribolzi and Yves Auda (GET)
      - Mr. SOULIYAVONGSA Xaysatith Current position: Deputy Chief of soil laboratory. Title of thesis "Influence of tree plantations on soil chemical characteristics, nutrient content and cycling" His PhD will be supervised by Vidhaya Trelo-ges from KKU and Christian Hartman (IRD)
  - DALAM with the help of NuOL propose to organize the LMI LUSES meeting in Vientiane in the campus of Dalam.
  - French Embassy will organize "Journee de la Recherche" on the same time than LMI LUSES. This will allow the participation of Thai and IRD scientists to this meeting.

[2] The involvement of the 2 DALAM researchers in a PhD was done recently in December 2014 so 6 months after after the visit of the coordinators.

- CANSEA: Potential interaction of LUSES team with the DP CANSEA and EFICAS project. A meeting has been organized by PPR SELTAR on the 18th of December to determine the potential projects which can be shared by our teams.

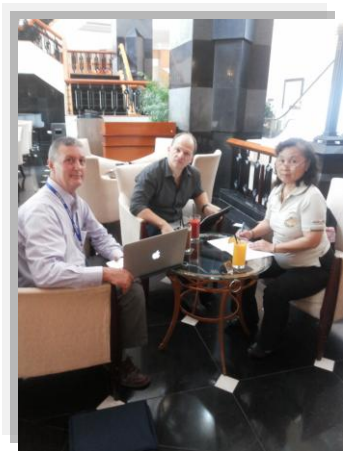
2. VISIT IN VIETNAM OF LMI LUSES COORDINATORS IN JUNE 2014

Preamble:

Before the formal LMI visit to our Vietnam's partners, Alain Brauman and Jean Trap (IRD researchers of ECO&SOLS), both members of LMI LUSES has the opportunity to presents their work to a meeting organized by Stephane Bellafiore, IRD scientist from LMI RICE on "Epidemiology of Plant Parasitic nematode in South East Asia". The workshop was funded by BIOASIA and the PPR SELTAR

- **Program and objective**

Date	Time	Meeting details	Location	Object
16 to 17-06	Day	Participation to the Workshop Meloidogyne	Hanoi	Give 2 oral presentations- determine the possibility to incerase LMI LUSES and RICE interaction
18/6	Morning			
		Meeting with IRD and CIRAD representatives : Jean Pascal Torréton (IRD representativeà); Philippe Girard (CIRAD Regional Representative)	IRD Office in Hanoi	Present a statement of LUSES after the Hanoi LMI annual meeting regarding the 3 main scientific project, the Sealnet network etc..
		Meeting with USTH Pascal Gantet and S. Grellier	USTH Campus	How LUSES could be beter involved in USTH action such as Students internship, lectures etc..
	Afternoon			
		Meeting with SFRI Toan Tran Duc : Responsible of International relationship in SFRI and MSEC Thuy Doan : Researcher in soil science, Fong,: Deputy Land Use Research dept	SFRI	Determine how SFRI could be more ivolved in the LUSES project (Cafe, Acacia , Rubber); see involvement of SFRI on the Soil Analyses Network
19/6	Morning			
		Meeting with ICH and INPC (Inst of Nat product) Quynh Le Thi Phuong (deputy head Biogeochemistry)+ PhD student Nguyen Thi Mai Huong	INPC Campus	See how luses could be involved in CIAT CRP 'consortium research project (Forest Tree and Agriculture)
	Afternoon	Departure for Bangkok		



Visit of CIAT representative

Visit of INPC and ICH representatives

- **LMI LUSES visiting team**
    - Mrs. Nopmanee Suvannang: LDD, Director of LUSES. Thailand
    - Mr. Alain Brauman: IRD, Director of LUSES
    - JL Janeau, IRD, soil scientist of LMI LUSES posted in Vietnam
- **Main output of the visit**

LMI RICE

- Set up a common training on nematode's identification with the involvement of Dr. Teodora Cabasan from University of Southern Mindanao in 2015
- Try to work on a nematode's network between France and SEA scientist.
- Need to set up a proposal to PPR SELTAR in 2015 on a common projet (LMI RICE-LUSES) link to the setting up of more sustainable agricultural practice on rice in order to reduce nematode's parasitism and increase rice yield and soil quality.
- Pascal Gantet (the current LMI RICE leader) will be replaced by Michel Lebrun who is a specialist of beneficial microorganisms.

USTH

- Biotechnology and Pharmacology axe could interested the biologist involved in LUSES
- USTH deliver double master diploma from France and Vietnam
- PhD grant are only for Vietnamese student
- Asian students could apply for international master degree but they need to be selected and speak English
- Subject for master need to be send in August
- We could apply for USTH research project (10.000 $ / year mostly for networking) with LMI RICE

SFRI

- SFRI is interested in Rubber researchs and especially on Agroforestry. Regarding this topic, they already develop some interactions with ICRAF and the North West Agroforestry Institute
- SFRI is keen to participate actively to the soil analytic network develop by LUSES. They will participate to the inter-calibration program using the reference soil.
- Regarding the LUSES project, they want to be more involved in the OMM project because they are interested to apply vermicompost based on manure in lowland rice fields. 2 students of Thuy work on this field (Nguyen thi An, bachelor level and Le Thi To Giang who do her internship with Pascal Jouquet in India.)

INPC

- Develop research on Environment and natural resources.
- They develop research projects with IRD team (D. Orange, JL Janeau, Emma Rochelle Newal), they are involve in the NUCOWS project and were members of the JEAI BIOGEAQ.
- They are more water oriented than soil oriented.
- This institute is interested in LUSES project and could be involved in the second phase of LMI in 2016.
- They would like to participate actively to the soil analytic network develop by LUSES by the inter-calibration program using the water reference.

CIAT

- CIAT is located in NAFRI and work with LMI partners such as NAFRI and NUOL
- CIAT lead a consortium research project named CCAGS (climate change climate smart technology and food security)
- They want to promote climate smart technologies coming from diverse institutions but they need partners to better evaluate these technologies on soil services.
- Others consortium may be interested for LUSES; Water land and Ecosystem and Forest tree and agriculture. Need to follow the calls on their website.

C] LUSES GOVERNANCE AND FUTURE EVOLUTION

C1- DESCRIPTION

The International Joint Laboratory LUSES is an operating tool of the IRD based on a common scientific project constructed and directed in partnership with our local partners. The International Joint Laboratory is characterized by:

- Shared governance with our local partners
- Hosting of the project within a partner site
- Development of research activities and innovation from a common project based on shared scientific facilities
- A partnership established over time

C2- COORDINATORS

The LMI has two co-coordinators (one French and one Asian) at the same hierarchical level. The two directors of LUSES are Mr. Alain Brauman, Director of Research at IRD posted at the Land Development Department since the 1st of September 2011 and Mrs. Nopmanee Suvannang in charge of the director of the « Soil Analysis Technical Service, Office of Science for Land Development », LDD.

C3- CHANGES IN THE LUSES GOUVERNANCE STRUCTURE IN 2014

When it was launched in June 2012, LUSES' governance included two project directors, a Scientific Committee and a Steering Committee. One of the main weaknesses of this structure was the unclear distinction of the respective rules of the two committees. So we followed the suggestions of the steering committee meeting (cf. report S.C. Hanoi 2013) and modify the governance of the project by:

- Replacing the scientific committee by an Executive Committee (EC) composed of LMI members including the French Research Unity leaders of UMR IESS, ECO&SOLS and GET

- The executive committee will be in charge of all the operational aspects of the project relating to the funding, organization and functioning of the partnership. The executive committee will meet on an annual basis.

- The composition (see table 3) of this committee is based on the following principles:

    - Committee must be small (no more than 14 members)
    - Members must be scientific experts;
    - Balance between French and Asian experts
    - The majority of the institutions involved in the project must be represented
    - An Institutional Committee replaces the Steering Committee

- Composition: The Institutional Committee (IC) (see appendix A) will be composed of 9 representatives of the 7 Asian and 2 French institutions involved in the project. The directors will be invited to attend and, whenever necessary, the 3 French Research Units leaders will be invited or others external scientific experts.

- Role: Approve the scientific orientations of the project and check compliance between these orientations, trainings and teaching programs. The Institutional Committee will be in charge of renewing the directors and will meet 3 times along the project (beginning, midterm and end)

Conclusion: The LMI governance is now more simple and operational and will be kept unchanged until the end of the initial phase of project.

Table 3 Executive committee list

Names	Institu	Coun	Official title
Mr. Christian Valentin	IRD	France	Deputy Director of UMR IESS head of PPR SELTAR
Mr. Olivier Ribolzi	IRD	France	LMI CEFIRSE representative, UMR GET, Project leader
Mr. Jean-Luc Chotte	IRD	France	Director of UMR ECO&SOLS
Mr. Oloth Sengtahevanghoung	DALAM	Laos	Deputy Director, Project leader
Mr. Alain Pierret	IRD	Laos	Researcher, LMI LUSES, Dalam
Mr. Christian Hartmann	IRD	Laos	Researcher, LMI LUSES, Dalam, Project leader
Mr. Silinthone Sacklokham	NUOL	Laos	Vice Dean of the Faculty of Agriculture
Mr. Didier Lesueur	CIRAD	Thailand	Researcher, LMI LUSES, LDD
Mr. Alain Brauman	IRD	Thailand	Co-Director of the LMI LUSES, LDD
Mrs. Yupa Hanboonsong	KKU	Thailand	Professsor, Project Leader
Mr. Poonpipope Kasemsap	KU	Thailand	Director of DORAS Inst.
Mrs. Nopmanee Suvannang	LDD	Thailand	Co-Director of the LMI LUSES
Mr. Trinh Anh Duc	ICH	Vietnam	Researcher, Coordinator of EAI-BioGEAQ
Mr. Toan Tran Duc	SFRI	Vietnam	Head Departement Soil Environment, BioGEAQ

D] REPORT OF LUSES MAIN ACTIVITIES IN 2014

D1- 2014 MAIN EVENTS

Date	Activity
10-13 February	Participation of LMI and HRPP coordinators to the WCA (agroforestry) congress in New Delhi
03-07 March	Coll. Training on Characterization of soil molecular structure. LDD- LMI LUSES Platform. Thailand
04-19 March	Mission to LMI and HRPP by Frederic Do (IRD, UMR ECO&SOLS)
17-18 March	Mission of LMI LUSES directors to LMI partners in Lao PRD.
31 March -02 April	Training on Vermicompost, KU,Thailand
01-11 April	Mission of T. Chevalier (IRD, ECO&SOLS) and J. Abadie (INRA, ECO&SOLS), trainers for the Coll Training on microbial activities and Soil organic particle
02-04 April	Coll. Training on "Characterization of soil microbial activities. LDD- LMI LUSES Platform. Thailand
08-10 April	Coll. Training "Characterization of Soil Organic Particle , Soil analysis Laboratory. Thailand
18 April	Coll. Training with NUCOWS "Polar Organic Chemical Integrative Sampler: POCIS in practice" (D. Orange, Tran Thi Nhu Trang), VNU-HCMC, Vietnam
21-22 April	Mission of the The SEALNET LUSES network (JL Duprey IRD and N. Suvannang LDD) in Vietnam
21-25 April	Coll. Training."Biofertiliser", LDD- LMI LUSES Platform. Thailand
29-30 April	Mission of the The SEALNET LUSES network (JL Duprey IRD and N. Suvannang LDD) in Lao PDR.
22 May	Official opening ceremony of Regional Platform of Microbiology LDD- LMI LUSES
08-10 June	Mission to Khon Kean, Thailand, experiment site by Michel Grimaldi (IRD, IESS Biophys team)
16-17 June	Participation to the LMI RICE workshop on nematodes
18-19 June	Mission of LMI LUSES directors to LMI partners in Hanoi, Vietnam
16-20 June	Coll. Training on EcoFilter, Luang Pra bang, Lao PDR.
23 -24 June	Setup of the long term intercropping exp (Buriram, Satuk) Thailand

15-17 July	Mission of Jean Trap (IRD, ECO&SOLS) Biofunctools field experiment in Chachoengsao, Thailand
28-30 August	Planting of intercrop (Buriram, Satuk) Thailand
28-29 August	2014 International Conference on Rubber (2014 ICR), Pattalung, Thailand. Co-organization and contributions.
08-10 September	Visit of LMI partners in Vientiane to organize LMI Annual meeting, Lao PDR.
07- 09 October	Mission Michel Grimaldi (IRD, IESS Biophys team) to LMI and JEAI partners, Lao and Thailand
13-14 October	**LMI annual Meeting, Vientiane, Lao PDR**
15 October	LMI meeting of EC committee, Vientiane, Lao PDR
15-18 October	Workshop on Sustainability of Natural Rubber in the 21st Century, Vientiane, Lao PDR. Co-organization and contributions
20-29 October	Setup of field measurements with the method learned during the EcoFilter training, Lao PRD.,
03-14 November	Coll. Training 'how to measure Soil biodiversity", KU, CRCC Chachoengsao and LDD Thailand

Comments: The main achievement in 2014 was the launching up of three scientific projects and the SEALNET soil laboratories network, the organization of seven collective trainings, the organization of the annual meeting of LUSES in Lao followed by the organization of an international workshop on rubber sustainability involving nearly 80 international scientists. (see appendix J)

D2-COMMUNICATION

- The website (www.luses.ird.fr) has been revamped by our LMI assistant and we will include all the papers and presentations delivered by the LMI members during the annual meeting. The website is now well indexed by Google.
- Thanks to Dr Christian Hartmann, the Tree Plantation together with the JEAI ECORUBBER one ((http://jeai-ecorubber.jimdo.com) and the OMM project (http://sbsm-omm.jimdo.com/) has now their own website.
- A Facebook page has (www.**facebook**.com/**LMILUSES**) has been opened but must be shared more widely amongst LMI members
- A flyer has been finalized with the help of the IRD Representative in Bangkok

D3-COLLECTIVE TRAINING

TWO KINDS OF TRAINING WERE OFFERED IN 2014:

1. 4 collective training involving most of the regional institutions of the LUSES project (see table 4)

2. Specific or team training (table 5) involving just one team (example training on soil microbial structure done for the LDD Biotech team) or just few students or researchers involve in a specific project project (ex: Vermicompost done in Kasetsart univ. for 2 trainees of LDD and NUOL)

Table 4: Collective training of 2014 organized or co-organized by LUSES

Title	Localization	Country	Country	Trainees	Projects link	IRD	Co-funding	%	Origin of co-funding
Characterization of soil microbial activities	LDD-LMI platform	Thailand	Lao P.D.R, Thailand, Vietnam,	20	TREE ; OMM	1,728 €	7,369 €	81%	IFC,YARA,ECO&SOLS,TICA
Biofertiliser Training Course	LDD-LMI platform	Thailand	Lao P.D.R, Thailand, Vietnam, Cambodia	20	TREE;OMM	- €	13,000 €	100%	Crawford Fund, Daekin Unv. LDD
Training on EcoFilter	Luang Prabang	LAOS	Lao P.D.R, Thailand, Vietnam,	6	ECOFILTER	3,185 €	-	-	
Soil biodiversity training	CRCC Field and KU	Thailand	Lao P.D.R, Thailand, Vietnam,	14	TREE	4,606 €	5,500 €	54%	IFC, DP CANSEA,CRCC, TICA
			Sub-total	**60**					

NB BIOFERTILIZER Training: The organization of the collective training on beneficial microbes with Deakin University (Australia) previously schedule in 2013 has been postponed to 2014. LUSES contribute in 2013 for 4000 € (25% of the total budget).

Table 5: Team training organized by LUSES

Title	Localization	Partners	Country	Trainees	Projects link
How to measure Soil microbial molecular structure	LDD-LMI platform	LDD	Thailand	13	TREE
Characterization of the Soil Organic Particle (SOM)	LDD, Soil lab.	LDD, KU, NuOL	Thailand, Lao	20	OMM;TREE
Vermicompost	Kasetsart Univ.	NUOL, LDD	Thailand, Lao	2	OMM
			Sub-total	**35**	

Table 6: Distribution of participants by country

Country	No. of participants 2012-2013	2014	2012-2013-2014
Cambodia	2	2	4
Indonesia	1	0	1
Laos	19	12	31
Thailand	76	74	150
Vietnam	21	8	29
Total	**119**	**96**	215

This table shows that the part of trainees from each country is stable over the 2 years (2013 and 2014)

In 2014 more than 96 candidates (some applicants participated in more than one training course) participated in these training courses. 70% originated from Thailand as most of the training sessions (5/6) were organized in Thailand. Nevertheless, 20 trainees originated from Vietnam and Laos were able to attend these training sessions.

D4- VALORIZATION

Publications	Ref. Journal[3]	non ref. Journal[4]	Congress [5]	Student Report
2012-2014	7	4	22	5

The complete list of publications related to the project is presented in appendix B. Because LUSES is still a young project (2.5 years), we could not expect an important number of papers in peer review journals. A significant effort must be made in 2015 to increase the numbers of such publications.

[3] In referenced journal

[4] In non referenced journal

[5] Oral conference

Table 7: 2014 Consolidated Budget repartition with scientific projects (€)

2014	IRD	Co-funding	Total	% Cofund.	Origin of co-fundings
Administration					
Admin	4,936 €	3,000 €	7,617 €	39%	TICA Thailand
Animation	2,326 €	8,199 €	10,425 €	79%	TICA Thailand
Annual meeting	6,500 €	8,356 €	14,856 €	56%	IESS-ECO&SOLS-SELTAR-IFC-CIRAD
Capacity building					
OMM	8,761 €	3,000 €	11,743 €	26%	CEFIRSE, LDD, Royal Project
ECOFILTER	8,884 €	20,000 €	28,884 €	69%	ANR TECITEASY, MSEC, IESS, GET,
TREE PLANTATION	8,843 €	40,698 €	49,441 €	82%	IFC, CRCC, YARA, HRPP, TICA LDD, TICA KU, Cansea, ECO&SOLS
SEALNET Network	1,850 €		1,650 €		
LUSES coll. Training	2,900 €	13,000 €	15,500 €	84%	
Total	**45,000 €**	**112,517 €**	**156,399 €**	72%	
% co-funding	**28%**	**72%**			

The budget devoted by the LMI LUSES to capacity building and research correspond now to 78% of the total budget.

Co-funding: This year was characterized by an important increase of co-funding (52% in 2013, 71 % in 2014) originating from funded scientific projects such as ANR TECITEASY10.000 € for Ecofilter or the French Institute for Natural Rubber (12,000 € for TREE PLANTATION) but alsofrom Asian partners such as TICA (LDD + KU 9,800 € for TREE plantation,) or LDD (3,000 € for OMM project). This demonstrates the important leverage of the LMI LUSES project, as the IRD contribution to the overall project is less than 30% now.

Table 8: 2014 Consolidated Budget repartition by main items (€)

2014	IRD	Co-funding	Total	% Cofund.	Origin of co-fundings
Administration					
Admin	4,636 €	3,000 €	7,636 €	39%	TICA Thailand
Animation	2,326 €	8,199 €	10,525 €	78%	TICA Thailand
Annual meeting	6,500 €	8,356 €	14,856 €	56%	IESS-ECO&SOLS-SELTAR-IFC-CIRAD
Capacity building					
Collective training	10,570 €	45,530 €	56,100 €	81%	IFC, CRCC,YARA,HRPP,TICA LDD, TICA KU, Cansea, ECO&SOLS
Ind supports	7,760 €	3,800 €	11,560 €	33%	TICA KU, CEFIRSE
Field and laboratory works	11,558 €	43,632 €	55,190 €	79%	IFC, YARA,HRPP, TICA LDD, TICA KU, ECO&SOLS, LDD,ANR TECITEASY, MSEC, IESS, GET
SEALNET Network	1,650 €		1,650 €		
Total	**45,000 €**	**112,517 €**	**157,517 €**	71%	
% co-funding	**29%**	**71%**			

Table 9: Comparison with 2013

2013	LUSES	Co-funding	Origin of co-fundings
Administration			
Secretary + admin	4 000 €	3 000 €	TICA Thailand
Reserve Luses	5 156 €	3 000 €	TICA Thailand
Annual meeting	8 000 €	7 775 €	IESS-ECO&SOLS-SELTAR
Capacity building			
Equipment	10 014 €	700 €	ECO&SOLS
Collective Training	15 830 €	34 850 €	HRPP-SELTAR,KKU,KU,RICE
Ind. Support	7 000 €	2 500 €	Kasetsart Univ.
Total	**50 000 €**	**51 825 €**	
% co-funding		**52%**	

Compared to 2013 and despite a reduction of 5,000 € of the IRD contribution, the distribution within the different items did not really change. We could just notice, following the Steering Committee recommendation, a significant decrease of "animation" budget.

CONCLUSION

The evolution of LUSES fits with its initial objective regarding the reinforcement of local capacity in the field of soil ecology.

- In 2014 the simplification of the LUSES governance (replacement of the scientific committee by an executive committee) and implementation of thematic actions, which will replace the open internal call represented a major evolution which seems now well accepted by our partners
- The important increase of LUSES co funding (from 50 k€ in 2013 to 150 k€ in 2014) demonstrates that the project has induced a funding "snowball effect"
- The funding of new projects, involvement of LUSES in the co-organization of international meetings, increasing numbers of publications are clear indicators of the increasing scientific visibility of this project.