



Agroecology and
Safe Food System
Transitions



Crop livestock integration in Vietnam: boosting agricultural sustainability through innovation technical models and supportive local and national policies

Le Thi Thanh Huyen, Han Anh Tuan, Nguyen Thanh Trung (NIAS), Do Trong Hieu (NOMAFSI), Dong Thi Na, Pascal Lienhard, Mélanie Blanchard (CIRAD)

3rd Greater Mekong Subregion Agriculture Ministers' Meeting (AMM-3) Kunming, Yunnan, People's Republic of China, from 19th -22nd Nov. 2024.



Innovative models: forage, silage and compost

1. **Forage** production



6. Compost use for **crop fertilisation**



5. Processing in **compost**



4. **Manure** collection



3. Animal raising in **stall**

Testing innovative models on farms

with various objectives

- **Diversify and increase** forage production
- Design **intercropping system** with forage
- **Conserve the quality** of forage & silage
- Valorise the manure into **quality compost**

- Support the **adoption** by farmers

2. Processing into **silage**



Diversify and increase in forage production

Support farmers access to **planting material**, and a **diversity** of forage species

Farmers knowledge on **forage management**

Forage	Description	Annual Prod (ton FM/ha)
Green Elephant grass (Taiwan)	Forage cane. Newly introduced in the region. Less piths (easier to cut for farmers, and to eat for animals)	20-60
Mulato 2 grass	Erected grass. Hybrid. No risk of seeds contamination /unwanted propagation as compared to other grasses (e.g. ruzi grass). Softer than forage canes.	15-50
Guinea grass (Mombasa)	Erected grass. More productive than traditional guinea grasses (TD58, purple). Softer than forage canes.	15-50
Stylosantes g. (Ubon)	Forage legume. Improve animal feed quality (fresh or silage). More productive than traditional CIAT 184	5-15

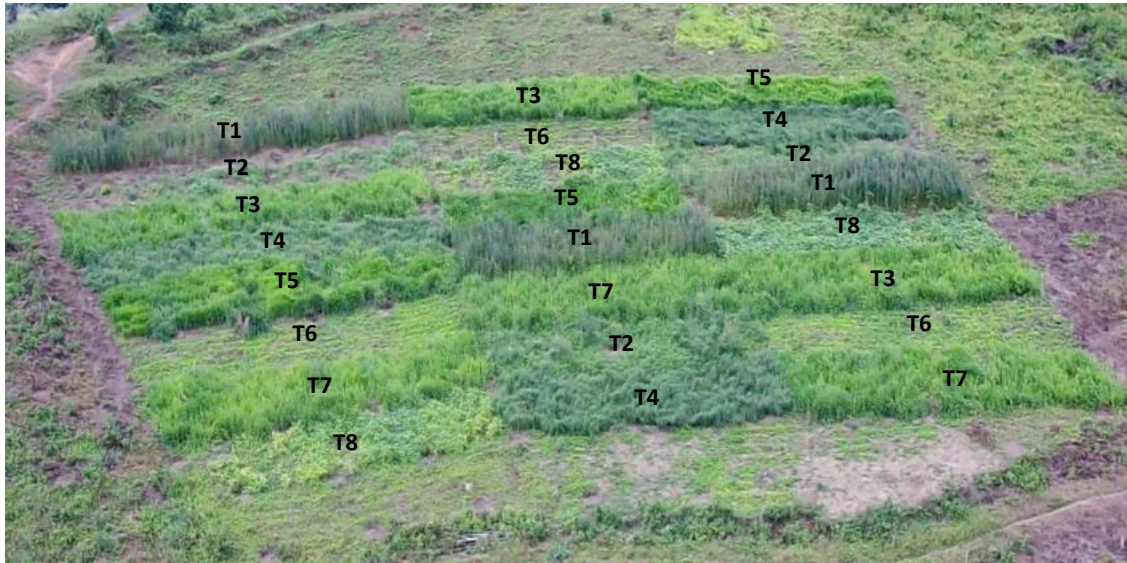
Taiwan Green Elephant Grass : Large enthusiasm from farmers, good yield, can be used as green forage or silage (storage), preferred compared to VA06 (less pith).



Co-design of intercropping systems with forages

- Insufficient **land available**: need for **new production modes**
- **Intercropping systems with forages** help decreasing soil erosion and preventing landslide in sloping agricultural areas
- **Some demo plots supported by ASSET**
 - Forage strips in coffee and Maca plots
 - Intercropping of diversity of forage in Maca plantation
 - Monitor effect of forages on soil health and Maca growth in intercropping/monocropping systems

Experiment Macadamia and forage grasses (Tuan Giao)



Treatments:

- T1. Sunnhemp and Rattlepod
- T2. Centrosema
- T3. Brachiaria ruzi
- T4. Stylosanthes (Ubon)
- T5. Mulato II
- T6. Forage peanut (pinto)
- T7. Ruzi + stylo
- T8. Rice bean

Guinea grass strips in cassava (Tuan Giao)



Guinea grass strips in coffee (Mai Son)



Conserve the quality of forage with silage production

Goal : maintain the quality of forage to shift use to a period of forage deficit

Support farmers **capacity building**

Support farmers **access to equipment and inputs.**

Incentive packs : EM, choppers and bags

Investissement	Unit price (VND)	Nb of years depreciation	Remarks
Forage and cassava stem chopper	5 000 000	5	1 chopper/group of 5-7 farmers
Double layer bag for silage (800-1000 kg)	160 000	3	2 bags/farmer

Annual inputs (for 2 silage bags)	Unit price (VND)	Qty (kg)	Annual cost (VND)	Remarks
Efficient Microorganisms (EM) Guard II	180 000	1	180 000	0,5kg/bag
Salt	8 000	6	48 000	3 kg/bag
TOTAL (VND)			228 000	



Technical leaflet on silage processing (En, Vn)



Valorise the manure into quality compost

Goal : support the production of high quality organic fertiliser on farms, decrease the dependence on chemical fertilizers

Support farmers **capacity building**

Support farmers **access to equipment** and **annual inputs.**

Incentive packs: EM, plastic cover (roof, canvas) and Compressor



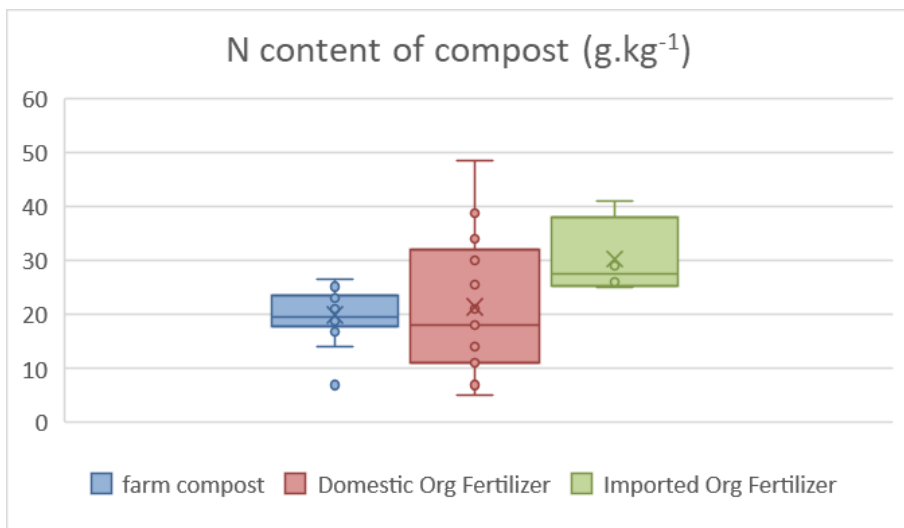
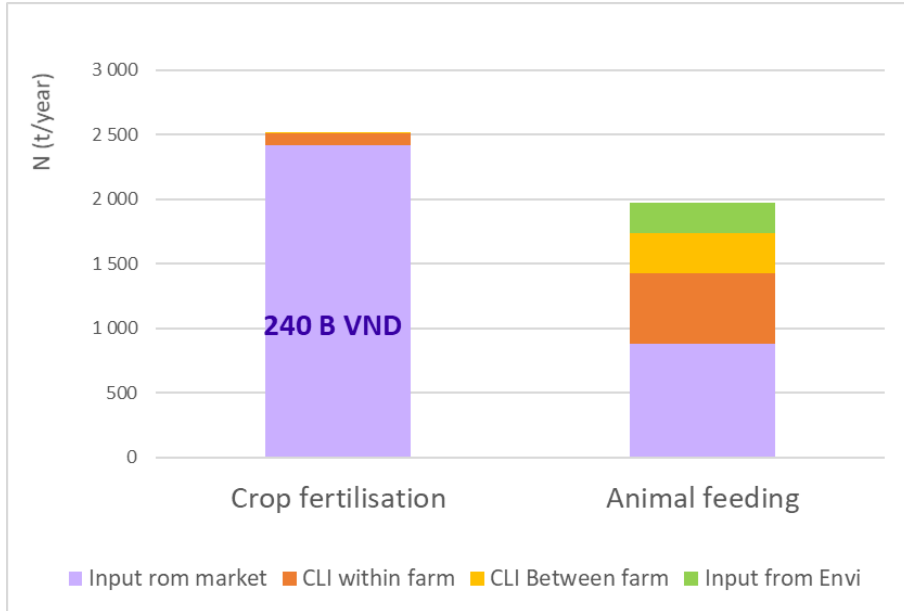
Technical leaflet on composting (En, Vn)

Annual inputs (for 1 ton of compost)	Unit price (VND)	Qty (kg)	Annual cost (VND)
Efficient Microorganisms (EM) Trichoderma plus humic	100 000	1	100 000
Rice bran or corn starch	7 000	5	35 000
Phosphate	6 000	5	30 000
Urea	16 000	0,2	3 000
Potassium	20 000	0,2	4 000
TOTAL (VND)			172 000

Investment	Unit price (VND)	Nb of years depreciation	Remarks
Roof for compost pit	500 000	10	10-12 sheets of tole
Canva	70 000	5	To cover compost pile
Compost compactor	33 000 000	10	To facilitate handling and storage; improve conservation and marketing of compost



Farm composts: Satisfactory quality and potential for reducing dependency on external inputs

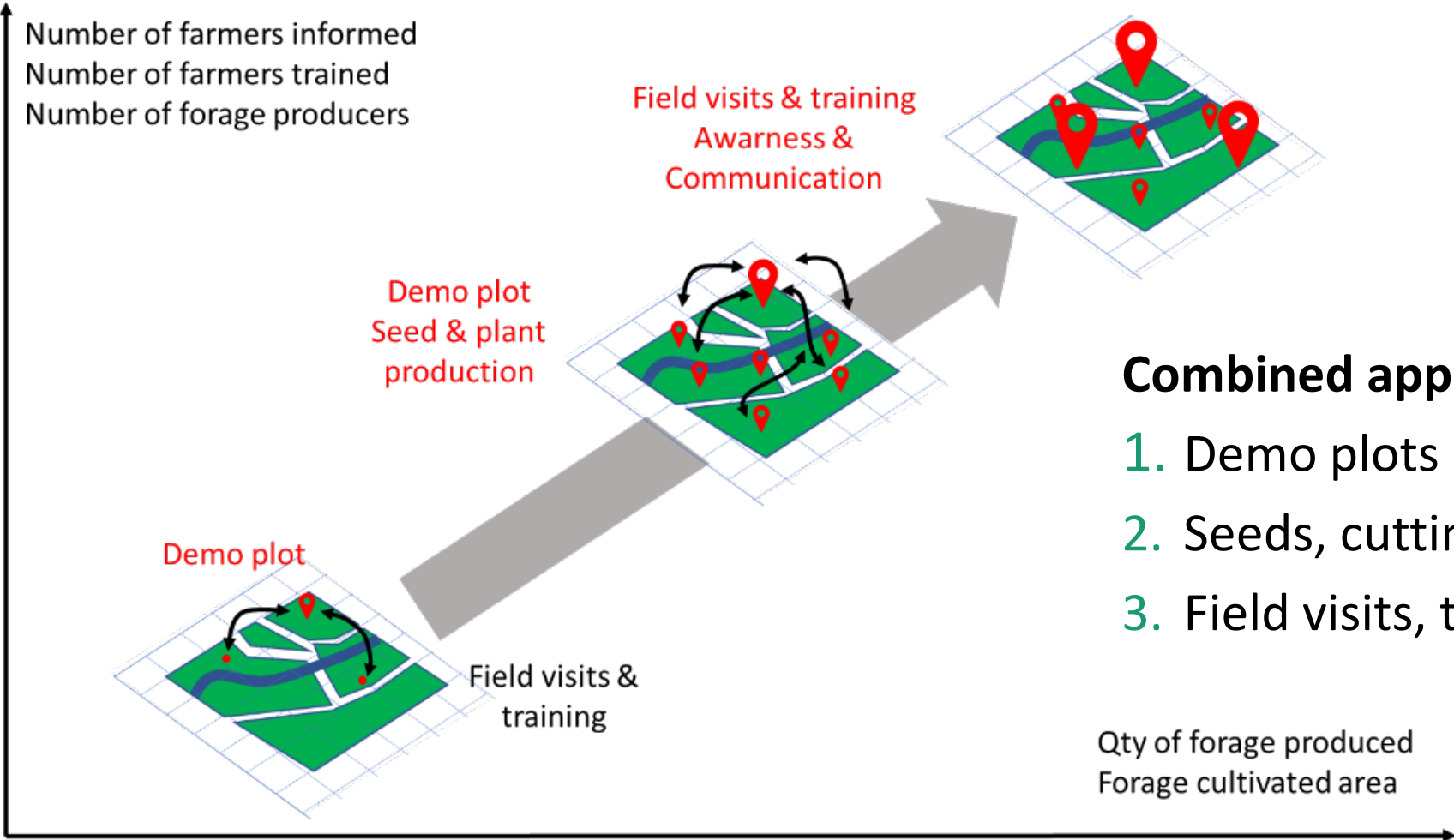


- **Heavily rely on external chemical fertilizer : costly and environmental impacts**

In Northwest rural area (estim. 2022)

- Costs from **\$100 to \$1.000** per family farm per year
- 100 kgN/ha (against 54kgN/ha in world, FAO 2022)
- **Farm compost quality varies**
 - Comparable quality to some **commercial organic fertilizers**
- Farm compost Important sources of **nitrogen (N)** and **Phosphorus (P)** and option to **reduce the use of chemical fertilizers.**
- **Support the local production of farm compost**
 - Cost of locally made compost: \$10/t
 - Price of commercial compost : \$200/t

Supporting the up and out scaling



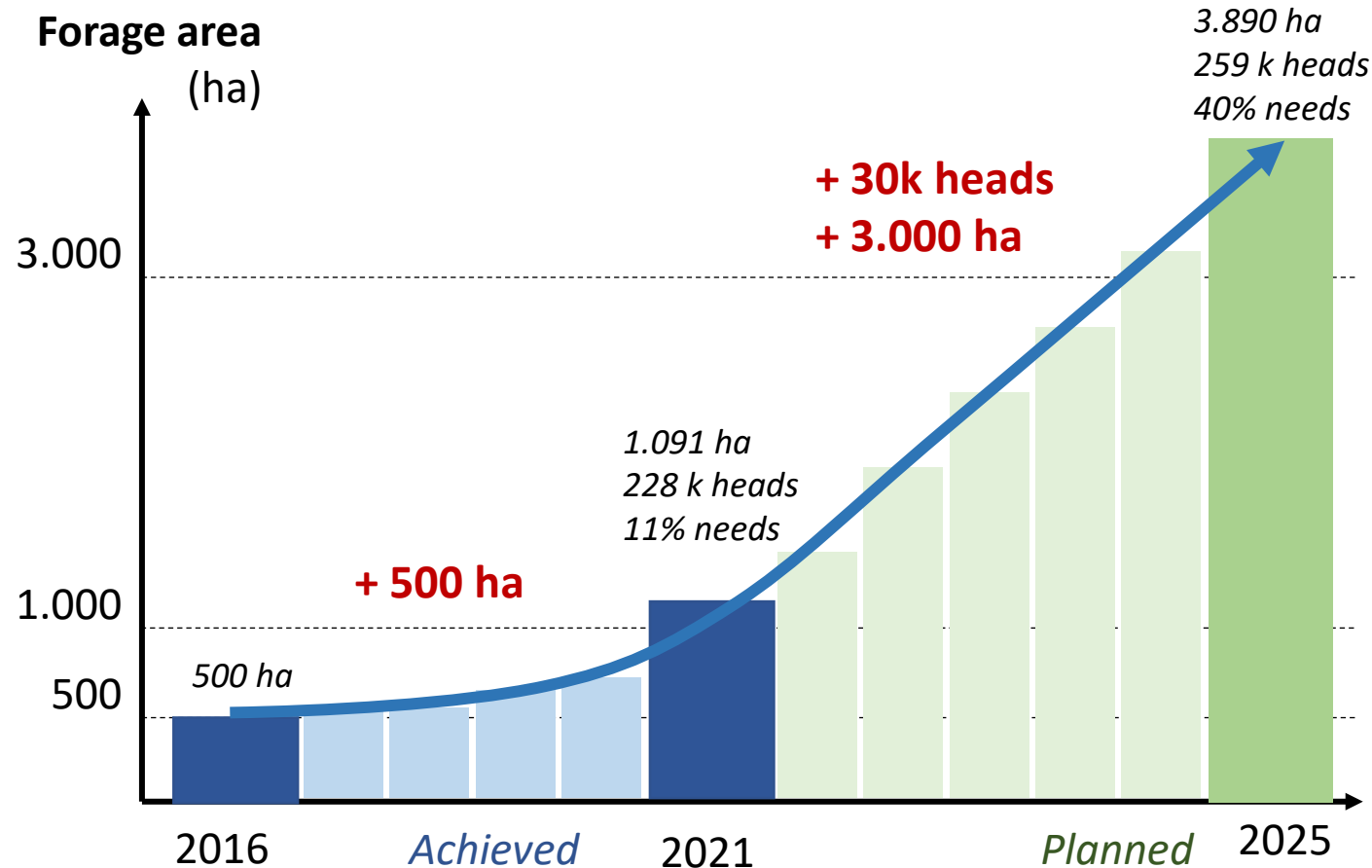
Combined approach

- 1. Demo plots and trials
- 2. Seeds, cuttings, incentives pack
- 3. Field visits, training & communication

Ambitions in line with local livestock development strategy

The Strategy and policy of developing livestock production in Dien Bien province period of 2021-2025, orientation to 2030

- 1- Increase in the **herd** of cattle and buffalo
- 2- Improve **animal diet** with **forage**
- 3- Increase the **forage area**



- Increase the forage production
- Design new production models
- Conserve the quality of forage & silage

Ambitions in line with national commitments

Aligned with Vietnam ambition to contribute to Climate Change mitigation and develop a Circular Economy:



The **Use of organic fertilizer** in agriculture it to be doubled by 2030 compared to 2020 (NAP FST, March 2023)



Methane (CH₄) emissions from agriculture are to be decreased by 30% by 2030 (NDC, 2022), with ruminants as contributors. Increase use of silage and legume in animal feed can help reduce **Emissions from Enteric fermentation**



Take home messages

- Forage-Silage-Compost model is a good example of Crop-Livestock Integration
- Crop-Livestock Integration can boost agricultural and food systems sustainability and support national and local national policies
 - Circular economy enhancement
 - GHGs emissions reduction
 - Decreased environmental pollutions
- Relatively low investments (“incentive pack”) can foster a rapid and strong adoption of Crop Livestock Integration with visits, training and awareness raising





Agroecology and
Safe Food System
Transitions

LEARN MORE | ស្វែងយល់បន្ថែម | រៀនបន្ថែម | TÌM HIỂU THÊM



Agroecology and Safe Food System Transitions in Southeast Asia (ASSET)

វិវឌ្ឍនាការកសិកម្មធូលី និងប្រព័ន្ធស្បៀងអាហារសុវត្ថិភាព

ការប្រែប្រួលបរិបទកសិកម្ម និង ការធានាសុវត្ថិភាពអាហារ

Chuyển đổi Nông nghiệp sinh thái và Hệ thống Thực phẩm An toàn

Coordination:



Funded by:



Co-funded by
the European Union



AFD



FONDS FRANÇAIS POUR
L'ENVIRONNEMENT MONDIAL