



Agroecology and  
Safe Food System  
Transitions



# Supporting crop-livestock increased integration in North Western Vietnam

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## Green Transformation 2024

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ASSET

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In partnership  
with  
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FONDS FRANÇAIS POUR  
L'ENVIRONNEMENT MONDIAL

# A SHARED VISION OF CHANGE



**O2. Regulatory framework is improved**

**O4. Extension services are improved**

**O6. Linkages and transparency in VCs are improved**

**O1. Local stakeholders are better informed**

**O7. Agro-ecotourism is developed**

**O5. Food safety is better managed in VCs**

**O3. Agroecological practices are disseminated**

Participatory Guarantee Systems (PGS)  
E-commerce

Exchange visits  
Communication & sensitization events

Support to the Vietnam Food Safety Taskforce

Livestock system development & tree crop livestock integration  
Agroecology crop protection | Soil conservation & crop diversification  
Safe & organic agriculture | Agroforestry

**SHARED VISION**  
In 2030, functional agroecological and quality-based value chains contribute to improve local farming community livelihood



including



1. Support to **forage and livestock development strategies**
2. Support to **animal food safety** improvement
3. Support to **quality coffee development** strategy
4. Support to **Agroecological Crop Protection**
5. Support to **quality product visibility and value chain development**

- **1 shared vision**
- **7 outcomes**
- **6 key technical activities supported by the project**

# 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 is to be doubled by 2030 compared to 2020 (NAP FST, March 2023)



Methane (CH<sub>4</sub>) 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**



# 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

2. Processing into silage



## Testing innovative models on farms

With various objectives

- Increase and diversify forage varieties
- Design intercropping system with forage
- Conserve the quality of forage & silage
- Valorise the manure into quality compost
- Support the adoption by farmers

# 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)
<b>Green Elephant grass (Taiwan)</b>	Forage cane. Newly introduced in the region. Less piths (easier to cut for farmers, and to eat for animals)	20-60
<b>Mulato 2 grass</b>	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
<b>Guinea grass (Mombasa)</b>	Erected grass. More productive than traditional guinea grasses (TD58, purple). Softer than forage canes.	15-50
<b>Stylosantes g. (Ubon)</b>	Forage legume. Improve animal feed quality (fresh or silage). More productive than traditional CIAT 184	5-15

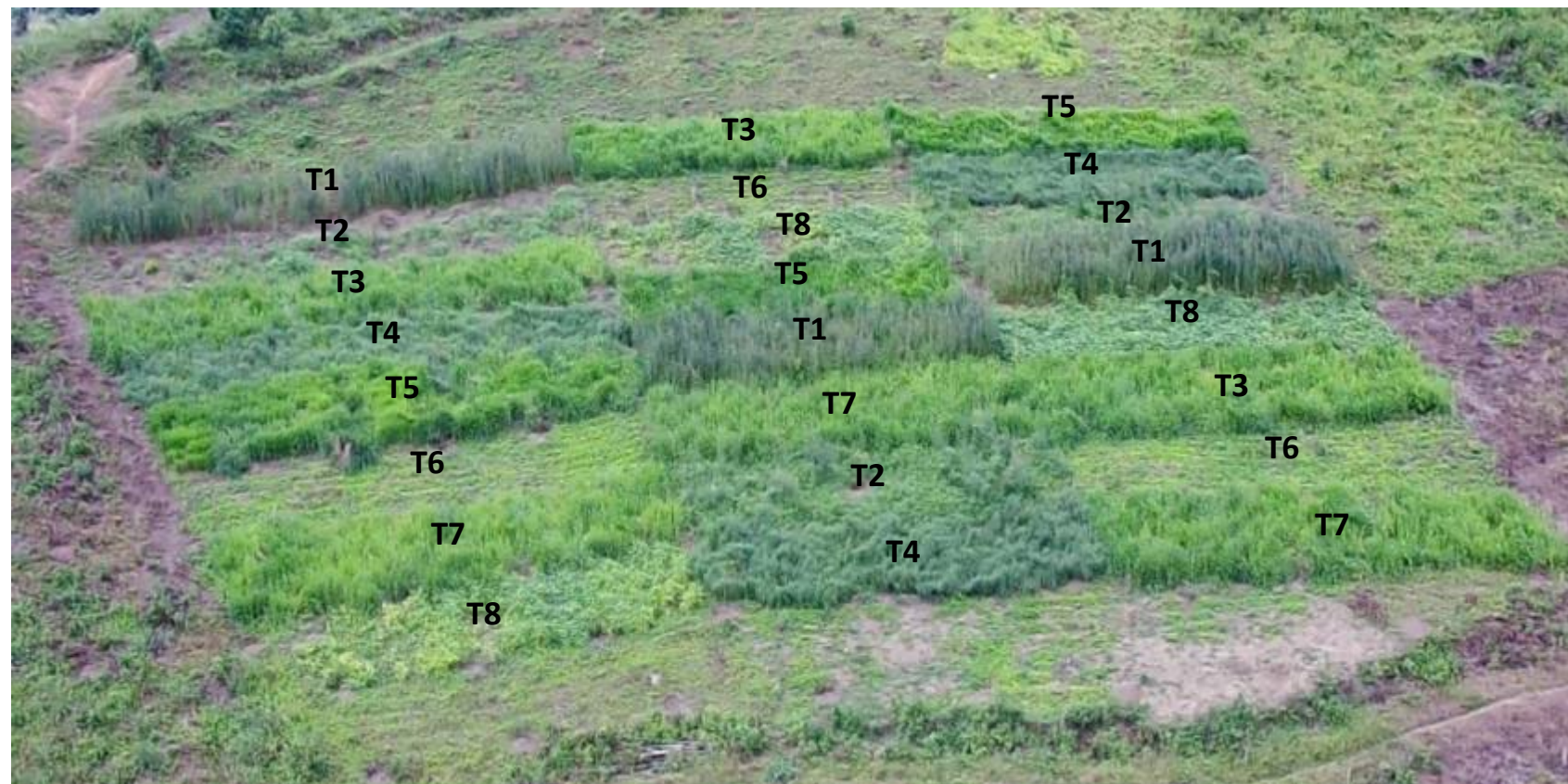


**Taiwan Green Elephant Grass** : Large enthusiasm from farmers, good yield, can be used as green forage or silage (storage), preferred compared to VA06 (less pith).

# 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

Guinea grass strips in cassava (Tuan Giao)



Experiment Maca +  
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 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



**Technical leaflet on silage processing (En, Vn)**

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
<b>TOTAL (VND)</b>			<b>228 000</b>	



# 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 Compactor



Technical leaflet on composting (En, Vn)

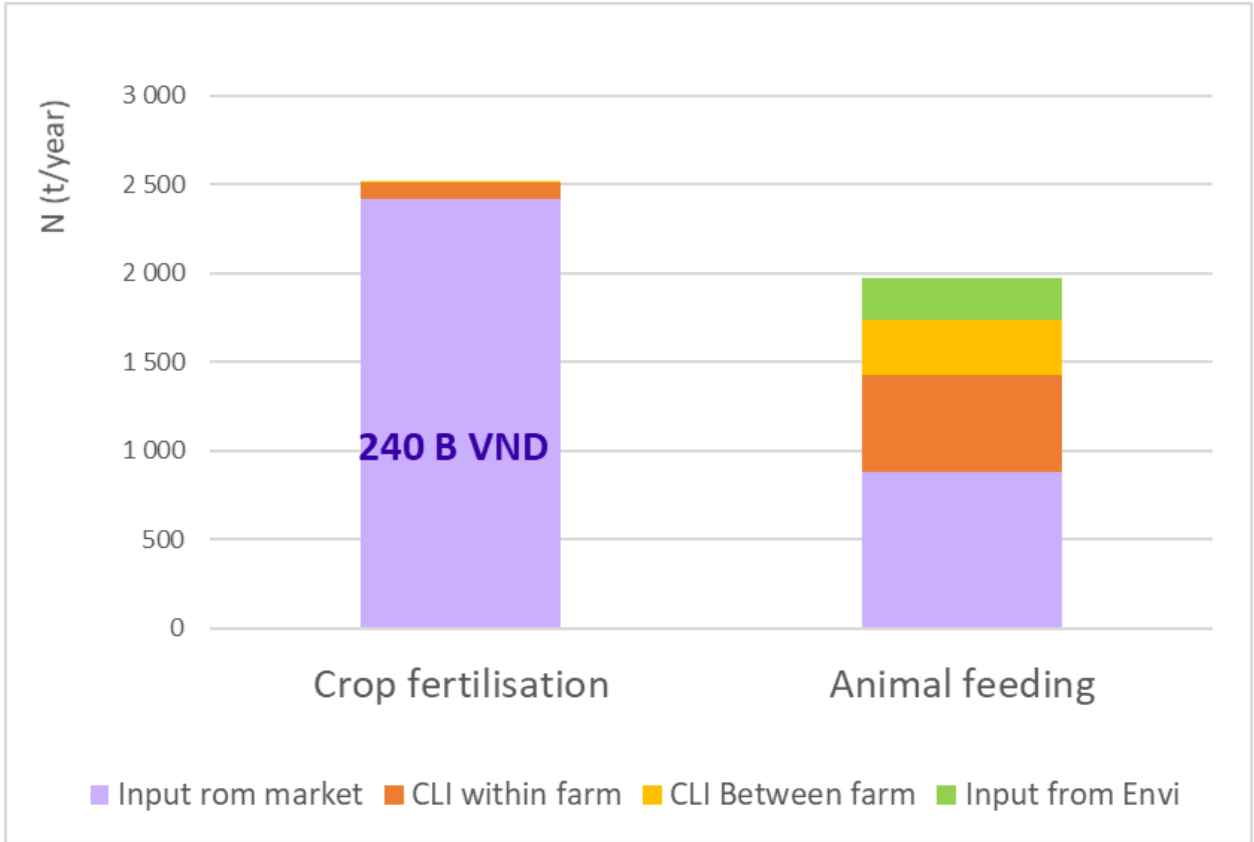
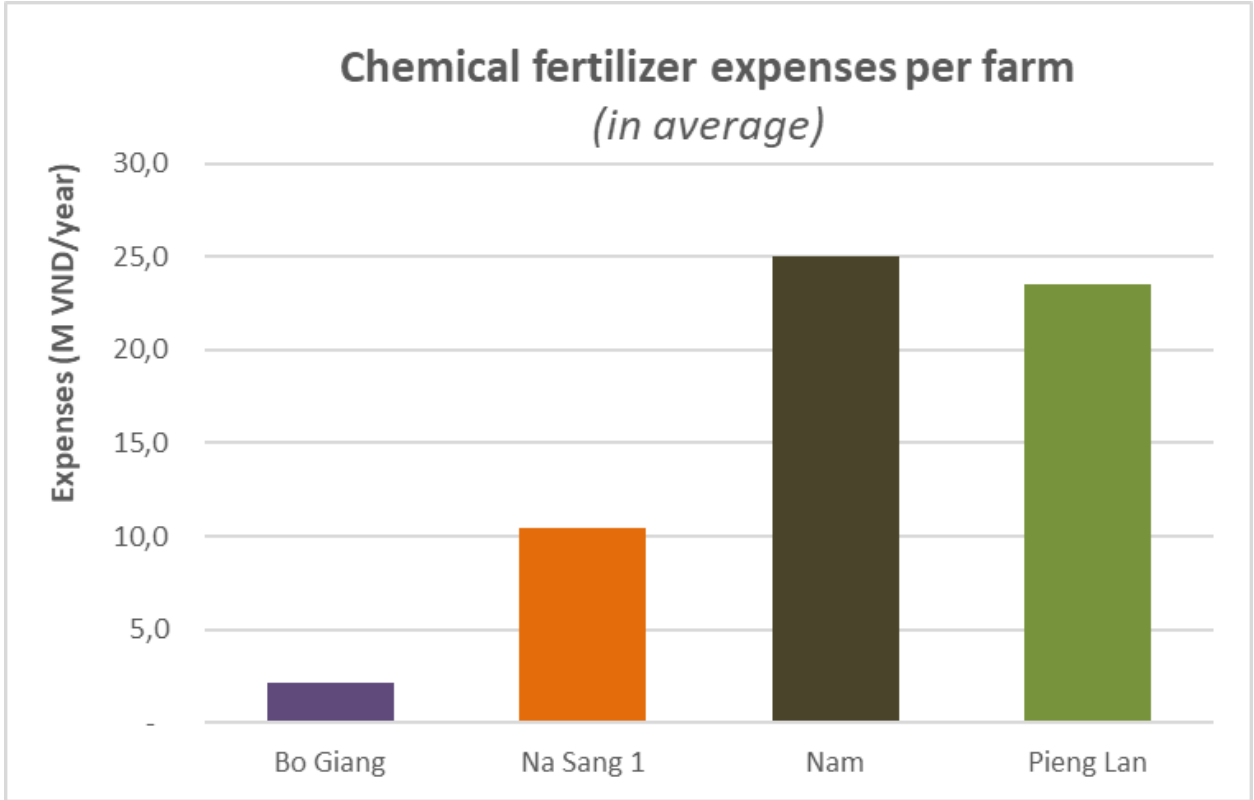
Annual inputs (for 1 ton of compost)	Unit price (VND)	Qty (kg)	Annual cost (VND)
Efficient Microorganisms (EM) Trichoderma plus humic	100 000	1	100 000
Rice bran or corn starch	7 000	5	35 000
Phosphate	6 000	5	30 000
Urea	16 000	0,2	3 000
Potassium	20 000	0,2	4 000
<b>TOTAL (VND)</b>			<b>172 000</b>

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





# High dependence of farms and territories on inputs



- High dependence of farms and territories on market inputs:
  - different cropping systems
  - different level of intensification
- Estimated at between **2.5 and 25 MVND.y<sup>-1</sup> per farm (2022)**
- Estimates for one district in the North West (2023)
  - **240 B VND.y<sup>-1</sup>**
- Different quality of the compost and chemical fertilizers
- Quantities of N applied in chemical fertilizers could be reduced by considering the N applied via manure and compost

# Benefits from promoting locally-made Compost

## Example of Maca development – Tuan Giao district

- Objective 20,000 ha of Macadamia in 5 years

Area (ha)	20 000
Maca density (nb plants/ha)	280
Nb Maca plants/objective	5 600 000

Fertilization recommendations (kg/plant)	
from year 1 to 4, per year	12,5
after year 5, per year	15
Fertilization needed/plant for 10 years (kg)	140
Fertilization needed/20,000 ha for 10y (tons)	784 000

Price bag organic fertilizer DAVICO HC-03 (VND/25 kg)	137 500
Price bag organic fertilizer DAVICO HC-03 (VND/ton)	5 500 000
Price fertilization for 20,000 ha & 10 years (in 10 <sup>9</sup> VND)	4 300

172 M USD

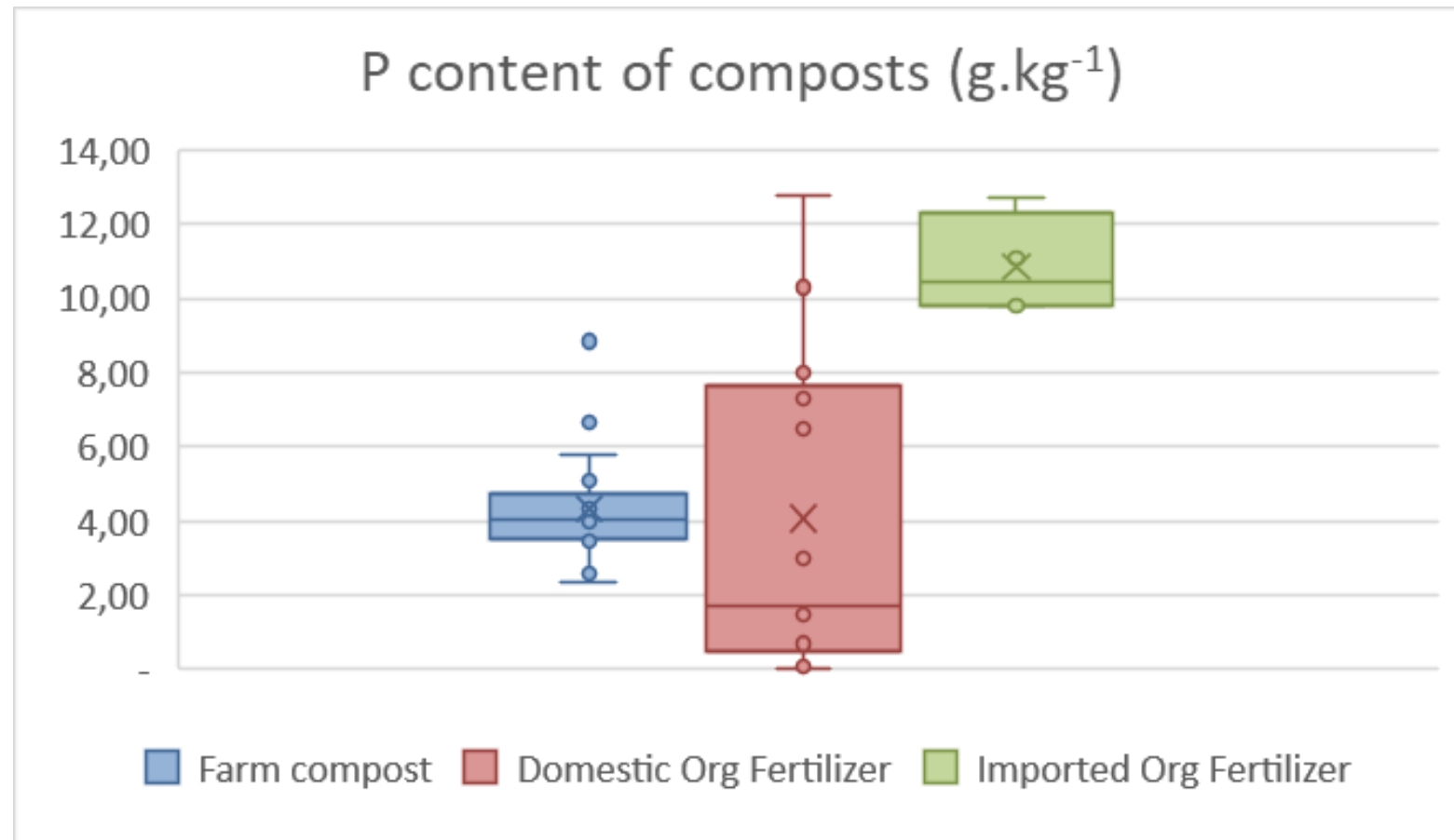
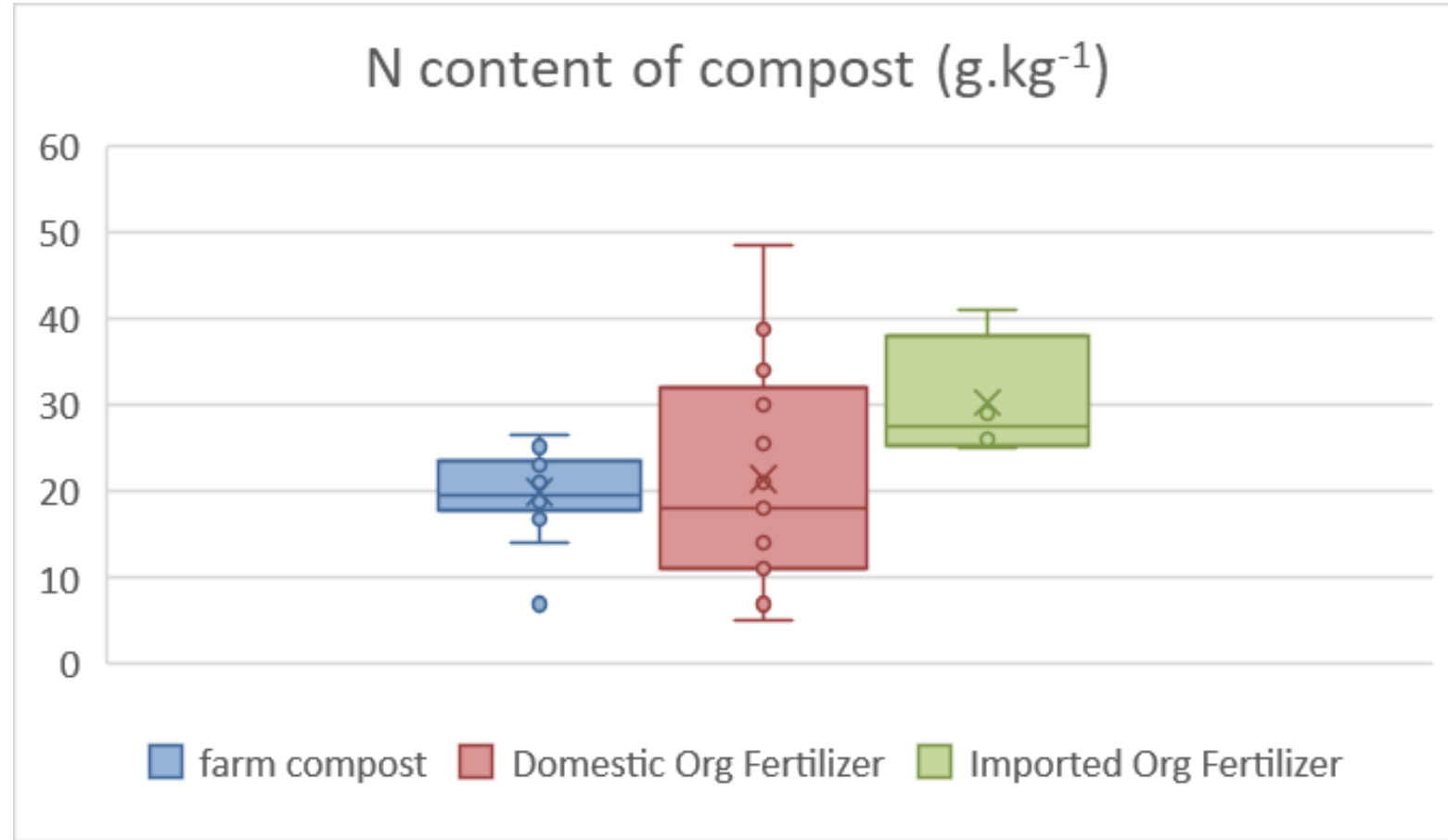
- What about supporting the partial production of organic fertilizer by smallholder farmers?
- Cost of locally made compost: 290,000 – 340,000 VND/ton
- Not considering the effect on bad smells and the decrease in environmental pollutions*



1 livestock owner: ton/year	5
1 livestock owner: ton/10 years	50

	Organic fertilizer (tons)	Nb farmers needed
1% organic fertilizer need	7 840	157
5% organic fertilizer need	39 200	784
10% organic fertilizer need	78 400	1568

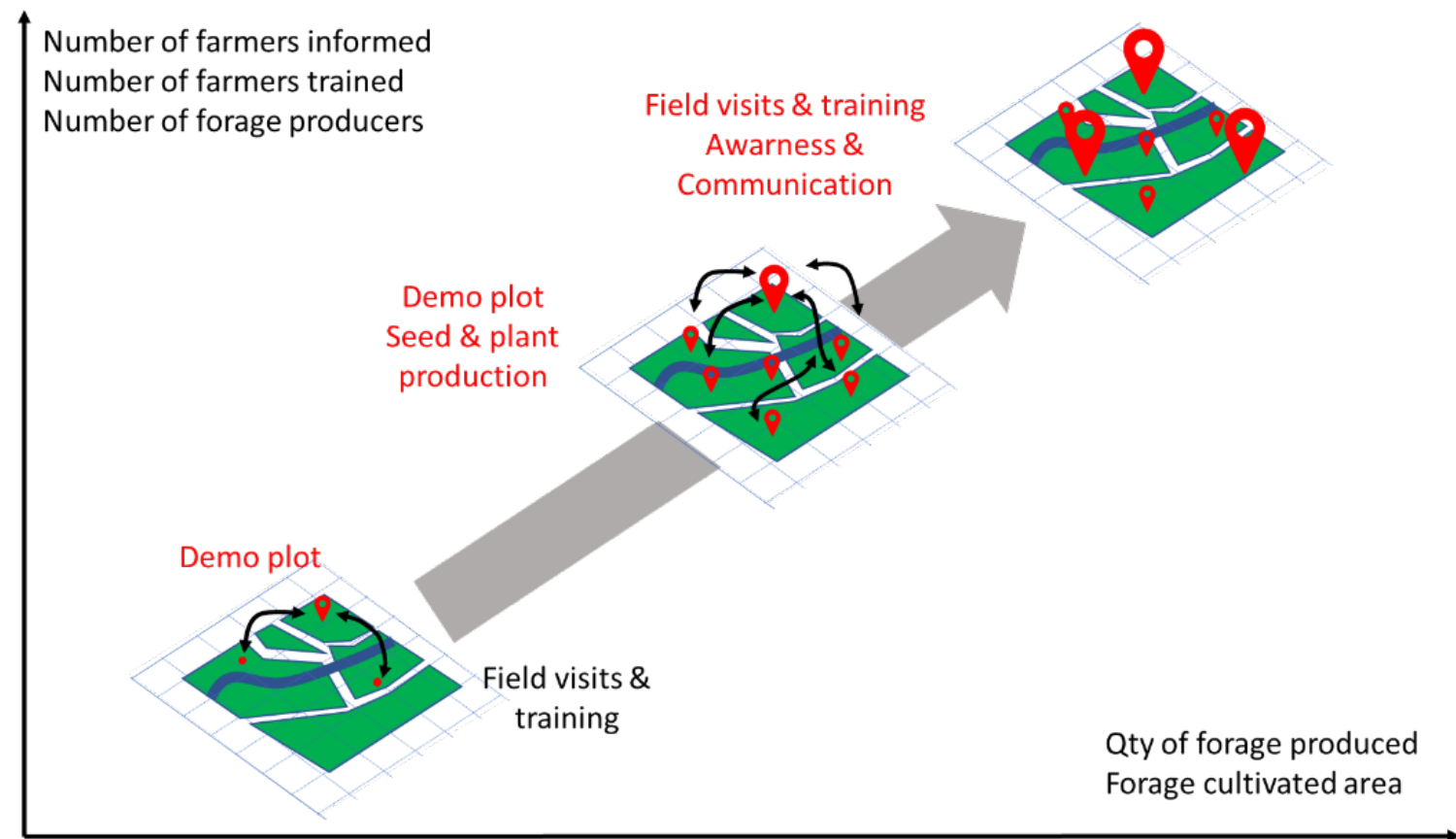
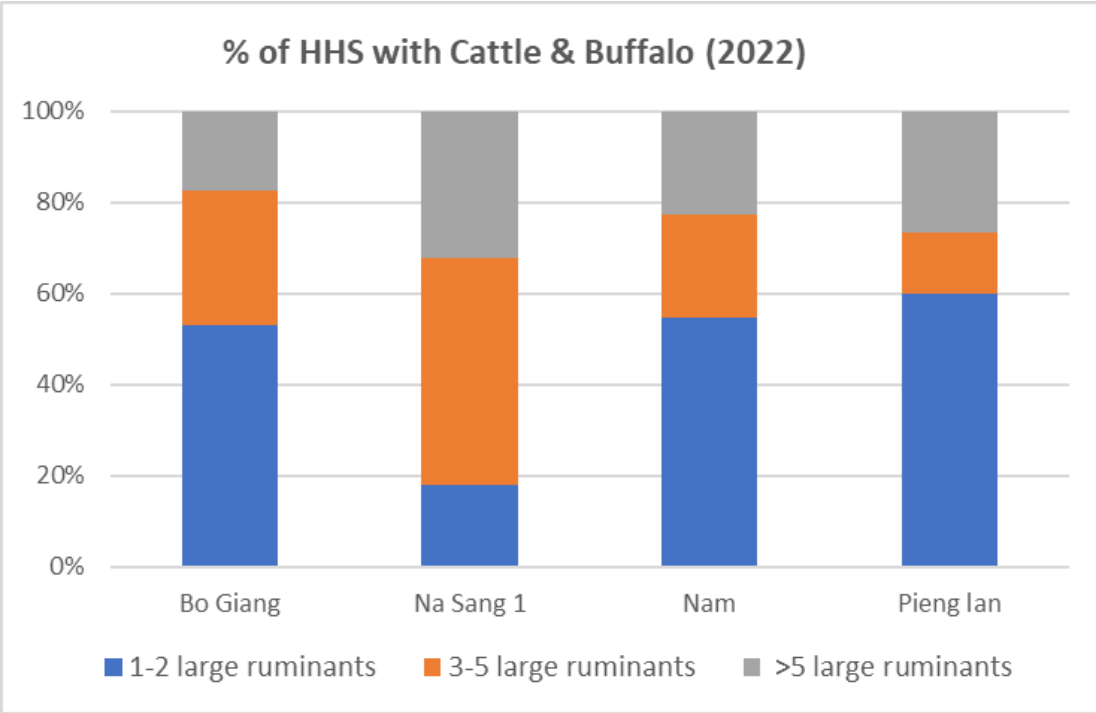
# Farm Composts: Variable but Satisfactory Quality



- **Variability in the quality of farm compost:**
  - Balance between crop residues and animal waste
  - Added biomass (coffee plum, pork waste, ...)
  - Composting conditions (canvas, roofs, pits, turning, drying, etc.)
- Farm composts can be of comparable quality to certain **organic fertilizers produced and marketed in Vietnam.**
- **Important sources of N and P for farms**

# Supporting crop-livestock integration

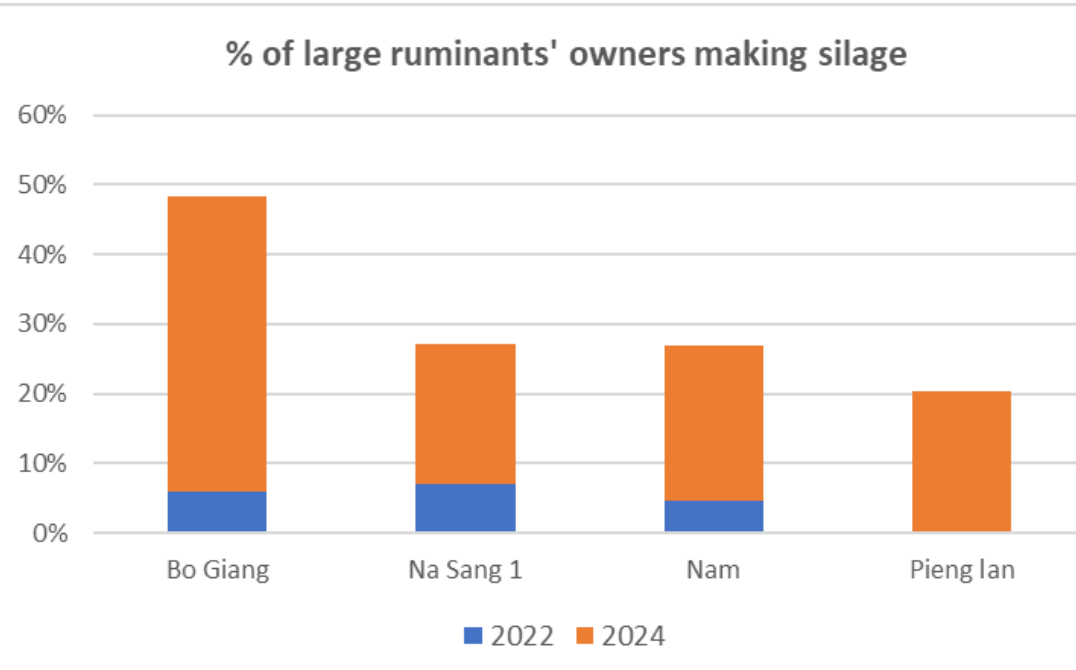
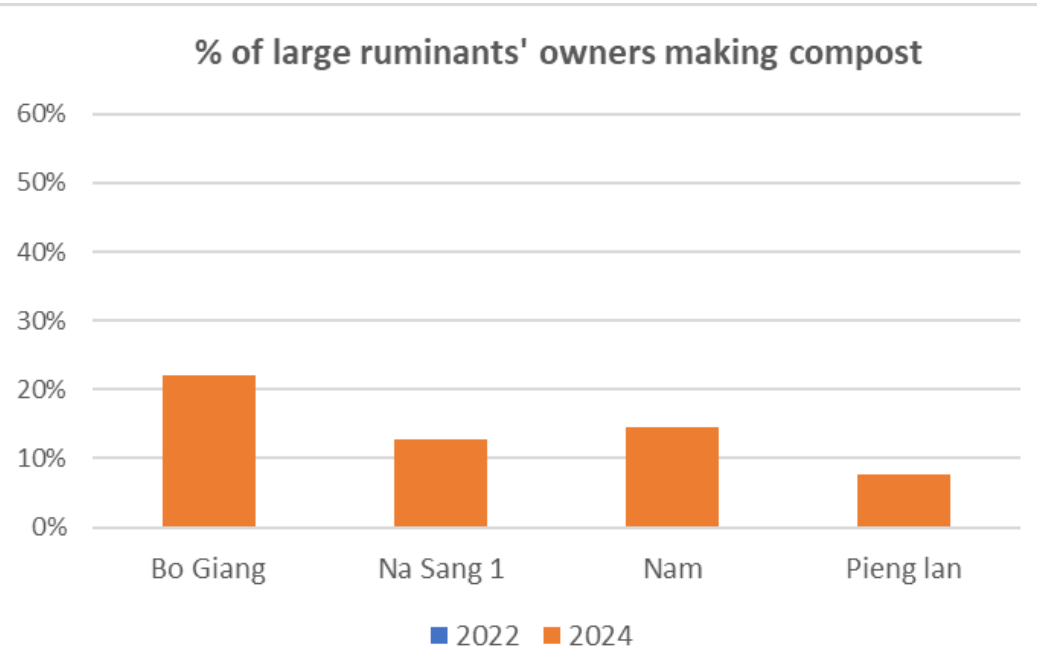
- 66% [43-97%] of farms with at least 1 large ruminant
- Different herd size, but globally small-scale raising systems (<5 LR)



## Combined approach

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

- Effect on adoption of silage-compost practices after 3 years



# Take home messages

- Forage-Silage-Compost (FSC) model is a good example of Crop-Livestock Integration (CLI)
- FSC model can strongly contribute to national and local ambitions of transforming agricultural and food systems through e.g. circular economy enhancement, CH4 emissions reduction, decreased environmental pollutions
- Relatively low investments (“incentive pack”) can foster a rapid and strong adoption of FSC model
- Uptake of composting technology is slower than for silage as more labor intensive, and limited market so far for locally-produced compost

Incentive pack	Unit price (VND)	Qty	Cost/HH (VND)
Forage and cassava stem chopper	5 000 000	1 for 5 HHs	1 000 000
Double layer bag for silage (800-1000 kg)	160 000	2	320 000
Efficient Microorganisms (EM) Guard II	180 000	1	180 000
Roof for compost pit	500 000	1	500 000
Canva	70 000	1	70 000
Efficient Microorganisms (EM) Trichoderma plus humic	100 000	1	100 000
<b>TOTAL (VND)</b>			<b>2 170 000</b>
<b>TOTAL (USD)</b>			<b>87</b>



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THANK YOU !



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

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