



Agroecology and  
Safe Food System  
Transitions



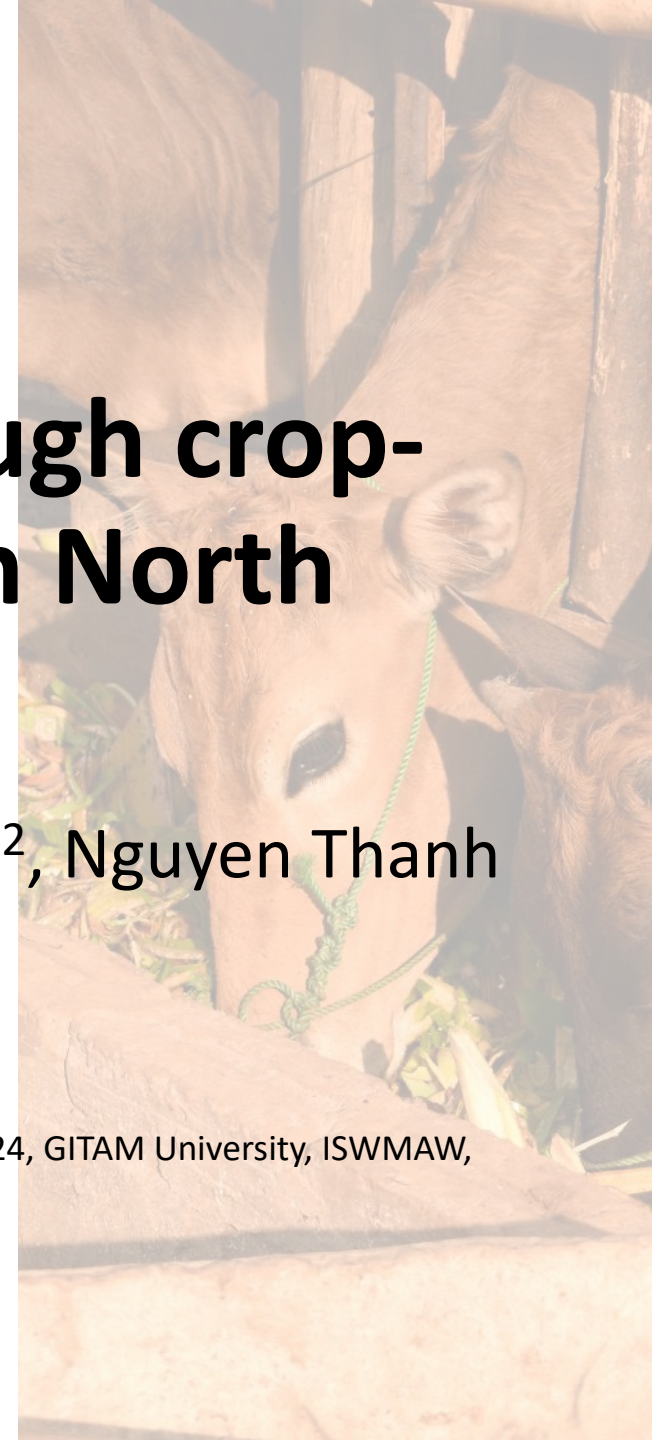
**cirad**  
AGRICULTURAL RESEARCH  
FOR DEVELOPMENT

# Supporting circular economy through crop-livestock increased integration in North Western Vietnam

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# Agricultural and livelihood development strategies in Dien Bien Province, NW Vietnam

## Dien Bien Province at a glance

2021

9 500 km<sup>2</sup>

42% forest (~ 400,000 ha),

10% cultivated (~ 100,000 ha)

28% not yet allocated (~ **260,000 ha**)

0,6 million inhabitants

**Thai (39%) and H'mong (35%)**

**40 % of poor**

Main economic exchanges:

**China (Buffalo)**

Vietnam (rice), international (coffee)



VNA/VNS Photo  
Xuân Tiến



# Agricultural and livelihood development strategies in Dien Bien Province, NW Vietnam

## Pillar 1: Developing perennial crops, notably Macadamia

- Plan for planting 120,000 ha of Macadamia (2021-2030 Plan to develop macadamia trees in the province - vision to 2050)

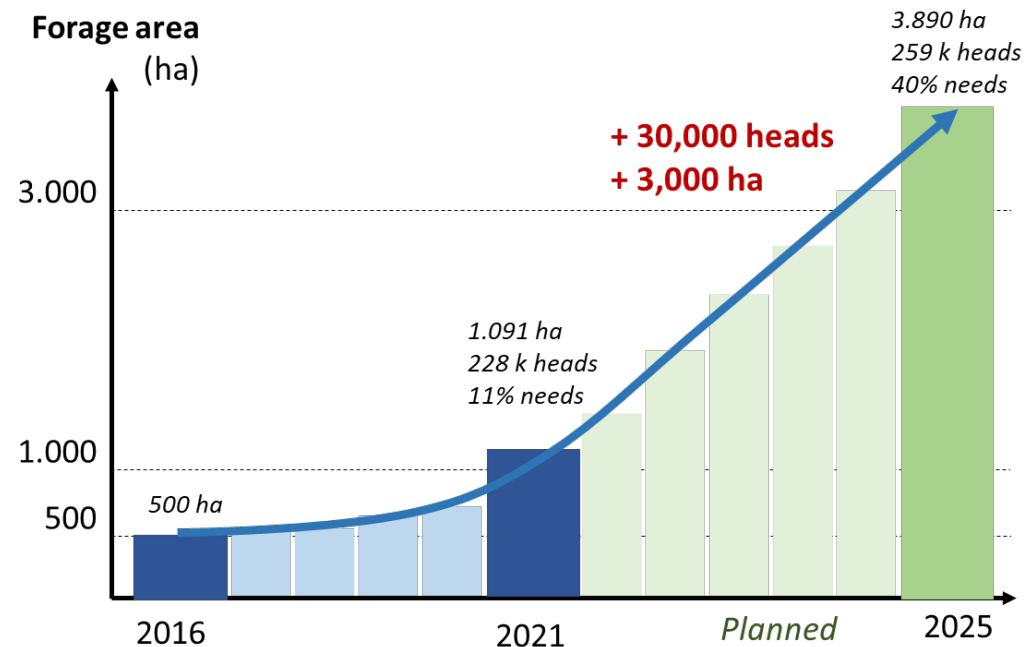




# Agricultural and livelihood development strategies in Dien Bien Province, NW Vietnam

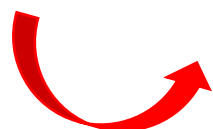
## Pillar 2: Developing cattle and buffalo raising

- 230,000 heads in 2021 (150k buffalo, 80k cattle)
- Main issue: animal feed during the winter/dry season (4 months: Jan – April)
- Animal feed need during winter period (weight maintenance): **590,000+ tons**  
*[Voluntary Daily intake of 6.2 kg DM/100 kg LW/day, Boudet and Rivière 1968]*
- Strong development ambition: **+30,000 heads**
- ... in a context of decreasing land resource availability for animal feed production



# Possibly through cassava by-products valorization

- 8,000 ha in 2021
- Annual mean aboveground biomass production: ~ 15 tons DM/ha, ~ **120,000 tons/year**
- ... un-used / left on the ground!
- That could (partly) be used for silage making, and feed for cattle-buffalo during the winter season
- Recycling 45% of cassava stems and leaves into silage could cover up to 10% of large ruminants feed need during the four-month winter season



# Back benefits for crops / Macadamia and other crops

- Potential production, easier collection, processing and re-use of **1,500,000+ tons** of manure annually

1. Recycling of cassava stems and leaves



2. Support cassava by-products processing into silage



**Circular economy**



3. Support animals increased raising in barns



4. Support animal manure increased collection



5. Support manure increased processing into compost



6. Support Increased use of compost for crop production



# Cost of Silage-Compost integrated models

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>



# Take home messages



- The use of cassava by-products for silage making is a good opportunity to enhance Crop-Livestock Integration and Circular Economy in the mountainous areas of NW Vietnam
  - > Support sustainable livestock and perennial development



- Silage-Compost integrated models can strongly contribute to national and local national ambitions
  - Circular economy enhancement
  - GHGs emissions reduction
  - Decreased environmental pollutions



- Relatively low investments (“incentive pack” of ~90 USD/HH) can foster a rapid and strong adoption of Silage – Compost models





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**Thank you for your attention!**

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