



# Agroforestry: an opportunity to improve the sustainability of livestock systems in Vietnam?

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**Agroecology and  
Safe Food System  
Transitions**

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Environmental challenges of cattle tropical grazing systems, August 30<sup>th</sup>

# Livestock farming systems in north-west Vietnam

- Mixed crop-livestock systems with buffalo and beef cattle + pigs, poultry, and aquaculture.
- By-products, grazing on fallow land, slow development of forage production (land constraints) on barn + animal mobility
- Highly intensive rice cultivation, with cassava and maize on sloping land (soil erosion issue)

## Livestock systems challenges

- Extreme poverty in rural and remote areas
  - Growth in the animal product consumption and imports
  - Development of production: herd, genetics, health management, feed
- How can we improve livestock production while enhancing sustainability?



# Changing context for livestock farming systems: reforestation, fruit and industrial production

- **Forest management and protection**

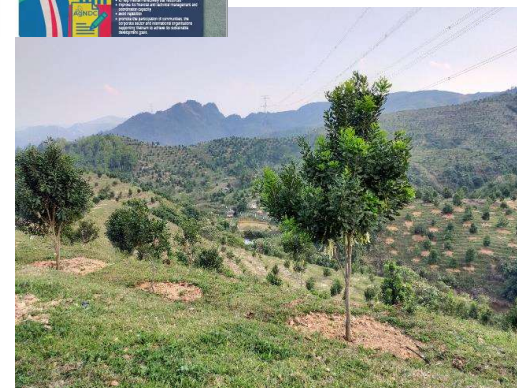
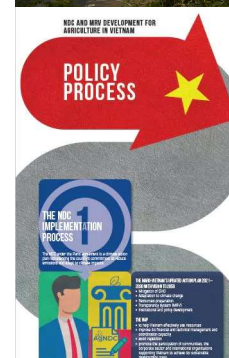
- Payment for environmental services: soil protection in watersheds, regulation of water sources, Mitigate GHG, C sequestration, natural landscapes and biodiversity
- Land use planning, forest protection and productive forests

- **Fruit and industrial production**

- Convert slope land with low economic efficiency
- Fruit (mango, citrus, avocado, etc.)
- Industrial production (coffee, tea, macadamia)
- Subsidised seeds & seedlings, mineral fertilisers
- Capacity-building, contract farming (access to land)

- Significant change in land use, biomass production and animal mobility: impact on livestock systems.

➤ Understanding the effect of these changes on livestock systems and sustainability





# Crop livestock integration : multi-scale biomass & N network



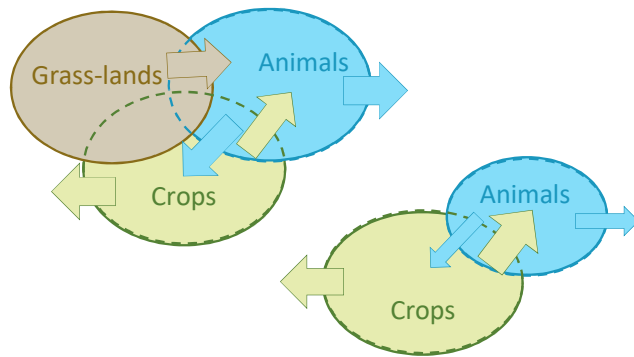
## Dien Bien district

1 639 km<sup>2</sup>

93 850 people

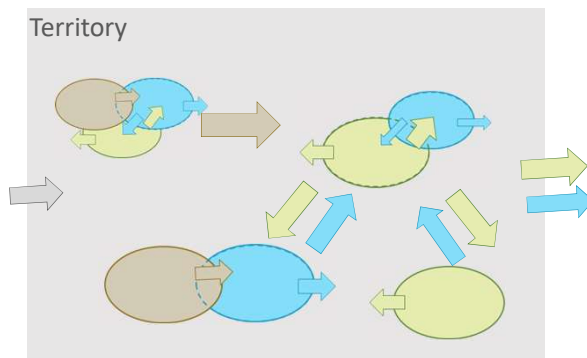
23 400 buffaloes

15 400 cattle



- Characterize diversity of farms and the crop-livestock integration within the farm
- Characterize and quantification of biomass exchanged between farms for animal feed, for animal waste management, and soil fertility management
- Design a multi-scale biomass and N flow model

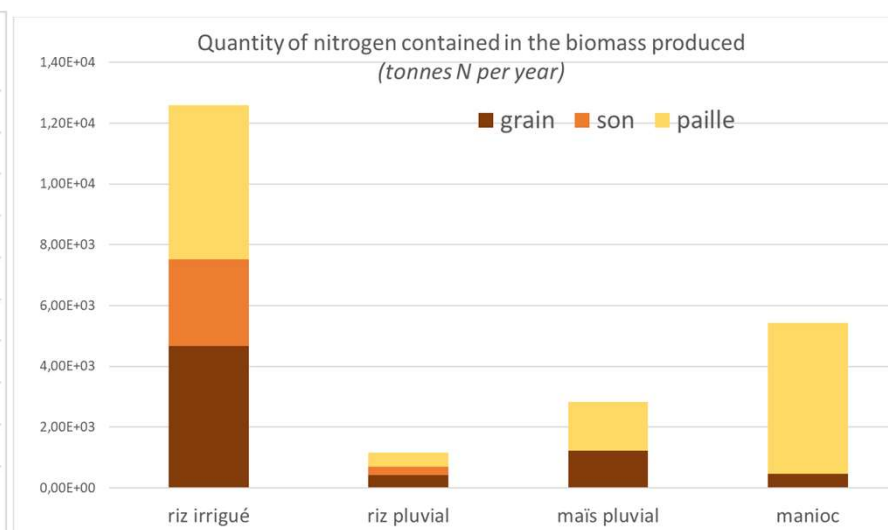
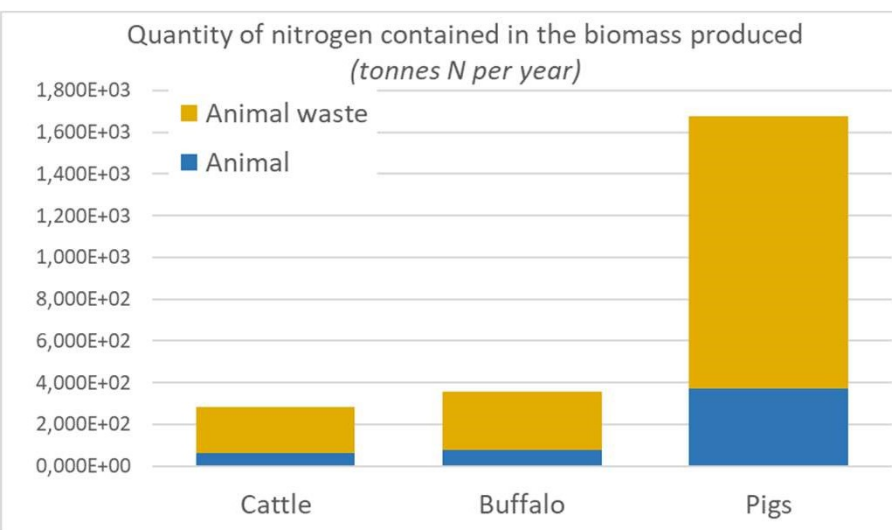
- Understand the role of livestock in recycling, autonomy of farms and territory on animal feed, and on mineral fertilizers
- Discuss the reforestation & development of fruit production: opportunities for improving animal production or new constraint?



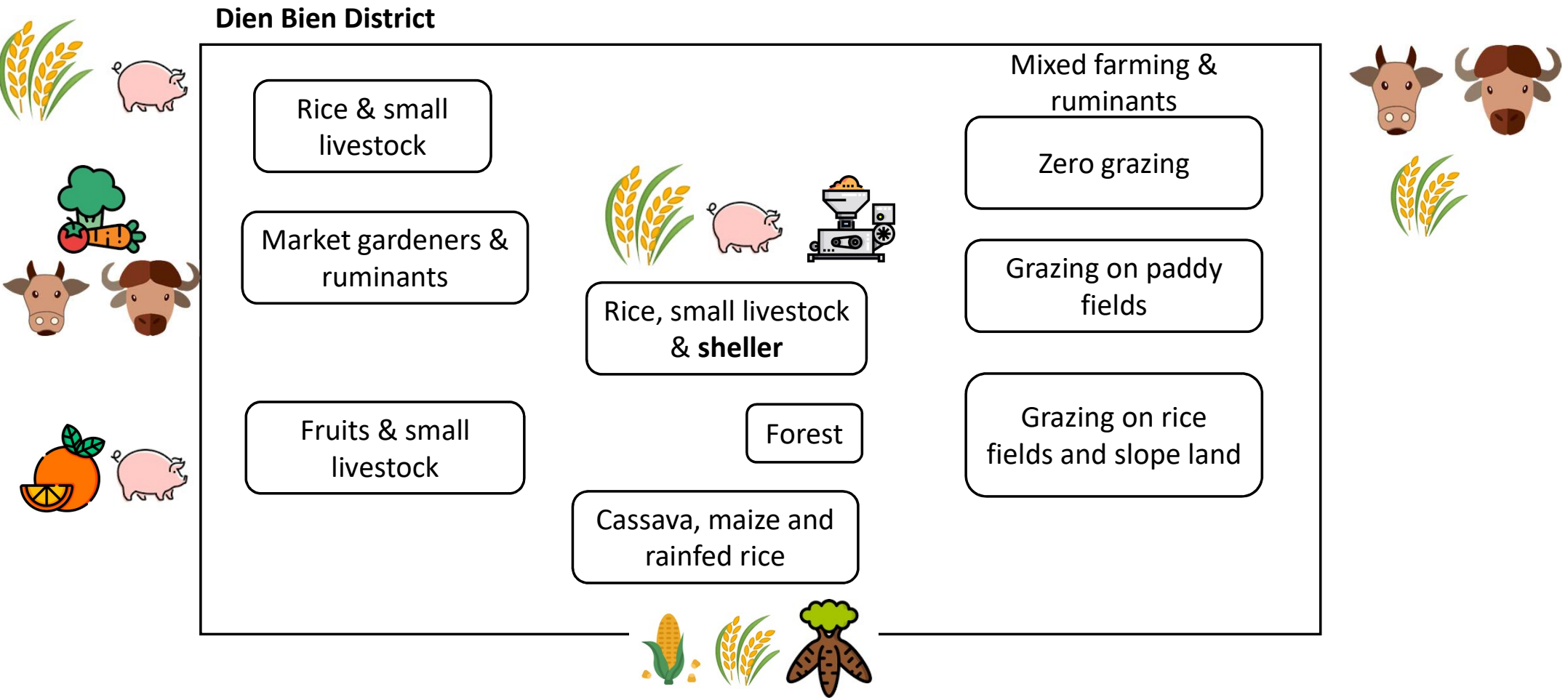


# Biomass produced, used, recycled in the territory

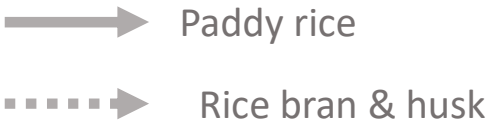
- Paddy rice, rice straws, rice bran and husks, maize grains and straws, cassava roots and leaves-stem, forage, silage, natural herbs, vegetables & fruits
- Animals, animal waste, manure and compost
- + Chemical fertilizers, industrial feed
- + N content in irrigation water



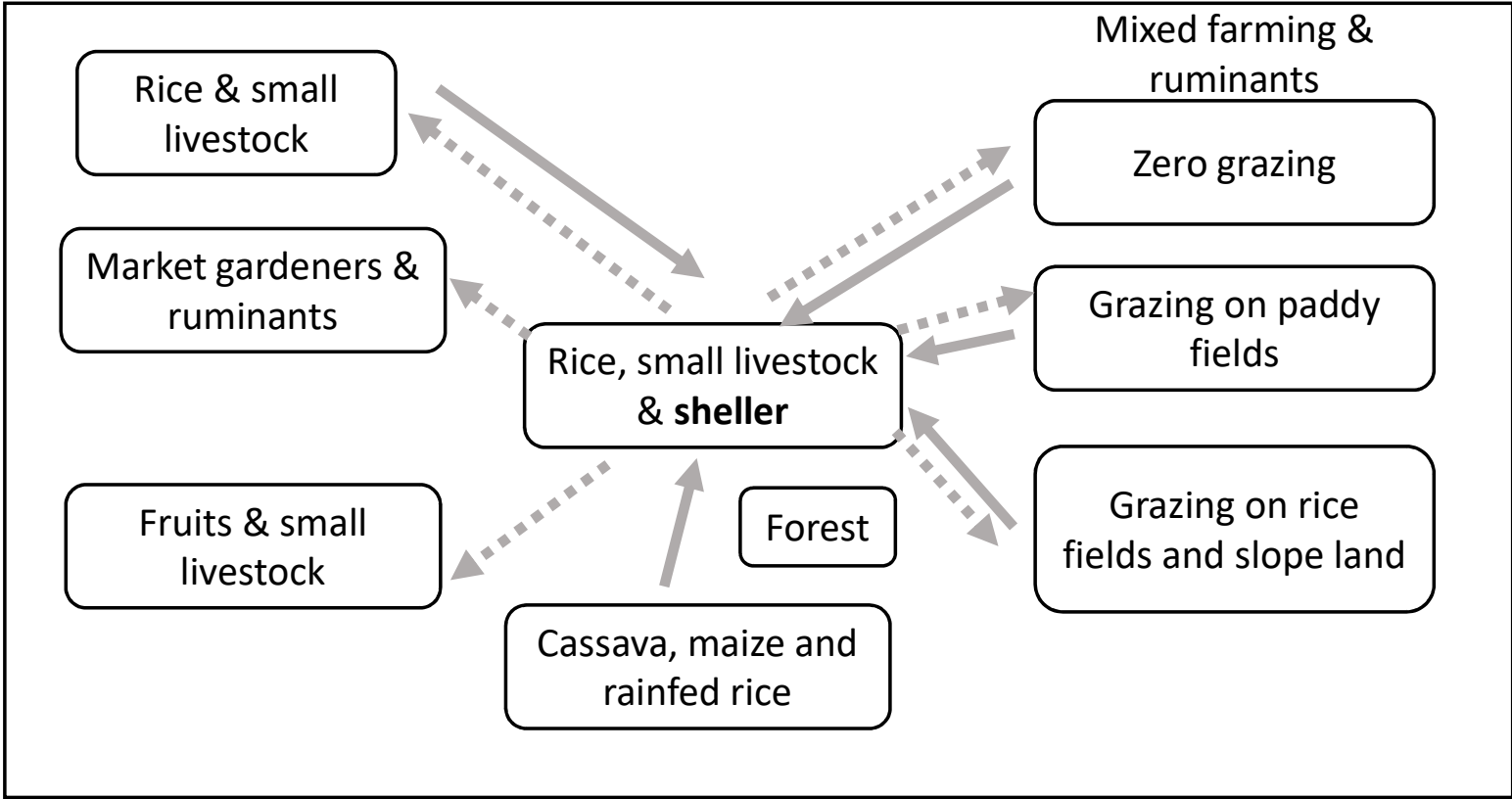
# A wide range of players involved in biomass recycling



# Organisation of biomass flows in the district



## Dien Bien District





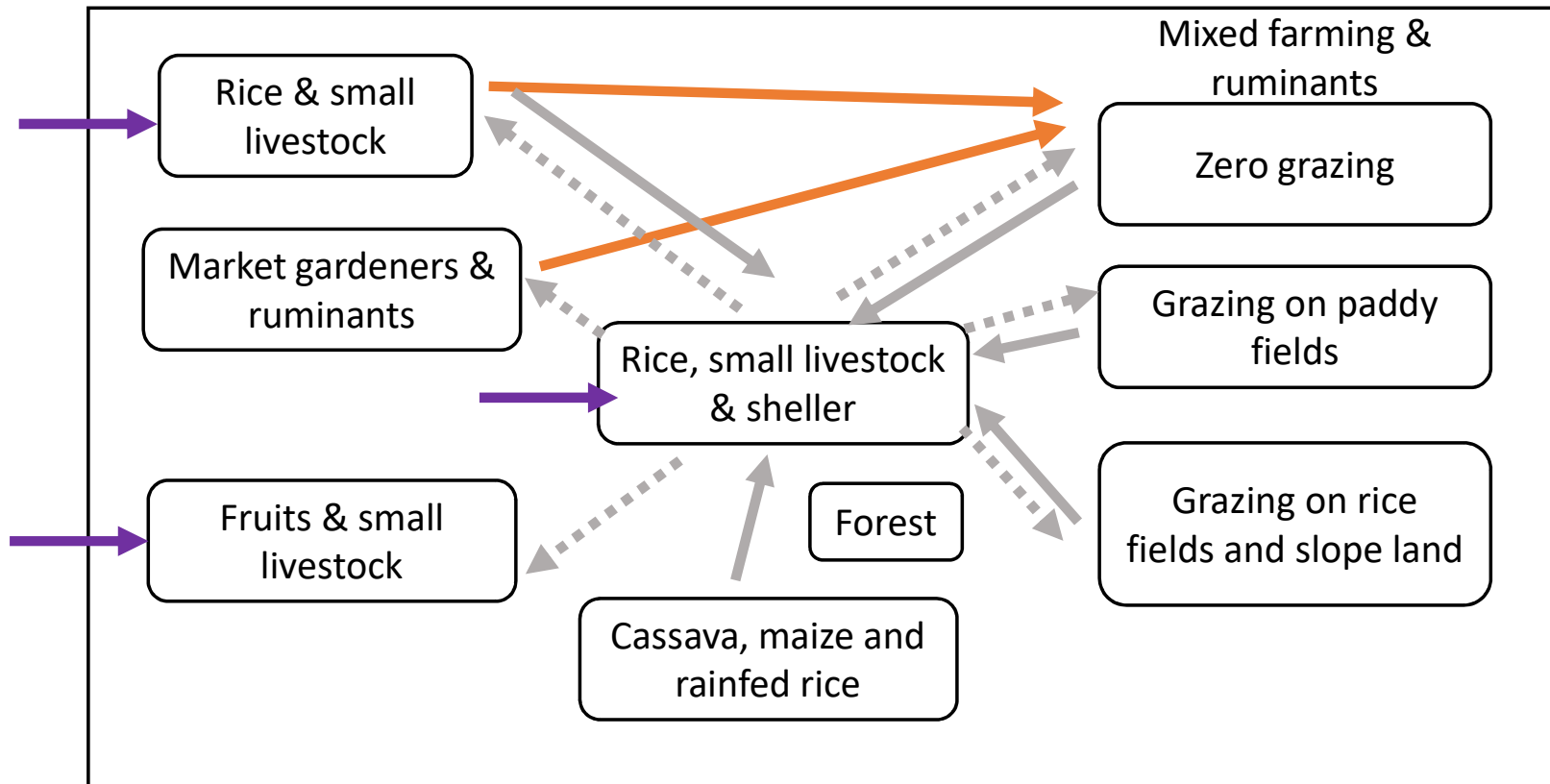
→ Paddy rice

... Rice bran & husk

→ Rice straw

→ Industrial feed

### Dien Bien District



→ Paddy rice

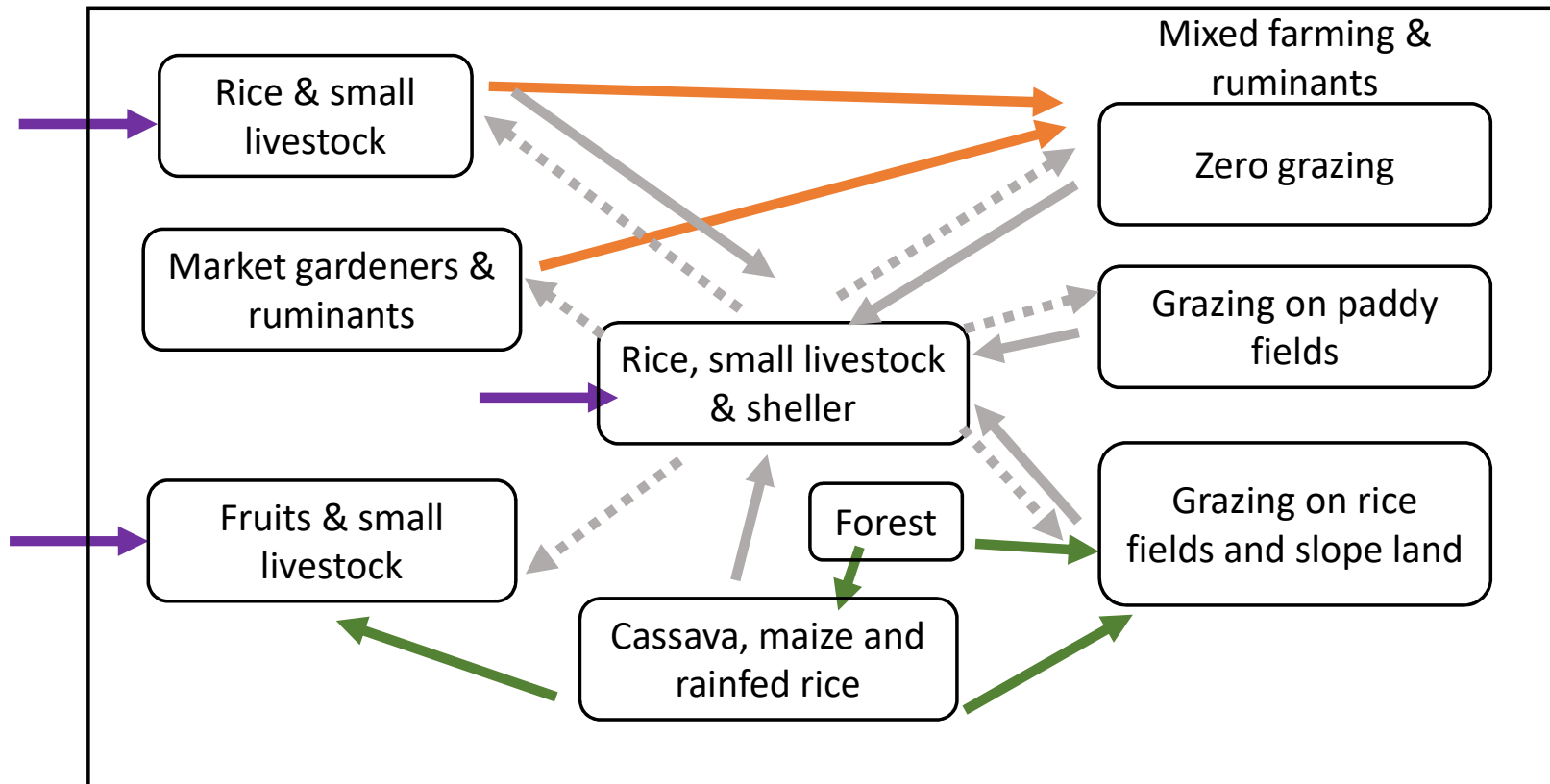
... Rice bran & husk

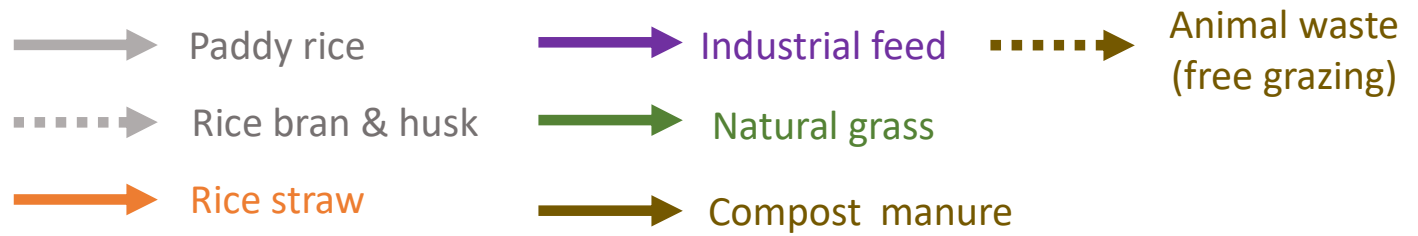
→ Rice straw

→ Industrial feed

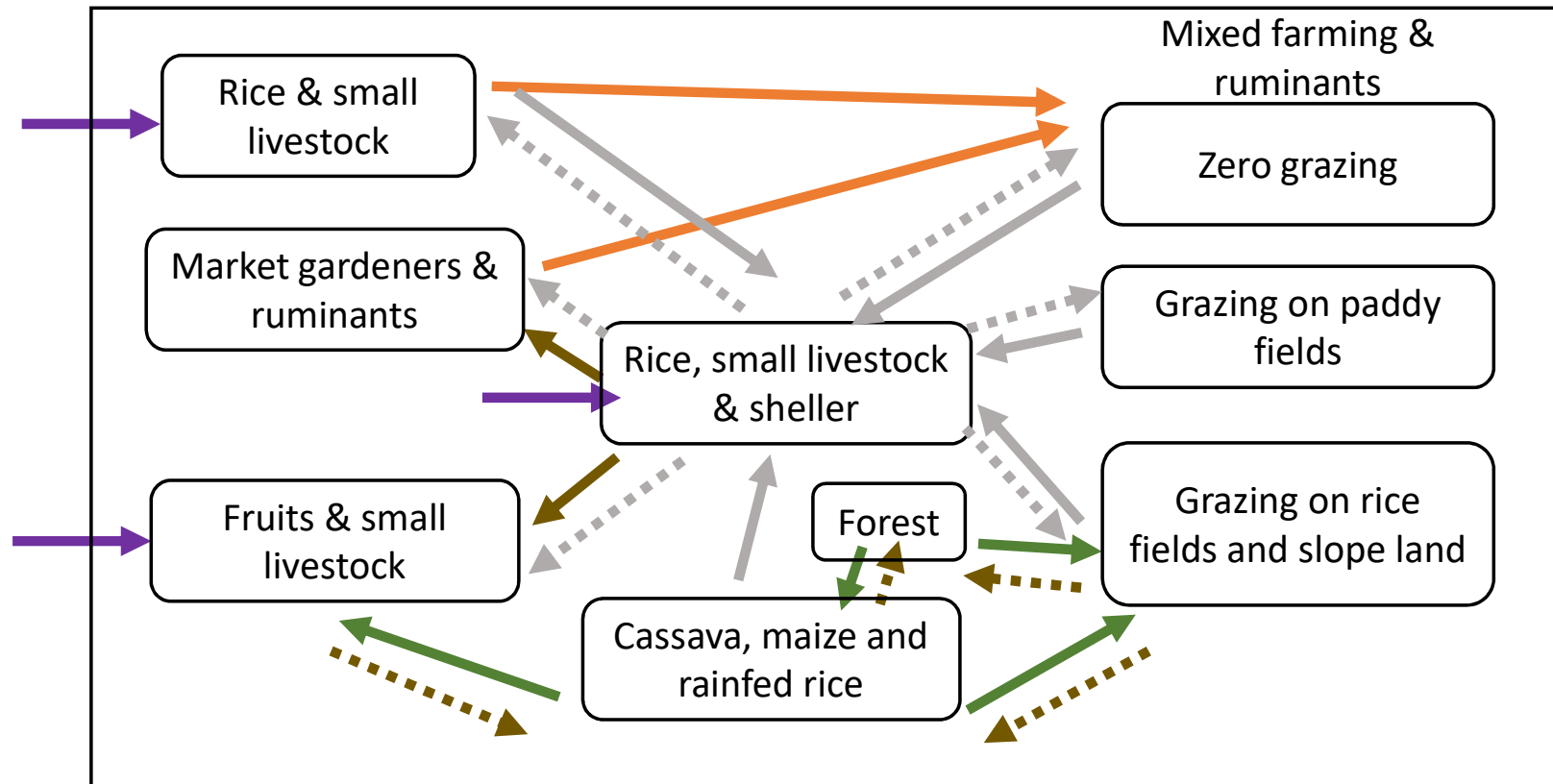
→ Natural grass

### Dien Bien District

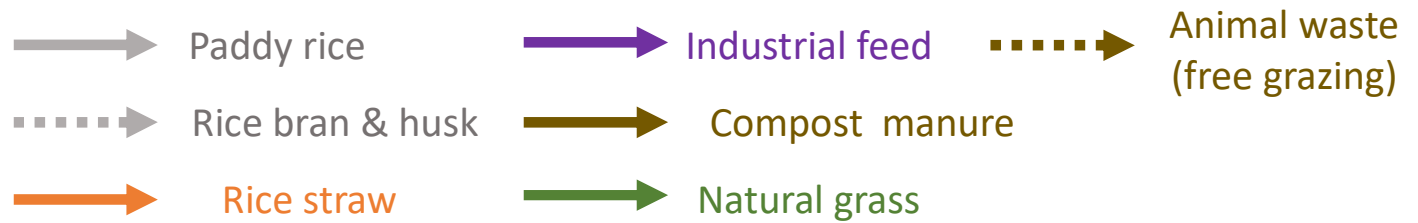




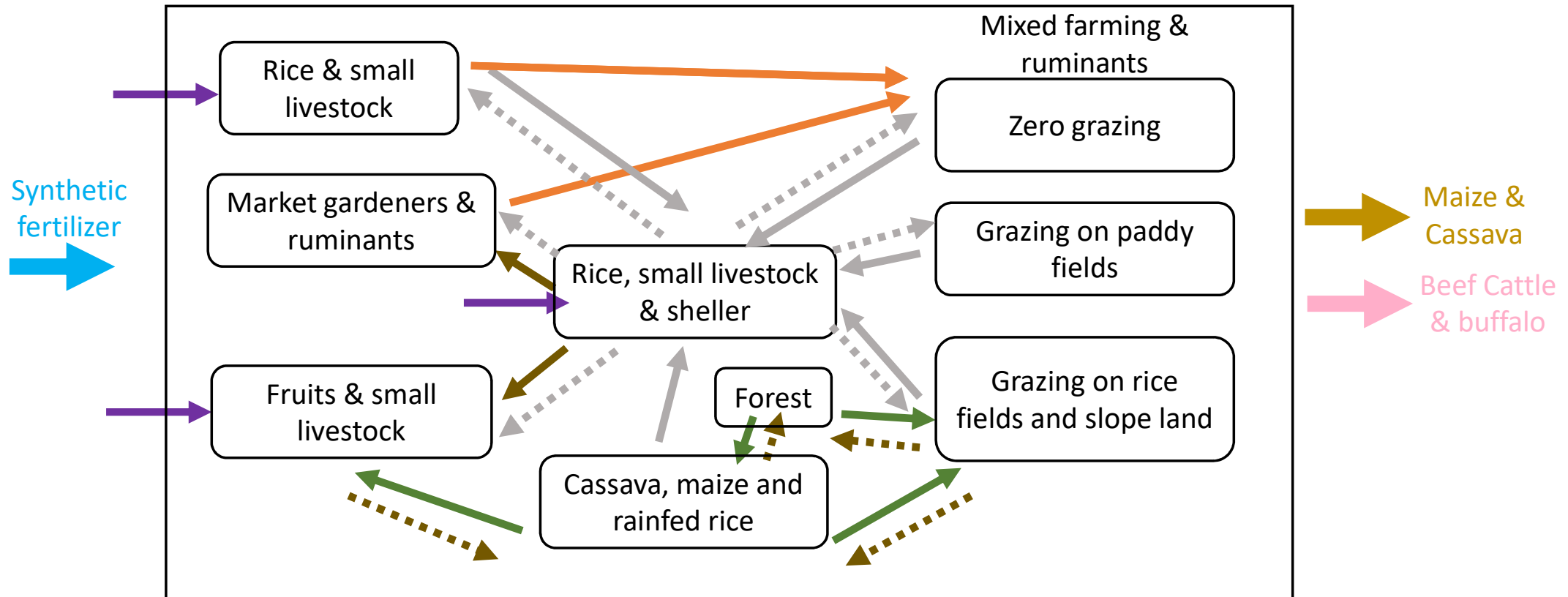
### Dien Bien District



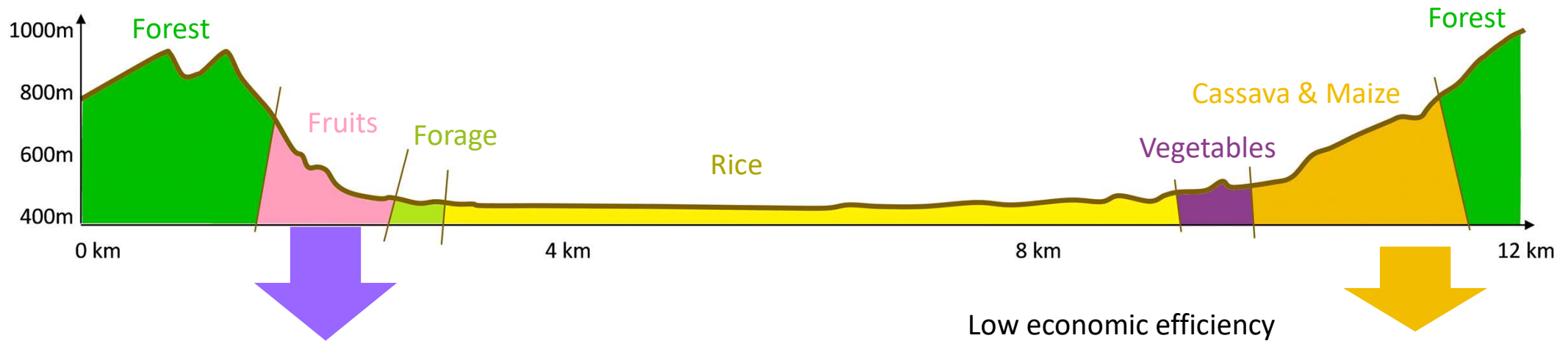




## Dien Bien District



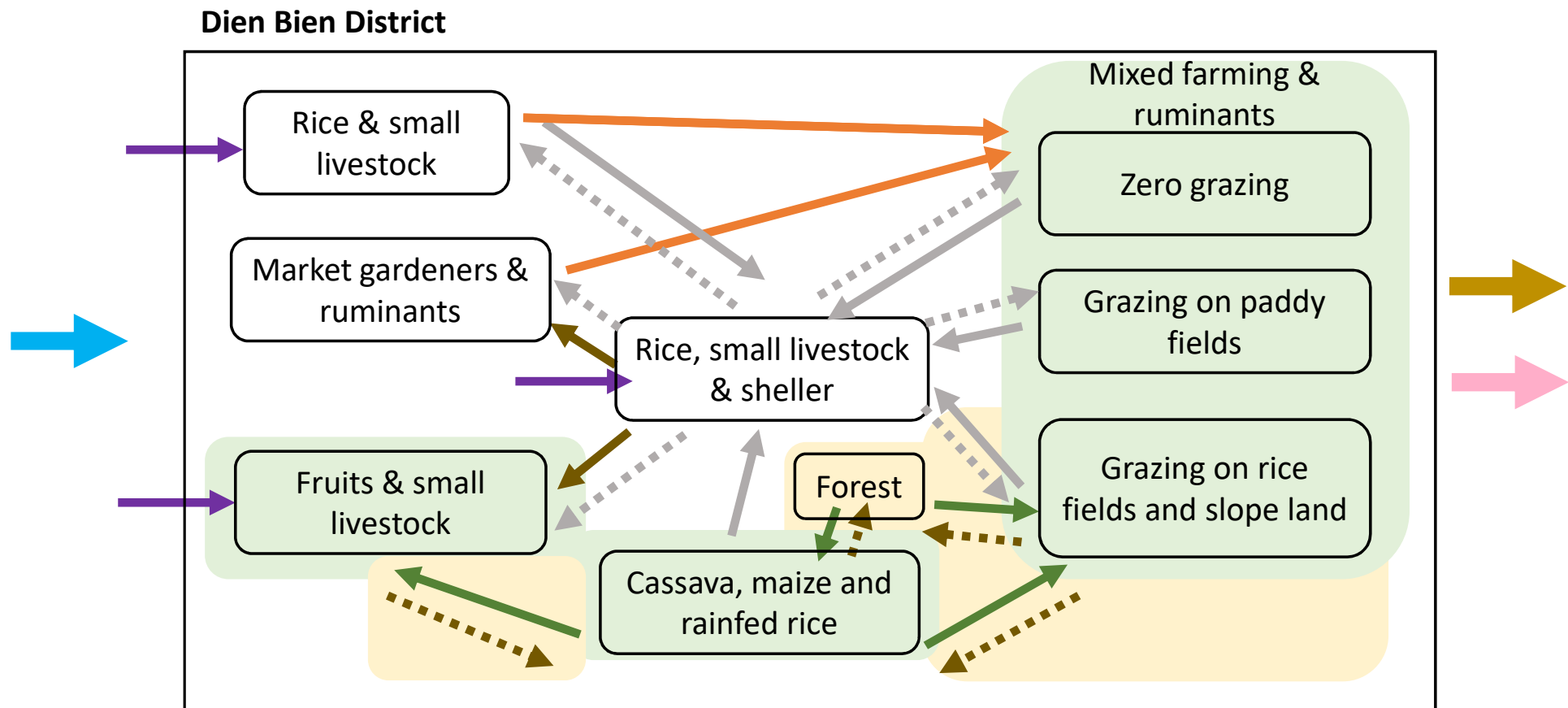
# Agroforestry an opportunity for improving livestock production ?



Low economic efficiency  
slope crop convert into fruit  
or industrial production



# Agroforestry an opportunity for improving livestock production ?



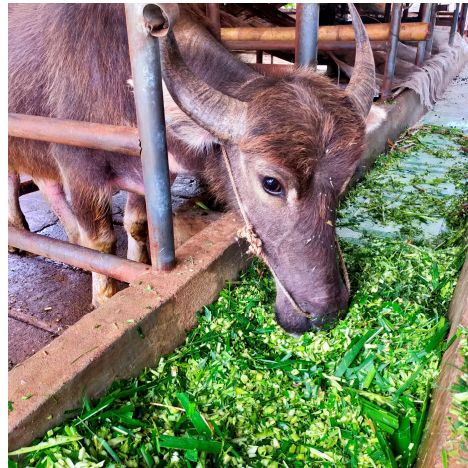
Reforestation could be a strong constraint for grazing systems

Agroforestry system an opportunity for improving of farmers livelihood & income



## Conclusion & perspectives

- Rice farmers with pigs and sheller are key players in crop-livestock integration between farms for animal feed, but above all for fertilising vegetables and fruit.
  - Reforestation with no other option to support animal feed: a new constraint for grazing livestock systems
  - Fodder under treetops could be an opportunity to improve livestock production in mixed systems and a new means of livelihood and income for farmers.
- Near future*
- Quantified assessments need to be finalised
  - The model should incorporate the results of technical models being tested in the field.
  - Discussion with stakeholders : extensionists, local authorities, producers, etc.





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