

Crop Biodiversity: A Foundational Component of Sustainably Intensified Farming Systems

Contribution of CENDI to the Agroecology Futures Regional Forum

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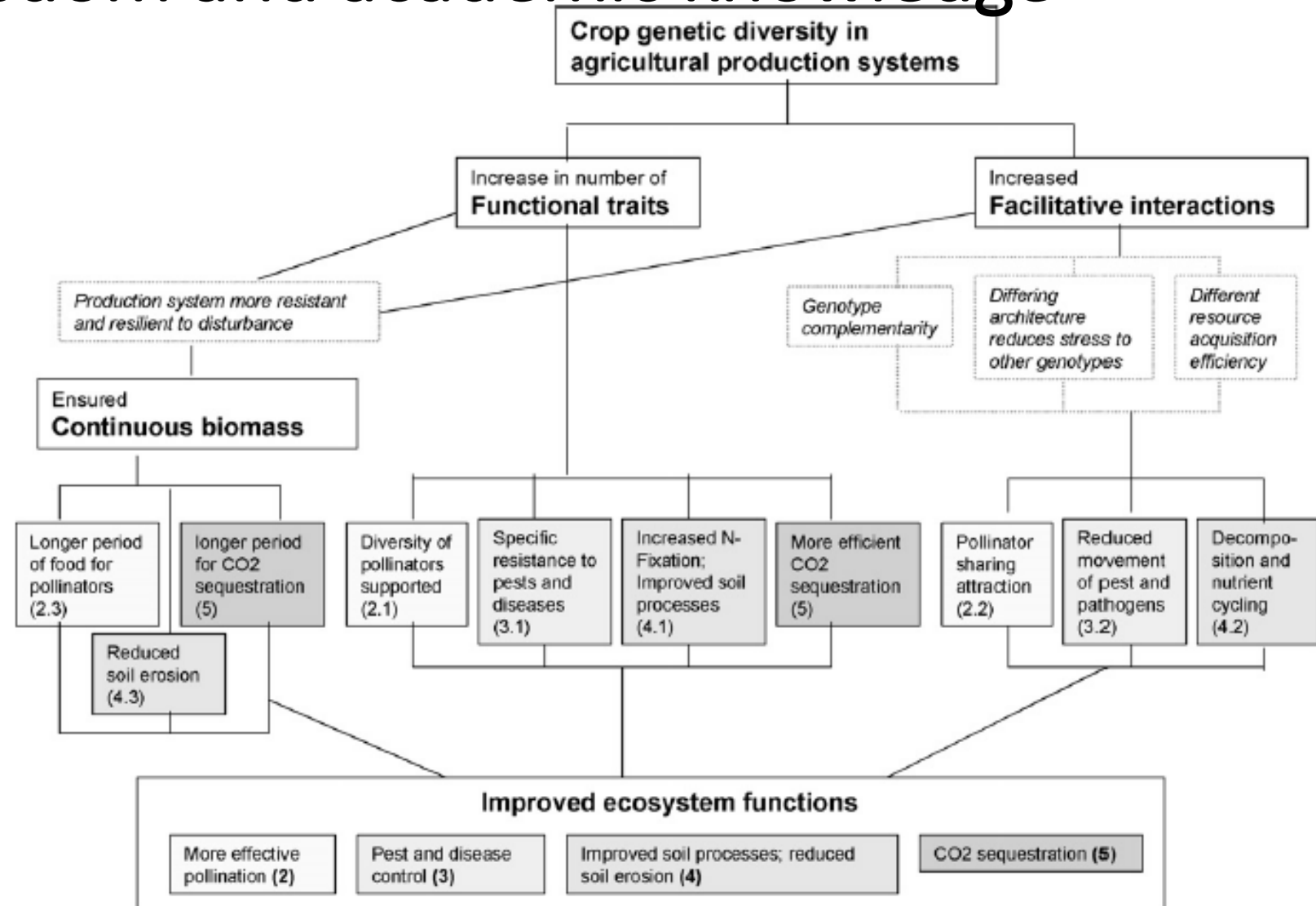
Is Vietnam in the paradox stage? Which photo is it choosing for agriculture?



Biodiversity is at the heart of Agroecology Futures

- Plant diversity is the engine that drives soil-crop interactions and enhances ecosystem services.
- The diversity of species benefits to the entire agro-ecosystem.
- Agriculture landscapes with rich and diversified fauna and flora are the most resilient, improving nutritional status of rural communities but also the most aesthetic ones.

CENDI's Agro-ecology practical works based farmers' local wisdom and academic knowledge



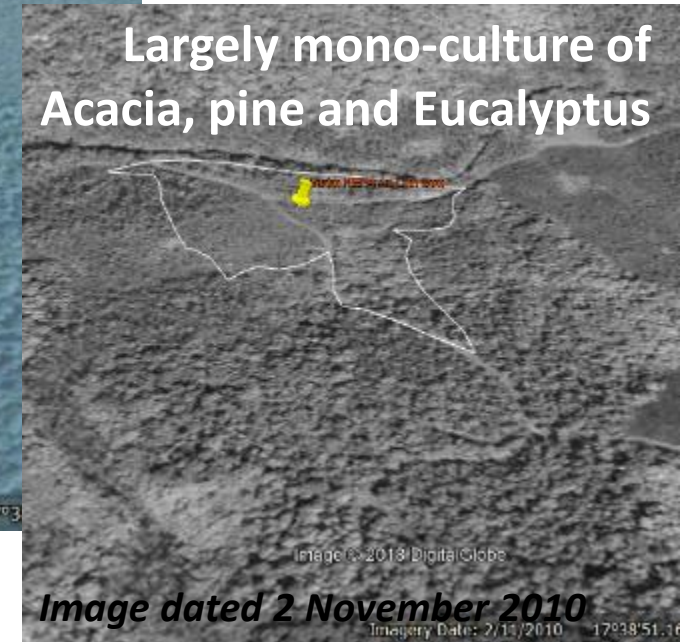
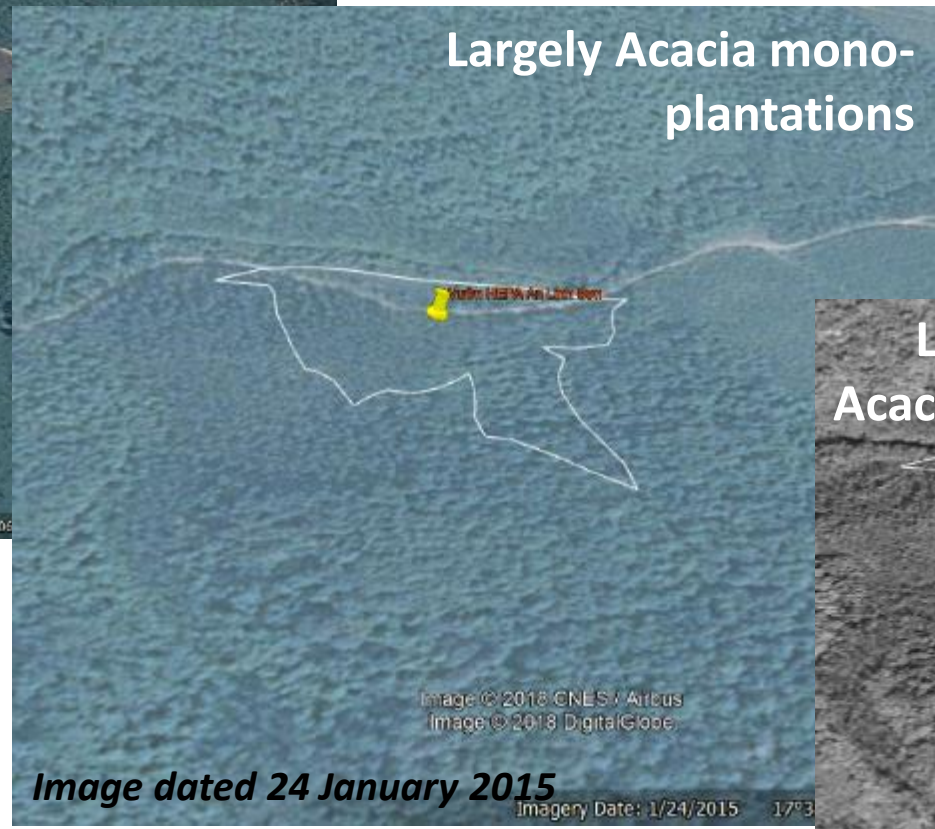
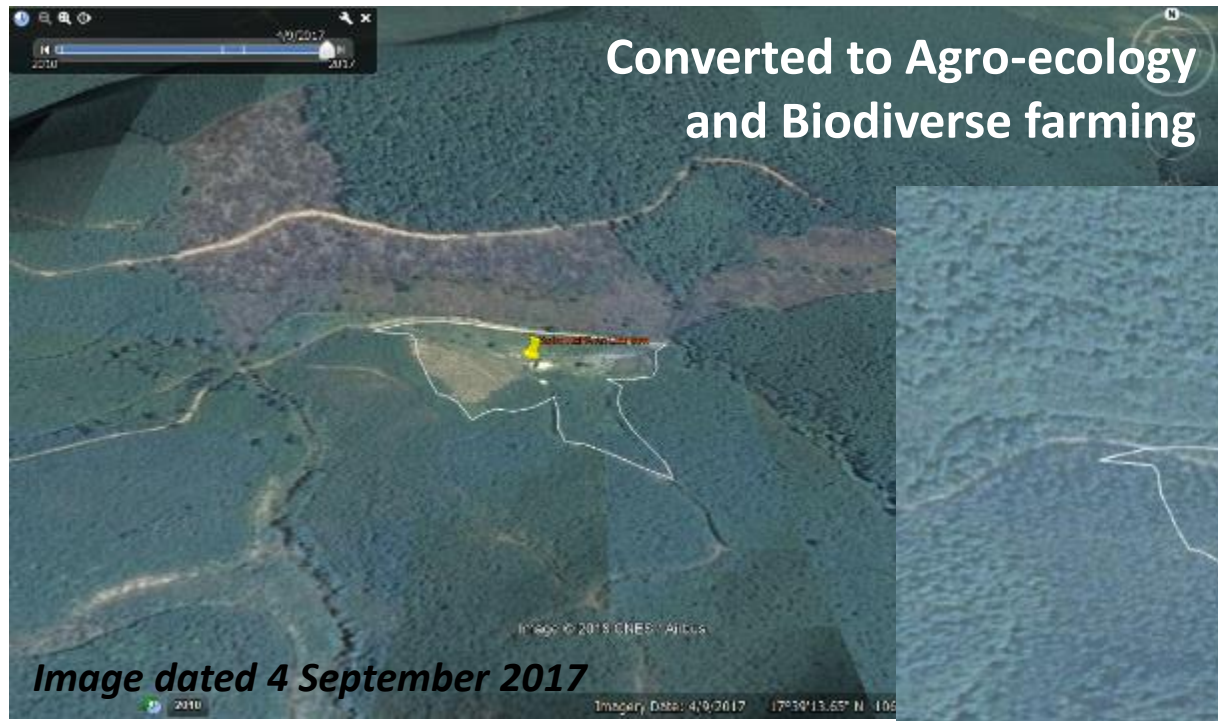
CENDI's Vườn HEPA An Linh Sơn

– an agro-ecological example of Biodiverse planting

- Part 1: Changes over land uses (conversion from mono-plantation towards Agro-ecological farming) – **currently doing**
- Part 2: Cultural Land uses/zoning respecting Agro-ecology principles (mixed-species planting, ecosystem-thinking and approach, biodiversity-oriented indicators) – **currently doing**
 - How many zones re-designed towards Biodiverse planting? Species for entire Area, each Zone?
 - Planting schemes to facilitate positive interactions (healthy produce and productivity and minimum of pests and diseases)
- Part 3: Crops system and rotational arrangements – **currently doing**
 - Functional traits
 - Facilitative interactions (companion plantings, minimum of pests and diseases)
 - Building biomass (and in the future will examine improved ecosystem functions)
- Part 4: Nutritional diets – **currently doing towards the Future**
 - Nutritional diets for niche/mindful consumers
 - Production systems (working out towards sustaining itself)
 - Genetic resources (conservation ex-situ, building farm-database)

Story of a young farmer making his conversion from mono-crop to Biodiverse farming

CENDI's Vườn HEPA An Linh Sơn – changes over land uses towards Agroecology



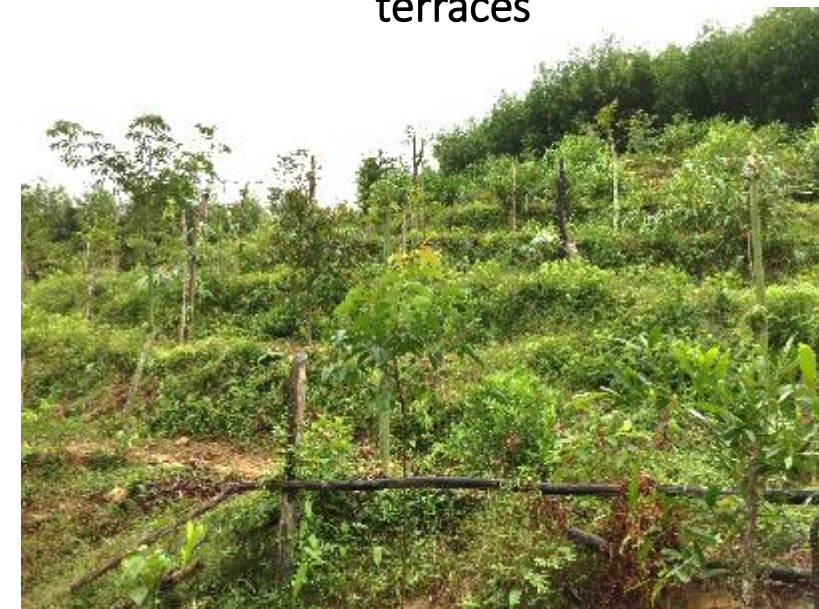
Zone 1: Middle Lower Part:
Diverse Fruit trees inter-crops with
Veggies, Spices and Mulching crops



Zone 2: Middle Upper Part:
Rotational farming and Crops Diversity of
High-nutritional crops and Mulching



Zone 3: Upper Part:
Mixed High valued Local Timber
Species integrated with Fruit Trees in
terraces



Vườn HEPA An Linh Sơn

“Sự an toàn của mọi người là niềm hạnh
phúc của tôi!” - Trần Quang Dũng



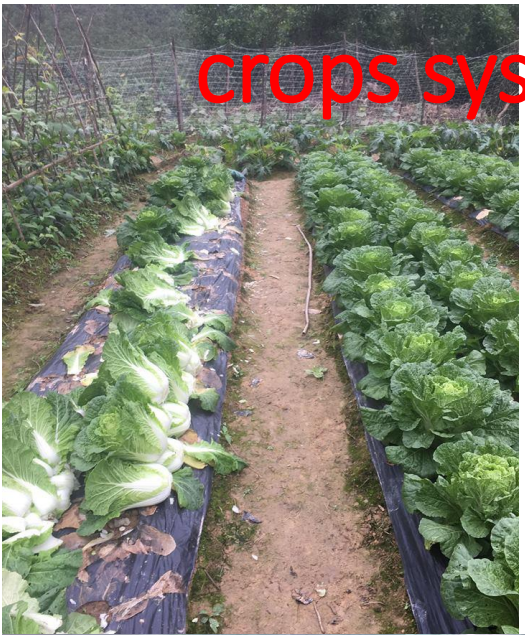
Diversity of species	
Fruit trees species	17 varieties
High valued timber tree species	08 varieties
Vegetables and annual crops	30 varieties
Herbal and other spices varieties	07 varieties
Total (2018)	62 varieties



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Diversity of species/varieties

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crops system and rotational arrangements



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nutritional diets for consumers



Trái cây nguyên chất Zucchini	
Giá trị dinh dưỡng trung bình trên 100 g	
Cung cấp năng lượng	
Calories	71 kJ (17 kcal)
Các thành phần chính	
Carbohydrate	1,8 g
- Tinh bột	? g
- Đường	2,5 g
- Chất xơ	1 g
protein	1,2 g
lipid	0,3 g
nước	95 g
Khoảng sản và nguyên tố vi lượng	
canxi	16 mg
đồng	0,4 mg
magiê	18 mg
kali	261mg
natrì	8 mg
vitamin	
Vitamin A	200 IU mg
Vitamin B6	0,2 mg
Vitamin B9	36mg
Vitamin C	17,9 mg
Axit amin	
Axit béo	
Nguồn: Cơ sở dữ liệu thành phần thực phẩm USDA và Interfel	



Bông cải xanh, sống (những phần ăn được)	
Giá trị dinh dưỡng cho mỗi 100 g (3,5 oz)	
Năng lượng	141 kJ (34 kcal)
Carbohydrat	6.64 g
Đường	1.7 g
Chất xơ thực phẩm	2.6 g
Chất béo	0.37 g
Chất đạm	2.82 g
Vitamin	
Vitamin A equiv. beta-carotene	(4%) 31 µg (3%)
lutein zeaxanthin	361 µg
	1121 µg
Thiamine (B1)	(6%) 0.071 mg
Riboflavin (B2)	(10%) 0.117 mg
Niacin (B3)	(4%) 0.639 mg
Pantothenic acid (B5)	(11%) 0.573 mg
Vitamin B6	(13%) 0.175 mg
Folate (B9)	(16%) 63 µg
Vitamin C	(107%) 89.2 mg
Vitamin E	(5%) 0.78 mg
Vitamin K	(97%) 101.6 µg
Minerale	
Canxi	(5%) 47 mg
Sắt	(6%) 0.73 mg
Magiê	(6%) 21 mg
Phốt pho	(9%) 66 mg
Kali	(7%) 316 mg
Kẽm	(4%) 0.41 mg
Thành phần khác	
Nước	89.30 g
*Đơn vị quy đổi	
	*µg = microgam • mg = miligam
	*IU = Đơn vị quốc tế (International unit)
Tỷ lệ phần trăm xấp xỉ gần đúng sử dụng lượng hấp thu thực phẩm tham chiếu (Khuyến cáo của Hoa Kỳ) cho người trưởng thành. Nguồn: CSDL Dinh dưỡng của USDA	



Cà chua đỏ, còn sống	
Giá trị dinh dưỡng cho mỗi 100 g (3,5 oz)	
Năng lượng	75 kJ (18 kcal)
Carbohydrat	4 g
Đường	2.6 g
Chất xơ thực phẩm	1 g
Chất béo	0.2 g
Chất đạm	1 g
Vitamin	
Vitamin C	(16%) 13 mg
Thành phần khác	
Nước	95 g
*Đơn vị quy đổi	
	*µg = microgam • mg = miligam
	*IU = Đơn vị quốc tế (International unit)
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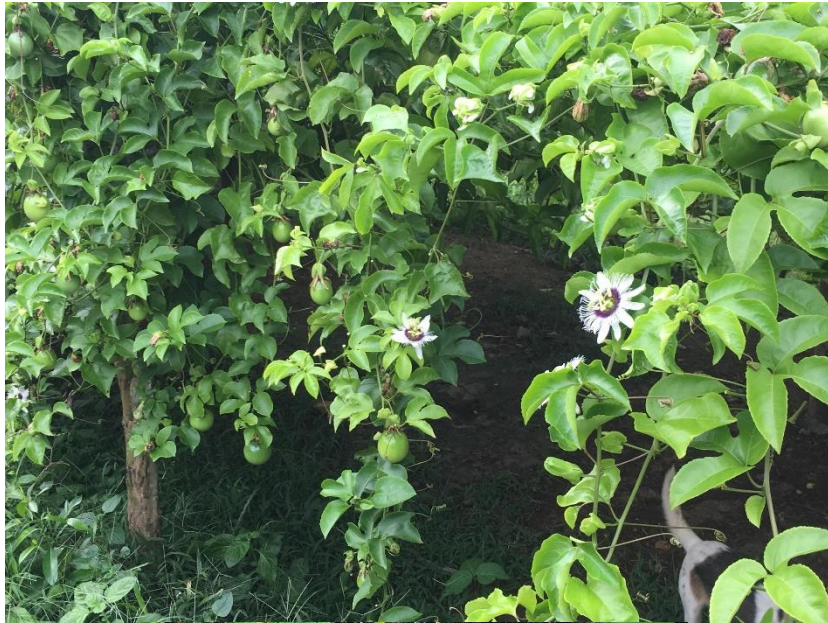


tiêu dùng ALSon

20,000	110,000		1 Trần Thị Hằng
25,000	125,000		2 Trần Thị Bạch H
25,000	30,000		3 Phạm Thị Bích
20,000	100,000		4 Trần Ngọc Thái
20,000	80,000		5 Trần Hồng Thà
			6 Nam Hương
Tổng	445,000		
Vận chuyển	50,000		
Sum	495,000		
Đơn giá	Thành tiền	Bán rau	
20,000	180,000		1 Trần Thị Hằng
25,000	100,000		2 Trần Ngọc Thái
25,000	125,000		3 Từ Anh (Thảm)
40,000	40,000		4 Vũ Thị Thuồng
20,000	120,000		5 Phạm Thanh L
20,000	30,000		6 Nguyễn Thị L
30,000	90,000		7 Nam Hương
Tổng	685,000		
Vận chuyển	60,000		Thương Thượn
Sum	745,000		



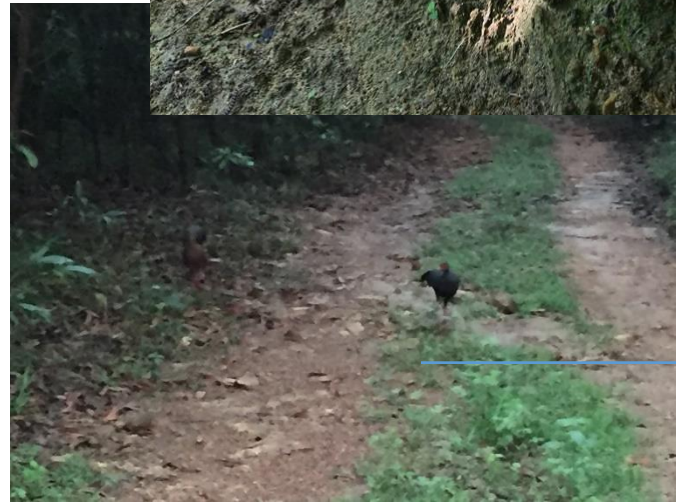
Flowers of passion fruits



Bees with the squash flowers



Presence of mushroom



A variety of wild chickens coming back



Challenges to the Futures? Crop Biodiversity is the Futures.



Reference: Miraculous Abundance P2: Farm du Bec
Hellouin Uses the Power of Nature.

- **Climate change hit Quang Binh region yet continued learning to minimize climate impacts from tolerant species/varieties (needed further trialing/experimenting)**
- **Upscale to other youth-led Agroecology practices, which Small grants from AliSEA needed to support other youths, alternative farmers to convert and extension**

CENDI's Agroecology farms towards Future

- **CENDI's Agroecology farms are moving towards Agro-Biodiversity Index:**
 - Diets and markets: how these smallholder Agro-ecology farms contribute to ensure food biodiversity for healthy diets
 - Production systems: how these smallholder Agro-ecology farms contribute to agrobiodiversity for sustainable production
 - Genetic resources: how these smallholder Agro-ecology farms contribute to diverse genetic resources for current and future options.