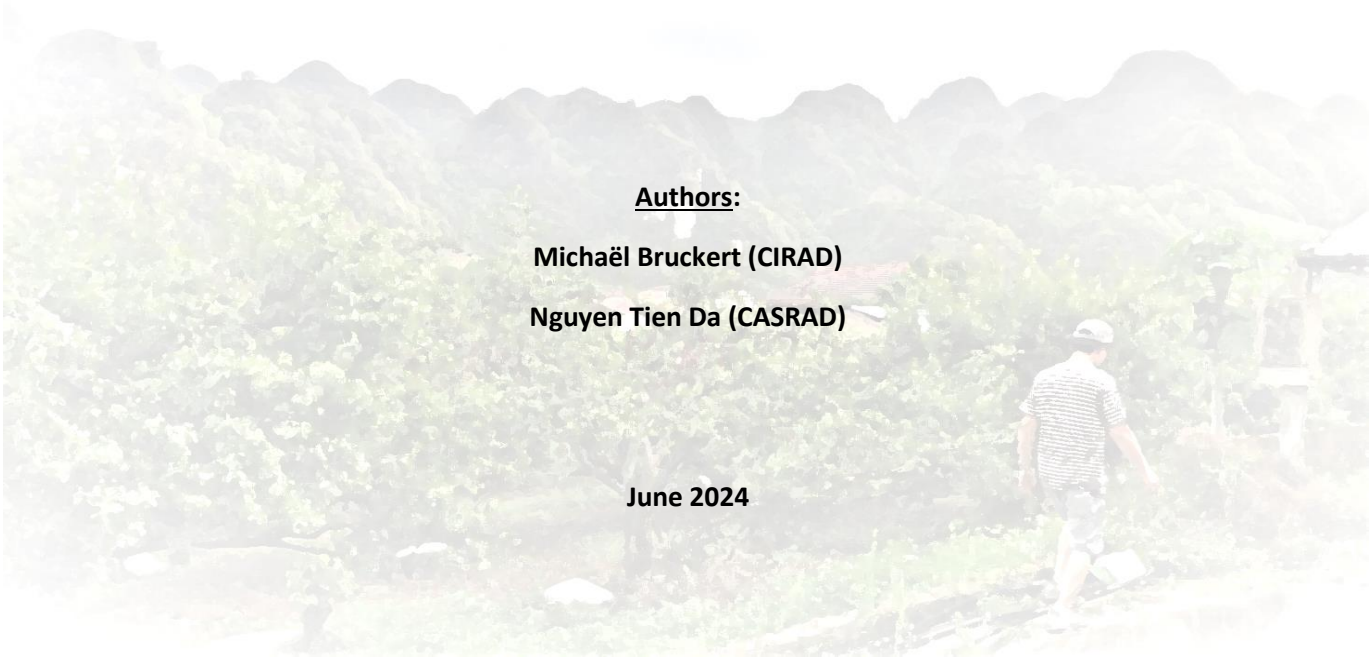
Agroecological Transformations at the Territorial Level and Food System Resilience during the COVID-19 Pandemic: the Case of Moc Chau District (Viet Nam)

FINAL REPORT



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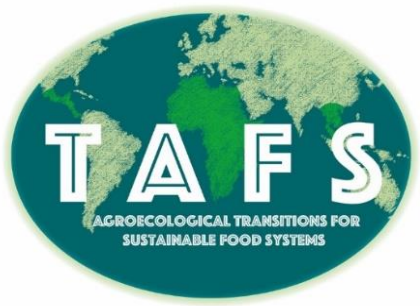

Transitions to Agroecological Food Systems (TAFS) is a multi-country research project launched in 2020. Its main objective is to provide convincing arguments to decision-makers to support agroecological transitions. The arguments will be based on scientific evidence, field data and concrete experiences, and will address the three key issues for a successful agroecological transition: (i) the year-round supply of sufficient, affordable, diverse, nutritious and healthy food for the rural and urban population; (ii) the generation of decent jobs and incomes for farmers and their families and; (iii) the sound management of natural resources in the context of climate change.

The project draws on this knowledge to lead a collective reflection on public policy instruments and to co-construct, with policymakers and food system stakeholders, a strategic vision of transition towards sustainable food systems based on agroecological practices.

TAFS is coordinated by CIRAD (the French Agricultural Research Centre for International Development) with five research partnership platforms in three continents:

- In Africa: ISA (Food Safety Information), PP&G (Public Policies and Governance), and SPAD (Altitude production systems and sustainability in Madagascar);

- In South East Asia: Malica (Markets and Agriculture Linkages for Sustainable Food Systems in Asia);

- In Latin America: PP-AL (Red Políticas Publicas and Desarrollo Rural).

TAFS collaborates with the Transformative Partnership Platform on agroecology (TPP) initiated by France and the CGIAR (Consortium of International Agricultural Research Centres) where it contributes to the policy component.

The project is implemented in nine countries: Burkina Faso, Mali, Madagascar and South Africa; Laos and Vietnam; Argentina, Brazil, and Colombia.

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EXECUTIVE SUMMARY

The COVID-19 pandemic and the subsequent steps taken by national governments have largely disrupted the global agrifood system, especially in low and middle-income countries. Local food systems and agroecology are often put forward as a way to face and prevent future crises. However, it is necessary to analyze in details if alternative food networks show more resilience than conventional networks. This report documents the agroecological transformations taking place in Moc Chau district in the North-West of Viet Nam (Son La province) and quickly assesses the impact of the COVID-19 crisis on the local food system, questioning the resilience of agroecological food systems in the face of crises.

Agrarian change in the district brought about a relative segmentation of the output market between a "generic" mass market for "standardized" commodities (so-called "traditional" market) and a "dedicated" niche market for "specialized" products displaying specific attributes (so-called "modern" market). Agroecological transformations are initiated by policy-makers, international projects and market demand and show a low degree of territorial integration. They are mainly driven by concerns for food safety and by a will to retain value through the market valorization of high-quality and specialty produces. At the same time, farmers are increasingly confronted with land degradation, soil erosion and chemical pollution. Cooperatives, certifications and contracts are the main tools promoted to develop and market products with specific quality attributes. The focus of these initiatives is mainly on modernizing traditional agricultural systems. However, the traditional market also displays a certain degree of connectivity: traded products are also usually information-laden and transactions are embedded in dense social networks.

Moc Chau district has been affected by the decisions that public authorities have taken to prevent the spread of the COVID-19 crisis. The local food system did not suffer from important disruptions and failures. Diversity of food sources was mainly preserved as production for self-consumption is still prevailing in rural areas. The food system is made of a diversity of decentralized of flows and actors, which allows for a high degree of resilience. Besides, it has a high degree of autonomy as it does not rely much on external factors of production. VietGAP certification, membership to cooperatives and contracts with the modern sector appeared as being assets as actors displaying these features have done better than others. However, this resilience is not directly related to these features: it is mainly due to the choice made by public authorities to favor the "modern" sector. Besides, large-scale actors such as cooperatives and companies could more easily pay for higher transportation costs. The "traditional" mass market was affected at the national scale by the closure of numerous wet markets and at the international scale as borders were closed. Online sales proved to be an efficient mean to circumvent the disruptions in supply chains.

In Moc Chau district, resilience appeared more as a capacity of the different networks to keep on operating in spite of the restrictions, rather than as a proactive strategy of adaptation and innovation in response to these restrictions. Contextualization of public decisions, short duration of the higher level of restrictions, high level of self-consumption, low dependence to external factors, and the diversity of actors, relations and flows explain this resilience. There is no resilience as such: the degree of readiness, recovery and responsiveness of actors directly depends on the type of shocks they have to face – in Moc Chau district, on the design and differentiated implementation of decisions by public authorities.

INTRODUCTION

Context

The COVID-19 pandemic and the subsequent steps taken by national governments have affected societies throughout the world between 2020 and 2022. Lockdowns and restrictions imposed on human mobility have largely disrupted the global agrifood system, especially in low and middle-income countries. Several studies and reports have warned about the potential consequences of these disruptions on people lives. Mainly, experts have pointed to the consequences that preventive measures taken by governments had on labor availability, transports, supplies and prices of inputs and food, resulting in detrimental consequences on production of and access to food, and consequently on people's livelihoods and diets (Yousefian et al. 2021; HLPE 2020). Effects are supposedly stronger on the downstream segments of the supply chains, in the informal sector and in urban areas, and tend to sharpen pre-existing inequalities (Reardon, Bellemare, and Zilberman 2020). Several reports and studies promote local food systems and agroecology as the way forward to face and prevent future crises (Singh 2023; IPES Food 2020). These alternative ways of organizing food systems are supposed to be more beneficial for all actors, mainly the most marginal ones, and to allow for higher performances in terms of well-being, equity or environmental stewardship (Gliessman 2014; Anderson et al. 2021; Allen 2010). The higher degree of diversity, multi-functionality, coexistence, connectivity, self-regulation and autonomy that these systems display are supposed to increase their resilience (Lamine 2015; Chiffoleau et al. 2020; Tittonell 2020). Resilience is broadly defined as "the dynamic capacity to continue to achieve goals despite disturbances and shocks" (Tendall et al. 2015, 18). It represents both the capacity of a system to recover from shocks and crisis, and the outcome of such as process. Resilient food systems usually show "robustness", "redundancy", "flexibility" and "resourcefulness" (Tendall et al. 2015, 19). However, it is necessary to analyze in details if alternative food networks (Ilbery and Maye 2005) show more resilience than conventional networks.

The goal of this study is to document the agroecological transformations that are taking place in Moc Chau district in the North-West of Viet Nam (Son La province) and to quickly assess the impact of the COVID-19 crisis on the local food system. Moc Chau district is a mountainous region, located about 200 km from Hanoi, the capital city. Even though the agricultural sector is still dominated by the production of maize, cassava, tea and milk, it has specialized over the last two decades in the production of (often temperate) fruits and vegetables to answer the growing urban demand (Huynh et al. 2021). Some production patterns and organizations tend to adopt some of the principles of agroecology (Dao and Nguyen 2022; Pham 2022; Hoang Thanh 2021), even though the concept is rarely mentioned as such. Moc Chau district has the reputation of producing good quality agrifood products, associated with aesthetic appreciations regarding the local landscape. Local authorities and international projects support the development of high-quality food crops, including safe vegetables and fruits. Besides, the Son La province aims at being a leader for organic production which makes this territory an interesting case to study.

As other districts in Vietnam, Moc Chau has been affected by political decisions related to the spread of COVID-19. By analyzing the impact of this crisis on the agrifood system in Moc Chau, we will shed light on and question the specific resilience that agroecological initiatives and territories may show in a context of external shocks. Therefore, this survey looks at the impact of the COVID-19 crisis on agroecological initiatives in Moc Chau district and, in turn, questions the resilience of agroecological food systems in the face of crises. What was the impact of the COVID-19 crisis on the food system in Moc Chau district? How did the local actors react to the crisis? How were agroecological initiatives affected? Did these initiatives show greater resilience to the crisis?

Methodology

There is no actor that overtly claims to work following the principles of agroecology in Moc Chau, nor is there any structured and purposeful social movement that embodies this watchword. However, the district is renowned for the number of actors and project related initiatives that aim at developing and promoting “safe” and sustainable practices, as well as local specialty products. Therefore, for this survey we have mainly targeted actors involved in the production of higher quality food products (many of them being cooperatives) in Moc Chau district. Even though we address the local food system in general, our study mainly focuses on the case of fruits and vegetables.

The work was divided in three main tasks: 1/ a desk survey to gather data on the food system and to review the projects and initiatives taking place; 2/ a field survey to collect primary data from key informants; 3/ the analysis of the data and the writing of the report. The field survey has consisted in 25 open-ended and qualitative interviews carried out with local actors in Moc Chau in May and November 2023.

The sample of actors interviewed is as follows:

- 2 representatives of local authorities
- 17 cooperatives
- 2 companies
- 1 trader
- 1 farmers group
- 2 retailers

Complementary informal interviews and visits have been done with shops and supermarkets selling Moc Chau products in Hanoi. This primary and secondary data has been complemented by field surveys from the ASSET project on market arrangements, especially on e-commerce and fruits and vegetables value chains.

We first quickly map the local food system in Moc Chau district. We then document the main agroecological initiatives and transformations that are taking place. We finally sketch out the main impacts of the COVID-19 crisis on the food system while questioning the role of agroecology in this crisis.

1. FOOD SYSTEM IN MOC CHAU DISTRICT: A QUICK MAPPING

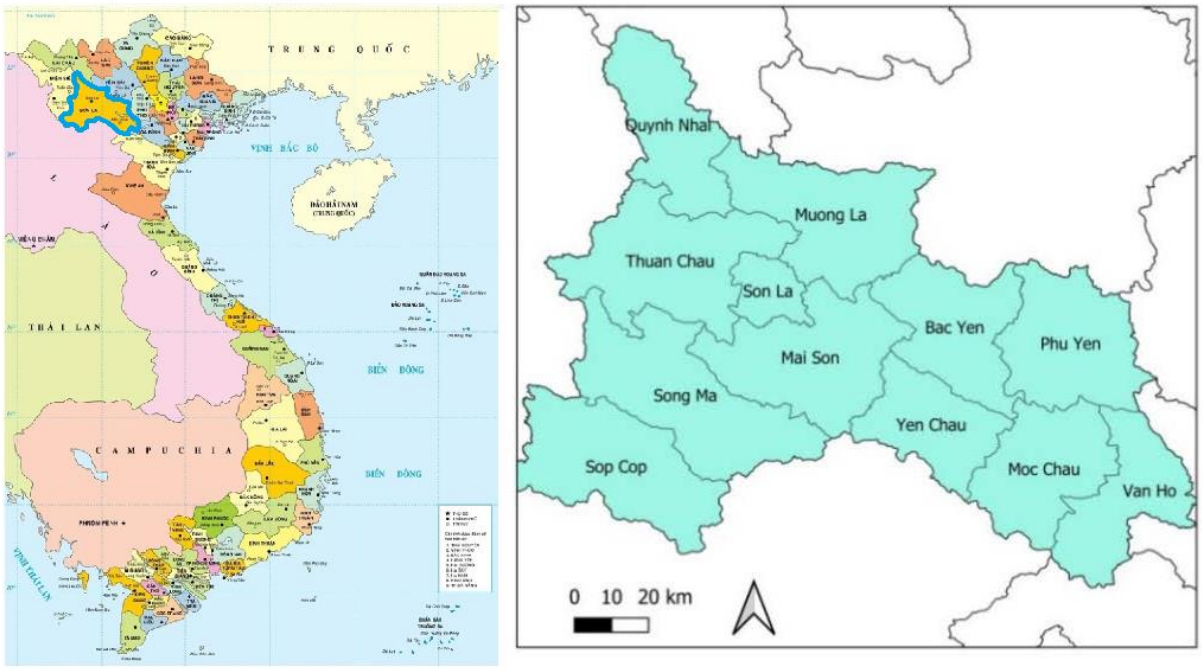

Figure 1 – Map of Son La province[1]

1.1. Presentation of the Moc Chau district

Moc Chau district, in the Son La province, has a total area of 1,071 km^2 and is populated by over 113,000 people (density = 105 person/km^2). It is made of 2 towns (Moc Chau City and Moc Chau Farm Town) and 13 communes. 36 % of the population is urban. The average poverty rate is around 12%. Ten minority ethnic groups are represented (including 38% of Kinh people, 30% of Thai people, 12% of H'Mong and 12% of Muong).

Moc Chau district is at an elevation between 80 m and 1,300 m. It is made of a plateau (*cao nguyên Mộc Châu*) at an average elevation of 1,050 m and surrounded by mountains interspersed by narrow valleys. It is delimitated to the North by the Black river reservoir (Hoa Binh reservoir) and to the South by the Lao border. The district has a relatively cool climate (average temperature of 19°C), which combined with a sufficient amount of rainfall (around 1,500 mm), a fertile soil and the flat terrain on the plateau, makes it suitable for agriculture and livestock production. However, some communes and hamlets suffer from a lack of connection with Moc Chau city, the main town of the district. The main economic activities in the district are related to agriculture and tourism.

[1] Source: (Le Thi Thanh et al. 2021)

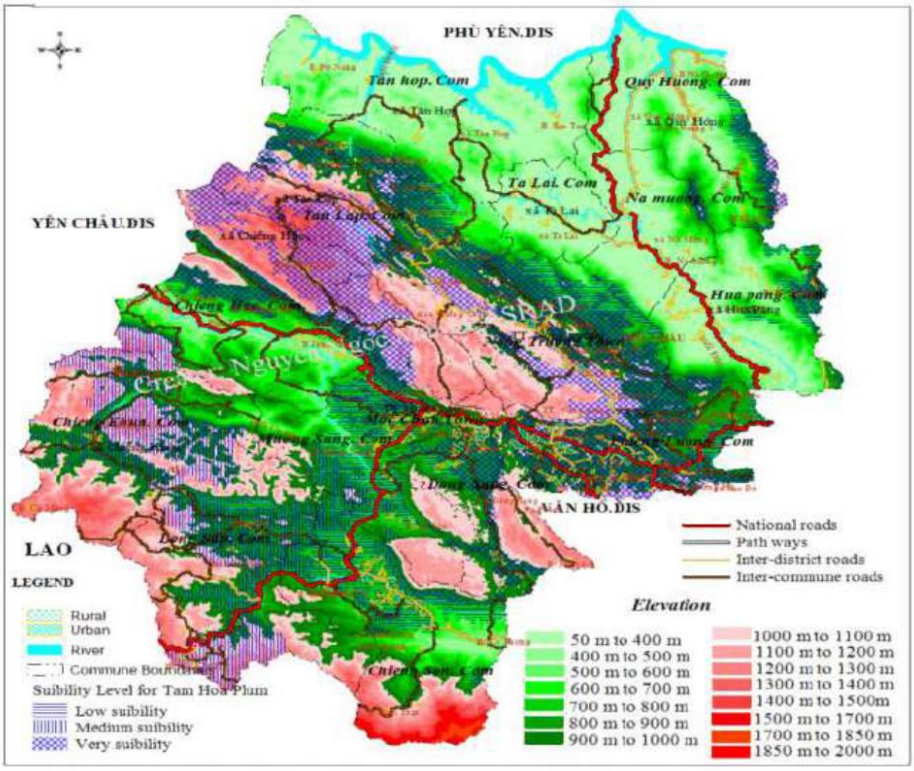

Figure 2 – Map of Moc Chau district[2]

1.2. Agrarian change and commercialization of agriculture

Agrarian systems in Moc Chau – as in most districts in North Western Viet Nam – have transformed quickly since the late 1990s, from a subsistence pattern to a commercial orientation that implied specialization, intensification and market integration. Early transformation happened quickly after the independence with the creation in 1958 of the entity that later became the Moc Chau Milk Company (*Công ty cổ phần Giống Bò Sữa Mộc Châu*). The process of agrarian change combined different dynamics[3]. Production has been "extensified" as forests have been cleared to open new fields for the cultivation of maize first, and of fodder and fruit trees later. Meanwhile, livestock has increased in number of heads. Farming practices have also intensified, with the introduction of horticultural crops, high-yield varieties, more productive milk cows, and chemical inputs for fertilization and pest control. While family farmers kept ownership over the main factors of production, private capital has penetrated the farming sector with the creation and the expansion of entrepreneurial and capitalist farms. Many activities started to be externalized. Producers were increasingly integrated in markets at the farm level for purchasing means of production (including equipment and inputs), hiring labor force and for selling their outputs, but also at the household level where a process of "commodification of subsistence" (Bernstein 2017) took place. Some sectors experienced an integration of their activities, with contract farming being introduced in the milk and tea sectors. The processing of food products (dairy products, tea, dry fruits, etc.) developed, contributing to a transfer of value from the farms to industrial units. Shifting relations of production and property, as well as the development of off-farm and non-farm activities, have diversified the sources of incomes and fostered social differentiation among farmers. Some producers have managed to secure an economic rent by valorizing the distinct qualities of their products (pertaining to a specific location, good practices and local varieties grown)

[2] Source: (Nicetic, Dinh Thi Huyen, and Le Thi Hang 2022)

[3] A dedicated survey based on interviews, data and archives analysis would be required to document agrarian changes in Moc Chau in more details. In this report we are only sketching the main evolutions.

through the development of specific brands and labels mainly for tea, dairy products and fruits. This rent was also favored by the relative low cost of land in the early 2000s (interview with GreenFarm, 24/05/2023).

Agrarian change came along with a relative segmentation of the output market between a "generic" mass market for "standardized" commodities and a "dedicated" niche market for "specialized" products displaying specific attributes – to use the typology proposed by Salais and Storper (Salais and Storper 1992). This is especially the case for fruits and vegetables. Most of the marketed production is bought by collectors and sold to traders who operate in wholesale markets in the urban region. In this case, the products are standardized and mainly valued for their cosmetic attributes (size, appearance, color, etc.). In these buyer-driven value chains, relations between suppliers and buyers are usually "spot-type" as there is no long-term commitment and information is easily coded (Ponte and Gibbon 2005). A minor part of the production, mainly supplied by cooperatives, follows specific standards and is sold to the so-called "modern" sector (supermarkets, specialized shops…). In these "relational" or "captive" value chains (Gibbon, Bair, and Ponte 2008), the qualities of the products are certified by a third party and buyers resort to tests and monitor the suppliers' operations. There is a strong interdependence between suppliers and buyers, even though the buyer usually imposes the conditions of the transaction. The section on the vegetables and fruits value chains will give further insights about this divide.

1.3. A diversified and specialized agrifood system that is increasingly integrated in commercial value chains

System of production

Son La province, with 57,800 ha under fruit production, is the second largest fruit-producing province in Vietnam[4]. In Moc Chau district too, there is an official direction towards agricultural production and development (interview with Ms. Hoa, head of the district agriculture division, May 2023). Almost 80% of the households are engaged in activities related to agriculture, forestry and aquaculture while 20% of the people are employed in food services in the district (A4NH).

Agriculture accounts for 27% of the total production of value. On the total of 86,080 ha of land, around 30% are used for annual crops (around 25,000 ha), 28% for planted forest, 30% for natural and protected forest and 11% for perennial trees (including fruit trees) (Huynh et al. 2021). Only 7% of the cropland are irrigated (around 1,800 ha).

The main products in terms of land use and volumes produced are rice, maize, cassava, tea, dairy products, fruits and vegetables. Fruits, tea and dairy products contribute to most of the added-value produced.

- Maize cultivation has quickly expanded in the late 1990s, bringing along a shift from subsidence farming to commercial farming with the introduction of hybrid varieties, and the development of large private companies in the sector of animal farming (milk cattle and pig) and input supplies (Friederichsen and Neef 2010). In 2022, maize is the main crop in terms of cultivated area with 7,500 ha cultivated, which accounts for almost half of the total cropland, for a total production of 35,000 tons. However, maize production has halved over the past 5 years.

[4] Source: https://lecourrier.vn/son-la-les-fruits-de-la-reussite/984576.html

- Rice ranks second with a cultivation area of 2,700 ha (2,200 ha in lowland and about 500 ha in upland) and an annual production of about 14,000 tons in 2022 (1,000 tons in the upland and 13,000 tons in the lowland, including 3,700 tons of spring paddy).
- Cassava cultivation is rapidly expanding: it is cultivated over about 2,800 ha for a production of 40,000 tons, 4 times more than in 2019). Arrowroot is produced over 850 ha for an output of almost 16,000 tons.
- Vegetable cultivation (mustard leaves, pumpkin, beans, cabbage, etc.) expands over almost 3,000 ha for a production of over 48,000 tons.
- Fruit trees (plums, longan, mangoes, avocado, etc.) cover over 10,000 ha for an annual production of 44,000 tons.
- Tea trees cover about 2,100 ha, producing almost 27,000 tons of fresh leaves.
- Regarding livestock, poultry farming amounts to 640,000 heads (producing over 1,500 tons of meat) and pig farming to over 50,000 heads (producing 3,800 tons of meat). There are about 6,000 heads of buffaloes and 42,000 heads of cattle, including about 25,000 heads of milk cattle, producing over 80,000 tons of milk per year. Most of the livestock (especially milk cows) are raised in barns as there as few pastures in the district.
- 123 ha are dedicated to aquaculture for a total production of 440 tons.

Regarding the spatial distribution of farming activities, corn, paddy and vegetable production as well as milk cow farming are concentrated in the lowlands (in the valley and on the plateau around Moc Chau city). Tea and fruit production are found both in the lowlands and on the sloping lands, while cassava and rain-fed rice are cultivated in higher places and sloping lands.

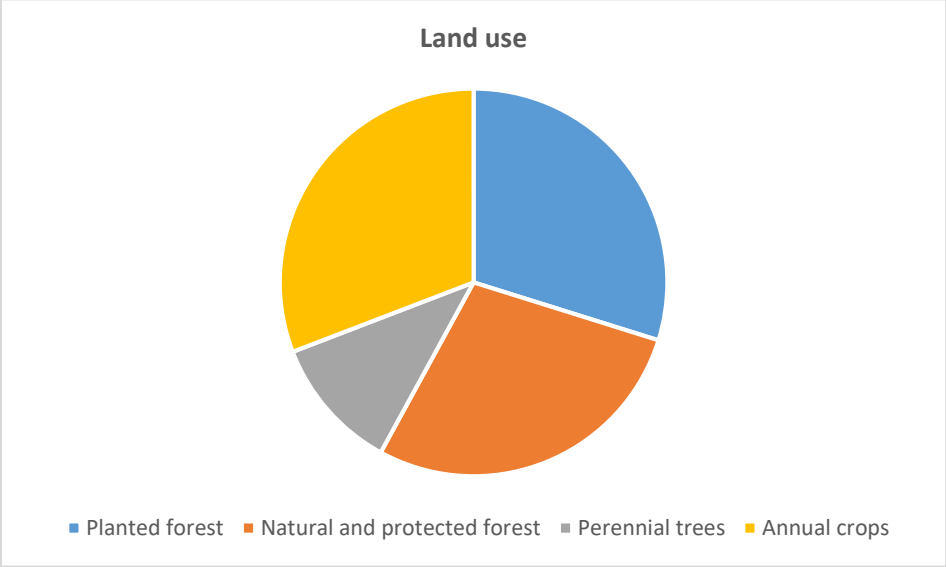

Figure 3 – Land use in Moc Chau district in 2020[5]

[5] Source : (Huynh et al. 2021)

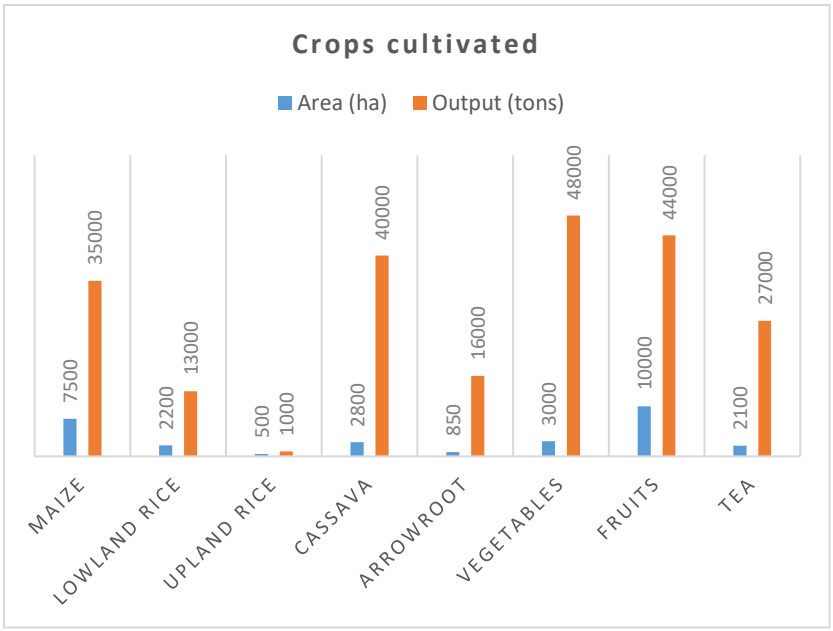

Figure 4 – Main crops cultivated in Moc Chau district in 2022[6]

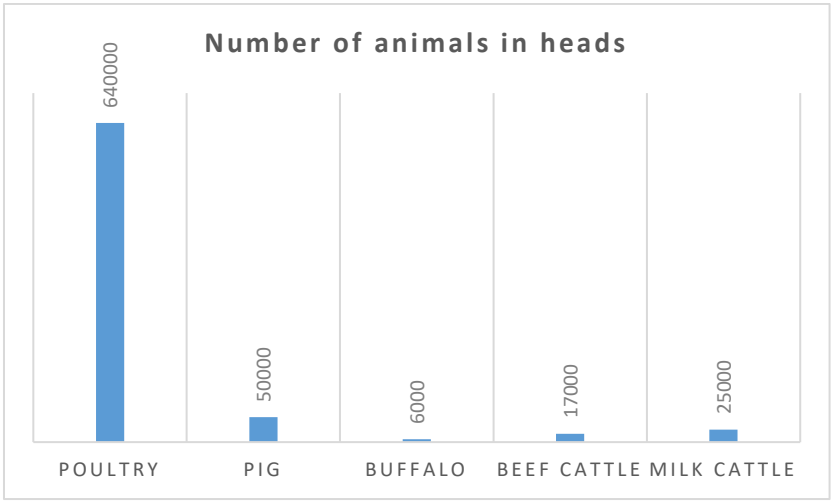

Figure 5 – Animals farmed in Moc Chau district in 2022[7]

Figure 6 – Variety of landscapes in Moc Chau district: strawberries (left), mixed (centre), tea (right)

[6] Source: Statistics from Son La province, 2022
[7] Source: Statistics from Son La province, 2022

Food processing

There are currently around 50 registered agricultural cooperatives and 232 farms (even though it is not clear how many of them are operational) in the district, plus around a hundred of agricultural companies and cooperative groups (*tổ hợp tác*) for food production, 25 food-processing units and 25 slaughterhouses (all at household scale) (Huynh et al. 2021). Tea and milk production are the most concentrated industries in the district. Sixteen factories process fresh bud tea, with a total capacity of about 400 tons per day. Moc Chau Dairy Cow Breeding J.S.C. continues to upgrade its 10 dairy products processing lines at two processing factories, with an average capacity of 250 tons of fresh milk per day. It holds about 5% of the market share at the national scale and about 20% in the Northern region[8]. Nafoods Group J.S.C has a factory that processes passion fruit juice in the district. The other farming sectors rely on a dense network of traders who buy products at the farm gate and bring them to local and/or distant markets.

Figure 7 – Plum processing

Food flows and distribution

Maize is mainly intended for animal consumption, in and out of the province. Tea is not consumed locally but sold both to the national market and to the export market (mainly in the Middle East). Most of the rice produced in the district is consumed locally, while some extra rice might be bought from other districts in Son La province (such of Phu Yen) or from Dien Bien and Thai Binh provinces. Likewise, Moc Chau district consumes more or less the same amount of meat that it produces. Fish is sourced from other districts in Son La and from the Red river delta. We can estimate[9] that about one third of the vegetables produced in the district are consumed locally and that a significant and increasing part (about two third) is sold to external markets, especially in the Red river delta (including Hanoi) as will be developed below. Depending on the season, vegetables (such as garlic, onions, potatoes, etc.) are also brought in from the Red River Delta and provinces such as Hoa Binh or Thanh Hoa. Likewise, we estimate that less than 10% of the fruits are consumed locally, while the vast majority is shipped out of the district, both to national urban markets in the North and to foreign countries such as China. However, the district has to source some specific “off-season” fruits like litchis, durian, pineapple or

[8] Source : https://www.vietcap.com.vn/api/cms-api/uploads/file/202401/MCM-20240112-VisitNote.pdf
[9] Based on the statistics of food production and of food consumption (Huynh et al. 2021).

watermelon from other provinces, and grapes and apples from China. The subsection on vegetables and fruits value chains (section 2.3) gives further information about the way producers connect to the markets.

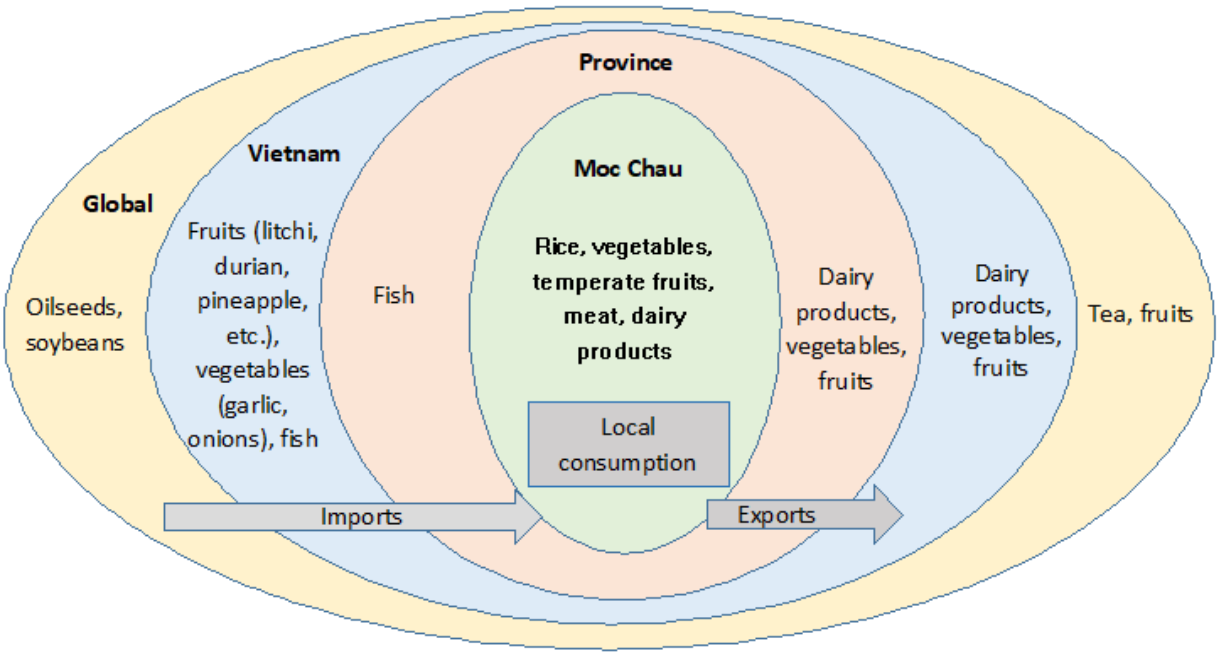

Figure 8 – Food flows in and out of Moc Chau district

The local system of food distribution can be described as "traditional". There are only around ten public food markets in Moc Chau district (Huynh et al. 2021), among which the main one is Km70 market in Moc Chau city. Other markets are located in Chieng Son (Chieng Son market) or in the old city-center of Moc Chau city too (Moc Chau market). A significant proportion of the fresh food is self-consumed (especially rice and vegetables), exchanged through non-market relationships or is bought from small-scale shops, retail stores and street markets. The main road the goes through Moc Chau city is sided with grocery stores that supply rice, fruits, vegetables, meat and eggs. There are only a few supermarkets in the district, including MT Mart in the outskirts of Moc Chau city, which sells only a very small amount of fresh food products.

A specific feature of the food environment in Moc Chau is the numerical importance of shops selling specialty agrifood products (*nông sản đặc sản*), usually labelled as "north-western specialties" (*đặc sản Tây Bắc*). These shops are one of the main outlets for OCOP products (see below).

Figure 9 – Public food market (left) and road side sales (right)

Figure 10 – Shop selling local specialty foods to tourists

Food procurement, consumption and nutrition

Households spent on average around 2,000,000 VND per months (about €75) for food purchases, accounting for more than half of their income (Huynh et al. 2021). About 40% of households buy most of their food at informal and street market, and about the same percentage at convenience stores. Other food sources are formal open markets (about 10%) and people from the interpersonal network (colleagues and relatives, also about 10%).

The nutrition and consumption survey carried out by the A4NH team (Huynh et al. 2021) shows that starchy staples still dominate the adults' diet (about 36% to 38% of the total weight consumed). The consumption of meat, poultry, fish and dairy is still low. The daily intake of fruit and vegetables by men and women meets the WHO's recommendation while it is still low among children under five. About 23% of women and 37% of children between 6 and 23 months of age do not meet the minimum dietary diversity (MDD) level[10] while 55% of women do not practice exclusive breastfeeding during the first 6 months of their kids. Meanwhile, the consumption of sweet and ultra-processed food is increasing, with 80% of the households having consumed sweets during the 7 days before the survey.

The prevalence of stunting among children under five is still quite high (30.4%), exceeding the national average (23.8%). Stunting is less prevalent in Moc Chau city compared to more remote and mountainous communes in the district. 15.1% of women are considered underweight while 14.2% of men, 10% of women and 18.5% of children under 5 are considered overweight and obese.

1.4. Public policies target technological developments and increases in production for food security and exports

Based on the guidelines and decisions issue by the MARD, the provincial and district levels implement specific policies and program for agricultural and rural development. The main goal is to increase productivity to ensure higher revenues for farmers and for food security for all. In its plan for 2025 and 2035, the Son La province People's Committee aims to keep on converting land from rice cultivation

[10] i.e. they did consume food from less than 4 of the 7 defined "food groups" during the day before the survey

to cash crops and high added-value products such as fruits, vegetables, tea and cassava. The provincial government operates a nursery that provides free planting material for longan, mango and *sơn tra* apple (*táo mèo* or *Docynia indica*).

Son La provincial authorities also plan to develop the production of agricultural products intended to processing industries and to exports in order to secure higher margins. As access to new arable land is limited, the implementation on high technology (such as net and greenhouses, smart irrigation systems, cold storage, etc.) and the development of large-scale and capital-intensive units are seen as a mean to achieve higher productivity. According to Ms. Hoa, director of the district agricultural division, the district authorities plan to determine areas where high technologies will be encouraged and deployed, decide about the main agrifood products to be produced there and determine specific companies and cooperatives to produce them (interview, 22/05/2023).

2. AGROECOLOGICAL INITIATIVES AND PRACTICES IN MOC CHAU DISTRICT

2.1. Main drivers of agroecological initiatives

Even though the concept of agroecology is barely used by public authorities and food system actors in the Moc Chau district and Son La province, many initiatives aim at improving the safety and sustainability of the local agrifood system. Moc Chau district can be called an "agroecology territory" – in other words, a place "places where a transition process toward sustainable agriculture and food systems is engaged" (Wezel et al. 2016). As for the Dien Bien province (Bruckert and Hoang Thanh 2022), agroecological transformations are mainly driven by policy-makers, international projects and market demand. They are mainly driven by concerns for food safety, at both political and consumer level, and a will to retain value through the market valorization of high-quality and specialized produces. Meanwhile, local political authorities see these initiatives as a way to promote the image of the district and to foster territorial development.

At the same time, farmers are increasingly confronted with land degradation, soil erosion and chemical pollution mainly related to maize mono-cropping, but also with crops losses and increasing production costs due to rising cost and/or inefficiency of inputs (Le Thi Thanh et al. 2021).

2.2. Government policies and programs to support agroecological transformations

Improving food safety and traceability through standards and certifications

In the framework of the participatory Theory of Change that took place within the ASSET project, the Son La province committed that, by 2030, it will "be nationally recognized as a good model of agroecology and safe food systems transformation. All stakeholders, from producers to consumers in rural and urban areas, benefit from functional agroecological and quality-based value chains that improve local farming community livelihood. Agro-Ecotourism is well-developed and promotes local culture and locally produced safe products."

Several documents and legal texts target a sustainable orientation of the agrifood sector in the Province. In 2021, the Executive Committee of the Son La Provincial Party has issued a Resolution on "concentrated and sustainable development of agriculture, forestry and fisheries, high-tech application by 2025, orientation towards 2030" (No. 08-NQ/TU). The same year, the Son La Province's People Committee has released a Decision to "develop a safe and sustainable plant-growing sector" (No. 860/QD-UBND). This Decision aims at improving efficiency and ecological impact of agricultural production, notably to save water and reduce the use of pesticides through the use of technology such as net houses, green houses, fruit bags, microbiological products, etc. It also plans a close monitoring of the use of chemicals. The local authorities are responsible for monitoring the use of chemicals: all inputs used must be included in the list published by the MARD and inspection teams are visiting supplier shops to ensure their compliance with the rules.

One of the key policies of the province in terms of food safety is the setting-up of "safe supply chains" (*chuỗi cung ứng an toàn*). In 2021, 158 chains have been certified by the DARD in Son La, with an area of 2,697 ha and an output of about 35,000 tons of products. In Moc Chau district, 58 safe supply chains have been certified, including 18 for vegetables (160 ha), 34 for fruits (500 ha and 6,000 tons/year), 4 chains for tea (252 ha), and 2 chains for dairy products (interview with Ms. Hoa, head of the district agriculture division, May 2023). According to the local authorities, most of these products are sold in shops managed by the local government.

29 cultivated areas dedicated to crops for exports are granted Production Unit Code (PUC) in order to ensure traceability (10 for Australia, USA and Japan, 17 codes for China). Traceability is also supported through the creating of linkages between producers, processors, distributors and consumers who are encourage to use barcodes and QR codes.

The development of area certified under the VietGAP (Vietnam Good Agricultural Practices) standard is also an important strategy of the local government. In 2023, the certificate, valid for a duration of 3 years, is granted for 382 ha of crops (mainly for tea, fruits and vegetables), with a goal (set in 2021) to achieve 1,029 ha and 10,295 tons in 2025. There is no area certified with GlobalGAP and organic agriculture standards yet in Moc Chau. However, the provincial and district authorities promote an "organic-orientation" of agricultural production (*sản xuất theo hướng hữu cơ*) which is not strictly defined and officially certified, but which entails a control over the use of chemical inputs. This orientation is promoted through trainings, public propaganda (documents, billboards and loudspeaker announcements), subsidies given for inputs, and plans to develop zones for organic and organic-orientation production. In Moc Chau district, 635 ha are considered as been cultivated in "organic orientation" with a target of 1,000 ha for 2025. Regarding the organic certification, the target for 2025 is to reach an area of 20 ha of organic vegetables (200 tons), 30 ha for fruits (305 tons) and 10 ha for tea (100 tons) and to have three companies and cooperatives certified. In Son La province, the area of crops certified under the organic agricultural standards in 2023 is 35 hectares, with an output of 455 tons/year.

A certification trademark, Moc Chau Safe Vegetables (*Rau An Toàn Mộc Châu*) has been established in the years 2010s with the support of international development projects. It is managed by the Son La government. Presently, 3 cooperatives (which are also certified VietGAP) are allowed to use this brand: Ta Niet cooperative (*Hợp tác xã Ta Niết*), Tu Nhien safe vegetable cooperative (*Hợp tác xã rau an toàn Tự Nhiên*), and An Tam safe vegetable cooperative (*Hợp tác xã rau an toàn An Tâm*). The authorization to use the brand is renewed every year, but an anonymous key informant that we met on the field informed us that it is a "very political" process with few effective controls taking place. As a matter of fact, few products sold by these cooperatives are marketed using the "*Rau An Toàn Mộc Châu*" logo. However, this trademark illustrates a promising will to brand safety and territorial anchorage together and capitalize on the good image that Moc Chau vegetables have on the urban markets such as Hanoi. A study from 2018 revealed that 35% of consumers in Hanoi know the "*Rau An Toàn Mộc Châu*" logo (Ferrand et al. 2018).

Collective trademarks are granted to two products: Oolong tea and Moc Chau avocado while Shan Tuyet tea (produced by the Vinatea Moc Chau Company) is the only products certified as a "Geographical Indication" in the district. In 2023, 30 different products have been certified under the OCOP (One Commune One Product) program in Moc Chau district, making it the district with the highest number of OCOP products in Son La province. The majority of the products have 3 stars, even though some have been upgraded to 4 stars in 2023. OCOP certifications are mostly granted to cooperatives such as Quyet Thanh cooperative for dried fruits (plum, mango, banana, etc.) and 19 May cooperative for dried fruits and wine. Other products include honey, tea, vermicelli, mushrooms (*Cordyceps*), fresh plums (*Nà Ka* queen plum), etc. Only one OCOP product is not a food product (*Dải Yếm* waterfall tourist area). The OCOP certificate is granted by the provincial authorities and is supposed to signal products that are typical from the region and that abide by food safety regulations.

Figure 11 – Bill promoting the collective trademark "Moc Chau Safe Vegetables"

Market arrangements and collective action

The Province supports the creation of cooperatives and farmers groups, which are seen as key tool to improve the circulate knowledge, benefit from technological innovations and to better access market. In Moc Chau, most cooperatives for fruits and vegetable production have 10 to 20 members in total, farming over a total area of a dozen of hectares. Cooperatives have in theory both a social and an economic dimension: they allow for a mutualization and sharing of resources and facilitate the access to markets upstream and downstream. However, in Moc Chau (as is the case in other regions in Vietnam), cooperatives often operate as companies as the main decisions are made by the board and rarely involve all the members. Most cooperatives are limited to a role of intermediary between markets and farmers: they supply inputs (seeds, seedlings, fertilizers and pesticides) at a lower price and try to guarantee an outlet with a premium price for certified products. Some organize technical trainings with the support of local authorities. They rarely supply credit to their members. Only a few of the cooperatives that we met were fostering the mutualized use of equipment and machines or were ensuring a collective operation of water systems.

Almost all the cooperatives that we met have at least some surfaces dedicated to the production of VietGAP certified products. Cooperatives seem to be well a suited organizational form for the abidance to the VietGAP standards: they allow to control the supply and use of inputs, provide technical trainings and may support their members with traceability processes and official registration. On the market side, they ensure the pay-out of a premium price as most of them have strong relationships with dedicated distributors in niche markets (mainly through formal contracts with supermarkets and specialized shops). Individual farmers do not produce at a sufficient scale to be able to implement these standards (and to dedicate time to the painstaking paperwork implied) and to maintain relationships with these specific buyers. As cooperative leaders told us, supermarkets often place orders with a short prior notice, which would make it difficult for individual family farmers to meet these demands.

Besides, Son La provincial authorities encourages alternative modes of distribution. A specific attention is given to the practice of e-commerce, in order to increase connectivity in the value chains: trainings are provided on how to set up and upgrade a website, how to conduct live chats and how to practice online payments. Son La province has also collaborated in 2021 with the e-commerce platform Sendo

for a “Son La Specialties Day”. Some producers (especially cooperatives and companies) have started to sell their products online, especially through social media such as Zalo and Facebook. This tendency has been reinforced at the time of COVID-19, as highlighted below. However, only a minority of the production is sold online.

The province and the district also support the opening of shops selling specialty products for tourists, such as shops dedicated to the sale of OCOP products. These shops offer a variety of products such as dairy products (fresh milk, yogurts, milk biscuits, etc.), a local spice mix (*chẩm chéo*), black garlic, dry fruits, noodles, tea, dry bamboo shoots, honey, plum and rice wine, etc. Most of them are located on the main road between Moc Chau and Hanoi and national tourists usually stop over on the way to buy local specialty products.

More generally, the local government plans to develop agrotourism. Farm visits are already very common in Moc Chau district, especially for tea estates, plum and peach farms (at the time of blossoming), and strawberry farms. Tourism related to landscape and agricultural production is meant to increase in the future as the Moc Chau district is promoting its image of “freshness”, “cleanness” and “authenticity” associated with cool climate, mountains and ethnic minorities, and is increasingly equipped with accommodation facilities (hotels and homestays) and better connected to Hanoi by road.

Projects that support agroecological transformations

Different projects have also been supporting transformations towards more agroecological practices in Moc Chau district in the past decade. Most of these projects were not specifically dedicated to Moc Chau district but were targeting the entire Son La province. Some projects were targeting forests (AFLI-II by ICRAF), adaptation to climate change (CSA AF), gender issues (GREAT funded by ACIAR), maize (“Maize Laos and Vietnam” by ACIAR and the University of Queensland and Conservation Agriculture for Maize by ACTAE and NOMAFSI), tea (T-LEAF by Helvetas), livestock (Revalter by CIRAD), temperate fruits (Temperate by ACIAR Queensland university) or vegetables (Integrated vegetable seed systems development by CIAT, “Improved market engagement for counter-seasonal vegetable producers in north-western Vietnam” and “Vegetables Value Chains” by ACIAR and Applied Horticultural Research) (Le Thi Thanh et al. 2021). More recently, the ASSET project (2021-2025) aims at harnessing the potential of agroecology, with specific interventions carried out in the Son La province, notably the implementation of a territorial branding strategy for Moc Chau district. The CG-led SHIFT initiative (started in 2022) aims at transforming food systems to improve diets, with specific data collection and interventions in Moc Chau district.

2.3. Two value chains with an agroecological orientation: vegetables and fruits

We will now shed light on two sectors that are embodying the transformations taking place in the Moc Chau district: fruits and vegetables. Since the early 2000s, Moc Chau district has specialized on the cultivation of varieties of vegetables and fruits that are suited to specific local climatic and soil conditions in order to answer a growing demand from large cities which became better connected. In the 2020s, Moc Chau is a four-hour drive away from Hanoi, which makes it possible to access quickly and safely the final market, even for fragile and perishable products such as leafy vegetables, herbs or strawberries.

Vegetables value chains

The recent expansion of vegetable production, implemented by public authorities since the years 2010s with the support of international and local partners, aimed to benefit from Moc Chau’s

competitive advantage in terms of climate and soil fertility. The main goal was the "strengthening [of] an emergent horticulture cluster" (Sautier and Nguyên 2016) so as to supply low-elevation urban areas (mainly Hanoi) with temperate (also called "counter-seasonal") vegetables – the same way as the city of Da Lat is supplying Ho Chi Minh City. In the early 2000, vegetable production Moc Chau district was happening only in a few places in the lowlands during the winter season and was intended mainly for the local consumption markets. Stimulated by a better connectivity to urban centers where demand was growing (especially in Hanoi), vegetable production has developed quickly over the past 20 years throughout the Moc Chau plateau and has increased by 70% in terms of area and by 80% in terms of output since 2018. In 2022, vegetable production was covering 2,981 hectares, for a total production of 48,381 tons[11]. In some communes (such as Chieng Hac, Muong Sang, Phieng Luong and Tan Lap), the volume produced as more the doubled since 2016 (Vu Thi Phuong, Nicetic, and Dyer 2020). Vegetable production is now concentrated mainly in communes around Moc Chau city: the planting area exceeds 100 ha in Chieng Hac, Dong Sang, Muong Sang, Phieng Luong, Moc Chau Farm Town, Tan Lap and Moc Chau city itself.

Large volumes (about 70% of the production) are now marketed to distant traditional and modern markets, especially in Hanoi. Most of the production happens in the summer season (April to October) in order to supply low altitudes markets with "temperate" vegetables such as white cabbage, tomatoes, carrots, potatoes, pumpkins, French beans, white radish, winter melon (= wax gourd), chayote, lettuce, kohlrabi, but also cucumbers, onions and leafy vegetables (such as the Brassica variety called *cải mèo*). Winter production is small and is mostly sold to the local markets.

Strategies of production depend on a trade-off between high-yield and easy-to-produce products (like pumpkin, chayote, radish and cabbage) and high-value but more fragile products (like tomatoes, beans, winter melon and leafy vegetables). Communes that are well connected to Moc Chau city, with more experienced farmers and longer-established cooperatives (such as Dong Sang and Muong Sang) tend to opt rather for the second option. In 2020, the government of Son La plans to expand the area of vegetable production in the more "central" communes of Tan Lap, Muong Sang, Dong Sang, Phieng Luong and in communes further from Moc Chau center like Hua Pang, Chieng Hac, Ta Lai and Chieng Son.

Strategies of production also depend on organizational patterns and market segmentation. The vegetable sector is indeed quite segmented between a "traditional" production done by individual family farmers who supply the mass market, and a certified production collected by cooperatives and companies and intended to specialized markets (safe food shops, supermarkets, canteens, factories, etc.). Most initiatives that relate to agroecological principles are to be found in the latter pattern.

Vegetable production is mostly carried out by individual small-scale farmers over about ½ hectare. A dozen of cooperatives and a handful of companies (such as GreenFarm in Moc Chau city) are present in the sector. Seeds are bought from small-scale local shops (there are around 60 shops supplying seeds in the district) and seedlings from nursery farms. The vast majority of the vegetables produced by individual farmers for the market is collected by local collectors.

Whereas small some collectors deal with less than 1 ton of vegetables per day, other collect 10 to 20 tons per day during the peak season. The former usually operate at the commune or even at the village level, gathering products from a dozen of farmers, while the later operate at a larger scale, collecting from over 1,000 households. Larger traders also operate as "consolidators" our "groupers" by buying from village collectors. Collectors usually use small 1 to 5-tonne trucks to collect vegetables from

[11] Source: Son La statistics 2022

farmers. In some cases, farmers bring their products directly to the collector's house, often located along main roads or in producing communes. Some traders may also provide services such as harvesting, packing and transportation, as well as credits and inputs. They usually perform grading (separating products into 2 to 3 categories usually based on the appearance of the products, which later impacts on the selling price) and packing. Larger traders either use their own truck or hire transport services to bring the products to wholesale markets. Small collectors often put the packed products on the side of the main roads, and larger traders collect them with 15-tonne trucks on their way to Red river delta markets.

Our research estimates that 60% of the production from Moc Chau district is sold to urban wholesalers in the Red river delta – mainly in Hanoi, but also in the close-by provinces of Hung Yen, Hai Duong, Vinh Phuc, or further in Hai Phong, Bac Ninh, Nam Dinh, Thai Binh, etc. Some vegetables are also sold in other districts in Son La province, and in Northern provinces (Bac Giang, Phu Tho, Dien Bien, etc.), in Central provinces (Nghe An, Thanh Hoa) and in Southern provinces (Ho Chi Minh city and Can Tho city, mainly for winter melon). Urban wholesalers then sell the products to nearby retailers, HORECA customers and marginally to final consumers.

Moc Chau district is often associated with the production of "safe vegetables". The already-mentioned projects, which promoted the cultivation of temperate vegetables, also targeted a reduction in the use of chemical inputs. These vegetables cannot be easily cultivated in the Red river delta during the hot season, or else with high inputs of chemicals to prevent pests. During this time, Hanoi source most of its temperate vegetables from other regions such as Lam Dong province (Da Lat city) but also from China. The lack of local supply in this season opens up an opportunity for low-quality vegetables. Therefore, many consumers suspect that products imported from China or from unclear origins have a high content of pesticides residues and do not meet food safety standards.

In 2013, an ACIAR project[12] tried to connect farmers producing high quality vegetables in Moc Chau with the urban market. The implementation of a multi-stakeholder group allowed to organize experience-sharing trips to Da Lat city and to set up a logo and the above-mentioned certification trademark (*Rau An Toàn Mộc Châu*) linked to the territory (Sautier and Nguyên 2016). Farmers have been trained on "safe vegetable" good agricultural practices for products such as tomatoes, cabbage, French beans, capsicum or lettuce. 230 tons of these vegetables have been delivered to supermarkets (Fivimart, Metro, OceanMart) and to safe food shops (BigGreen) in Hanoi. Farmers groups and, later, cooperatives have been established to consolidate the links with these retailers.

Cooperatives buy vegetables from their members and sometimes from non-members called "linking members" (*thành viên liên kết*). Cooperatives and companies sell their products through differentiated channels. Most of them have signed contracts with the so-called "modern" retail sector, such as supermarkets (AEON, WinMart, MT Mart, Big C, etc.), specialized shops (Bac Tom, BigGreen, Tam Dat, etc.), canteens for school or industrial estates and large-scale processors (such as factories producing ketchup or kimchi). Most of these clients are located in or around Hanoi. These transactions usually require specific quality conventions, notably the VietGAP standard. It is estimated that around 25% of the volume of vegetables produced in Moc Chau (about 12,000 tons in 2020) are sold through these dedicated channels (Vu Thi Phuong, Nicetic, and Dyer 2020). However, cooperatives also sell part of their products to the "traditional" mass market" (mainly to traders in Hanoi operating in wholesale markets), where the specific attributes of quality of the products are not taken into account. This implies that a certain percentage of the production certified as VietGAP is not sold under this label in

[12] ACIAR project AGB-2009-053 "Improved market engagement for counter-seasonal vegetable producers in North West Vietnam".

final markets and that farmers do not get any premium for these products. Some cooperatives that we met complained that the demand for certified products is decreasing, making them to turn to the mass wholesale market for their surplus production.

As an illustration, we now shed lights on 3 actors that somehow epitomize the recent transformations of the vegetable value chains in Moc Chau: Dung Tien agricultural cooperative, Tu Nhien safe vegetable cooperative, and GreenFarm company.

- Dung Tien agricultural cooperative (*Hợp tác xã nông nghiệp Dũng Tiến*)

The cooperative has been established in 2016 and includes 18 members, all of them from ethnic minorities and living in Phieng Luong commune. They contribute to the cooperative by bringing cash (from 30 to 1,000 million VND). The director makes himself all the strategic decisions regarding the rules, the governance and the marketing of the products. The cooperative supplies seeds, fertilizers, pesticides (below the market price), and trainings to members.

Members produce cabbages, tomatoes, green beans, squashes, chayote and potatoes over 12 hectares. All members are certified with the VietGAP standard and are encouraged and trained to use organic inputs. The head of the cooperative also plans to convert two hectares under greenhouse into organic production for tomatoes, cucumber and salads in 2024, and to open an organic shop in the province. Five employees are in charge of harvesting and collecting the products and sticking stamps with traceability codes on them. There is no joint production protocol apart from the respect of VietGAP standards.

The cooperative buys the totality of its members' production (around 800 tons per year) but also sources from thirty "linking suppliers" (non-members gathered in a "cooperative group") of volume of around 500 tons per year. The latter provide the same varieties of products but only half of its area holds a VietGAP certification. The cooperative signs purchasing agreements with its members by which its commits to offer a price premium for certified vegetables. The total value of products traded every year amounts to about 4.8 billion VND.

Its main customers are one supermarket (WinMart), companies selling products to schools (An Phat clean foods service and trade J.S.C and Huong Viet Sinh J.S.C.), "associations" (*hiệp hội*) in Nam Dinh and Ha Nam provinces. The surplus and non-certified products are sold to traders in wholesale markets in Hanoi (Van Quan market in Ha Dong district, Southern market, Cho Xanh market, etc.), especially during the summer time when schools are closed and production is still high. Supermarkets, companies and associations sign purchasing contracts with the cooperative, require the supply of VietGAP-certified products and offer a premium price (from 3,000 to 5,000 VND per kg). Prices are negotiated every 10 days for supermarket but are set for the year with associations. Half of the premium is redistributed to the farmers who also get benefits in cash every year.

The cooperative uses its own truck to ship products to Hanoi. As it does not have equipment for packaging and labelling, it collaborates with a cooperative in Gia Lam district (Hanoi) for packaging. The cooperative sticks its stamps to its products (name, address, phone, VietGAP, QR code for information).

- Tu Nhien safe vegetables cooperative (*Hợp tác xã rau an toàn Tự Nhiên*)

The Cooperative has been established in 2013. It is located in Ban Ang village, Dong Sang commune. It includes 35 households as members, including 3 people from ethnic minorities. It is headed by 5 board members and employs one person for accounting. Members contribute to the cooperative by bringing their own land. Its main activities relate to cultivation, pre-processing, packaging, and trading of food

products. Both board and members establish the rules but only the board members make decisions on governance.

The cooperative supplies seeds, fertilizers, pesticides, machines (ploughs), funds for members and technical advises. During meetings, the cooperative members agree on specific guidelines for specific crops. There are no formal contracts signed with the members but written commitments specify the annual production plans. The cooperative buys 70% of its members' production; the remaining 30% are sold to traders which then sell in Hanoi. It also buys surplus products (brassica, tomatoes…) from An Tam and Ta Niet vegetables cooperatives in Moc Chau. The total value traded amounts to about 24 to 25 billion VND (around €1 million). Farmers grow tomatoes, cabbage, green gourd, carrots, baby broccoli, choy sum, etc. over 20 ha. All the production is certified VietGAP. In 2017, the cooperative has 0.6 ha certified organic (Vietnam Organic standard) but the certificate has expired; a new "Japanese organic" certification is in process in 2023.

The main clients of the cooperative are supermarkets (BigC, MegaMart and AEON) and a kimchi factory (IC Food), all located in or around Hanoi. The cooperative signs contracts with all these clients which explain about the quality, size, color, etc. of the products. With supermarkets, the price is set every week: at the beginning of every week, the cooperative sends price announcement to the supermarkets; they discuss during the week and agree for the price for the next week. According to the sale representative of the cooperative, the premium commanded is about 1,000-1,500 VND per kg. With IC Food however, which buys only cabbage at the end of the season, the price is fixed 3 months before the harvest. The cooperative ships products to Hanoi with its two trucks 3 tons and 5 tons). They deliver one or two times per day and the transportation cost is included in the final price charged to the supermarkets. Farmers may also sell their products without contract directly to traders operating in wholesale markets in Hanoi (Van Tri, Yen So, Thanh Ha, 365, Long Bien, etc.). Traders in Van Tri market (labelled as "safe market") require higher appearance than in supermarkets, but are said not to care about the VietGAP certification. They offer a slightly higher price (with a premium of 500 VND/kg, excluding transport) which is negotiated every day based on the market price. These traders rent a transportation service that comes to pick up the products in Moc Chau. One member sells its products to Moc Chau central market.

The cooperative uses the collective brand "*Rau An Toàn Mộc Châu*" for selling in products to supermarkets. Cooperative members who sell directly to local markets don't use the brand as wholesalers "do not care about it" as we have been reported.

- GreenFarm J.S.C (*Công ty cổ phần GreenFarm*)

The GreenFarm company, located in Ban Ang village (Dong Sang commune) has been created in 2012 by a former researcher at FAVRI. 7 partners hold the shares of the company which employs 40 people (5 permanent and 35 seasonal staff). In Moc Chau, it produces vegetables (tomatoes, cabbage, cauliflower, gourds, fresh herbs, etc.) and fruits over 10 ha (9 ha for vegetables, 1 ha for fruits). Another production plot is located in Van Ho district. All production plots are certified VietGAP by VietCert, a service provider for agricultural assessment and certification based in Hanoi. The company plans to produce organic vegetables over 3.9 ha.

The company also buys products from around 40 households, as its "linking members", in Moc Chau district, Van Ho district and Hoa Binh province. This sourcing accounts for 30% of the total volume sold. The company provides them with seeds, fertilizers (NKP), pesticides, water dripping system, machines, credit, and technical advises. Only some of these linking members are certified VietGAP but the company regularly checks and inspects them.

The main clients are supermarkets (AEON in Hanoi, Lotte in Hanoi and Nghe An province), minimarts (MaxValu in Hanoi) and an industrial kitchen (Sao Viet Food in Hanoi). Supermarkets check the products but strict requirements come along with a premium price. AEON monitors a strict inspection, requires VietGAP certification and traceability, as well as good packaging and good appearance. It has a strict regulation about pesticide and fertilizers residues so GreenFarm has to check every month or every week. Lotte need only certificate but no tests. Contracts are signed with headquarters of the companies. GreenFarm also sell below-quality products at its office in Moc Chau for local consumers. Some traders buy food products from the company and supply shops in Hanoi (Thien Lanh Food, BRG Mart, Ha An food, etc.). The company has two cold trucks with which it delivers its products every day to Hanoi. It also owns a cold store in Hanoi. All products are packed with the GreenFarm logo.

Figure 12 – GreenFarm field in Moc Chau

Figure 13 – Cabbage from Moc Chau promoted at AEON supermarket (Hanoi)

Fruits value chains

Moc Chau district is considered by some experts as "the most suitable district for temperate fruit production in Son La province" (Nicetic, Dinh Thi Huyen, and Le Thi Hang 2022, 52). Fruit production has also developed recently. It has increased by one third since 2018, for a total area of 10,401 ha in 2022. The panted area of plum (mainly from the Tam Hoa variety) has increased by 50% over the past 5 years, reaching 2,494 ha in 2022, while the volume has more than doubled, with 26,556 tons produced. Longan (1,072 ha producing 12,525 tons), mango (751 ha for 1,959 tons), oranges (243 ha for 2,098 tons), avocado, passion fruit, apricot, peach, banana, jackfruit, sugar apple and jujube fruit are also cultivated. Between 2018 and 2022, longan and orange production have more than doubled. The volume produced in the district is meant to keep on increasing in the future as unproductive fruit trees below 4 years cover a substantial area (around 700 ha for longan trees, 700 ha for mango trees and over 1,000 ha for plum trees). However, prices are fluctuating and have steadily decreased as this fast expansion has recently led to an oversupply. It is noticeable that only a minor part of fruits production is done under VietGAP certification.

Plum production is concentrated mainly in the communes of Chieng Son, Moc Chau town, Moc Chau Farm Town, Phieng Luong and Tan Lap. On average, households usually grow plums on 1 ha. The majority of farmers for additional income only. In some areas, farmers grow plum trees in low density, in small pockets of fertile land or intercropped with maize, fodder or tea (Nicetic, Dinh Thi Huyen, and Le Thi Hang 2022). Areas where plum trees are planted as monoculture (like the touristic Na Ka plum valley in Moc Chau Farm Town) show a high density (over 400 trees per ha). Plums are harvested either green or ripe.

Farmers deliver the fruits to collectors and traders who operate grading (based on the maturity, size and color of the fruits) and packing for shipping. Collectors and traders are usually based in the production zone and pay cash. However, during peak production, some traders might come from other provinces. Most of the fruits produced in Moc Chau district are shipped to urban markets, mainly in Hanoi but also partly in Central Viet Nam and in Ho Chi Minh City. Before the COVID-19 crisis, China was an important buyer of plums and passion fruits but this demand has been highly affected by the crisis. In this study, we have focused on the supply chain to Hanoi market.

The value chains for fruits are quite similar to the value chains for vegetables. Some large collectors sell directly to wholesalers in urban areas while other village collectors sell to intermediaries (larger traders). Some of the large traders pay agents to secure the transactions with urban wholesalers (Nicetic, Dinh Thi Huyen, and Le Thi Hang 2022). Products are shipped to final markets either by the traders' own trucks or by external transport providers. Long Bien market in Hanoi is the main outlet for Moc Chau fruits in the capital city.

As for vegetables, fruit cooperatives follow a specific organizational pattern, even though they purchase a lower percentage of the production in Moc Chau district compared to vegetables. According to the ACIAR report (Nicetic, Dinh Thi Huyen, and Le Thi Hang 2022), there are for example only two cooperatives that collect plums in Moc Chau. Besides, cooperatives operate more as private collectors than as full-fledge collective organisations as they usually do not sign purchase contracts with their members and rather maintain informal agreements (as for the Moc Chau clean agriproducts cooperative – *Hợp tác xã nông sản sạch Mộc Châu*). On the other hand, they usually have contracts with buyers in the "modern" sector, such as safe food shops (Soi Bien, Bach Hoa Xanh), specialized shops (KleverFruit), supermarkets (WinMart, Lotte, etc.) and minimarts, most of them based in Hanoi. Some companies also practice online sales, mainly using Zalo and Facebook to introduce their products

and to receive orders. A significant volume of the fruits produced in Moc Chau are processed into dry fruits, fruit juices and fruit alcohol.

As an illustration of the fruit value chain, we now quickly introduce three actors that are highly involved in the production and marketing of high-quality fruits in Moc Chau: Quyet Thanh agricultural cooperative, Moc Chau clean agriproducts cooperative, and 19/5 cooperative.

- Quyet Thanh agricultural cooperative (*Hợp tác xã nông nghiệp Quyết Thanh*)

The cooperative has been established in 2019. It produces fresh fruits (plum, persimmon, avocado, peach, orange) over around 30 ha and processes dry fruits (dry plums, bananas, strawberries, papaya, jackfruits, mangoes, etc.) in its factory in Moc Chau city. It also produces fruit alcohol. Only part of the production (main fruits sold fresh) is certified VietGAP. Fresh fruits account for 65% of the sales and processed products for the rest.

The cooperative has 20 members; 16 of them own land. Members contribute to the cooperative by bringing their land; they do not have to buy share nor to pay fees. The director of the board makes all the main decisions (rules, production, marketing, etc.).

The cooperative provides seedlings for fruit trees, fertilizers, advices for pesticides use and welfare benefits to its members. It buys all the production form its members with a premium. Some of them have permanent contracts that are renewed every year with the cooperative. The cooperative also buys fruits for processing (banana, strawberries, papaya, jackfruit, mangoes, peaches, persimmons, longan, etc.) from "linking members" to whom it provides inputs. With these linking members, the price is not fixed, and the cooperative buys at market price with a premium. The price for products certified VietGAP is 20-30% higher. Some processed products (dry plums, apricot alcohol, etc.) have an OCOP certification. The cooperative has more than ten contracts with distributors in Hanoi, Ho Chi Minh City and Da Nang. These three main cities account for about 20% of the total income. Private companies (such as LangFarm, Anh Duong foods and agriproducts J.S.C.) buy 60% of the products to sell them in shops or for exports to China. Tourism shops in and outside the district account for the remaining 20% of the sales.

- Moc Chau clean agriproducts cooperative (*Hợp tác xã nông sản sạch Mộc Châu*)

The cooperative has been established in 2016 and comprises 8 members who contribute by bringing their land. It is involved in the production, purchasing and marketing of fruits (plums, avocados, oranges, persimmons, pears, strawberries, longan) and vegetables (chayote, carrot, cabbage) grown over more than 40 ha. The director decides about governance, production, and marketing while the whole board decides about rules. The cooperative supplies pesticides and fertilizers to its members. Only the plum production (over 1,000 tons per year) is certified VietGAP. The cooperative has informal purchasing agreements with all its members who however sell 30% of their production to other buyers. 10% of the supply comes from non-members.

The cooperative has annual purchasing contracts with supermarkets (WinMart, Lotte, Saigon Coop Mart) and specialized food shops (KleverFruit, Soi Bien, Bach Hoa Xanh, etc.) in the North of Vietnam (for 70% of its sales) and in the South (for the remaining 30%). Traceability is ensured through QR codes. Shipping is done by bus when small amounts are required. Otherwise, they rent a truck to deliver to Hanoi. Deliveries to Ho Chi Minh City may sometimes be done by plane. Since 2020, around 20% of the production is sold online mainly via Facebook.

- 19 May cooperative (*Hợp tác xã 19/5*)

The 19 May cooperative is named after the birth date of President Ho Chi Minh. It has been established in 2000 and is focusing on fruits production and processing. It has 30 members. The activities are centered on the production (mainly fruits such as plums and pears, but also vegetables and tea) and processing (dry fruits, fruit syrup and fruit alcohol) – with a processing capacity of 800 to 1,000 tons per year. The cooperative has purchasing contracts with its members who farm over 30 ha of land and with around 200 external suppliers working over around 100 ha. It usually supplies inputs, such as organic fertilizers or specific tools) to its members. The cooperative is certified as VietGAP and 6 products are being certified as OCOP. It aims at setting "ecological chains" and at fostering synergies between agriculture and ecotourism. The director depicts it as a pioneer in the district in the introduction of high-yield varieties and crop-livestock integration to develop a circular economy. It has benefited from governmental support and from technical trainings from several projects (including one with a French agricultural school).

Almost half of the products are sold in Hanoi. The cooperative operates with a network of exclusive distributors who are located in most of the Provinces in the Red river delta and with whom contracts are signed. The distributors further sell the products to final retailers and retain a margin on the total turnover. In the late 2010s, the cooperative has started selling online, directly using Facebook and Zalo to introduce the products while its distributors sell the products on institutional platforms such as Lazada, Shopee and VoSo.

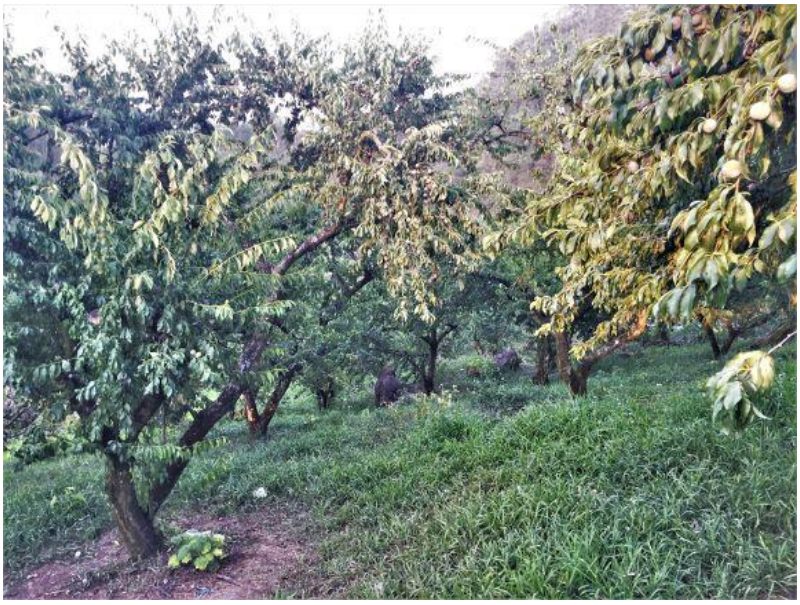

Figure 14 – Plum trees in Tan Lap valley

Figure 15 – Dried plums with OCOP certification from 19 May cooperative

2.4. Rationales and impacts of agroecological transformations in Moc Chau

Agroecology for modernization

Agroecological transformations in Moc Chau are not a reaction nor a counter-narrative against the conventional food regime, as may be the case in the global North or in South America, as they mainly take place in a process of ongoing agrarian transition that is unfolding in the north-western mountains (Turner, Bonnin, and Michaud 2015). Even though dynamics of intensification, scale extension and externalization have taken place in Moc Chau district since the late 1990s, the agroecological transformations that have been initiated since the past 10 years seem to accompany these changes, rather than to react against them. As in other places in Vietnam, the process at work can be characterized as an "agroecologization of commodification" or an "agroecologization of intensification". In contrast to what Giraldo and Rosset describe as "emancipatory agroecologies", which are underpinned by social movement and aim at "transforming power structures" (2022, 7), the initiatives taking place in Moc Chau district consist in "gradualist changes through already existing institutional frameworks" (2022, 3) – or, as Hett and her colleagues put it, their focus is on "modernizing traditional agricultural systems"(Hett et al. 2023).

The main strategy of these agroecological initiatives is to add value in systems that are already in the process of intensification and externalization. Focusing on market integration and specialization, they reinforce rather than counter the dynamics of polarization and concentration that are at work. The changes brought to the practices and relations of production are often incremental and do not target a "fundamental change", as advocated by Gliessman (Gliessman 2014). Agroecological practices are restricted to the so-called "modern" value chains and are yet to be applied to "traditional value chains" – apart from mandatory regulations that are anyway not systematically followed nor enforced.

Moreover, agroecological transformations in Moc Chau district are mainly made of piecemeal initiatives with a low degree of territorial integration. The duplication, scaling-up and scaling-out of these models at the territorial level still need to be achieved. Entrepreneurial farmers, most of them having been involved in projects and being supported by local authorities, are the key drivers of these transformations. Agroecological practices are mainly based on expert knowledge, implying the

implementation of standards of production and of processes for quality management and traceability. Epitomized by the development of “safe vegetables” cooperatives, agroecological initiatives in Moc Chau district address both the production and the distribution domains. Cooperatives, certifications and contracts are the main tools leveraged to tackle food safety issues and to reduce uncertainty for producers.

Agronomic and socio-economic impacts

No exhaustive survey has been carried out so far to assess the impact of these agroecological initiatives on variables such as the use of chemical inputs, biodiversity, soil health, incomes, etc. We might however try to question the different agroecological initiatives through the prism of 7 of the 13 principles of agroecology, as endorsed by the UN.

- Recycling, input reducing, and soil health

The adoption by several actors of the Good Agricultural Practices standards hints at a will to limit harmful practices, but it rarely entails a redesigning of the farming system. We can argue that enhancing the quality (and, hence, market value) of the final products is the main goal of this strategy, even though soil health may be improved and harmful inputs may be reduced consequently. It is also noticeable that organic agriculture is not effective yet in the district.

- Economic diversification

The development of processing activities and agrifood industries in the district (dry fruits, dry meat, dairy products, tea…) reflects a tendency towards retaining more economic value locally and empowering local actors. This is for sure one of the main goals of the development of OCOP products, as supported by the central and local governments. However, this process seems to benefit mainly to large-scale and entrepreneurial actors (mainly private companies and well-capitalized cooperatives). The benefit for family farmers is still to be proven by a robust impact analysis.

- Fairness, participation and connectivity

Cooperatives, collective branding, link to the territory and alternative market arrangements may obviously improve connectivity, fairness and participation. In theory, cooperatives provide opportunities to alter the social relations of production by changing the relations of property and the relation to markets. However, in the context of Moc Chau, our survey shows that this organizational framework rarely improves participation and imply collective ownership only in rare cases. Mainly, cooperatives allow for economies of scale through product specialization and collective marketization. They ensuring guaranteed market access, timeliness, premium price for qualities and stable quantities to producers (Enthoven and Van den Broeck 2021).

The combination of certifications and contracts has at first generated both horizontal coordination – at the village and territory level, with the identification of common interests – and vertical coordination – at the value chain level, with agreements between suppliers and distributors to diminish transaction costs (Sautier and Nguyên 2016). However, the tentative of place-based labelling, where the products were associated with their region of origin, seems to have run short, with a low use and visibility of the different certification trademarks such as Geographical Indications and “*Rau An Toàn Mộc Châu*”. The VietGAP certification seems to take the upper hand as it opens the door to the modern retail sector. Meanwhile, public authorities now rather promote the OCOP certification as a tool for product specification and local withholding of value through processing.

These certification schemes usually allow for more remunerative prices for producers and therefore work as an incentive to produce higher quality products. However, associated with the signing of purchasing contracts, they do not imply a great deal of cooperation between actors at the territorial level as they are mostly based on individual and opportunistic behaviors. Moreover, these mechanisms tend to create dependence to the output market, which is well illustrated by the difficulties that some cooperatives face in a context of decreasing demand by supermarkets. Finally, they usually imply knowledge imposed by external experts rather than the co-creation of knowledge among grassroots actors.

Actors in Moc Chau show a great deal of market arrangements that differ from the relations that characterize the "traditional" mass market. These innovations consist both in innovative market "channels" and market "forms" (Loconto et al. 2018, 7) – the former being the specific supply chains through which the products circulate while the latter refer to the way of organizing the transactions. We differentiate here direct sales, shops for local specialties, contracts with retailers and e-commerce.

Direct sales are not very developed in Moc Chau. It is mostly practiced by local farmers (most of them from ethnic minority groups such as Thai and H'Mong) who sell their seasonal production at the entrance of the wet markets or on the roadside. Most of the certified products are sold through intermediaries, be they traders, specialized shops or distributors. Some fruit plantations (producing plums, strawberries) have introduced "pick-your-own" options, allowing for consumers to collect themselves their fruits. However, we might argue that aesthetic and hedonic dimensions are here more important than environmental or social ones.

Shops for local specialties, including OCOP products, have recently mushroomed. As explained above, they mostly target national tourists who have a stop on their journey between Hanoi and Moc Chau. These shops play an important role in promoting the image of the region as one rich of gastronomic specialties (dairy products, spices, dry fruits, tea, etc.). Landscape attributes or association with local ethnic minorities are sometimes put forward. However, they rarely come up with a narrative that goes beyond the local specialty. Other attributes such as those related to the method of production (safety, cleanliness, etc.) are usually not communicated.

The ***contracts signed by cooperatives and companies*** with the "modern" retail sector are one of the main innovative market forms that transactions take on. In theory, contracts may improve connectivity, allowing for direct relations between suppliers and buyers. Commitments to purchase may prevent the risks related to variations in demand. However, these contracts may also jeopardize fairness and participation: most of the added value is captured by large-scale distributors who are the main market drivers. Farmers lose some control over the products and the processes (Cohen, Vicol, and Pol 2021): they have less power to decide about their production and marketing practices and products show a high degree of standardization. This further contributes to unbalanced relations of power between producers and retailers.

E-commerce improves connectivity through a better circulation of knowledge and a lower degree of intermediation. It creates a new mechanism to build trust between sellers and buyers and complexifies the importance of certifications. On the one hand, interpersonal relations might make it superfluous to display certifications while, on the other hand, certifications might create trust in a context where sellers and buyers do not meet physically. Therefore, local authorities aim at promoting the sales of OCOP products on institutional online platforms. Our survey shows the opportunities provided by online sales, but also its limitations to foster agroecological transformations. Online sellers usually put forward organoleptic and cosmetic criteria and health benefits of their products, rather than their agroecological dimensions. Besides, e-commerce tends to create an arena that enhances competition

among producers, contributing to a higher volatility of the prices and offering avenues for frauds. Finally, online sales tend to benefit those who have already consolidated their position in the value chains rather than small-scale producers who lack bargaining power (Bruckert et al. 2023).

In Moc Chau district, as is also the case in Dien Bien province (Bruckert and Hoang Thanh 2022), markets for agroecological products do not take the form of “alternative food networks” (Goodman, DuPuis, and Goodman 2012). These innovative markets channels and forms are usually private initiatives targeting the creation and upholding of premium prices rather than alternatives to the limits of conventional networks. Most of the alternative supply chains for certified products target distant markets or non-local consumers. Apart from the OCOP shops that are not patronized by local people, there is almost no direct sales taking place locally. Especially, there is no local market for VietGAP certified products in Moc Chau. More generally, there is no physical market *per se* where local agroecological producers would connect with consumers in the territory.

Nevertheless, it appears that there are usually few intermediaries in most of these alternative value chains. Besides, the traditional mass market also displays a certain degree of connectivity. A recent student’s dissertation have shown that products are also usually information-laden – although the information is rarely about environmental and social characteristics – and that market transactions are often embedded in dense social networks, where long-term relations and informal agreements allow for a high level of trust (Dorilas 2023).

3. THE COVID-19 CRISIS AND THE FOOD SYSTEM IN MOC CHAU DISTRICT

It is usually considered that Vietnam is one of the rare countries that manage to control the outbreak of the COVID-19, at least at the first stage of the pandemic (Minh et al. 2021). The response of the State has been gradual and adapted to local contexts, with a clear difference of measures depending on the health situation in the different provinces and districts (Le et al. 2021). In 2020, restrictions were imposed on internal travel and a strict closure of the international borders was decided, which affected both trade of goods and tourism inflows. A two-week nationwide lockdown has been imposed in April 2020. Stricter restrictions have been adopted in early 2021 in the wake of a major wave of infection. Quarantined areas were established by the government for infected people. In different provinces in the North, strict measures were taken starting from March and April 2021, such as partial lock-downs, bans on gatherings, halt of some activities and tests at borders between provinces. Most restrictions were eased after September 2021.

3.1. The impact of the COVID-19 crisis on the local food system

The impacts of the measures are multifaceted, ranging from economic activity to incomes, expenditures, employment, access to education, social relations, and health. Assessments of the impact of COVID-19 have shown that incomes have declined across vulnerable households and workers (UNDP 2021). Regarding agriculture, some studies have shown that the sector has maintained its growth at the national scale, even though the exports have slightly decreased in 2021 due to the closure of borders (Tran et al. 2020). However, farmers' incomes have been negatively affected (Bui et al. 2021) and the food and nutrition security concerns have been raised due to the disruption of supply chains and the increase in input prices (Tran et al. 2020).

In Moc Chau district, the impact of COVID-19-related measures on food systems depended on the type of actors and activities involved. How did the crisis affect the local actors' practices? How did it affect food markets (for consumption, input supply, exports, etc.) and distribution systems in the territory? Which strategies did farmers and traders implement to cope with COVID-19?

Impact on collective action

Even though mobilities were restricted during the peak phase of the crisis, collective action has not been totally hampered. Mobile phones, which are already the main tools used by traders, were widely used to keep contacts between transacting parties. Within cooperatives, online meetings were been organized to maintain a basic governance mechanism.

Impact on food consumption

Studying the impact and food consumption and nutrition was beyond the scope of this report. Interviews on this topic were carried out with local authorities (at district and commune level). The main impact related to the closure of food shops and markets and to difficulties to circulate. As market access to food products was hindered, but also as people wanted to save money in a context of lower incomes and growing uncertainties, general demand for food products decreased. Urban people stock-piled dry and processed food while rural people turned to self-consumption, especially for vegetables and meat. We can therefore assume that urban people have had a less balanced and diversified diet during the times of COVID-19-related restrictions. However, no clear food price inflation nor impact on food security have been mentioned.

Impact on local food distribution

Most food retailers faced difficulties to source products due to restrictions on transportation, especially for products sourced out of the district and the province, and to subsequent higher prices. At some point, no trucks could come from Hoa Binh province and Hanoi to deliver food products such as fruits and vegetables. In March and April 2021, activities considered as "non-essential" had to stop. The retailers that we met at Km70 market in Moc Chau reported that this period was the most stringent one for their activity. Whereas vegetable stores were allowed to keep on operating, fruit shops had to close. Many people consider fruits as a surplus or even as a luxury that is not needed in the daily diet – even when the fruit shops were open, the demand was lower than usual. Shop keepers received low assistance from public authorities (one reported that she received 120,000 VND and another received nothing).

Impact on food production and sales

According to the local authorities, the total volume of crops produced decreased while some crops could also not be harvested due to lack of labor or market demand. Many producers also reported higher losses in fields or in the warehouses, due to inadequacy between production and market – either due to lack of demand or to transportation issues.

The COVID-19 crisis has highly affected the procurement of inputs for agriculture. Animal husbandry and fisheries, highly dependent on feeds and medicines, have been heavily affected. Our survey did not address these sectors. However, many fruits and vegetables producers reported an increase (from 10% to 100%) in the price of imported fertilizers such as potassium and magnesium. Some also mentioned an increase in the price of seeds. However, apart from affordability issues, no one mentioned difficulties to access these inputs. The cost of labor is reported to have increased, while some cooperatives complain that the availability of labor force was lower.

The production process has apparently not been affected much by health-related restrictions. When actors mentioned that the total volume produced has decreased, it was mainly due to lower demand. Only the Tan Lap tea cooperative (*Hợp tác xã chè Tân Lập*) mentioned lower yields due to a lower use of fertilizers. Organizations operating processing activities were more affected, as "social distancing" measures prevented workers from gathering in the same plants or workshops. Sometimes, sorting and packing of products was done at home by farmers, rather than at the cooperative building. Quyet Thanh agricultural cooperative reported to have reduced its processing activity to 30% of its usual volume.

The sourcing of products for companies and cooperatives did not face severe difficulties as such – when the volume sourced was reported to have decreased, it was mainly due to a lower demand, as will be detailed below. Most cooperatives studied mentioned that the price paid to suppliers (namely farmers) has decreased during that period – a few interviewees specified that it was the case mainly for non-VietGAP products. Access to suppliers was sometimes challenging, especially to "linking farmers" that are sometimes located far from the cooperatives headquarters. Many cooperatives have therefore recentred their sourcing on their core members. In some case, the production plan has also been revised, as for the Dung Tien agricultural cooperative (*Hợp tác xã nông nghiệp Dũng Tiến*) which changed its crops from leafy vegetables to less perishable and therefore easily marketable ones, as roots and tubers.

The COVID-19 crisis has highly affected the market demand. First, demand has decreased at the local scale. Even though the cooperatives and companies surveyed rarely sell to the local population, travel restrictions have resulted in lower tourist frequentation and have hence caused a plunge in the

demand. The tea cooperative has lost part of its high-end market (specialty tea sold locally). The Northwest specialty cooperative (*Hợp tác xã đặc sản Tây Bắc*), which runs a specialty food shop targeting tourists in Moc Chau city, has seen its volume of sales drop by 30%.

Second, access to long-distance markets was also affected. The government has decided to close many wholesale markets in major cities, fearing that low levels of sanitation and difficulties to keep distance between customers could favor major contaminations. Meanwhile, most of supermarkets and high-end shops have remained open. Consequently, actors selling to the traditional wholesale sectors have been much more affected than those selling to the "modern" sector. Thus, the Ta Niet cooperative reported that its sales to wholesale markets in Hanoi have plunged, while sales to supermarkets have increased. Indeed, while wholesale markets were closed, consumers in Hanoi had to resort to supermarkets to get their vegetable supply. Cooperatives and companies that are targeting exclusively the modern sector did not suffer major changes – on the contrary, a cooperative like Tu Nhien safe vegetables cooperative reported that the demand from supermarket increased, while the prices proposed also went up at that time.

Transportation to final market was undoubtedly the most affected segment in the food value chains. Some trucks were prohibited from driving between Hanoi and Moc Chau, while others had their drivers tested several times. For most of the actors, the cost of transportation increased by about 10% to 30%, while the frequency of journeys was reduced. One cooperative mentioned that at some point the leafy vegetables got spoiled on the way due to longer delivery times. Tien Dung agricultural cooperative however managed to get a "green line" for its truck, making it easier to move between Moc Chau and Hanoi.

Exports of agrifood products was severely affected. The Chinese market, quite crucial for fruit production in the North West, was mostly closed. Thanh Dat fruits cooperative (*Hợp tác xã hoa quả Thành Đạt*) and the Phuong Doan trader (*Cơ sở thu mua Phương Đoan*) both reported having lost access to China, causing a 50% loss in terms of value for the latter. Tan Lap tea cooperative was able to keep on exporting tea to Pakistan, but the cost of shipping was multiplied by eight while the frequency has reduced.

Despite most of these restrictions and difficulties, most actors did not report major loss in terms of incomes. Some complained about revenue losses, but other reported that it was stable, or even that it increased, especially for the cooperatives and companies selling mainly to the high-end market.

3.2. Agroecology and the COVID-19 crisis in Moc Chau district

Agroecology and resilience

The context of the COVID-19 crisis is an opportunity or a "stress-test" (Duguma et al. 2021, 18) to question the place and the role of agroecological practices in the resilience of agrifood systems and in their capacity to react to shocks. We will question this relation in the case of Moc Chau district based on the main characteristics and mechanisms of "agroecology" that we have identified above: traceability and certifications; cooperatives; specific market arrangements.

In the context of the COVID-19 crisis, VietGAP ***certification*** appears as being an asset as certified producers seemed to have done better than non-certified ones. However, this might be a misleading explanation. VietGAP products were not valued as such: the decision allowing supermarkets to open incidentally and indirectly favored the suppliers of certified products. Certifications did not provide higher resilience in the face of COVID-19 crisis. On the contrary, "people did not care about certifications at the time of Covid", a cooperative director told us. Other actors explained us that

consumers were not looking for certified, specialty and high-quality products during this period of uncertainty and focused on sourcing staple products. OCOP products did not seem to sell particularly well. More generally, it seems that Moc Chau district was not especially able to valorize its image as a trustworthy supplier of healthy products in this context. However, only dedicated interviews with a large sample of consumers could confirm this assumption.

Likewise, ***cooperatives*** seem to have been less affected by the crisis than individual farmers. However, this might also be misleading as companies, which does not show a great deal of collective action, also did well. Here again, this resilience is mainly related to the choice made by public authorities to favor the modern sector. Besides, large-scale actors such as cooperatives and companies could more easily pay for higher transportation costs and use their political influence to negotiate better travelling conditions. The same argument holds for contracts: producers having contracts with distributors happened to get better access to markets as prices and volumes did not change much, but this is again due to political decisions and not to the internal structure of the distribution network.

Other ***market arrangements*** have shown different degrees of resilience in reaction to the COVID-19 crisis. The "traditional" mass market, whereby products are traded "spot" (i.e. one-time transactions with no pre-defined volume or price), was affected at different scales: the national one by the closure of numerous wet wholesale and retail markets and the absence of institutional recognition of transporters, the export one by border closures and higher cost of transportation. As already argued, the "specialized" market characterized by purchasing contracts was less affected as supermarkets and high-end shops remained open. Unsurprisingly, online sales proved to be an efficient mean to circumvent the disruptions in supply chains – some actors have intensified this practice while others have started it to compensate a loss of outlets. But the practice has remained marginal. Indeed, social media applications were used to introduce and order products, but they did not solve the challenges related to delivery and transportation. However, it seems that, as in other places, the practice of e-commerce has gained a specific momentum in this context. Finally, local sales in specialty shops faced difficulties as demand from tourists collapsed.

Main lessons learned: the importance of diversity, decentralization and autonomy

The food system in Moc Chau did not suffer from important disruptions and failures. Many factors can put forward to explain this relative resilience. First, political decisions were cautious not too much affect food production and distribution, as many people in the country rely on the agricultural sector for their livelihoods.

Diversity of food sources was mainly preserved. Diversified production for self-consumption is still prevailing in rural areas; some food shops such as vegetable shops and supermarket remained open, which allowed for both a proper access to healthy food for consumers and to market access for producers. The district also shows a great "diversity in specialization": if some sectors were more affected than others, this did not have a huge impact of the local economy in general.

Apart from the milk sector, the agrifood sector in Moc Chau has a high degree of autonomy as it does not rely much on external factors of production. There is no full-fledged labor market for agriculture and few migrant workers only are working as seasonal labor, which prevents disruption in production, as happened for instance in India (Reardon et al. 2020). Access to means of production in the fruit and vegetable sector was still ensured, even though prices went up.

It is often argued that short food supply chains (SFSC) show a higher degree of resilience than long and conventional ones (Ušča and Tisenkopfs 2023; Nemes et al. 2021; Yousefian et al. 2021). In the case of Moc Chau, the main types of SFSC are those that Renting and his colleagues call "extended" ones, using

certifications and labels to sell products to distant markets with a restricted number of intermediates (Renting, Marsden, and Banks 2003). “Proximate” SFSC (farm shops, CSA, catering to schools, etc.) are almost absent, while “face-to-face” SFSC are mainly consisting in the practice of e-commerce by some actors. In this context, extended SFSC have shown greater resilience whereas face-to-face SFSC had a different fate: while e-commerce boomed during the COVID-19 crisis, roadside sales were banned.

The local food system in Moc Chau is made of a diversity of decentralized of flows and actors, which is a key factor of resilience as well as an important feature of agroecological food systems (Chiffoleau et al. 2020; Singh 2023): numerous small-scale farmers produce for their own consumption and sell surpluses to various traders. Traders further sell to dozens of downstream traders located in various wholesale and retail markets which were not affected identically by closures. As there is rarely exclusivity in the relations between sellers and buyers, it rarely happened to a producer has fully lost a market (apart from the export market, as in the case of traders exporting passion fruits to China). The main exclusive relations taking place are between cooperatives and supermarkets, and those have not been heavily affected by political decisions.

There is also a diversity of relations between these actors in terms of both spatial extension and forms of relations: the local food system is made of a combination of short and long supply chains, of spot-type and contract-based transactions. The loss of local market due to the absence of tourism was in some cases compensated by an increasing volume of distant sales. The importance of oral agreements, the density of information communicated and interpersonal relationships that underpin the transactions (Dorilas 2023) allow for an “intensity of the links” (Chiffoleau et al. 2020, 397), which also constitute a factor of resilience.

In the case of Moc Chau, resilience appeared more as a capacity of the different networks to keep on operating in spite of the restrictions, rather than as a proactive strategy of adaptation and innovation in response to these restrictions – in other words more as a “readiness” and “recovery” than as a “responsiveness” (Ušča and Tisenkopfs 2023).

4. CONCLUSION: COVID-19 CRISIS, AE AND RESILIENCE

Moc Chau district displays a variety of situations and initiatives related to agroecology. Cooperatives, certifications, and contracts are the main tools promoted by public authorities, international projects and local actors to develop and market products with specific quality attributes. As other places in Vietnam, this rural region has been affected by the decisions that public authorities have taken to prevent the spread of the COVID-19 crisis.

This report has shown that the food system in Moc Chau did not suffer from important disruptions. Contextualization of public decisions, short duration of the higher level of restrictions, high level of self-consumption, low dependence to external factors, and diversity of actors, relations and flows explain this resilience. Those who interrupted their practices did not suffer much from it in terms of well-being, while others could keep on operating almost as usual, with only marginal changes and adaptations.

Actors involved in initiatives inspired by agroecological principles in Moc Chau district have been differently affected by restrictions. Mainly, those who were part of the more “formal” sector made up by cooperatives and companies having contracts with supermarkets were less affected than others, thanks to the national policies favoring the “modern” food distribution sector.

Mainly, our survey shows that there is no resilience as such: the reaction, response and recovery of local food system actors depends mainly on contextual factors. In our case, the relative “arbitrariness” of political decisions was key to decide who would get less shocks. The degree of readiness, recovery and responsiveness of actors directly depends on the type of shocks they have to face – in Moc Chau district, on the design and differentiated implementation of decisions by public authorities.

Now that the COVID-19 crisis seems to be behind us, it is time to think how we can “build back better” (Duguma et al. 2021, 18) by improving preparedness, strengthening security nets, sharing knowledge, and working at community level for more “inclusive, coherent and transparent” decisions (Blay-Palmer et al. 2020). One important challenge is also to foster short food supply chains that feature a high diversity in and complementarity between actors and types of relations between them, and that allow for a higher connectivity between producers and consumers through territorial approaches.

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