

FOOD SYSTEMS PROFILE

MOC CHAU

The rural area - Vietnam



Objectives

This Food Systems (FS) profile aims to provide a synopsis of the food system of the Moc Chau district in Son La province, a rural area in northwestern Vietnam. This profile gives an overview of the main food system outcomes, constituent elements and drivers. It does so through a set of metrics that highlight key challenges and offer a baseline for the measurement and monitoring of future changes. It builds from the outcomes concerning residents' diets, nutrition and health, socio-economic, and environment. It then traces back to the food supply chains, the food environment, consumer behavior and finally the underlying drivers. Ultimate, the profile's goal is to help researchers and policy makers understand the existing challenges among the elements of the food system help develop actionable policy recommendations for local socio-economic development planning.

Food systems considerations

A **food system** describes all elements and activities related to the production, processing, packaging, distribution, marketing, consumption and disposal of food, as well as all associated inputs and outputs (Figure 1). Food systems, if sustainable, deliver benefits to individuals, society, and the environment that provide healthy, nutritious food for communities, generate inclusive and profitable business opportunities for supply chain actors, from family farmers to market vendors, and help conserve the natural environment and its biodiversity [1].

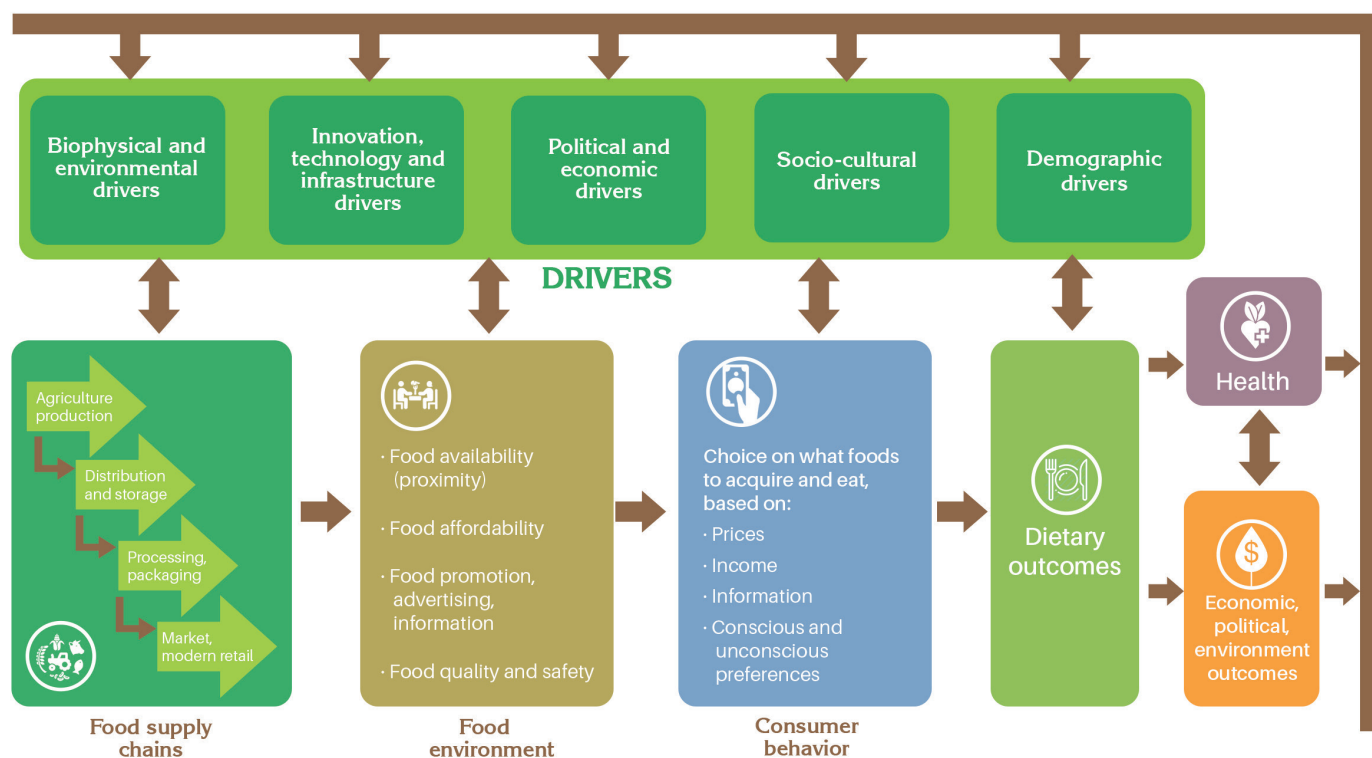


Figure1: Conceptual framework for the food systems analysis in this profile. Source: [2]

Core indicators of constituent elements and drivers of food systems applied in this profile



Nutrition and health outcomes (page 3)

Nutrition and health outcomes are evaluated using indicators associated with food insecurity and hunger that lead to malnutrition and have negative effects on health and quality of life.



Social, economic and environment outcomes (page 3)

Social and economic outcomes refer to direct losses in economic productivity caused by poor public health and increased health care costs, as well as indirect losses due to reduced cognitive functioning and deficits in schooling.

Environmental outcomes highlight the effects of agricultural production and food consumption on water and land use, biodiversity, and climate change.



Diets (page 4)

Diets are comprised of the all the food that an individual consumes. Dietary patterns are the quantities, proportions, and combination of different foods and beverages in diets. Diets are an intermediate outcome that affect the aforementioned outcomes.



Food production and supply chains (page 5 and 6)

The food supply chain consists of the activities and actors involved in the production and consumption of food, and those related to the disposal of its waste.



Food environments (page 7)

Food environments include key elements that influence consumers' food choices and diets, including the availability, affordability, and physical accessibility of different foods, in addition to their marketing and promotion. The food environment is a key element of the food system.



Consumer behavior (page 8 and 9)

Consumer behavior is determined by individual and household decisions, from acquisition to consumption of food. Personal attitudes and motives, taste preferences, convenience, food safety, and health-related perceptions determine consumers' food choices.



Drivers of food systems (page 10)

Drivers include factors that directly or indirectly affect the food systems and changes that influence nutrition and diets.

Moc Chau: setting the stage

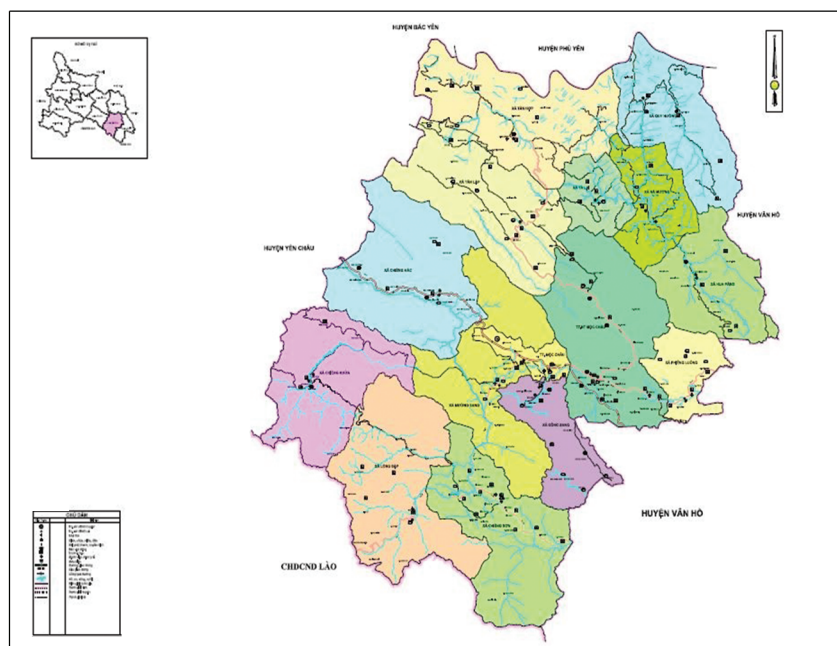


Figure 2: Moc Chau district and key socioeconomic features

Moc Chau is a mountainous district of Son La province, located in the northwestern region of Vietnam between Hanoi (200km) and Son La (120 km). The district lies on the Moc Chau Plateau, which is characterized by relatively flat terrain, fertile soil, a cool climate and an altitude of 1,050 meters. Such conditions render the district ideally suited for agriculture and livestock production, with year-round harvesting of vegetables, subtropical fruits, tea, flowers and dairy cattle. More than 60 percent of residents hail from the Thai, Hmong and Muong minority ethnic groups and, despite favorable natural conditions, face significant socio-economic challenges: seven percent of households live below the national poverty line and another five percent hover just above it, while malnutrition is endemic, with 20 percent of children stunted [3] (Figure 2).

Total area (2018):
1,071.7 km²

Total population (2018):
113,937 persons

Population growth (2018):
1%

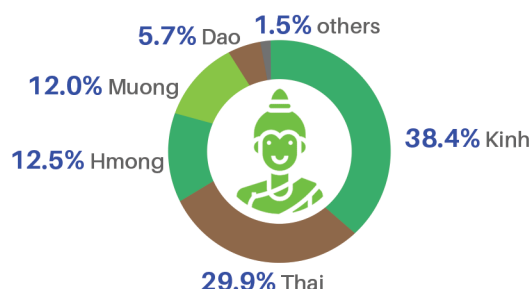
Population density (2018):
105.3 person/sqm

Rate of near-poor and poor household (2018):
12.1%

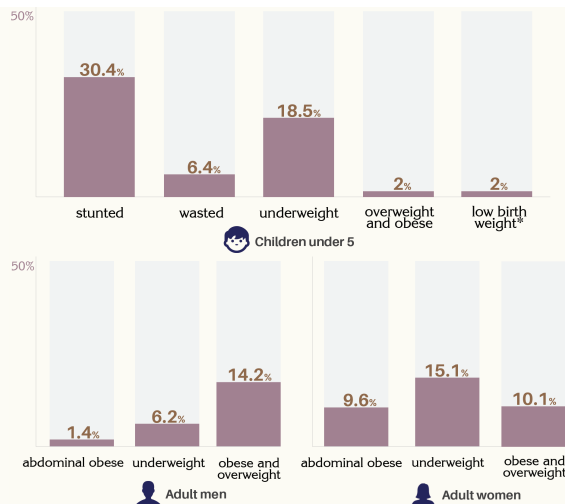
Administrative units:

2
Towns

13
Communes



Number of ethnic minority groups (2018)
10



Data source: CIAT&NIN, 2018 [4]
*Reported by health center of Moc Chau district in 2018 [5].

In this profile, adult women refer to women of reproductive age
Stunting: A child whose length-for-age ratio below the line -2 is stunted. Below -3 is severely stunted
Underweight: A child whose weight-for-age ratio below the line -2 is underweight. Below -3 is severely underweight.
Wasting: A child whose weight-for-length ratio below the line -2 is wasted. Below -3 is severely wasted.
https://www.unicef.org/infoycountry/stats_popup2.html
Body Mass Index (BMI) is a measure indicating nutritional status in adults. It is defined as a person's weight in kilograms divided by the square of the person's height in metres (kg/m²)
Adults: Underweight <18.5, Normal range 18.5 - 24.9, Overweight ≥25.0 - <30.0, Obese ≥30.0
Abdominal obesity: Waist > 90cm in men or Waist > 80cm in women
Children under 5: A child whose BMI for-age is above the line 3 is obese. Above 2 is overweight.

Nutritional status of children under 5 years old:

- Prevalence of stunting is high.
- Prevalence of wasting or underweight is medium.

Social and Economic outcomes



Data source: CIAT&NIN, 2018 [4]

- Inhabitants of Moc Chau currently spent more than half of their household budget on food (54.3%), which was slightly higher than the provincial level (49.2%) and national levels (51.1%) (VHLSS 2016) [11]. It is important to ensure that consumed foods meet nutrition and health requirements while not harming the share of income dedicated to different aspects of life, especially education, healthcare, entertainment, and daily expenses.



Data source: Moc Chau Department of Statistics, 2017

- The high percentage of households engaging in agriculture, forestry, aquaculture and the food services sector shows how important these industries are for residents as a source of food and/or income.



Data source: Health Center of Moc Chau district, 2019 [12]

- Generally, the stunting and wasting of children under five are more likely to occur in communities with a higher percentage of poor households.

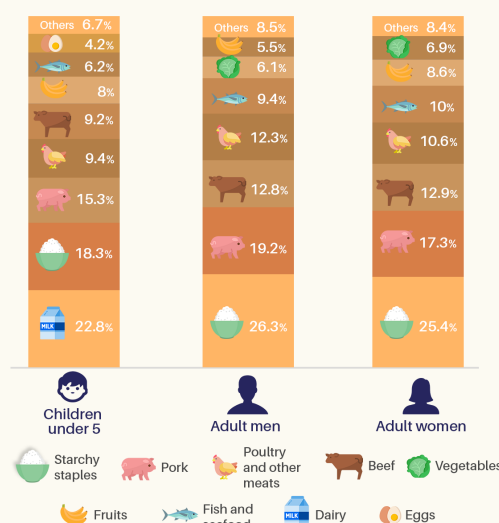
- Household food expenditure is high.
- Stunting and wasting are prevalent, and are even more common among young children from poor communes.

Social, economic and environment outcomes



Environment outcomes

Relative contribution of Greenhouse Gas Emissions (GHGE) from food production per food group to average diet of children under five years old, adult men and adult women in Moc Chau.



Data source: CIAT&NIN, 2018 [4]

*To calculate the GHGE associated with producing individual diets, data from a 24 hour recall survey was combined with generic emission factors for the production of specific food commodities [13].

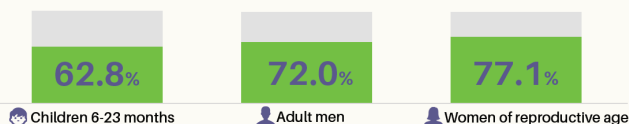
- Foods from animal sources (beef, fish and seafood, egg, dairy, poultry and other meats) are the largest contributor to the dietary carbon footprint of Moc Chau households. The production of meat generates more GHGE per gram or calorie of food than the production of plant-based foods. This is especially true for beef, coming from a ruminant animal with high emissions per gram of food produced. Because of these high emissions, small quantities of beef can contribute significantly to the overall carbon footprint of the diet. Therefore, from an environmental as well as nutritional perspective, it is important to encourage diverse diets.
- The dietary GHGE for both women and men per day are dramatically lower than the overall national average (by 18% and 37%) due to under-consumption of meat, poultry and fish compared with the recommended level. Given their relatively low intake of food compared to adults, dietary emissions for children under 5 years old are 68% lower than this overall national average [14].

- Animal-based food sources are the highest dietary contributor to GHGE.



Diets

Minimum dietary diversity (MDD)



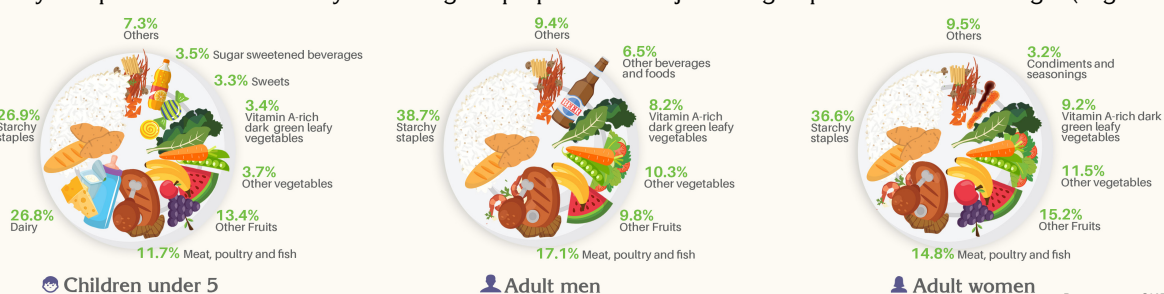
Data source: CIAT&NIN, 2018 [4]

*MDD depends on age and sex for children 6-23.9 months means the proportion of age it is the proportion receiving foods from 4 or more out of 7 defined food groups during the previous day. For women 15-49 years old and adult men, it is the proportion having consumed at least 5 out of 10 defined food groups during the previous day.

- The proportion of children 6 -23 months of age with a diet that meets the MDD in 2018 (62.8%) in Moc Chau was lower than even that in 2014 for the province as a whole (83.5%) and for Vietnam (79.9%) [15], [16]. This may reflect an inadequate micronutrient intake among those children.
- Micronutrient deficiencies impair the health and development of children. Therefore, improving dietary diversity of children should be an important strategy for enhancing micronutrient intakes in the district.

Composition of a diet of children under five, men and women

Dietary composition is calculated by estimating the proportion of major food groups to a diet's total weight (in grams).



Data source: CIAT&NIN, 2018 [4]

- Generally, consumption of dairy products among adults is lower than the consumption of energy-dense and other unhealthy foods, such as sugar sweetened beverages. It seems that the consumption of sugar sweetened beverages among children under five is relatively higher compared to other food groups. Dairy products were consumed in greater quantities by children under five than by adults.

Portion size of typical foods

Portion size is the quantity of a specific food an individual chooses to eat as a main meal or snack, which is measured in grams and may be larger or smaller than a typical serving [19].

Adults:

The average daily intake of fruit and vegetables by men and women meets the World Health Organization's recommendation of 400 grams per day. However, 22.9% of women do not meet the recommended threshold for minimum dietary diversity. Therefore, prioritizing and investing in activities to improve dietary diversity is critical for improving the nutrition and health of women.

The consumption of meat, poultry and fish is slightly lower compared to recommended levels for Vietnamese adults, especially for women of reproductive age. These recommended levels equal five to six units of meat, poultry and fish per day, providing 35-42 total grams of protein [20]. Noticeably, the dairy intake of adults is lower than Vietnam's generally recommended amount of three to four units per day, for a total of 300-400 mg of calcium [20].

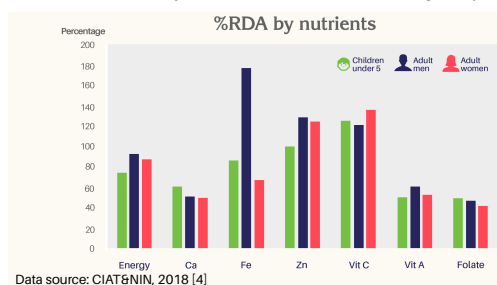
Children under 5

The intake of vegetables and fruits, meat, poultry and fish as well as dairy for children under 5 are generally much lower than recommended levels by the National Institute of Nutrition, 2016 (~320 grams of vegetable and fruit per day, 3.5 units of meat, poultry, and fish per day, providing 24.5 gram of protein and 4 units of dairy per day, providing 400 mg calcium/day) [21].

Diet quality

Recommended Dietary Allowance (RDA) (%).

Recommended Dietary Allowances (RDAs) are the average daily dietary intake level that suffices to meet the nutrient requirements of nearly all (97-98%) healthy people².

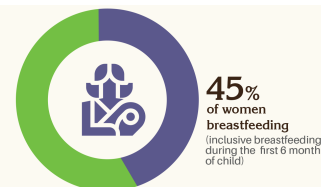


Data source: CIAT&NIN, 2018 [4]

Despite all three groups consuming the RDA of lipids, protein, and glucid, no group met the RDA of calcium, iron, vitamin A, and folates; women and children under five fell particularly short.

²https://ods.od.nih.gov/Health_Information/Dietary_Reference_Intakes.aspx

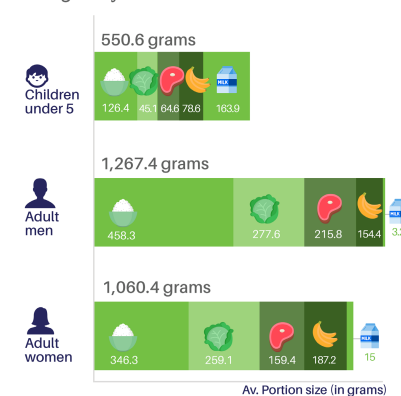
4 Food systems profile



Exclusive breastfeeding is crucial for the optimal growth, development and health of infants, and reduces the risk of obesity and non-communicable diseases later in life [17]. Therefore, exclusive breastfeeding for the first six months, combined with safe and adequate complementary foods up to the age of two years, should be the target for health care in the district.

In Moc Chau, 55% of women do not practice exclusive breastfeeding during the first 6 months. The potential causes of this include insufficient breastfeeding support at birth by a health worker, negative perceptions concerning the practice, high exposure to infant formula advertising, and low consumption of breastfeeding public information campaigns [18].

Average daily intake



Av. Portion size (in grams)

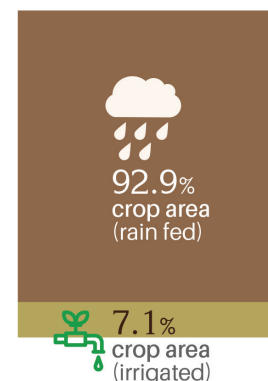
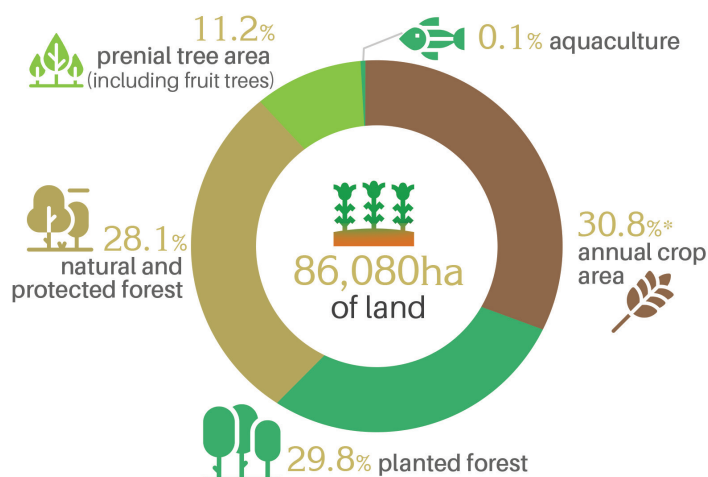


Data source: CIAT&NIN, 2018 [4]

- 37.2% of children 6 - 23 months of age and 22.9% of women in reproductive age not meeting minimum dietary diversity.
- Consumption of meat, poultry, fish and dairy among adults and children under 5 is low.
- Consumption of vegetables and fruits among children under five is low.



Land use for food

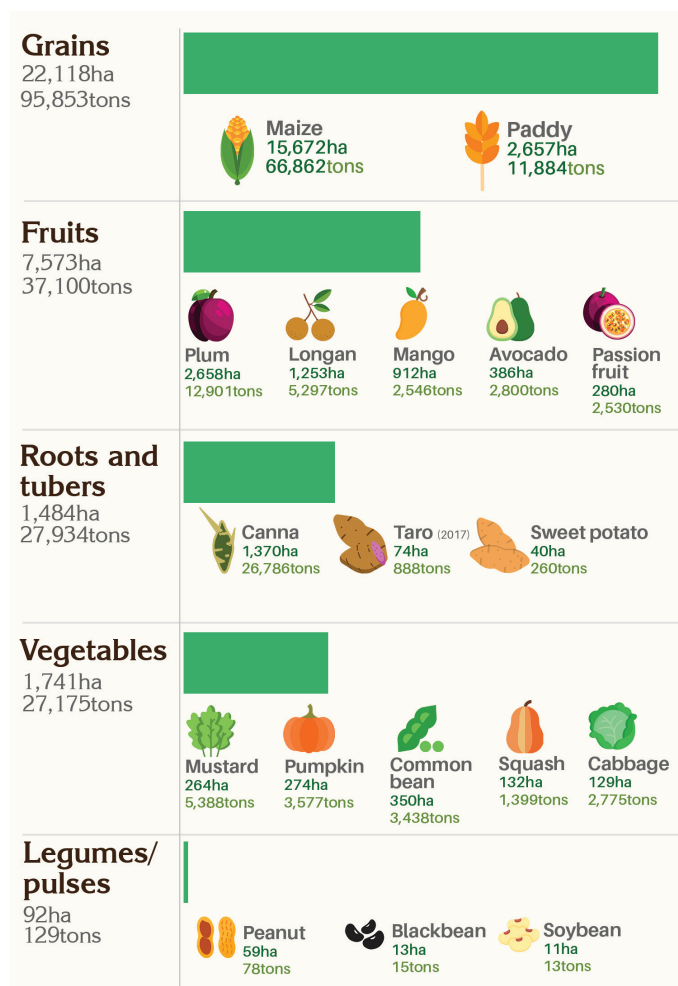


*of which 7.1% irrigated

Data source: Moc Chau Department of Statistics in 2018

Food crop production

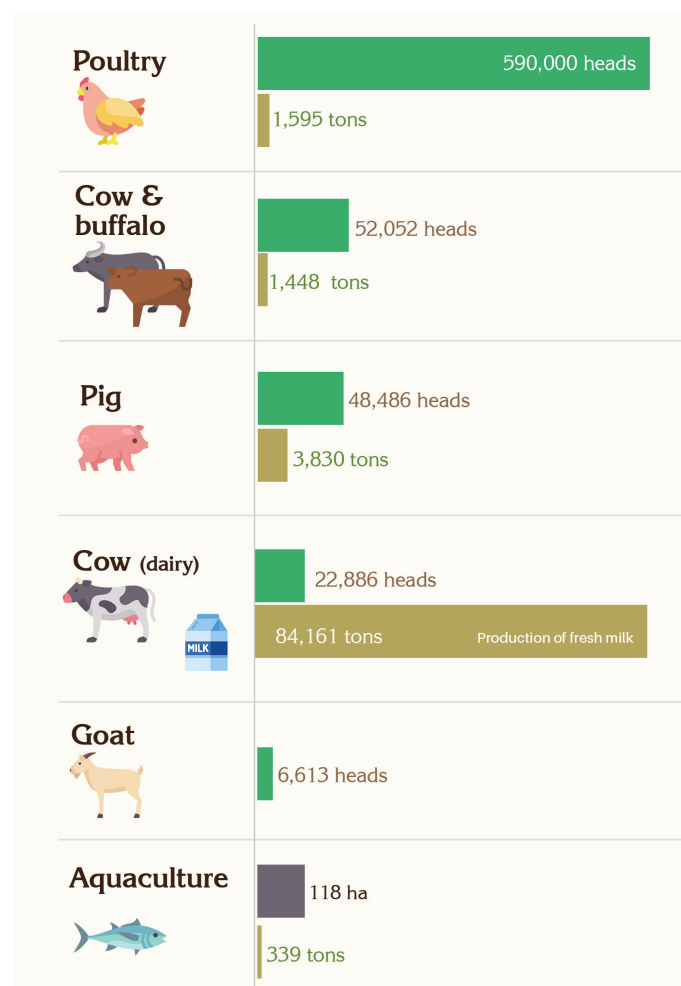
Top five food crops



*The graphic depicts the total area and production of food crop categories and leading crops per category
 Data source: Moc Chau Department of Statistics in 2017&2018

Animal based food production

Top five livestock for food



Data source: Moc Chau Department of Statistics in 2017&2018

- While rice is the primary staple food in Moc Chau, maize and fruits are the cash crops which generate the highest share of total income [22].
- The district government of Moc Chau has recently increased investment for the development of high value crops focusing on safe vegetables and fruits due to increasing demand from urban markets.

- Livestock production is a means to promote rural income diversification for local people in Moc Chau. The numbers of animals, especially pigs and milk cows, has increased apace with significant public support and investment into the sector's expansion [3].

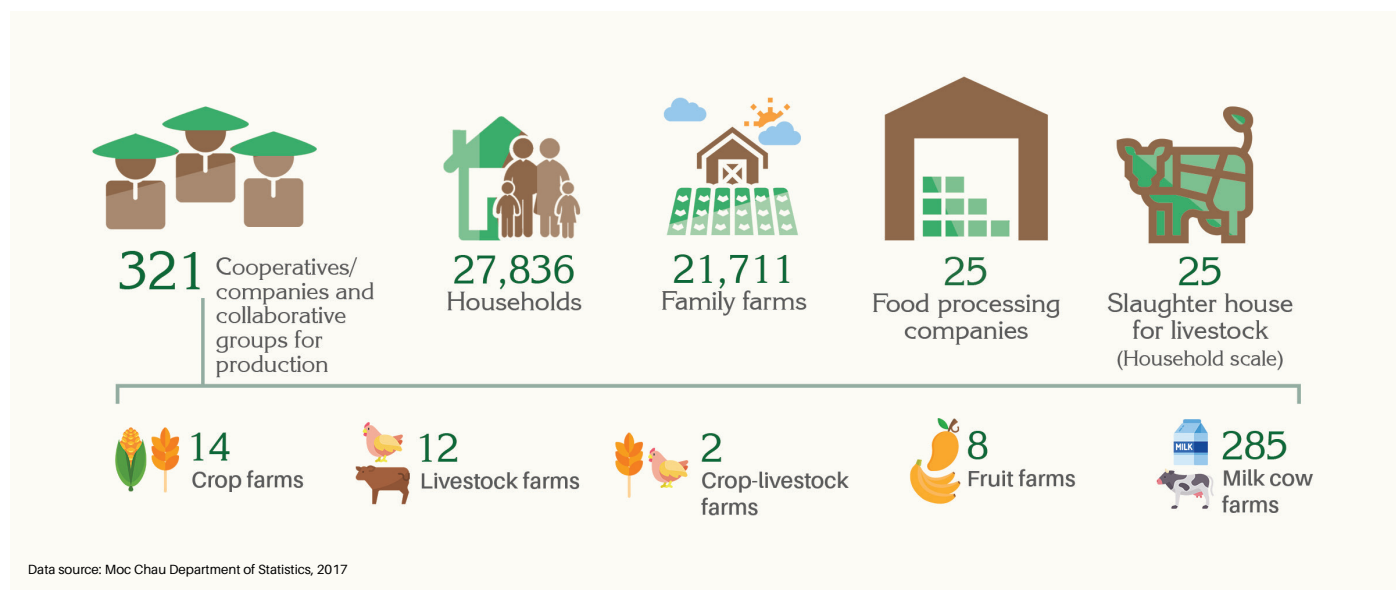
Storage and distribution, Retail and markets

Storage and distribution (Transportation)



- The development of transport infrastructure system of Moc Chau in recent years has enabled rapid distribution of agricultural products to the lowlands and neighboring areas. However, there are three poor communes with 17,000 people (including Tan Hop, Chieng Khua, and Ta Lai) that remain remote and poorly connected by road.

Processing and packaging



- The district's transportation system is continuously expanding and upgrading in quality, which enables Moc Chau's food producers to better access markets inside and outside of the district.
- Due to favorable weather conditions for dairy cows and milk production, milk from the district is considered a specialized agricultural food product, with output expected to rise every year. Moc Chau's fresh milk production, of 100,000 tons per year, accounts for nearly 10% of Vietnam's total [23]. As per the livestock development strategy, the number of dairy cows is planned to increase to 35,000 in 2020 and 70,000-100,000 by 2030. Milk farms account for 80% of total farms in Moc Chau. Dairy farmers earn significantly higher income than farmers in other agricultural sectors [24]. However, animal source foods are associated with higher energy use and GHG emissions than plant-based foods [25].
- Recently, sustainable and inclusive supply chains have been developed to bring safe foods produced in Moc Chau to other lowland areas—including vegetables, fruits and VietGAP-compliant pork—to market in Hanoi via large and small retailers, for instance Vinmart, CoopMart, Big C, Mega Market.

- Although local agricultural production for various food sources and safe food products have been growing rapidly, the consumption of vegetables, fruits, meat, poultry, fish and dairy among children under 5 and adults in Moc Chau is low. The underlying causes require further research to examine this issue.
- While the livestock production generates important income for local farmers, animal source foods are associated with higher energy use and GHG emissions than plant-based foods.

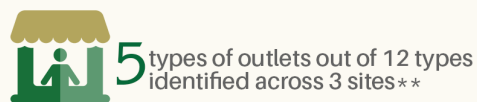
Food outlets for the whole district



6 Food systems profile

Food availability and food access (measured areas) *

Diversity of food outlets



Food outlet density



Proximity



Note: Diversity of food outlets is defined as the number of common types of food outlets present in the research location. Food outlet density is defined as the number of food outlets per 1,000 inhabitants. Proximity is defined as distance from households to the nearest food outlets in kilometers.

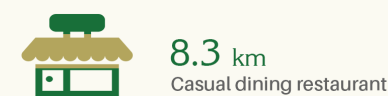
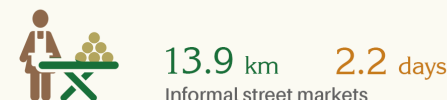
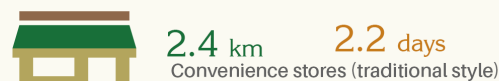
*Based on the baseline survey conducted in 10 representative villages of rural Moc Chau.

**Comprising twelve types of food outlets, including traditional convenience stores (in which are included conventional grocery stores and independent small-format grocery stores), small-scale street vendors or pop up semi-permanent stands, mobile vendors, formal open markets, bakeries, convenience stores (modern style), specialized fruit and vegetable shops, Bia Hoi, restaurants and diners, casual dining restaurants, and cafés. Bia Hoi is a type of popular food outlets in Northern Vietnam which serve draught beer and fast foods.

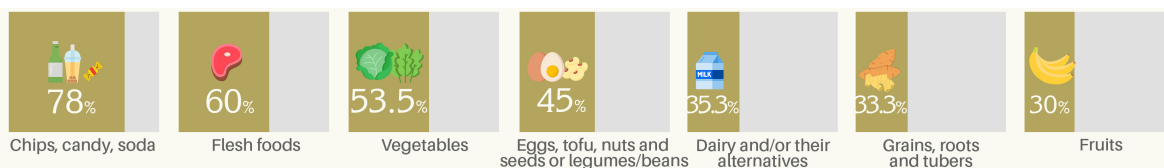
Food environments



Proximity and frequency of visits to specific types of food outlets (numbers of day per week)

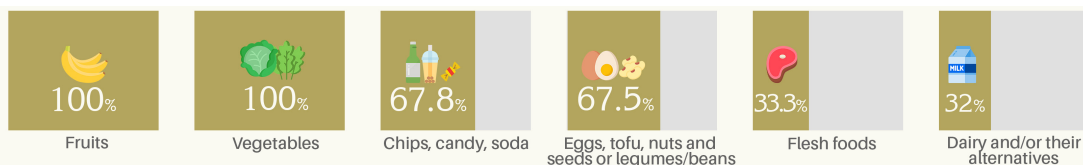


Food availability at convenience stores



- Unhealthy foods including chips, candy and soda appear in many more convenience stores than other food groups.

Food availability at informal street markets and formal open markets



- Healthy foods, including fruits and vegetables, are more prevalent in informal street markets and formal open markets than other food groups.

Economic access (measured areas)

- No locals are unable to afford rice and vegetables, while only a few/less struggle to afford fruit due to its price.
- Meanwhile, 65.4% of locals identify meat as being too expensive to consume as much as they'd like.

Characteristics

The food environment in Moc Chau district can be characterized as a traditional food system because of the following features:

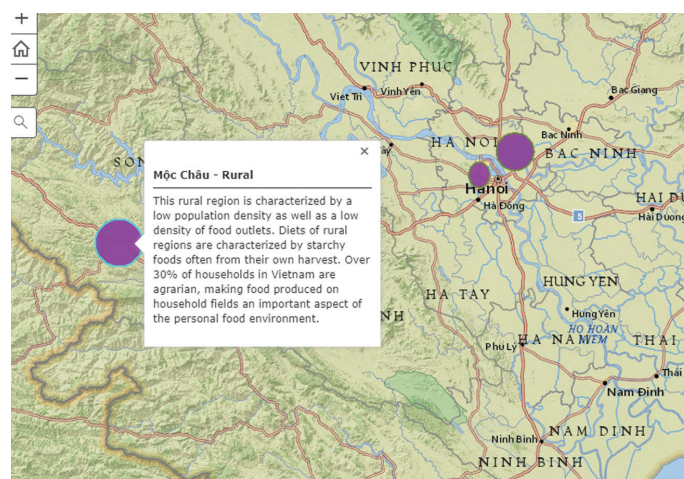
- High dependence of local people on locally grown products;
- Long distance for food access in traditional markets and limited household budgets for food purchasing;
- Some products, such as fruits and vegetables, are farmed seasonally, causing rural households to depend more on market availability off-season;
- Fresh foods and convenience foods are sold in the most outlets, in small quantities and at prices affordable to those with low incomes
- Convenience stores (traditional style), informal street markets, and formal open markets are typical food outlets in Moc Chau.

- Food outlets are quite homogeneous.
- Distance to food outlets is quite far.
- Convenient stores (traditional) offer many unhealthy snacks and sugar sweetened beverages.
- 65.4% of people reported that meat is too expensive.

Food outlet map

The objectives of the food outlet map are:

- To take stock of food outlets that are present at the research site; and
- To provide a spatial overview of the availability of different food groups.



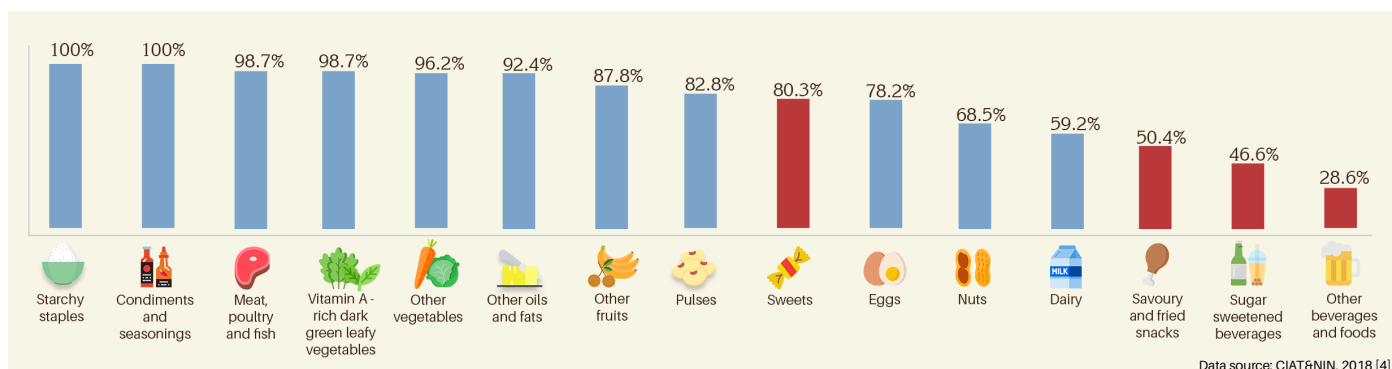
For more information, access the map link:

<https://arcg.is/1y990L>



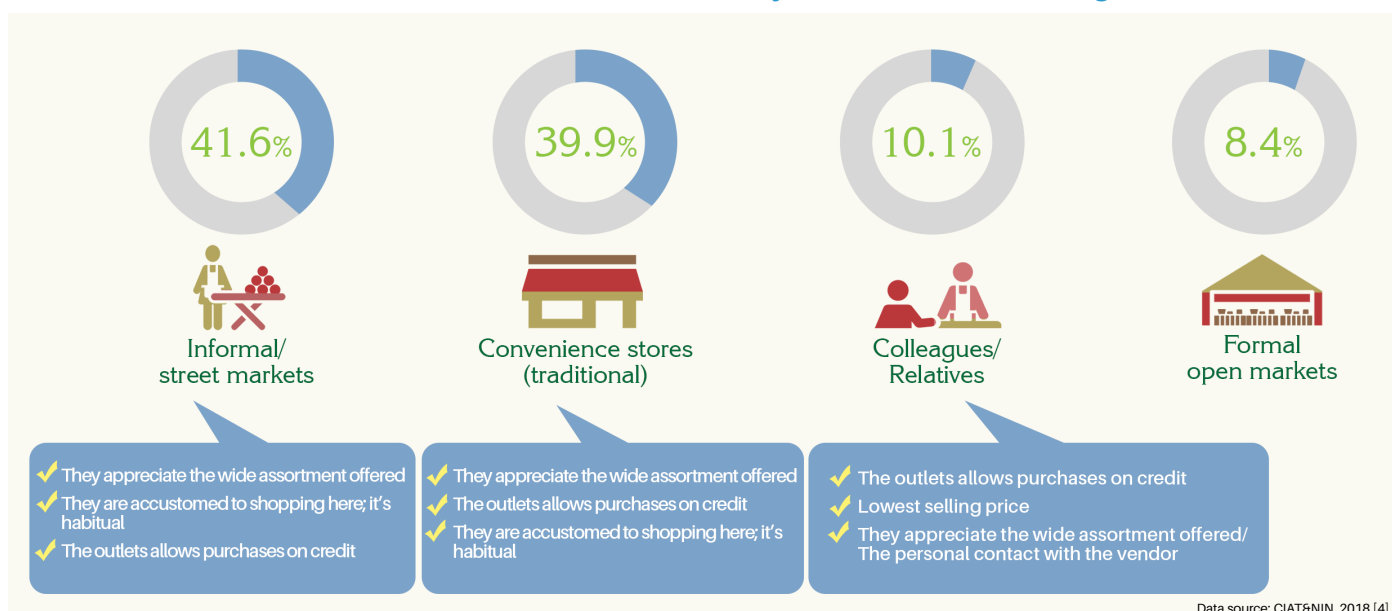
Consumer behavior

Share of households consuming a specific food group in the past 7 days



- The consumption of dairy products is less than that of energy dense foods, and other types of unhealthy foods (such as sweets). There is a high percentage of households consuming unhealthy snacks and sugar sweetened beverages. This may be related to the popularity of these unhealthy foods at convenience stores (traditional) near the households, and limited nutritional knowledge of consumers.

Share of food outlets where households buy most of the food during a week



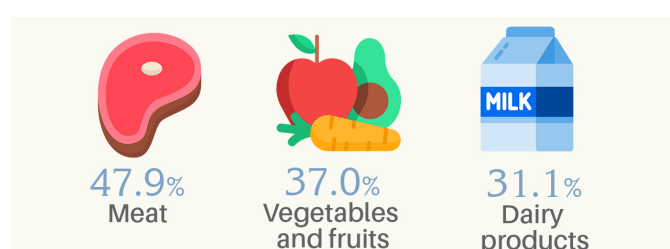
Top 3 main reasons of households to choose the top 3 food outlets

- Informal street markets and (traditional) convenience stores are the main retail outlets where consumers purchase their food. Both channels offer a wide variety of products and allow consumers to purchase food items on credit. Consumers are accustomed to frequenting these locations, which provides a habitual basis for their ongoing use. Given that unhealthy foods are both popular and widespread in convenience stores, market interventions in these outlets should be considered as part of the larger effort to improve diets and nutrition.

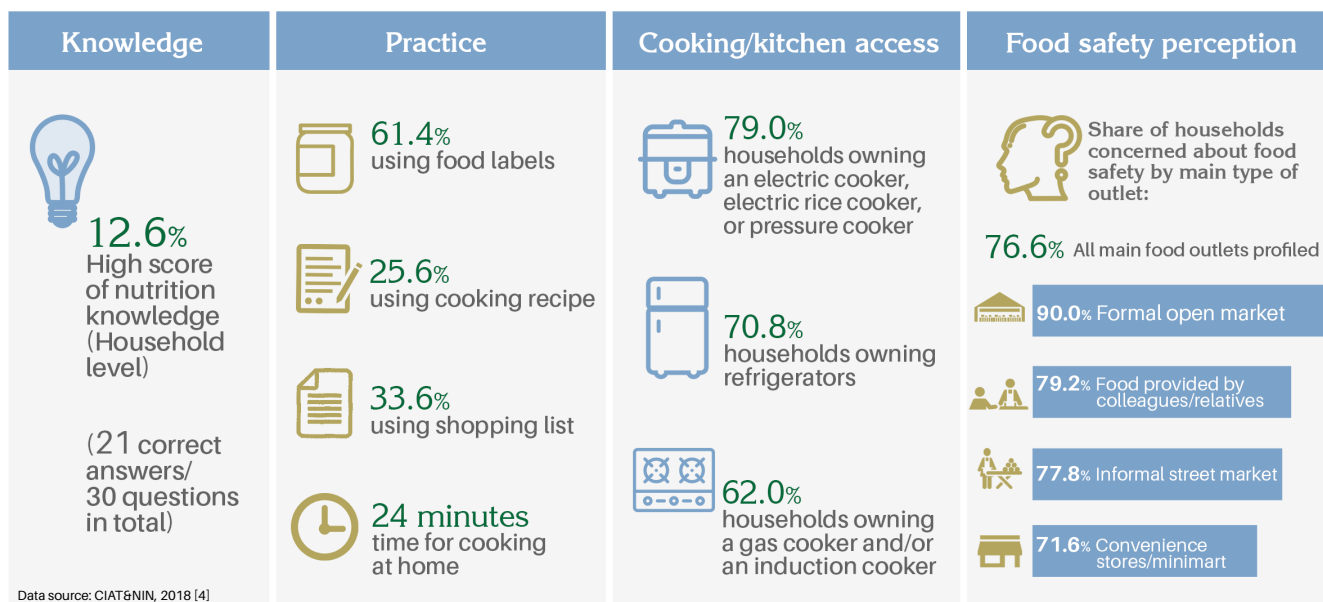
Most important food characteristics



Top 3 food categories households prefer to buy more if budget increases



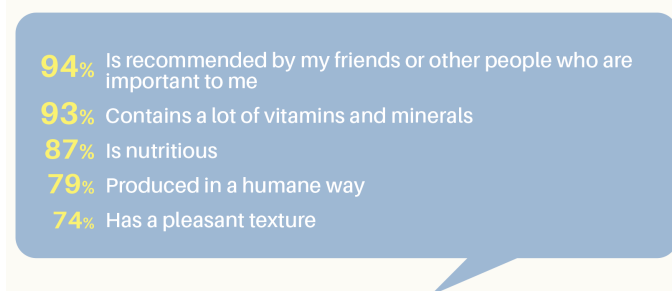
- For Moc Chau's residents, healthfulness (38.7%) and safety (35.7%) are the two most important features when choosing food options. These attributes are considered to be more important than nutritional content (12.8%), price (7.2%) or taste (5.5%). Concerns about food safety are widespread in the Vietnam, and are important issues with consumers and policymakers alike.
- The results concerning which food items households would purchase if budgets increased are striking. In previous sections, we have seen that men and women in Moc Chau consume the suggested daily quantity of fruits and vegetables, but not meat (including fish); they also under-consume dairy products. While dairy products are not a traditional part of the Vietnamese diet, this fact demonstrates the need to improve the nutritional knowledge of consumers in order to make them aware of the food groups that are critical to an improved diet.



- There is a lack of knowledge concerning nutrition among Moc Chau consumers, with only 12.6% demonstrating an acceptable level. This reinforces other results in this section, where it is shown that consumers lack a solid understanding of which foods are necessary for an improved diet. Thus, nutritional education campaigns are necessary to improve the knowledge and nutritional standing of the population.
- The majority of Moc Chau consumers use food labels when selecting food (61.4%), though very few (6.1%) have a strong grasp of the information that labels provide. Other “modern” practices, such as using shopping lists and cooking recipes, are not widespread.
- Moc Chau consumers spend little time preparing food at home, as compared to other consumers in the rural regions of Northern Vietnam, who required 2.6 hours per day for these activities in 2011 [26].
- Most consumers own cooking and kitchen equipment for food storage and preparation, enabling them to improve diets and reduce food waste.
- Moc Chau consumers are more concerned about food safety in traditional (formal and informal) markets compared to other outlets. However, actual public health risk is low and there is little evidence to actually support that these foods sold in wet markets are unsafe and as such, the planned closure of almost all formal markets based on fear alone may be unnecessary. Increased cost of foods and dietary changes associated with supermarkets and exposure to ultra-processed foods (for which consumption is linked to obesity and non-communicable diseases (NCDs) leaves food and nutritional security at risk [27]. This is a striking result; as traditional markets are where most consumers buy their products. This signals that consumers are willing to take the “risk” of purchasing food in traditional markets due to the wide assortment of fresh products on offer, their affordability, the ability to purchase food on credit, and ingrained behavioral habits. Hence, traditional markets are a potential setting for interventions to improve food safety and relieve consumer concerns anxiety about food hazards.
- While 37.2% of children under five and 22.9% of women do not consume the recommended minimum dietary diversity, 15.4% households do not want to change their diets, and only 37% of households would increase their food and vegetable consumption if their financial capacity were to increase. This may be associated with consumption habits, cultural practices and a lack of nutrition knowledge. Hence, there is a strong opportunity for behavioral-change communication campaigns that focus on increasing children’s fruit and vegetable intake and increasing dietary diversity generally.

Top 5 most important reasons for the choice of food

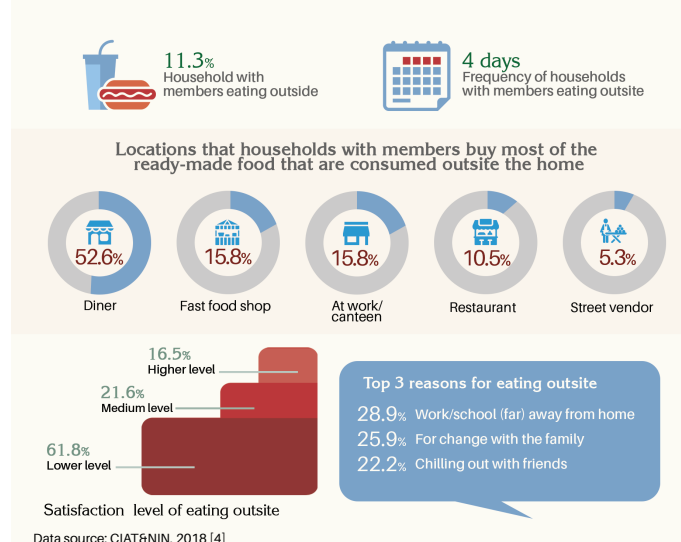
Food away from home



Top three attributes when buying food away from home



- Although consumption of fruits and vegetables among children under five is low, only 37% of consumers would consume these two products more should their budgets increase.
- The share of households consuming dairy is low.
- The share of households consuming unhealthy snacks and sugar sweetened beverages is high.
- Food safety at traditional stores and markets is considered a significant concern, as most people shop there.
- Knowledge of consumers about nutrition is limited.



- When consumers choose food items, recommendations from friends and family are their main source of information. After that, the vitamin and mineral content, as well as the general nutritional characteristics of the items are influential when making purchasing decisions. It is notable that the physical qualities of a food (such as texture) also quite important.
- Most Moc Chau consumers do not usually eat outside of their own homes). When they do, more than half of this consumption takes place in diners. The main reasons for eating out relate to working or studying far from home, and leisure with family and friends.



Drivers



Biophysical and environmental drivers

- Moc Chau is located in a mountainous area with natural conditions favorable to agriculture, such as fertile soil and irrigation systems that enable year-round agricultural production [28].
- Agricultural production in Moc Chau is very diverse, with both large-scale dairy cattle and fruit being well-developed production systems.
- In recent years, as they were affected by climate change and natural disasters (floods, droughts, hails), local communities have become more vulnerable to water insecurity and crop diseases. This hampers the growth of high value crops and, as a result, many varieties of drought-tolerant crops have been adopted by local farmers [29].
- Local authorities emphasize adaptive solutions for agricultural production to mitigate climate change impacts. Examples include the shifting of crop structures from inefficient crops to the planting of fruit on sloping land [3].



Innovation, technology and infrastructure drivers

- Since 2004, high-tech agricultural practices have been on the rise in Moc Chau, targeting increased yields and high quality end products to match market demand. Particularly in animal husbandry, through the adoption of new foraging technologies, Moc Chau-branded milk has become well known and the Moc Chau Dairy Company is among the most successful producers in Vietnam [30].
- Programs on “Promoting the Development of Organic Agriculture” and “One commune, One product” have been the focus of the government since 2019. As a result, many models of safe vegetable and fruit production have been developed.
- Infrastructure for trading activities has been enhanced and continuous investment in transportation infrastructure by the government has facilitated the rapid transformation of local food systems.
- The building of hydropower dams and reservoirs in Son La and Lai Chau provinces helps maintain the water levels in the area. This enables the sustainable development of new aquaculture products, like cage-raised fish in Quy Huong and Tan Hop communes. However, flood discharge from these reservoirs also has adverse impacts on agriculture production [31].



Political and economic drivers

- In recent years, many programs and policies (e.g. the National Targeted Program on Sustainable Poverty Reduction) have made great achievements in social and economic development.
- Part of Moc Chau has been upgraded into an urban area and rebranded Moc Chau Town by the provincial government. This may create a significant transformation of food systems from traditional to modern (Decree no. 128/QĐ-TTg, 2019) [32].
- Sustainable and inclusive food product value chains—particularly for safe vegetables, fruits and pork—have recently been developed by the province as well as by the government. Around 40 safe food product value chains have been developed to meet an increasing demand [3].



Social culture drivers

- The diverse customs and practices among ethnic groups in Moc Chau have both positive and negative impacts on food systems and its outcomes
 - + Most ethnic groups keep indigenous seeds that contribute to sustaining the traditional food systems in Moc Chau
 - Generally, compared to male infants, female infants and their mothers do not receive as much care from fathers and families after giving birth.
 - Child and consanguine marriage, as well as adolescent pregnancy among minority ethnic groups such as the Hmong have seriously affected the health of mothers and children. Pregnancies that occur when a woman's body is not fully mature constitute a major risk to the survival and future health of both mother and child. Children of adolescent mothers are more likely to have low birth weights and a poor nutritional status both at birth and throughout childhood. These children are further disadvantaged because women married as children tend to have less time elapse between pregnancies, give birth to more children over their lifetimes than those married later. This can also negatively impact child health [10], [33], [34].
 - Mothers often return to work just one to two months after giving birth, leaving the children to be cared for by their grandparents and eliminating the possibility of exclusive breastfeeding during the child's first 6 months. This increases the risk of an early introduction to complementary foods for children under 6 months, facilitating the development of diarrheal disease and food allergies, as well as increasing their chances of being overweight throughout infancy and childhood [35], [36].
 - In Dao ethnic group families, there are many strict rules/practices a woman must follow after giving birth. She must, for instance, only eat white rice with salt during the first month postpartum. This practice adversely affects to the nutritional status of both mothers and children.
- There is variation in the ability of women to participate in the public issues among different ethnic groups in the Northern mountain provinces. Understanding of gender-related laws is still low [37].
- Barriers to female empowerment include the long hours of work undertaken by women in remote mountainous communes, unequal pay, and extremely low levels of education [37]. However, Moc Chau authorities have implemented the registration of land use rights certificates which include the name of both husband and wife. This will hopefully empower women in household decision-making processes, including those that relate to agricultural production and food consumption.



Demographic drivers

- The large proportion of farming households (77.9%), as well as the high share of the labor force working in the agricultural sector promotes the growth of the sector.
- Since 2006, the Son La hydropower project has had a significantly negative influence on the livelihoods of resettled communities, as the agricultural land per capita has been decreased and local farmers have been forced to shift to non-agricultural activities [31].

- The growth of high value crops has been hampered by climate change and natural disasters.
- There is occasionally limited access to foods/fruit/vegetables due to climatic shocks and seasonal variations.
- Flood discharge from hydropower reservoirs has adverse impacts on agriculture production.
- There are high shares of child- and consanguine marriage, as well as adolescent pregnancies among minority ethnic groups.

Recommendations

Issues		
Food supply chains	Food environments	Consumer behavior
<ul style="list-style-type: none"> Although local agricultural production for various food sources and safe food products have been growing rapidly, consumption of various food groups is still low among the local population. While livestock production generates important income for local farmers, animal source foods are associated with higher energy use and GHG emissions than plant-based foods. 	<ul style="list-style-type: none"> Food outlets are quite homogeneous. Distance to food outlets is quite far. Convenient stores (traditional) offer many unhealthy snacks and sugar sweetened beverages. 65.4% of people reported that meat is too expensive. 	<ul style="list-style-type: none"> Although consumption of fruits and vegetables among children under five is low, only 37% of consumers would consume these two products more should their budgets increase. The share of households consuming dairy is low. The share of households consuming unhealthy snacks and sugar sweetened beverages is high. Food safety at traditional stores and markets is considered a significant concern, as most people shop there. Knowledge of consumers about nutrition is limited.
Diets Nutrition and health outcomes	Social, economic and environmental impacts	Drivers
<ul style="list-style-type: none"> Nutritional status of children under 5 years old: <ul style="list-style-type: none"> - Prevalence of stunting is high. - Prevalence of wasting or underweight is medium. 37.2% of children 6 -23 months of age and 22.9% of women in reproductive age not meeting minimum dietary diversity. Consumption of dairy among young children and adult is low. Consumption of meat, poultry, fish, and dairy among children under five and adults is low. Consumption of vegetables and fruits among children under five is low. 	<ul style="list-style-type: none"> Household food expenditure is high. Stunting and wasting are prevalent, and are even more common among young children from poor communes. Animal-based food sources are the highest dietary contributor to GHGE. 	<ul style="list-style-type: none"> The growth of high value crops has been hampered by climate change and natural disasters. There is occasionally limited access to foods/ fruit/vegetables due to climatic shocks and seasonal variations. Flood discharge from hydropower reservoirs has adverse impacts on agriculture production. There are high shares of child- and consanguine marriage, as well as adolescent pregnancies among minority ethnic groups.



Prioritized Research/Action		
Food supply chains	Food Environments	Consumer behavior
<ul style="list-style-type: none"> Conduct more in-depth research to identify the barriers local residents face in accessing local agricultural products for improved nutrition. Livestock production should be balanced with crop production in order to reduce food-related GHGE. 	<ul style="list-style-type: none"> Traditional markets are a potential setting for local authorities to increase market access to healthy foods. The availability of nutritious foods at traditional convenience stores should be improved. Childhoods nutrition can be improved through the provision of healthier school meals. 	<ul style="list-style-type: none"> Nutritional education campaigns are necessary to improve the nutritional knowledge and status of the population. Further education on how food systems generate GHGE, including food miles, may influence consumer perspectives and food choices.
<ul style="list-style-type: none"> Develop additional programs to increase access to safe, nutritious and diverse foods; add micronutrients to staple foods; improve access to clean water and sanitation Expand the provision of nutritional services through the health sector Provide training for mothers about pregnancy care, adequate and appropriate complementary foods, and feeding practices for childhood growth and development Prioritize and invest in policies and programs to improve the nutrition of pregnant and breastfeeding women, such as providing pregnant women with multiple micronutrient supplements Incentivize the production of nutritious foods Restrict marketing and improve the labelling of unhealthy foods to children. Implement of a carbon offset program and upgrade farming practices and technology in order to reduce GHG emissions Meat is identified as a major contributor to GHGE in the food system; reduce the amount of farmed livestock, especially beef and pork, by encouraging higher diversity in diets and education convening the impacts of GHGE Prioritize and invest in improving the nutrition and livelihoods of rural households through business models that are inclusive of small farmers. 		



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Acknowledgements

The research was supported by the Flagship Programme "Food System for Healthier Diets" funded under the CGIAR Research Program "Agriculture for Nutrition and Health" (A4NH).

The A4NH Research Program is designed to contribute to three goals - or system-level outcomes (SLOs) - set by CGIAR: to reduce poverty, improve food and nutrition security for health, and improve natural resource systems and ecosystem services. For more information, please visit the website: <http://a4nh.cgiar.org/>.

We would like to thank all the participants that took part in the validation workshop. We could not have gained such invaluable insight for this product without their great contribution. We also would like to thank Dr. Dindo Campilan and Dr. Godefroy Grosjean for their valuable input to this profile. Finally, we would like to thank Ms. Ysabel Anne Lee and Mr. Adam Savelli for their great support on proofreading this profile's content.

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The CGIAR Research Program A4NH, led by the International Food Policy Research Institute (IFPRI), is built on the notion that agriculture has the potential to do much more than contribute to basic food and income needs.

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Moc Chau Farmer Union (MFU) is a social – political organization of Moc Chau peasantry under the leadership of the communist Party of Moc Chau. MFU has been playing a key and central role in farmers' movements and building a new type of rural areas.

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