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Coping Strategies of Households in Lao Cai Province in Dealing with Risks in Tea Cultivation

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Abstract

Tea farming households in Lung Vai commune, Muong Khuong district have been facing different types of risks. This study aimed to analyze their current risk-coping strategies, then to propose some solutions for the future. A total of 90 farmers in 3 villages with different production scales had been interviewed using semi-constructed questionare of how they identified and measured risks based on their observations and experience. The statistical descriptions and comparisons results pointed out that most of them were very proactive and flexibly applied different strategies and measures to prevent and minimize losses. However, the differences in the strategies chosen and the level of application among the households depended largely on the household's resource capacity as well as the awareness of the household head. To promote the sustainable development of tea production in this area, the government and relevant actors in the local tea value chain should work together in order to develop solutions to intervene and support households to improve their capacity to apply risk-coping strategies more effectively in the future.

Keywords

Tea cultivation, risk, coping strategy, farm households, Vietnam

Introduction

Tea (*Camellia sinensis*) has become a key crop, bringing a prosperous and stable life for the people in many mountainous regions in Vietnam and Muong Khuong district, Lao Cai province in particular. In recent years, thanks to boldly changing the local planting structure, new tea varieties are actively bringing high productivity and high economic efficiency, helping to form a stable production chain to allow many tea-growing households to gradually escape poverty and get better enriched. By the end of 2021, Muong Khuong had planted nearly 4,000 hectares of tea, of which nearly 3,000 hectares of tea was for business. Tea is the main commodity crop in this district, which brought a gross output of more than 100

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billion VND in 2020 (Xuan Hien, 2022). According to calculations by specialized agencies, in the Lao Cai tea area, each hectare of tea on average brings in a revenue of 55 million VND/per year (Muong Khuong Center of Culture, Sports and Information, 2019). It can be said that tea production is making significant contributions to helping people in the local vicinity escape poverty and stabilize their socio-economic conditions.

However, tea production in Muong Khuong district often faces many types of risks that threaten to damage the sustainable development of tea production in the locality. Hence, tea-growing households must be capable of recognizing risks and implementing risk management practices appropriately to minimize adverse outcomes. A number of studies focused on the assessment of risk management strategies have been carried out at the household level examining how farmers respond to natural risks and climate change or on the impacts of risks on the livelihoods of farmers (Bui Thi Minh Ha *et al.*, 2020; Nguyen Ngoc Thuy *et al.*, 2020; Paumgarten *et al.*, 2020; Muench *et al.*, 2021). There is a lack of research focusing on assessing the coping strategies to risks that are specific to tea-growing farm households. Hence, this study aimed to address the risks that tea-growing households in the North-East regions of Vietnam were facing based on the experiences and observations of tea-growing farmers, and to analyze their current risk-coping practices related to their socio-economic characteristics to gain a deeper understanding of their choices in order to propose some solutions for the future when tea production becomes the focal large-scale commodity in the production of this locality.

Methodology

Lung Vai commune was chosen as the research area. Lung Vai is located at the border of Muong Khuong district, Lao Cai province, with 13 ethnic groups living there. For much of the past, people living here have faced many difficulties. In recent years, however, tea is now planted popularly and has become the key crop in the area. Tea production has become the foundation for the socio-economic development of the local people.

Giap Cu, Tao Giang, and Coc Cai are the three villages with the largest number of tea-growing households in the Lung Vai commune. Ninety tea-growing households in these three villages were randomly chosen to be surveyed on their risk management practices in tea production. Then, the selected households were grouped into three different tea production scales: large (>1 hectare, n1=30), medium (0.6-1 hectare, n2=40), and small (<0.6 hectares, n3=20) for a better understanding of their risk coping effectiveness and problems.

We conducted a direct interview with one representative of each of the selected households (most of them were the head). Each interview section lasted for about 30 minutes. We asked them to tell us about how they identified and measured risks based on their observations and experience. The self-designed questionnaire consisted of multiple choice questions on the situations of risks and short answer questions on how they cope with different types of risks. The risks were ranked in terms of their frequencies (rarely – 1 point, occasionally – 2 points, frequently – 3 points) and severity of loss (not severe – 1 point, severe – 2 points, extremely severe – 3 points). Statistical descriptions and comparisons were applied to help analyze the current risk-coping practices of different tea-growing scales.

Results and Discussion

Identified risks in tea production

Agricultural production in general and tea production in particular have outstanding characteristics that are highly dependent on external objective conditions as well as the natural growth characteristics of tea plants (OECD, 2009). These are the factors that bring risks to the tea production of farm households. According to the reports of Rejda & McNamara (2014), Komarek *et al.* (2020), and Nguyen Ngoc Thuy *et al.* (2020), risks in general can be classified by different criteria, but risks in

production and risks in tea production in Lung Vai commune can be classified into four main types: natural disaster risks, disease risks, financial risks, and market risks. Natural disasters and diseases cause risks during the tea cultivation process. Financial risks are related to credit accessibility in financing their production activities. Market risks are due to unfavorable fluctuations of prices in the input and output markets. Depending on the differences in production scale, tea-growing households face different risks in terms of risk types as well as risk levels.

According to the assessment of the farmers, over the past three years, drought, severe cold, hail, hoarfrost, and landslides were the most common natural disaster risks that affected tea production and caused losses to farmers in the locality (**Figure 1**). Drought was the most observed natural disaster among those identified and also had the highest frequency of occurrence (**Figure 2**). Drought often occurs during the budding and harvesting stages, which then leads to sharp reductions in the yield and quality of the tea products.

In addition, pests and diseases were among the top concerns and risks of the local tea-growing farmers because they can result in negative effects on the development and quality of tea products. Climate change and improper technical cultivation measures have created a favorable environment for the development of pests and diseases in tea plants. Typical pests include green leaf hoppers, mosquitos, and brown-red spiders, with green leaf hoppers being the most common pest that all tea cultivation households encountered (answered by 89.2% of the surveyed farmers). These pests not only occur with great frequency but also cause heavy damage to cultivated fields. Typical diseases are brown spot disease and rotten tea buds. These diseases also have a relatively high frequency of occurrence during harvests (78.4% of the farmers said their tea fields suffered from rotten tea buds disease) and often result in many serious consequences. Large-scale households often suffer more severe damage than others because the diseases usually occur on a large scale; when a few plants are infected, the disease will spread to the whole hill, so large-scale households often suffer more damage.

For tea-growing households, the main capital source for tea production is the accumulation of saving small amounts. The survey results revealed that most tea-growing households faced financial risks or were always in lack of capital (answered by 73.3% of the

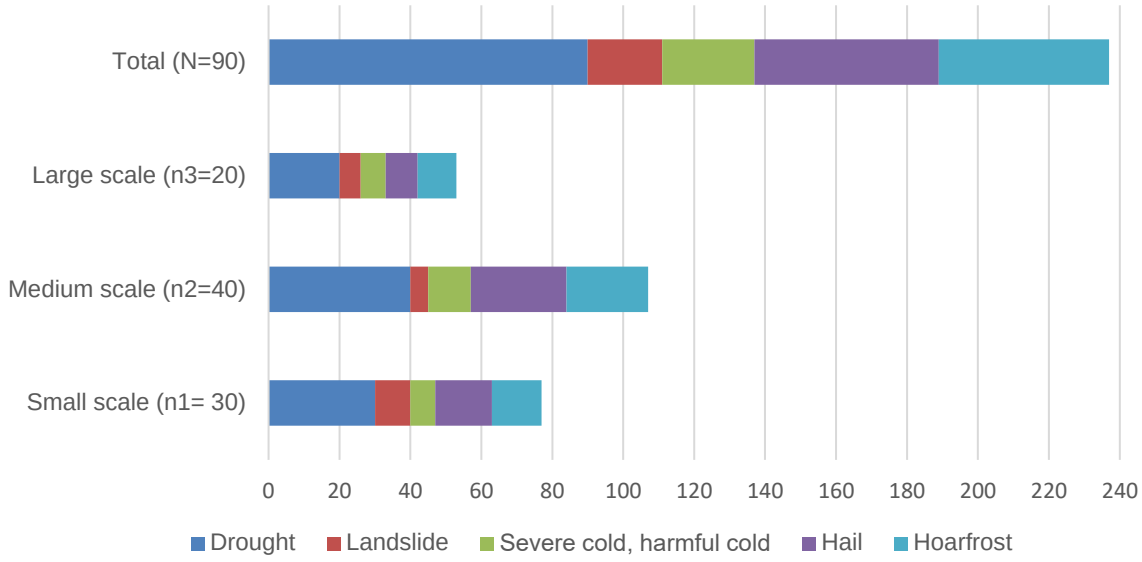

Figure 1. Observed natural disaster risks

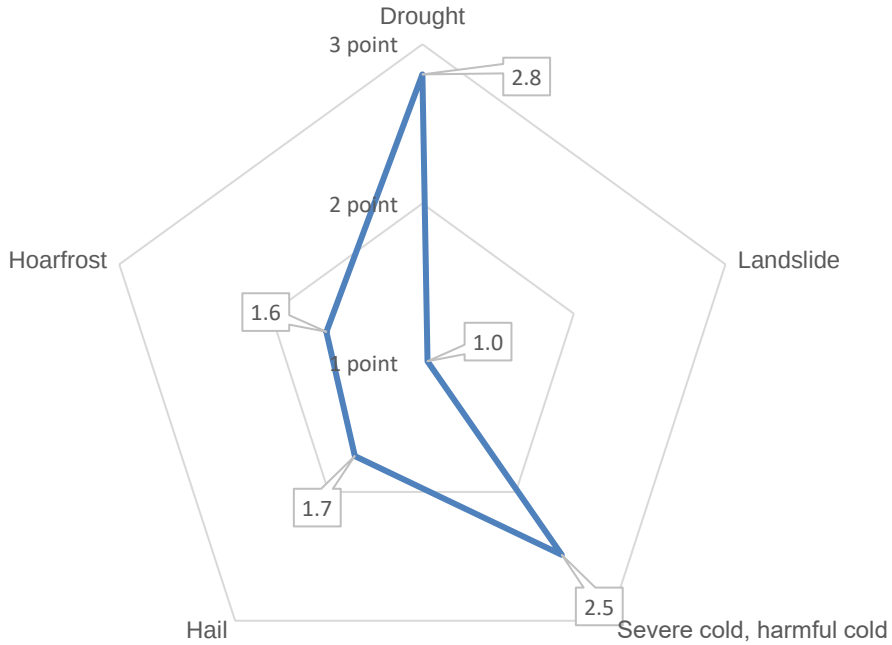

Figure 2. Frequency of natural disaster risks

surveyed farmers) (**Table 1**). For small-scale and medium-scale households who have no solid economic potential, only when tea is harvested and sold will they have money to purchase equipment and repay debts. Moreover, due to natural disasters or diseases, most of the cultivation households suffer from losses, making it difficult for them to rotate capital to expand their tea production. High-interest rates and cumbersome borrowing procedures were said to be the main constraints to their access to credit from financial institutions.

Besides production and financial risks, tea-growing farmers have also been facing market risks. Almost all the farmers (94.6%) said that they had often faced risks related to increases in input prices such as fertilizer prices and labor wages. Small-scale households often buy inputs in smaller quantities at unknown stores whereas large-scale households are able to buy in bulk, which creates a difference in input prices. When input prices fluctuate sharply, small-scale households will suffer more severe losses than large-scale households. The tea market is also embedded in other unpredictable risks to farmers. The situation of "good season - low price" is a frequent obsession of people. According to 97.3% of the respondents, the price of tea is not fixed and is dependent on market demand, meaning it can fluctuate up and down unexpectedly. Tea prices can drop sharply from 9,000 VND/kg to 6,000 VND/kg at any point in time. Moreover, 75.7% of the farmers said that they still had limited access to market information, and 10.8% said they could find no place to sell their tea products so unsold products hurt their business.

Overall, tea-growing households assessed that natural disaster risks occur most frequently, but losses from natural disasters were ranked as the second most common risk after disease risks. Ranked third and fourth in both frequency and severity were market risks and financial risks, respectively (**Figure 3**).

Strategies to deal with risks

Even though the government and the local authorities have taken several measures to support

Table 1. Occurrence of financial risks

Financial risks	Scale of tea-growing households							
	Small (n = 30)		Medium (n = 40)		Large (n=20)		Total	
	Number of HHs	%	Number of HHs	%	Number of HHs	%	Number of HHs	%
1. Is there a lack of capital?								
- Yes	23	76.7	29	72.5	14	70.0	66	73.3
- No	7	23.3	11	27.5	6	30.0	24	26.7
2. Reasons for the lack of capital								
- Loan interest too high	17	56.7	27	67.5	12	60.0	56	62.2
- Borrowing procedure is cumbersome	19	63.3	20	50.0	11	55.0	50	55.6
- Loan period is too short	23	76.7	10	25.0	7	35.0	40	44.4

Note: HHs means households

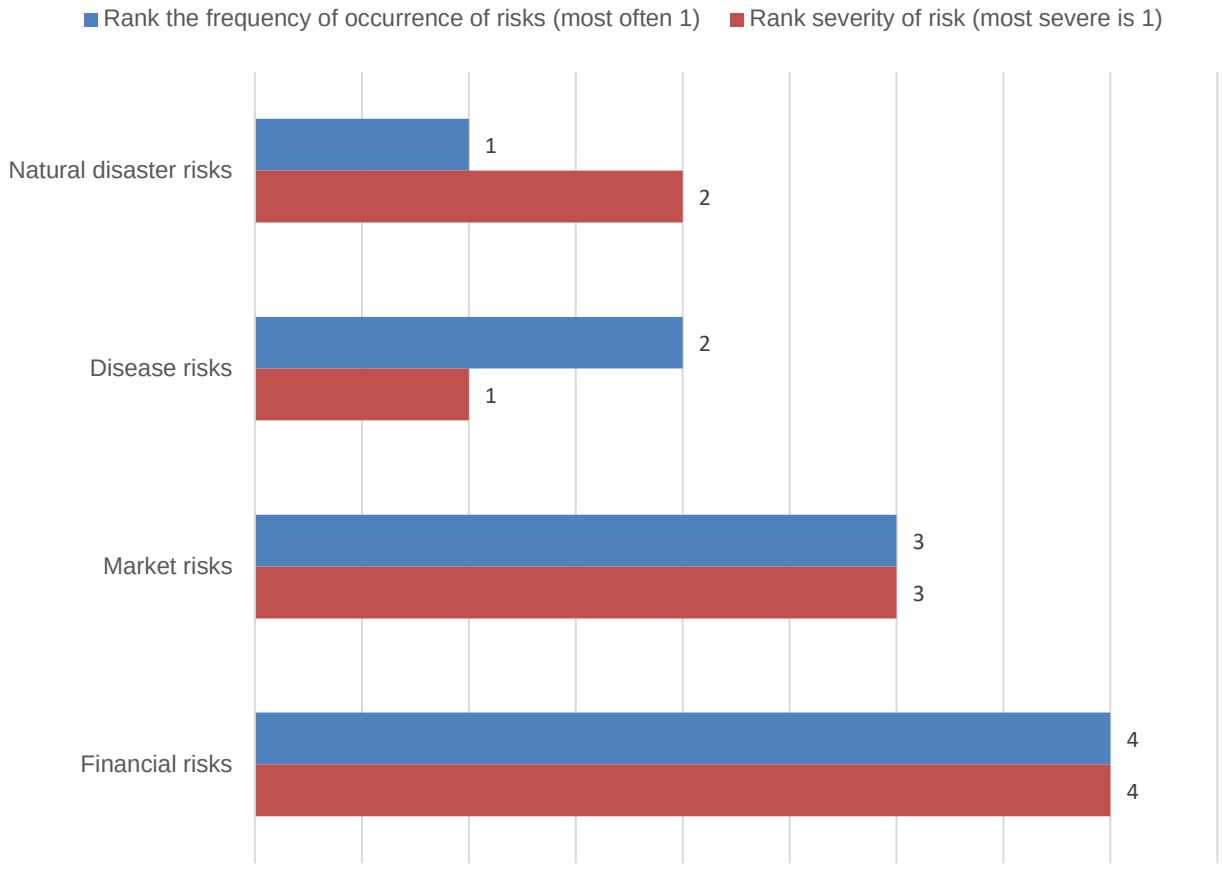

Figure 3. Risks assessment in tea-growing households

the development of tea production in the locality, the majority of tea-growing households are still applying unofficial strategies to mitigate and deal with risks as addressed by Paumgarten *et al.* (2020).

Tea cultivation households can perceive risks in many ways. Farmers take basic measures to avoid risks from unfavorable weather including intercropping trees and building water tanks as suggested by the local agricultural

extension officer. Intercropping trees has been promoted as a promising climate risk-reducing option in particular for low-input smallholders (Rusinamhodzi *et al.*, 2012; Brooker *et al.*, 2015). In Lung Vai commune, intercropping trees has proven to be the most effective measure (**Figure 4**). Most households in the commune have planted cinnamon and chinaberry trees, which create shade, help to keep the soil moist, help the tea plants develop well, and significantly reduce irrigation and fertilization costs. In addition, they also help create more income for households, ensure enough light for the tea plants to grow well, increase yield, and limit pests and diseases, especially red-brown spiders and green planthoppers, among others. This measure is favorable for small-scale and medium-scale households while large-scale households with stronger financial capacities often build water tanks in the nearby tea fields to collect and store rainwater for irrigation to avoid the risk of drought. The overall proportion of households building water tanks to store water for irrigation in this area is 65.3% which is much higher than the rate in other areas (Nguyen *et al.*, 2020).

The measures used by tea-growing farmers to prevent disease risks include spraying pesticides and clearing weeds around the tea plants. Spraying pesticides and herbicides is a simpler and more effective measure in the prevention of diseases in tea plants. However, this method is quite expensive, especially when farmers tend to switch from using chemicals to using biological and organic drugs. Therefore, only about 81% of large-scale households reported applying it, while the application rates in small-scale and medium-scale households were much lower at only 51% and 63%, respectively, in addition to also having lower spraying frequencies. In contrast, other methods are weeding and the clearing of tea stumps, which are used more often by these groups of households than by large-scale households because they take advantage of the household's laborers. Large-scale households tend to lack laborers so they have to hire people for these types of tasks, but the cost of hiring laborers is much higher than the cost of spraying. However, weeding seems to be a more sustainable method because it removes unwanted plants (weeds)

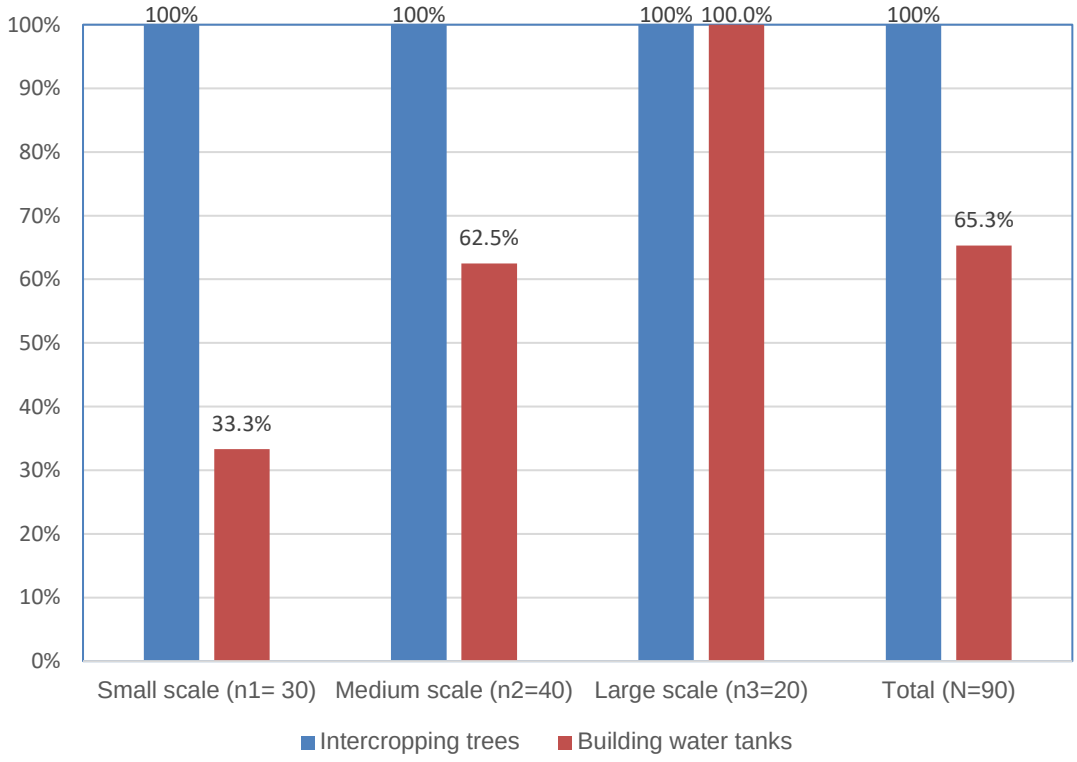

Figure 4. Coping measures to deal with natural disaster risks

while helping promote the growth of beneficial plants like grasses, which helps eliminate pests and diseases residing under the tea plants, and at the same time maintains soil moisture, prevents erosion, and increases the sources of nutrients for tea plants. In addition, it protects natural enemies such as predatory spiders, ants, and ladybugs while saving costs for tea farming households and fighting environmental pollution.

To cope with the financial risks, 56.8% of surveyed farmers said that they cut their daily spending to save money, and 67.6% of the households chose to borrow from local sources to enjoy preferential interest rates, loan periods, and loan amounts to be able to invest in tea production. Additionally, 78.4% of the households postponed nonessential activities such as suspending the expansion of their production scale and stopping the application of technical measures and new techniques to overcome their financial risks. These strategies are quite similar to those applied by farmers in Eastern and Southern Africa (Rahut *et al.*, 2021). However, most of the farmers claimed that the amount of money they could save or borrow from preferential sources was not sufficient for them to reinvest in tea production or to recover from losses when natural disasters or disease risks occurred.

Tea-growing households in Lung Vai commune seem to be more proactive in choosing measures to avoid market risks. Solutions that were chosen by the local households included reducing the amounts of fertilizer and pesticides; making their own organic fertilizers and pesticides; signing contracts with input agents and tea manufacturers; and selling tea to different collectors. Of which, the measure of reducing the number of inputs to cut down on production costs was widely applied in all three scales of production (about 83.3% of all the households). The second most popular measure was signing a contract with input-providing agents to enjoy lower prices and delaying payment. The third most popular one was selling tea products to different collectors to seek higher tea product prices. The measures of making organic compost and signing a contract with output consumers were the least implemented. It can be observed that small-scale and medium-scale households tended to choose unsustainable measures, while large-scale households tended to select more secure measures through contract signing with input providers and output consumers. Most of the large-scale households in this locality have signed production contracts with the Thanh Binh Tea Company to enjoy a more stable input and output source (**Figure 5**).

Even though agriculture insurance has not been implemented in this locality, to minimize losses, most tea-growing households have chosen to transfer or share their risks by participating share products group (83.8% of the surveyed households). Product-sharing groups work by following the principle that all farm household members will decide to sell their products together in batches to the same collector. Working as a group gives them more bargaining power so they can decide when to sell to receive the best price and avoid the pressure of unstable prices. Device sharing among production households has also been implemented as another risk-sharing measure. Households jointly contribute money to invest and divide amongst themselves to use different types of equipment to serve in tea production. In this type of group, large-scale households accounted for the highest proportion, followed by medium-scale and then small-scale households.

For many years, tea farming households have practiced community-based risk remediation measures. For households that have suffered a lot of damage and almost lost everything, other households have donated money to support them. Although the support is not much, it can contribute to helping vulnerable people overcome difficulties and recover from losses.

Discussion on solutions to improve the risk-coping capacity of tea-growing households

Tea-growing farmers in the research area have been very proactive and creative in taking measures to deal with risks in tea production as has been reported in households in other rural areas (Paumgarten *et al.*, 2020). However, the level of application of each measure depends on the capacity and resources of each household scale. Small and medium-scale households, with a lack of resources, often choose less expensive but also less sustainable measures

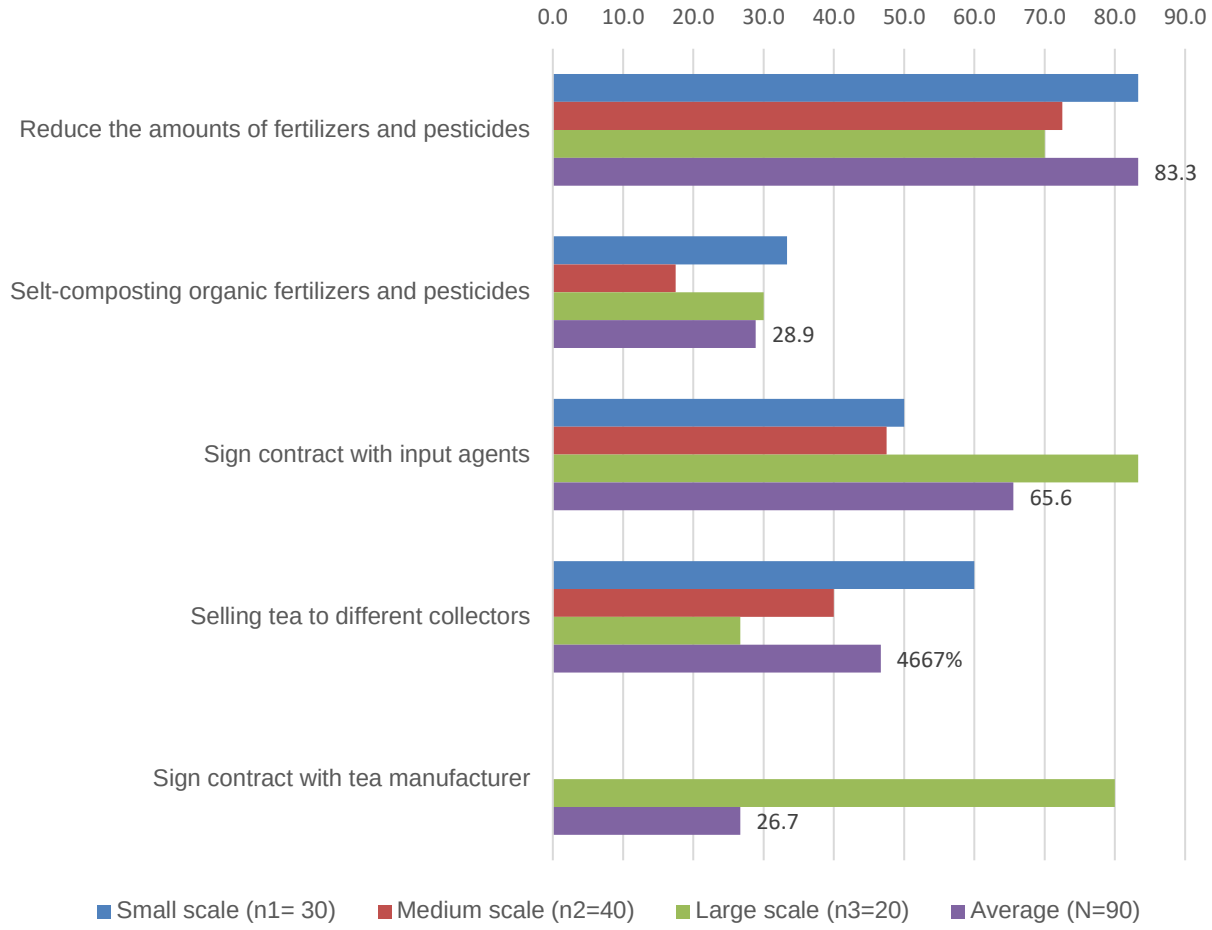

Figure 5. Percentages of households applying measures to cope with market risks

than large-scale tea growers. Linkage measures such as signing contracts with agents to supply inputs and consume output products have been applied and have contributed to stabilizing production for farmers. Community-based risk-sharing is a local innovation used to provide support in areas where there is no agricultural insurance policy coverage.

Lee & Lin (2022) addressed that people's perceptions and attitudes affect their responses to natural risks. Moreover, according to Aditto *et al.* (2012), De Silva & Kawasaki (2018), and Nayak & Manjunatha (2019), knowledge of the characteristics of risks that influence small farm households is the key factor that affects their practices to deal with risks. Therefore, it is necessary to enhance educational activities to provide sufficient and timely information to help improve the awareness and attitudes of tea-growing farmers. This would help them identify disasters and disease risks earlier and allow them to take appropriate coping and remedial measures. Local agriculture extension officers, Farmer Unions, and other local institutions with support from the local government should be proactive in providing such educational and training programs and campaigns.

According to the data presented herein, there are differences in the risk experiences and risk-coping practices among the groups of tea-growing households. Small and medium-scale households tend to suffer the most from risks due to their lack of production resources. Hence, the government and farmer support organizations, as well as beneficial partners or stakeholders who are involved in the tea value chain, should have better financial support mechanisms to help reduce risk occurrences for them (Nguyen *et al.*, 2020). With this support, tea-growing farmers can more easily access preferential loans for

investment in tea production for the application of modern and sustainable methods.

Moreover, it is especially important to build and strengthen the linkages among tea-growing farmers themselves and with other partners in the value chain to create a community-based risk remediation fund as a simple form of self-insurance in the locality (Nguyen *et al.*, 2020). With strengthened linkages, publicity, and transparency, all stakeholders in the tea value chain can easily access market information to ensure the stability of prices of inputs for tea production and the prices of tea products, which could help to reduce market risks for farmers.

Conclusions

Through studying the current situation of risks and how tea-growing households in the study area coped with risks, the following conclusions can be drawn: Firstly, tea-growing households frequently coped with risks due to different causes but the main risks come from natural disasters and diseases. Secondly, tea-growing farmers in the research area were very proactive and creative in taking measures to deal with risks in tea production. However, the level of application of each measure depended on the capacity and resources of each household scale. Small and medium-scale households, with a lack of resources, often chose less expensive but also less sustainable measures than large-scale tea growers. Linkage measures such as signing contracts with agents to supply inputs and consume output products were applied and contributed to stabilizing production for farmers. Community-based risk-sharing was also a local innovation in areas where there was no agricultural insurance policy coverage. To promote the sustainable development of tea production in this local area, it is necessary to enhance education activities to provide sufficient and timely information to help improve the awareness and attitudes of tea-growing farmers. The government and farmer support organizations, as well as beneficial partners or stakeholders who are involved in the tea value chain, should have better financial support mechanisms to help reduce risk occurrences for them. Moreover, the strengthening of the linkages among tea-growing farmers themselves and with other partners in the value chain should be crucially built up.

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References

Aditto S., Gan C. & Nartea G. V. (2012). Sources of Risk and Risk Management Strategies: The Case of Smallholder Farmers in a Developing Economy. In: Banaitiene N. (Ed.). Risk Management - Current Issues and Challenges: 449-474. Retrieved from https://www.intechopen.com/chapters/38993 on May 11, 2022.

Brooker R. W., Bennett A. E., Cong W., Daniell T. J., George T. S., Hallett P. D., Hawes, C., Iannetta P. P. M., Jones H. G., Karley A. J., Li L., McKenzie B. M., Pakeman R. J., Paterson E., Schöb C., Shen J., Squire G., Watson C. A., Zhang C., Zhang F., Zhang J. & White P. J. (2015). Improving intercropping: A synthesis of research in agronomy, plant physiology and ecology. New Phytologist. 206: 107-117. DOI: 10.1111/nph.13132.

Bui Thi Minh Ha, Nguyen Huu Tho, Nguyen Van Tam, Le Thi Minh & Le Thi Hong Phuong (2020). Risks in production of farmers in Tan Cuong area Thai Nguyen City. TNU Journal of Science and Technology; 225(01). Retrieved from http://jst.tnu.edu.vn/jst/article/view/2466 (in Vietnamese) on August 12, 2022.

De Silva M. M. G. T. & Kawasaki A. (2018). Socioeconomic Vulnerability to Disaster Risk: A Case Study of Flood and Drought Impact in a Rural Sri Lankan Community. Ecological Economics. 152: 131-140. DOI: 10.1016/j.ecolecon.2018.05.010.

Komarek A. M., Pinto A. D. & Smith V. H. (2020). A review of types of risks in agriculture: What we know and what we need to know. Agricultural Systems. 178. DOI: 10.1016/j.agsy.2019.102738.

Lee Y. J. & Lin S. Y. (2022). Effects of Perceptions of Climate Change and Flood Risk on Coping Behavior: A Case Study of Taipei, Taiwan. Sustainability. 14(289). DOI: 10.3390/su14010289.

Muench S., Bavorova M. & Pradhan, P. (2021). Climate Change Adaptation by Smallholder Tea Farmers: A Case Study of Nepal. Environmental Science & Policy. 116: 136-146. DOI: 10.1016/j.envsci.2020.10.012.

Muong Khuong Center of Culture, Sports and Information (2019). Lung Vai flourishes from the tea tree. Retrieved from http://laocaitv.vn/kinh-te-moi-truong/lung-vai-khoi-sac-tu-cay-che on May 9, 2021 (in Vietnamese).

Nayak J. M. & Manjunatha A. V. (2019). Farmers' Perception on Risk and Management Strategies in Mahanadi River Basin in Odisha: An Economic Analysis. Working paper 646. The Institute for Social and Economic Change, Bangalore.

Nguyen Ngoc Thuy, Bui Xuan Nha, Chan Minh Da Hanh, & Hoang Ha Anh (2020). Assessment of livelihood vulnerability index of small-scale tea producing households in Lam Dong province. Journal of Agriculture and Rural Development. 1(10): 122-132 (in Vietnamese).

Nguyen T. T., Nguyen T. T. & Grote U. (2020). Multiple shocks and households' choice of coping strategies in rural Cambodia. Ecological Economics. 167. DOI: 10.1016/j.ecolecon.2019.106442.

OECD (2009). Managing Risk in Agriculture: A Holistic Approach. OECD Publishing, Paris. DOI: 10.1787/9789264075313-en.

Paumgarten F., Locatelli B., Witkowski E. T. F. & Vogel C. (2020). Prepare for the unanticipated: Portfolios of coping strategies of rural households facing diverse shocks. Journal of Rural Studies. 80: 91-100. DOI: 10.1016/j.jrurstud.2020.05.013.

Rahut D. B., Aryal J. P. & Marenya, P. (2021). Understanding climate-risk coping strategies among farm households: Evidence from five countries in Eastern and Southern Africa. Science of The Total Environment. 769: 145236. DOI: 10.1016/j.scitotenv.2021.145236.

Rejda G. E. & McNamara M. J. (2014). Principles of risk management and insurance. Twelfth edition. New Jersey: Pearson Education, Inc.

Rusinamhodzi L., Corbeels M., Nyamangara, J. & Giller, K. E. (2012). Maize–grain legume intercropping is an attractive option for ecological intensification that reduces climatic risk for smallholder farmers in central Mozambique. Field Crops Research. 136: 12-22. DOI: 10.1016/j.fcr.2012.07.014.

Xuan Hien (2022). Lao Cai actively expands the area of tea trees. Retrieved from: https://doanhnghiepkinhtexanh.vn/lao-cai-tich-cuc-mo-rong-dien-tich-cay-che-a7205.html on April 22, 2022 (in Vietnamese).