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HOW TO FINANCE AGRICULTURAL ACTIVITIES IN MOUNTAINOUS AREAS OF VIET NAM? A CASE STUDY IN LAO CAI PROVINCE

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Abstract

Bui Thi Lam. (2020). How to finance agricultural activities in mountainous areas of Viet Nam? A case study in Lao Cai province (PhD Dissertation in English). Gembloux, Belgium, Gembloux Agro-Bio Tech, University of Liège, 196 pages, 39 tables, 40 figures, and 04 boxes.

Abstract

In the Northern Midlands and Mountains (NMM) region, the agricultural sector plays an essential role in the local economy because it is the main livelihood of the majority of the rural population. Among the factors influencing agricultural development, capital/financing has been becoming increasingly important because it affects the inputs used, investment in fixed assets, and the application of advanced technology. Unfortunately, the NMM region is the poorest area of the country, therefore, almost farmers here lack of capital to finance their agricultural production. This explains the reason why they still remain to be stuck in the cycle of chronic poverty: low investment, low productivity, low income. Moreover, several recent empirical studies reveal that agribusiness and other agriculture-based actors in Viet Nam also face with financial shortages. This study, therefore, examines financial demands of farmers and other farming actors in Lao Cai province as well as their constraints to access affordable credit to finance agricultural activities, and then, suggests feasible recommendations to increase funds to agriculture in the research site.

In this study, we approach the agricultural financial markets in Lao Cai province based on financial supply-side and demand-side analysis. On the supply side, 24 in-depth interviews with financial providers about their agricultural credit provision were conducted. On the agricultural finance demand side, we study two subclasses: (i) agricultural production by local farmers and (ii) the Seng Cu (SC) rice value chain, including production, processing, and consumption activities. At the general level, agricultural production, the study surveyed 193 farm households to determine their financial needs and their actual access to credit for agricultural investments. At the agricultural value chain financing analysis, we conducted 160 SC rice producers and 31 chain actors (small collectors, large collectors, and retailers). In addition, two econometric models are applied to determine the factors affecting the results of banking credit application of households; and, the influence of internal and external financing on SC rice production.

Our findings show that the financial sources for agricultural activities are diverse: formal sector (two state-owned banks: VBARD and VBSP); semi-formal sources (Farmers' Union, Women's Union); informal actors (moneylenders, friends, relatives), and direct Government's subsidies (Program 135, 30A and World Bank's Project). Compared to other financial providers, VBARD and VBSP have many advantages related to loanable funds, transaction points, and low-interest credit. However, credit provision of banks likely creates credit constraints to local farmers. Specifically, VBARD just devoted a small proportion (18.3%) of credit volume to farmers. In addition, VBARD's and VBSP's decision-making on disbursement strongly depends on assessments of local authorities, it is sometimes distorted by nepotism. In addition, credit services in terms of duration and repayment methods are not much improper, compared to clients' demands.

The survey of 193 farm households shows that a large proportion (84%) of the households have high credit demand because their own capital is not enough to finance their agricultural activities. Among farmers applied a loan at banks, 48% of them received nothing or smaller loans than their desires. They are mainly small and medium farmer households. Using the Multinomial Logistic Model (MLM), the study points out determinants of credit access of households: (i) lack of collateral; (ii) lack of good relationships with local authorities involved in application screening, (iii) low human capital (education/ethnicity). Difficulties in formal credit access, these farmers often fall into the following three actions: 1) reduce investment in agriculture; 2) using a large proportion of self-produced and low-quality inputs; and/or, 3) borrow money from informal lenders at very high interest rates. All these actions make agricultural production inefficient and undermine farmers' income. Arguably, although they are the beneficiaries of the preferential credit policy, they are often excluded from the formal credit market, which leads them still to be stuck in a vicious cycle of chronic poverty.

Likewise, the majority of actors participating in the SC rice value chain had high specific financial needs. SC rice growers received high-quality inputs and technical assistance from the input supplier (JVC) and the purchasing enterprise (TPC), which help them to reduce diseases, price, and market risks. Besides the advantage of SC rice's selling retail price, the linkages between chain actors contributed to the great potential of this value chain. However, banks still maintained the strict risk-avoidance strategy, which strongly depends on collateral of individual chain actors, not the entire chain. As a result, almost chain actors received lower-than-expected loans from banks, especially SC rice growers in uplands and TPC.

From the above research results, we can conclude that improving banks'

efficiency in credit provision and banks' participation in the chain are the first steps to improving the agricultural finance system in the research site. In addition, farmers and other chain members need to improve their production capacity and financial management in order to be assessed creditworthy by the bank. In addition, it is necessary to enact new legal regulations from the Government to encourage value chain financing models nationwide and to support the infrastructure system in mountainous areas. The coordination among four key players: producers, businesses, banks and the public sector is a comprehensive solution for agricultural finance in the research site.

Keywords:

Agricultural finance, agricultural credit, agricultural value chain financing, rice value chain, Lao Cai province, Northern Middle Mountain of Viet Nam.

Résumé

Bui Thi Lam. (2020). Comment financer les activités agricoles dans les zones montagneuses du Viet Nam ? L'étude de cas dans la province de Lao Cai (Thèse de doctorat en Anglais). Gembloux, Belgique, Gembloux Agro-Bio Tech, Université de Liège, 196 pages, 39 tableaux, 40 graphiques et 04 encadrés

Résumé

Dans la région des Midlands du Nord et les régions montagneuses du Vietnam, le secteur agricole joue un rôle essentiel dans l'économie locale car c'est le principal moyen de subsistance de la majorité de la population rurale. Parmi les facteurs influençant le développement agricole, le financement joue un rôle de plus en plus important car cela affecte l'adoption des matières premières, l'investissement dans les actifs fixes et l'applicabilité de la science et de la technologie. Malheureusement, cette région est la région la plus pauvre du pays, de sorte que la plupart des agriculteurs ici n'ont pas suffisamment de ressources financières pour soutenir leurs activités agricoles. C'est pourquoi ils restent coincés dans un cercle vicieux de pauvreté chronique: faible investissement, faible productivité, faible revenu. Compte tenu de la situation ci-dessus, le but de cette recherche est de trouver une méthode de financement efficace pour les agriculteurs en particulier et l'agriculture en général dans la zone d'étude.

Dans cette étude, nous abordons les marchés financiers agricoles sur la base d'une analyse de l'offre et de la demande financières. Du côté de l'offre, 24 entretiens approfondis avec des bailleurs de fonds sur leur offre de crédit agricole. Du côté de la demande de financement agricole, nous étudions deux sous-classes: (i) les agriculteurs locaux avec leurs activités agricoles et (ii) les acteurs participant à la chaîne de valeur du riz Séng Cu (SC) avec des activités production, transformation et consommation. Au niveau général, *la production agricole*, l'étude a interrogé 193 ménages agricoles pour déterminer leurs besoins financiers et leur accès effectif au crédit pour les investissements dans le secteur agricole. Dans notre recherche *sur le financement de la chaîne de valeur agricole*, nous avons étudié les besoins financiers de 160 producteurs de riz SC et de 31 acteurs de la chaîne (petits collecteurs, grands collecteurs et détaillants). En outre, des modèles mathématiques sont appliqués pour déterminer les facteurs affectant les résultats des prêts bancaires et l'influence des sources financières (intérieures et extérieures) sur la production de riz SC.

Les résultats de la recherche montrent que les sources de financement des activités agricoles sont diverses et sont fournies par: agent officiel (la Banque de

l'agriculture **et** du développement rural du Vietnam (VBARD) et la Banque de politiques sociales du Vietnam (VBSP); agent semi-officiel (Union des agriculteurs, Union des femmes); agence informelle (emprunts privés et emprunts auprès de parents) et *subventions directes du gouvernement* (Programme 135, 30A et Projet de la Banque mondiale.). Par rapport aux autres acteurs, les deux banques d'État (VBARD et VBSP) ont l'avantage de disposer de capitaux abondants, de lieux de transaction pratiques et de proposer des forfaits de crédit avec des taux d'intérêt bas. Cependant, les activités de fourniture de crédit des deux banques ont créé de nombreux obstacles à l'accès des agriculteurs locaux, en particulier, la VBARD ne représente que 18,3% de l'encours total du crédit pour les agriculteurs. De plus, les décisions de décaissement de la VBARD et de la VBSP dépendent fortement de l'évaluation des responsables locaux sur les ménages producteurs. Il a été démontré que leurs jugements peuvent être faussés par le biais du népotisme, c'est assez courant dans les régions rurales du Vietnam. Ensuite, les contrats de crédit à terme (court, long terme) et le mode de remboursement (une seule fois, le paiement de saison) ne sont pas adaptés aux besoins réels des agriculteurs.

Notre enquête auprès de 193 ménages agricoles montre qu'une grande partie (77%) des ménages ont un besoin élevé de prêts car leur propre capital ne suffit pas à financer leurs activités agricoles. Parmi les ménages qui demandent des prêts, 41% n'ont pas reçu ou reçu un prêt inférieur à leurs besoins. Ce sont principalement des ménages d'agriculteurs à petite et moyenne échelle d'investissement. ils sont confrontés à trois obstacles au crédit: (i) manque de l'actif hypothécaire; (ii) manque de bonnes relations avec les autorités locales, impliquées dans le filtrage des dossiers et la soumission bancaire; (iii) manque de crédibilité (éducation, compétence, ethnicité). Sans accès au crédit formel, les agriculteurs relèvent souvent des trois actions suivantes: 1) réduire les investissements dans l'agriculture; 2) utilise une grande partie des autoproduits et des intrants de faible qualité; ou / et 3) emprunter de l'argent auprès de prêteurs informels à des taux d'intérêt très élevés. Toutes ces actions conduisent à une production agricole inefficace et à une érosion des revenus. Dans la pratique, les ménages d'agriculteurs de petite et moyenne taille sont les bénéficiaires éligibles du crédit public subventionné du gouvernement mais ils sont souvent exclus du marché formel du crédit. C'est l'une des raisons pour lesquelles ils restent coincés dans un cercle vicieux de pauvreté chronique.

De même, la majorité des acteurs participant à la chaîne de valeur du riz SC ont une forte demande d'emprunt et diffèrent selon leurs activités. Les riziculteurs SC sont financés avant la saison, des intrants de haute qualité et des conseils techniques du contrat d'association de production avec la société d'intrants (JVC)

et la société d'achat (TPC). Cela aide les agriculteurs à réduire les risques liés aux ravageurs, aux prix et au marché. On peut dire que, outre l'avantage concurrentiel du riz SC en termes de prix de détail sur le marché, ces liens confirment le fort potentiel de la chaîne de valeur du riz SC. Cependant, les banques conservent encore une stratégie de prêt de couverture stricte - qui dépend fortement de l'actif hypothécaire de chaque acteur de la chaîne. En conséquence, la plupart des acteurs participant à la chaîne reçoivent des prêts bancaires inférieurs aux attentes, en particulier les riziculteurs SC dans la région montagneuse et PTC.

À partir des résultats de la recherche ci-dessus, nous pouvons conclure que l'amélioration de l'efficacité de l'offre de crédit et la participation des banques à la chaîne sont les premières étapes pour améliorer le système de financement agricole dans la zone d'étude. En outre, les agriculteurs et les autres acteurs de la chaîne doivent améliorer leur capacité de production et leur gestion financière afin d'être évalués par la banque comme solvables. En outre, le gouvernement a besoin de documents juridiques supplémentaires pour soutenir le développement du financement de la chaîne de valeur dans tout le pays et des investissements dans les infrastructures adaptés aux besoins du développement agricole dans la région montagneuse du Nord. Il s'agit d'un ensemble de solutions complet pour le développement de la finance agricole basée sur la coordination entre quatre acteurs clés: producteurs, entreprises, banques et gouvernement.

Mots-clefs : financement agricole, crédit agricole, finance rurale, financement à la chaîne de valeur agricole, chaîne de valeur du riz, province de Lao Cai, Nord du Vietnam.

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BUI Thi Lam

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List of Abbreviations

ADB	Asian Development Bank
AVCF	Agricultural Value Chain Financing
CIG	Common Interest Group
FAO	Food and Agriculture Organization
FSF	Farmer Support Fund
GO	Gross Output
GSO	General Statistics Office
GDP	Gross Regional Domestic Product
HH	Household
IC	Intermediate Cost
IFC	International Finance Corporation
IFAD	International Fund for Agricultural Development
LUC	Land Use Certificate
MARD	Ministry of Agriculture and Rural Development
MFI	Microfinance Institution
MLE	Maximum Likelihood Estimation
MLM	Multinomial Logit Model
MOLISA	Ministry of Labor, War Invalids and Social Affairs
NGO	Non-Government Organization
NMPRP	The Northern Mountain Poverty Reduction Project
PCF	People's Credit Fund
SFA	Stochastic Frontier Analysis
SLG	Saving and Lending Group
USD	United States Dollar
VA	Value Added
VBARD	Viet Nam Bank for Agriculture and Rural Development
VBSP	Viet Nam Bank for Social Policy (VBSP)
VND	Vietnam Dong
WACC	Weight Average Cost Of Capital
WB	World Bank
WDF	Women Development Fund

1.

Introduction

1.1 Background and problem statement

In Viet Nam, the agricultural sector contributes only to about 15% of the national GDP, while it is the main source of livelihood for approximately three-fourths of the rural population and over 90% of the poor (GSO, 2018). The recent empirical evidence emphasizes the importance of agricultural investment in developing countries, as a key driver of poverty reduction and a prerequisite for sustainable economic, social and environmental development (FAO, 2018; IFC, 2014; Nguyen, 2010; OI, 2013). Unfortunately, the majority of farmers in Vietnam lack of cash accumulation to finance their agricultural activities, which hinders them to exploit economic opportunities, improve their livelihoods, and eventually escape from their miserable lives and face with difficulty in credit access (Dufhues et al., 2005; Hoang et al., 2012; Yadav et al., 2015). Credit, therefore, plays a *sine qua non* role in enabling them raise agricultural investment, and then, enhance agricultural productivity and income.

The NMM region of Viet Nam is the largest agro-ecological zone and it also is the home to approximately 55% of the country's poor (GSO, 2017a). Under this general context, almost local farmers lack of capital to finance their agricultural production and obtain food security. In reality, many subsidized credit packages granted by the central government support to local farmers, which are disbursed through two state-owned banks, VBARD and VBSP. However, the national investigation (VHLSS 2016) with the sample size of 46,995 households living in 3,133 communes also highlights ineffectiveness of these financing sources in reaching local farmers and the poor in the NMM region. Among all of the obstacles to develop their agricultural production, financial shortage and difficulty in credit access is still reported the highest frequency, 56% in 2006 and 49.0% in 2016 (GSO, 2016). Thus, they have to struggle against various consequences regarding financial shortage. Obviously, it is an urgent need to have a better understanding about credit constraints of local farmers derived from both supply side, demand side and other relevant (f)actors.

Besides this, the approach of agricultural credit provision currently in Viet Nam, strongly depends on the Government's subsidies, also received much criticism from researchers and scholars (Quach Manh, 2005; Sauli et al., 2017; Tang et al., 2017; Thanh Tam, 2011; Zeller, 1994). In contrast, Agricultural Value Chain Financing (AVCF) is considered an interesting topic for agricultural development and has increasingly been applied worldwide, especially in developing nations and agriculture-based regions. Miller (2012) classifies and defines: internal financing refers to the financial sources occurring inside the agri-

chain among participants; while, external financing implies the funds derived from outside the agri-chain, whereby banks and other financial institutions create one-to-one relationships via contractual agreements with individual actors. In short, AVCF encompasses internal and external financing mechanisms, which create a financial and non-financial ecosystem to optimize the performance of chain actors.

With traditional credit provision, formal financial institutions cannot offer timely and sophisticatedly enough as the desires of farmers and chain actors. However, under AVCF approach, a diversity of funding can provide the tailored financial services to meet financial needs of almost chain actors (Miller & Jones, 2010). Besides this, small farmers, who is the weakest actor in the value chain, likely gain a greater share of value added and mitigate market risks to obtain stable income (Miyata et al., 2009; Olomola, 2010; Saigenji & Zeller, 2009). More broadly, AVCF also is able to tackle the environmental issues, that are being considered a weak performance to reaching the triple bottom line (economic, social and environmental) of green microfinance (Allet & Hudon, 2015). Unfortunately, litterature tells us that the application of AVCF in Viet Nam is still very limited and lack of systematic research in this topic in mountainous areas of the country.

Based on the theoretical and practical context mentioned above, the study on agricultural financing in mountainous areas of Viet Nam will be conducted to fill the gaps related to credit constraints and the effective approach of agricultural financing. The results of this case study would be in form of feasible solutions to the government in shaping effective agricultural financial sources that will contribute to sustainable agricultural development and increasing incomes of agriculture-based actors. In this study, Lao Cai – the 6th poorest province of the nation located in the NMM region – was selected as a case study. Being a border province with 25 ethnic minority groups, Lao Cai has special importance in social-economic-politic aspects in the region as well as the country.

1.2 Research questions

To answer the general question of the study is how to finance agricultural activities in mountainous areas of Lao Cai province, the study revolved around four research questions:

i. What are the financing sources for agricultural activities in Lao Cai?
ii. How do farmers in Lao Cai currently finance their agricultural production?
iii. How to finance effectively along the SC rice value chain in Lao Cai?

iv. What are reasonable solutions to improve credit access and achieve efficient agricultural value chain financing?

1.3 Research objectives

The study described the agricultural financing market in Lao Cai province by using supply-side and demand-side analyses, and then, identified promising lending provision for farm households and other chain actors. Specifically, the study addressed the following objectives:

- Describe the agricultural credit provision of financial providers in Lao Cai province;
- Analyze the current pattern of local farmers on how they finance their agricultural production;
- Examine the agricultural value chain financing of the Seng Cu rice chain in Lao Cai;
- Develop feasible recommendations to improve the credit access and to achieve efficient agricultural value chain financing in Lao Cai.

1.4 The scope of the study

The researcher mainly focused on credit services because of its importance to agricultural investment. Regarding other financial services, savings and insurance, this case study analyzed the potential that these services could offer to the target group in relation to the credit services.

In Lao Cai, agricultural producers include farm households, farm cooperatives and farm enterprises. Among them, farm households contribute approximately 90% of the farming output of the province. Thus, this study pay attention to farmers, as they represent the main group of clients at the demand-side of agricultural production. They are also the largest population group associated with agriculture and are a key contributor to the stability and prosperity of the entire province.

Concerning agricultural activities, the study approaches both two scopes: i/ agricultural production including cultivation and livestock produced by farmers; ii/ agricultural activities, which consist of agricultural production, processing, and marketing activities in Seng Cu rice value chain. Parallel with it, the financial demand-side analysis also encompass two main groups of clients: farmers with

their agricultural production; SC rice chain actors (e.g. SC rice producers and other participants) with their performance in the chain.

Regarding the agricultural product for the case study on the agricultural value chain financing approach, this study focused on the Seng Cu rice variety because of its fame and the economic interest for the growers. In fact, this rice often fetches the highest selling price in the national market.

1.5 General structure of the thesis

This thesis is organized in eight chapters. This first chapter, Introduction, sketches the background and problem statement of this study, as well as the research objectives. Chapter 2, Literature Review, describes the terminologies and findings from previous studies on agricultural finance and/or credit. Studies relating to the factors affecting the gap between the financial demand-side and supply-side are compared with and contrasted to provide insights in ways to narrow this gap. These resulted in the suggestion to analyze agricultural value chain financing as an approach to finance agricultural activities.

Chapter 3, Agricultural financial suppliers in Viet Nam, provides an overview of agricultural production and its financial sources in Viet Nam. Chapter 4, Research site, provides the main characteristics of Lao Cai province in terms of socio-political-economics and natural resources for the development of the agricultural sector. Chapter 4 also presents the Methodology, i.e. the various research techniques applied in gathering the data, and analyzing these in order to answer the research questions.

Chapter 5 presents the assessment of the financing system for agricultural activities in Lao Cai province. The chapter focuses on the credit provision of VBARD and VBSP through the lending portfolio, lending procedures and credit rationing. To assess the credit gap between supply-side and demand-side, Chapter 6 presents our findings on the financial demand of farm households and their formal credit constraints, and on the impact of credit access on agricultural production. The findings of these two chapters serve as basis in identifying a more effective approach on providing credit for the agricultural sector in the next chapter.

Chapter 7 examines the approach of credit provision namely agricultural value chain financing. Seng Cu rice value chain in Lao Cai was selected as a case study. Literature tell us under this approach specific credit demand of chain participants, especially farm households, are also met by both internal and

external financing in the chain. In order to help readers to visualize the lay-out of the study and the thesis, these are sequentially presented in Figure 1.1.

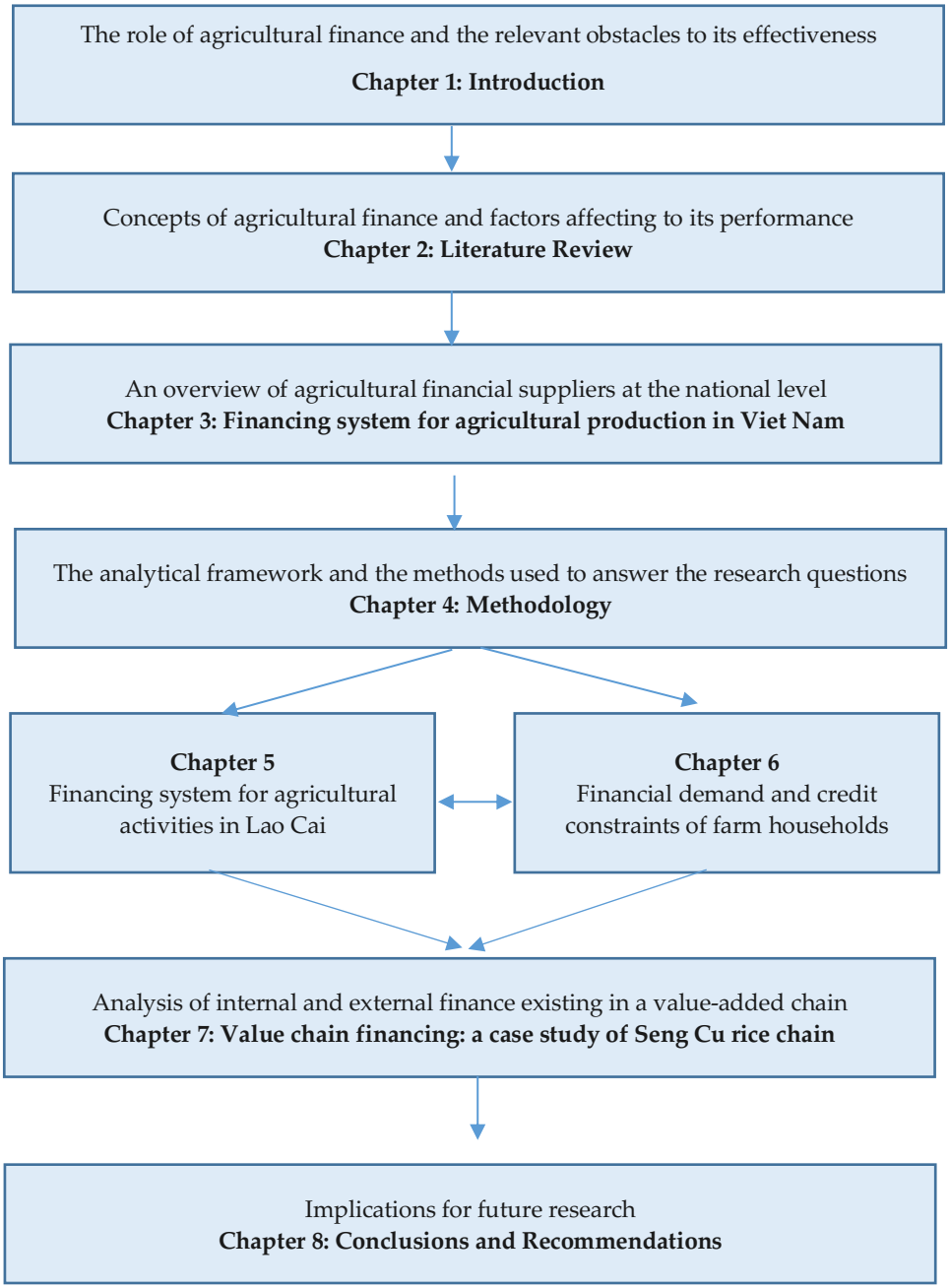


Figure 1.1: General structure of the thesis study

2.

Literature review

Next to the classification of several terminologies regarding agricultural finance and credit, this chapter has three main components. The second part aims to examine the characteristics of the agricultural financial markets in developing countries; in later chapters, these will be compared with the financial market in rural areas in Viet Nam (Chapter 3) and in Lao Cai (Chapter 5). The third section reviews the access to credit, i.e. its constraints and positive influences. This is the baseline for the analysis on the role of agricultural credit in the Lao Cai province, and is presented in Chapter 6. The fourth part of this chapter discusses three approaches on the financial provision for farmers in rural areas of less-developed regions and nations.

Based on the advantages and disadvantages for poverty reduction through agricultural finance, a mixed financial system seems more suitable for these economies. Several studies have demonstrated that agricultural value chain financing is an effective approach to provide tailored credit to the chain participants because of the combination of internal and external financing in the chain. Moreover, its performance supports not only the sustainable development of the agricultural sector, but also the economy as a whole.

2.1 The main concepts

2.1.1 Agricultural finance and agricultural credit

In this section, two concepts of agricultural finance and agricultural credit are distinguished, thereby determining the scope of the research.

"Credit" originates from a Latin word "Creditum" in mid-16th century with the senses "Belief", "Believe" and "Trust" (Oxford Learners Dictionary). Later, the word was used in borrowing transactions. Sunil Singh (2017) refers it to a temporary transfer of wealth (money, goods and services) from the lenders (e.g., those who have surpluses) to the borrowers, those who need and are able to use the wealth at the present in exchange for a promise to repay the same in the future.

Agricultural credit is defined in relation to different targets and scopes; it pertains to funds outside the farm sector that is granted for agricultural production (Sunil Singh (2017); it refers to any type of credit vehicles used to finance agricultural transactions (Jame Chen, 2018). This type of financing aims to meet the specific financial needs of farmers, as well as those of other actors in the value chain.

Agricultural finance has many definitions: it is the economic study on the acquisition and uses of capital in agriculture, and deals with the supply of and demand for funds in the agricultural sector of the economy (William G. Murray, 1980); it is a component of agricultural economics concerning financial resources at the individual farm level (Tandon and Dhondyal, 1962 as cited by Sunil Singh (2017); it aims to raise funds for the agricultural sector both at the micro and macro level (P. Raghuram et al., 2012). Macro-finance tries to handle the total credit needs of the agricultural sector and its enabling environment, while micro-finance focuses on the financial management of farming operations at the individual/household level.

Given the above definitions, agricultural credit and agricultural finance have many aspects in common. Both attempt to channel timely and adequate funds for the agricultural sector, and then, to have these used effectively by farmers and other agriculture-based actors. However, there is a small difference between these two concepts in terms of their scope. Specifically, agricultural credit focuses only on the *outside* funds granted for farming activities (e.g., a temporary transfer of wealth, including money, goods and services). These funds may come from banks, non-institutional financial organizations and money lenders, friends and relatives. Agricultural finance, meanwhile, takes interest in funds both from *outside* and *inside* (i.e., self-financing). In practice, recent studies conducted in developing countries often use these two terminologies interchangeably.

Since farming units in less developed countries are characterized by small holdings and low financial accumulation, their savings are inadequate to finance their agricultural projects and/or farming operations. Thus, providing an appropriate *outside* financing becomes the main task of agricultural finance. About 736 million people, comprising over 10 percent of the global population, live in extreme poverty ((World Bank, 2018b). Majority of them (80%) live in rural areas and acquire their livelihood from the agricultural sector. Moreover, small-scale farmers, who are managing less than 2 hectares of farmland, constitute 75% of this rural poor (CFS, 2015; HLPE, 2013; Rapsomanikis, 2015). In fact, the term "small-scale farmers" and the "poor" in rural areas are often used interchangeably, or in combination, without a clear classification.

Another difference between agricultural credit and agricultural finance relates to the range of financial services. Financial providers serve clients' demands for savings, credit, insurance, payment transfers and so on. Among them, banks have the largest range of financial services (CGAP, 2003;2012; Klein et al., 1999; Timberg et al., 2011). In many developing countries, governments support agriculture and rural areas through subsidized credit

provided by state-owned agricultural banks (Claudio et al., 1995). Thus, credit becomes an important service of agricultural finance providers, and is often termed as the *credit-based financing system* ((Schoombee, 1998).

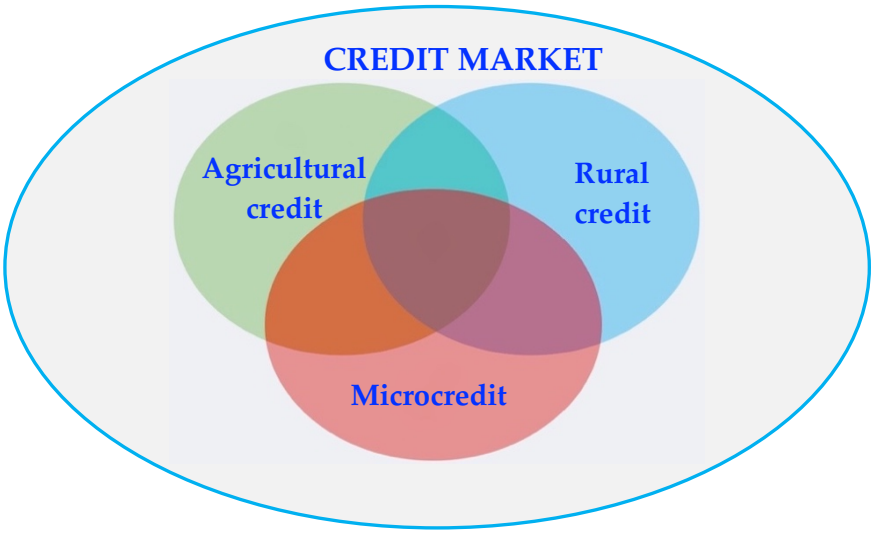
To answer the main question: "How are agricultural activities financed?", the study assesses three elements: (i) financed by farmers (i.e., inside financing or self-financing); (ii) financed by the agricultural credit providers (outside financing) and (iii) barriers hindering farmers to acquire loans.

2.1.2 Microcredit, rural credit and agricultural credit

Because of its importance to socio-economic development, agricultural credit has been the center of attention of numerous scholars, donors, policy-makers and private investors. They all agree that credit that is provided effectively to farming households and/or rural areas is a powerful tool to address agricultural development and poverty reduction. To be able to answer the question on "How to improve the credit provision in a given geographic area" and related issues, the market system boundaries need to be well-understood.

Figure 2.1 presents the overlap among three concepts: rural credit, microcredit and agricultural credit. *Microcredit* refers to loans of small amounts for the poor and vulnerable clients in society (CGAP, 2003;2012; Klein et al., 1999; Timberg et al., 2011). This credit service serves not only the agricultural production, but also the non-agricultural business purposes, consumption smoothing, social obligations and so on. *Rural credit* implies loans provided to clients of all wealth levels in rural areas, while *agricultural credit* emphasizes services mainly for funding agriculture-related activities, for example, input provision, production, processing and marketing. Thus, rural credit focuses on the location where the financial services are used, while agricultural credit highlights the kind of products which is invested in.

Agricultural production is conducted in both urban, peri-urban and rural areas under the urbanization context. Nowadays, urban agriculture within cities is also considered as an element of the agriculture sector. It deals with various socioeconomic issues, such as urban poverty, polluted environment, food insecurity and unemployment (Orsini et al., 2013). Urban farming has become more and more popular with sophisticated technologies, like hydroponic, aquaponics and vertical farming (Matthieu et al., 2018). However, in most developing countries with a low level of industrialization, particularly in rural areas, traditional farming methods still dominate this economic component.



Source: CGAP (2003)

Figure 2.1. The overlap three main concepts in the financial market

The systematic intersections of the three types of credit enable some clients (large-scale farmers and/or non-agricultural loan contracts) to easily access formal financial services. At the same time, in the same administrative regions, the vulnerable clients (the poor, small farmers, ethnic minorities and low skilled workers) face many obstacles in accessing formal credits that would enable them to seize economic opportunities and change their livelihood and social status. Furthermore, these overlaps create various difficulties in building a well-designed financial system, as well as proper credit services for clients in specific market segments.

The relationships between agricultural growth and poverty reduction have been intensely debated in recent empirical studies. On the one hand, many have questioned the role of agricultural growth in poverty reduction in many developing countries, because the share of agriculture in GDP has significantly declined. For example, in the last 50 years, the low performance of African agriculture has undermined the hope that economic growth and poverty reduction could be based on agricultural development (Collier et al., 2014). Smallholders obtained very low productivity, marketed a small percentage of their products and eventually earned incomes lower than that of the other sectors. Following this point of view, the authors argued that local farmers are able to escape from poverty through urbanization, i.e., migration out of agriculture, and/or a thorough transformation of the agricultural sector from small-scale to highly mechanized

large-scale farming (ibid). Keeping the food production and prices stable, may or may not, hinder the improvement of smallholder farm household's livelihoods. Of the 17 Millennium Development Goals, the two highest priority goals, Zero Hunger and Poverty Reduction, were reached by a downward trend in the world food price in the last three decades ((Timmer, 2010). For this reason, many national governments have reduced their attention on agriculture to support poverty reduction and rural development.

On the another hand, many empirical studies have indicated that agricultural investment is a crucial tool for poverty alleviation (Bravo-Ortega et al., 2005; Christiaensen et al., 2011; Loayza et al., 2010). Historically, studies confirm that agricultural investments and policy reforms have likely boosted the overall economic growth in the non-agriculture sector with a faster pace than in agriculture itself (Johnston et al. (1961); Schultz (1964)). In line with this argument, cross-country data analysis of household surveys conducted in Brazil, China, El Salvador and Czech Republic showed that the agricultural growth not only *directly* impacts on poverty reduction, but it also creates *indirect* effects through the interlink with non-agriculture activities (Christiaensen et al. (2006). More recently, several seminal studies have demonstrated that in most developing countries the impact of agricultural investment on poverty reduction is 2 to 3 times higher than that of non-agricultural activities (Christiaensen et al., 2011; Christiaensen et al., 2018). These results emphasize that enhancing agricultural productivity via the appropriate agricultural finance (i.e., credit) is a key entry-point for breaking the poverty cycle worldwide.

Additionally, in most developing countries, there is a great overlap between the smallholder agriculture and low-income population, and both of them mainly live in rural areas (World Bank 2018a). Therefore, in developing countries, agricultural credit and microcredit overlap and are inextricably linked to rural areas. This study conducted in Lao Cai, a poor agriculture-base province, therefore, agricultural credit, microcredit and rural credit are strongly connected each other. We examined financing sources for agricultural activities used by farmers living in rural areas with almost small loans, and, other relevant agricultural stakeholders in the chain (chapter 7) performing in both rural and urban areas with much higher credit volume.

2.1.3 The terms of "credit access" and "credit constraint"

Clearly, in the case of financial shortage, farmers need access to credit from financial providers, but they are not sure if they could borrow money. If they get a loan as desired, this can be considered as full access to credit; if, by contrast,

the credit demands of households are not satisfied, they suffer from "constraints to access credit" (Boucher et al., 2009; Dufhues et al., 2005; Duong et al., 2002; Linh et al., 2019; Quach et al., 2005; Wibowo, 2015).

Households face two types of credit constraints: the supply-side and the demand-side ((Boucher et al., 2009; Wibowo, 2015). The *supply-side constraints* come from the quantity-rationed strategy of lenders, in which all households get a loan size under a binding credit limit. In order to mitigate the repayment risk, lenders' loanable funds are attributed only to the best-paying applicants. The rest often falls into the category of unsatisfied clients, who get nothing or a loan amount smaller than what they asked for. Some supply-side constraints are similar to credit rationing, which is elaborated in section 2.2.3.

Demand-side constraints consist of three kinds: price, transaction cost and risk aversion. The price-rationed constraint refers to situations in which households do not apply for a loan because of the high borrowing interest rate compared to their expected profit. Other constraints are: inconvenient location of credit office, complicated procedures and latent costs resulting in an increase of transaction cost which undermines the desire of applicants. The third constraint is derived from the perspective of households about risks, i.e., households having a high level of risk aversion tend to avoid the credit for which a collateral, such as land, is required.

Client-related constraints are derived from a lack of physical, human and social capital (Dufhues et al. (2005). Among these, agricultural land is considered the most important collateral from borrowers that lenders use to decide on the size of a loan. Likewise, the lack of collateral and property right were identified as the major credit constraint in rural Pakistan, Rwanda, Uganda and China (respectively: Akram et al. (2008); Meyer et al. (2004); Muhongayire et al. (2013) Tang et al. (2017)).

Human capital is reflected through the skills, knowledge, education and health status of customers that relate to their non-repayment risk. Social capital is estimated from two components: households' social network and facilitations enabling them to overcome risk and other vulnerable circumstances. Social capital is also used by local authorities for credit screening. Under the lending group method of disbursement, social capital becomes the most important criteria affecting the decision-making of the lenders (Claudio, 2017).

Understandably, small farmers face a lot of barriers related to their socio-economic standing: low education, unskilled labor, non-valuable asset, low assessment from social network, even isolation among their community. For these reasons, many small farmers are excluded from the rural credit market

and/or become under-satisfied customers (Oluyombo, 2013). Consequently, they remain in the vicious cycle of poverty, thus illustrating the causality among low investment, low agricultural productivity, low income, low living standard and high vulnerability. Piot-Lepetit et al. (2014) argued that the lack of credit access is typically considered as one of the main reasons why the majority of the low-income population in developing countries remains poor and becomes poorer. Boucher et al. (2009) also indicated that credit constraints negatively affect the agricultural activities of unsatisfied farmer-borrowers through both their *ex-ante* and *ex-post* decision-making.

Besides the weak social-economic status of farmers, households' credit access also strongly depends on the lenders' assessment. From the supply-related viewpoints, formal financial intermediates often negatively perceive the agricultural sector and farmer clients, and associate them with high risks related to climate change, diseases and price fluctuation (Oliver et al. (2014). Klein et al. (1999) documented agricultural lenders' prejudices affecting strongly the farmer clients. For example, they see farm households are integrated into production and consumption units, which may induce heterogeneity of the financial needs and create difficulties in managing the approved loans. Such households are likely to reduce their aimed investment compared to the optimal requirement of the farming practices, leading to reduced yield and repayment capability.

In addition, various researchers have argued that agricultural lending obtains a small profit ratio due to high transaction cost, heterogeneity and sparse population (Dufhues et al., 2005; Duong et al., 2002). For the latter reason, lenders prefer to serve the urban and pre-urban dwellers and residents (Klein et al., 1999; Oluyombo, 2013). Generally, the poor and small-scale farmers face several credit constraints related to their social-economic status, and to how the formal banks negatively perceive about them. This study determined the obstacles of credit access of agriculture-base actors in Lai Cao province; and solutions suggested to mitigate these.

2.2 Characteristics of agricultural credit market in developing countries

Generally, the agricultural credit market is affected by three factors: supply, demand and market conditions (Mayo et al., 1998). This subsection analyzes the key features of the rural credit market for agriculture in developing countries based on both supply- and demand-side, as well as on its general contexts.

2.2.1 Rural financial market conditions in developing countries

❖ *Asymmetric information*

The "Lemons Principle" theory of Akerlof (1970) concerns the asymmetric information of buyers and sellers in the market. This theory estimates the cost of dishonesty existing in a market that is characterized by a mixture of both: honesty versus dishonesty and not-so-bad versus not-so-good products/services. The example used is lemon, on which honest sellers tell that its taste is sour, but the dishonest ones promise that its taste is sweet. The cost of dishonesty, therefore, includes not only the number and value of the purchases done under false pretense, but also the loss for society when legitimate businesses are driven out of the market. The better-informed market participants are the ones that gain the higher benefits. Lately, other authors have analyzed this concern under different names: the problems of 'adverse selection' and 'moral hazard' (Dembe et al., 2000; Jaffee et al., 1976; Mishkin, 2007; Stiglitz et al., 1981; Zeller, 1994).

Adverse selection is a situation in which one party (normally sellers) owns more information, or vice versa, before the transaction is concluded in order to gain higher benefits than others who have less accurate information. Moral hazard refers to a contract in which one side of a transaction deliberately takes additional risks that negatively affect the others who have to bear the cost of those risks. In other words, the people isolated from risk tend to behave inappropriately, compared to the people who are fully aware of the risks to which they are exposed.

The concept of credit is inextricably linked with trust; therefore, accurate information about the possibility of either success of the agricultural plan written in the loan application, or the payback transaction in the future, is the highest concern of lenders. Particularly in the rural credit market, the borrower has more information than the bank about (i) whether the amount of money taken from bank's loan is used for production (generating income and higher repayment possibility) or for consumption purposes (increasing the utility without income and very likely non-repayment capability); (ii) the probability of success of the agricultural business plan written in the loan application that tends to be optimistic. And, (iii) the tendency to respect their financial obligations, including the interest and the principal loan.

The lenders know about the borrowers' dishonesty written in the loan applications, but they cannot estimate exactly its probability. Consequently, the lenders also choose the best applications in accordance with their loanable fund. As a result, a high potential project may be rejected, while the much worse one

is funded by a bank (adverse selection effect). Both cases negatively impact on the banks' revenue and effectiveness and/or total welfare of society. Academic scholars call this situation credit rationing caused by asymmetric information, which discourages lenders to provide credit to risky projects with low capability of repayment.

❖ *The dichotomy of Agricultural versus Non-agricultural market*

General speaking, the agriculture sector plays a crucial role in many developing countries in terms of share of GDP and national workforce. In reality, as previously mentioned, most of the poor are living in rural areas and their livelihood dominantly involves agricultural activities. Other economic sectors in rural regions also depend directly and indirectly on farming activities through forward and backward linkages. Agricultural credit seems to have a central mission in boosting the agricultural sector and rural development. To fulfill this mission, it is necessary to clearly understand the characteristics distinguishing agriculture from the other sectors in the rural economy.

Five differences between agricultural production and other sectors may affect the effectiveness of credit provision:

(1) Location-specificity. Most of agriculture is produced in dispersed places, leading to higher transaction costs in reaching input and output commodities, and financial markets.

(2) Agricultural production often depends on natural conditions and requires (long) time. Most crop and animal production directly depend on climatic conditions and suffer from nature-related risks. In order to mitigate risk and achieve "smoothing consumption", farmers tend to maintain income-diversification strategies both on-farm and off- farm, and to stagger investment into seasonal crops versus perennials, and/or livestock. However, diversification may lead to loss of the advantages of specialization, while the poor tend to be the most diversified.

(3) Seasonality. Agricultural production is characterized by seasonality causing uneven and lumpy cash-flows: scarcity before harvest and surpluses after harvest. In order to better support farmers, agricultural schemes should be disbursed along with agricultural calendar.

(4) Highly volatile prices of agricultural commodities. Prices for agricultural commodities often exhibit large price fluctuations due to the temporary gaps between supply and demand which are related with the cropping stages, and the trade market. It implies that if farmers sell all their products on spot markets during harvesting time because of either

poor post-harvesting technologies or urgent cash need, their prices recieved are often low. Options to prevent this and to get higher profit for all are either to develop contract-farming, or post-harvest storage together with internal financing among the participants in the chain.

(5) Agricultural households are integrated production and consumption units. With regard to the loan's purpose, the most remarkable point is that farm households may use their loan obtained for other purposes than the intended purpose, like consumption, other production chains, or savings. In essence, the farm household's/family's finance is fungible between on-farm and off-farm activities, and borrowers can divert agricultural credit to other income-generating activities, or vice versa (Khandker et al., 2016; Klein et al., 1999; Quayes et al., 2008).

2.2.2 Rural financial clients and their financial demands

IFAD (2010) distinguishes three types of customers in rural credit markets, who have their own specific needs. Customers needing a working capital loan are: (i) individuals and households, (ii) on-farm production enterprises and (iii) off-farm enterprises. Focusing on the households, Zeller (2003) distinguishes two groups of household clients of financial services:

Better-off customers, who have higher income, are able to cope with several kinds of risks. These are larger farmers with large landholdings and other valuable assets; traders, owners of small agribusiness. Normally, they have land titles, buildings and other valuable assets as collaterals; therefore, they suffer from fewer obstacles to access formal financial services, including credit.

Poor and near-poor households, who live below the poverty line, have low resilience from vulnerability. They are smallholder farmers, seasonal laborers, tenants, first-level collectors and/or processors of agriculture products. Due to changes in season and low income, clients of this group have high credit demand for consumption smoothing and working capital for their agricultural investment. Besides this, they have a high need for insurance because of their vulnerability of frequent internal and external shocks. Most of this group does not have any traditional collateral, and the majority tries to use informal credit to safeguard food security and other basic needs. However, the group does not include the destitute people (or so-called the poorest of the poor), who have not enough social and other capital to become a member of the most poverty-targeted programs.

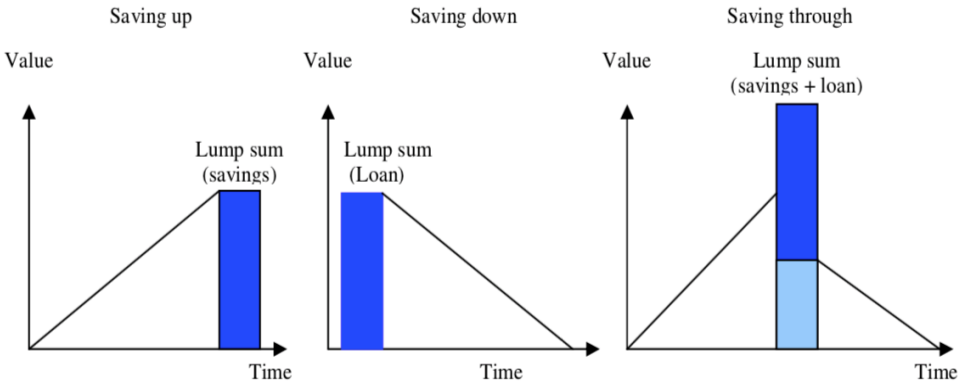
The most influential theories on the demand of credit, explaining the decision-making process of individuals or households choices for consumption, savings or borrowing are the "Permanent Income Hypothesis" (Friedman, 1957)

and the "Life-Cycle Hypothesis" (Modigliani, 1966; Modigliani et al., 1954). Both hypothesize that the consumption of individuals and households is rather decided upon the assumption of a permanent income during their entire lifetime over that of a temporary income. Thus, during their whole lifetime, people both borrow and save in accordance with their financial status being deficient or surplus, respectively. These financial services help the users obtain "smooth consumption" and maximum satisfaction even if their income changes day by day.

Many academic scholars and researches, hitherto, have also exploited these theories, in which the model of Lump Sum Money of Matin et al. (2002) is considered the most convincing argument explaining why and how the poor households and small farmers in rural areas need the financial services. Their explanation is based on the main assumption that they need the "lump sum" money (a large amount of money) at a particular time, when they have not enough at the present. Figure 2.2 illustrates the three cases of cash-flows corresponding to the financial services of farm households needed.

Saving up refers to a series of savings from now to a fixed date in the future in order to convert to a large sum comprising of principal and interest. In this case, the depositors want to purchase a high value asset that current income cannot afford in short time.

Saving down describes financial users who can purchase a high value commodity (large sum) even at present although their current income is insufficient. Simply, individuals or households take a loan from financial providers and make repayment until total financial obligations (principal and interest) are repaid.



Source: Matin et al. (2002), quoted by Quach Manh (2005)

Figure 2.2: Three alternative cases of financial demands of rural customers

S*aving through* is the combination of the two ways mentioned above, in which the financial users make savings at the first phase and loans for the second one. The amount of money "lump sum" is acquired at a middle point in the financial contract.

In the light of the above arguments, ADB (2000) also concludes that small farmers in rural areas have a high financial demand because they have difficulty in saving up. Box 2.1 indicates their need for basic financial services, including credit, saving, insurance, which can improve their economic activities and well-being. The question is how accessibility, outreach of financial services and its effectiveness can be enhanced.

Box 2.1: Financial demands of poor households and small farmers

The poor households and small farmers in rural areas have high demand for microfinance services including:

Credit: working capital in accordance with agricultural production; both of occasional loans to meet urgent demands such as education, health and other lumpy expenditures like housing improvement, buying transporting mean, etc.

Saving: safe, liquid, and convenient requirement as their deposit

Insurance: the more risks faced by farmers, the more insurance farmers need to buy, especially in livestock.

Source: adapted from ADB (2000)

2.2.3 Typology of rural lenders and credit provision of formal sectors

The coexistence of a wide variety of rural lenders is well-documented in previous studies (Barslund et al., 2008; Dufhues, 2007; Klein et al., 1999; Le Thi Minh et al., 2012; Madestam, 2014; Quach Manh, 2005; Sauli et al., 2017; Tang et al., 2017; Thanh Tam, 2011; Zeller, 1994). Table 2.1 gives an overview of four types of lenders: formal, semi-formal, informal, and those interlinked in the value chain, such as, input suppliers, collectors and traders. Despite the lower interest rates of formal lenders, borrowers face a lot of challenges to access formal credit because of the lack of reliable information and credit distribution performance of these financial institutions.

Hodgman (1960) stated theoretically that *Credit rationing* is a phenomenon due to economic reasons, such as "the interest rate, risk, possible benefits of a long-term customer relationship". Later, various researchers pointed out that credit rationing takes place in the monopoly market when a large set of borrowers' desire to finance their investment projects, while the lenders' fund is limited. In that case, the lenders have the special rights to screen and select the best customers in order to achieve the profit-maximizing scheme. This decision making is based on the lenders' assessment of the borrowers' repayment risk (i.e. probability of default), as well as whether, or how much the demand has exceeded the need (Jaffee et al., 1990; Jaffee et al., 1969; Jaffee et al., 1976). Furthermore, Stiglitz et al. (1981) and Stiglitz (1990) argue that *information asymmetry*, in which borrowers have much more information about repayment risk at given lending interest rate, causes the necessity for lenders to ration the credits.

Table 2.1: Typology of rural financial providers

1. Formal sector
o Agricultural development banks
o Rural branches of commercial banks
o Co-operative banks
o Rural community banks
2. Semi-formal lenders
o Credit unions
o Cooperatives
o Village or semi-formal community banks
o Non-Government Organizations
3. Informal lenders
o Rotating savings and credit associations
o Moneylenders
o Relatives and friends
4. Interlinked Credit Arrangements
o Input suppliers
o Crop buyers
o Processing industries

Baltensperger (1978) and Gonzalez-Vega (1984) point out a second mechanism of credit rationing, that contrasts to the first mentioned above, which is price-related. It relates to loan contracts (i.e., non-price rationing) such as loan size, collateral and borrower's equity at given the nominal "effective" loan rate. In light of this argument, Rosen (1974) suggests the lender should widely diversify its portfolio of products in accordance with (hedonic) pricing, because the profit-maximizing achieved is connected not only to the quantity purchased, but also to all the relevant quality characteristics of the competitive buyer, i.e., borrower. In this case, poor rural households cannot access credit; this is called the involuntary exclusion (Demirgüç-Kunt et al., 2008; Dufhues, 2007; Zeller, 1994).

Petrick (2005) presented six methods of measuring the extent of credit rationing: (i) direct measurement of loan transaction costs, (ii) qualitative

information collected in interviews, (iii) credit limit concept, (iv) spill-over effects, (v) econometric household modelling and (vi) econometric analysis of dynamic investment decisions.

Among these methods, the four earlier approaches use observations carried out directly in the field, while the two remaining ones use indirect analysis by econometric modelling of the consequences of credit allocation. To capture credit rationing, this study used both quantitative and qualitative analysis in accordance with, respectively, the second and fifth methods. More specifically, the Multinomial Logistic Model (MLM) is used to estimate the probability of an applicant getting a loan from the bank and the determinants affecting their credit rationing (i.e., fully refused, partly received and fully received). This mixed approach was also used by Baydas et al. (1994) and Zeller (1994).

Besides credit rationing, the *lending methods* also affect directly the credit provision to small farmers in rural areas. Typically, rural banks use two ways of disbursements: group lending (i.e., community-based groups) and/or individual lending. In order to receive a loan through the lending group method, generally, a small farmer has to (i) join the credit and savings group (CSG) and (ii) has received a good assessment by the head of CSG, as well as by local authorities (borrower screening). In other words, the better the local relationship a borrower has (which might not be consistent with her/his agricultural production capacity and repayment risk), the higher the probability s/he gets a loan (Dufhues, 2007).

The lending group is considered a suitable way to provide credit for low-income and small farmers, who often have no or low physical capital as collateral. This method helps lenders to mitigate repayment risk and enforce the borrower's financial obligations through the peer-review screening and the community pressure. This method, therefore, allows to significantly reduce the transaction cost for both of lenders and borrowers (FAO, 2017; Klein et al., 1999). However, the lending group method is criticized in terms of the borrowers' reach and lender's effectiveness.

As mentioned above, the social capital of borrowers plays a crucial role in the screening process of a loan, as the clerks seldom conduct field trips to gather reliable information about applicants before disbursing a loan. They strongly depend on the assessment of the head of CSGs about each applicant. Unfortunately, nepotism and opportunism are relatively widespread in developing countries (Dufhues et al. (2002) and Okae (2009). Therefore, the CSG's assessment, may or may not, be biased and distorted in order to orient loans to their relatives or whoever they like, and to benefit through their social network.

Claudio (2017) observed that lending group assessments lead to difficulties for bank officers to evaluate applicants (i.e., they "look the same") and to make the right decisions on credit disbursement. Apparently, the information about the borrowers gradually get weaker towards the top of the decision-making pyramid. In many developing countries, the governments provide, often through special banks or other institutions, subsidized credit packages to support farmers and agricultural growth (Claudio et al., 1995; Elizabeth, 1998). These are called 'preferential loans' and often given as specific credit packages. Unfortunately, information on preferential credit packages is also weakened, and sometimes deliberately distorted, from agricultural development banks to local authorities, and then, to eligible beneficiaries. Thus, the need for formal financial providers to participate more frequently in the assessment of borrowers in order to achieve the twin goals of poverty reduction as government's mandate and financial sustainability.

Using cross-country data, the work of Klein et al. (1999) pointed out that commercial banks prefer serving urban clientele to rural ones. Four reasons given in Table 2.2, among others, contribute to why banks likely neither voluntarily establish rural branches nor develop specific financial services for the poorer households living in rural areas. Overall, providing financial services in the rural market suffers from higher transaction cost, higher risk, lower profitable ratio and more difficult in work with local authorities. Perhaps, these may explain why the twin goals of poverty reduction and agricultural development, through the expansion of credit provision, have not been achieved yet as expected. Germidis et al. (1991) explains the reasons for these policies include weak legal institutions and low income of borrowers.

Given the policies of formal credit suppliers, the farmers, consequently, approach the informal credits as an alternative source to finance their agricultural investments. In the past decades, informal lenders have received negative assessments because of their *usurious interest rates*. Looking on the bright side, the borrowers are able to tackle their urgent needs (health, education, diseases in agricultural production, etc.) by informal credit, which seem better than not being able to deal with their troubles (FAO, 2017).

In addition, current findings stress several positive changes in informal lender's performance in terms of loan purposes, such as simple procedure, quick disbursement and lower interest rate (Diagne et al., 2000; Dufhues, 2007; Klein et al., 1999; Madestam, 2014; Zeller, 1994). Varghese (2004) indicates the crucial role of such moneylenders in the socio-economic development at the household level as well as the rural community. He emphasized the advantages of

moneylenders in getting accurate information, well-estimated risks and effective enforcement in the financial obligations of borrowers. Based on these, some researchers suggest the *bank-moneylender linkage* as the key tool in order to: (i) overcome the disadvantage of the informal sector (e.g., limited loanable fund), (ii) increase the competition and develop the rural financial market and (iii) better serve rural clients (Dufhues, 2007; Madestam, 2014; Varghese, 2004).

Table 2.2: The dichotomy of rural versus the urban financial market

1. Higher transaction costs (for both borrowers and lenders)
i. Lower population density and wider spatial dispersion of markets and institutions ii. Lower level of infrastructure of communications, roads, education, etc. iii. Lower level of access to information, education, and business training.
2. Higher systemic risks, more volatile cash flows, and complex legal frameworks
iv. Lower degree of income diversification in the rural economy; v. Higher covariant weather risks affecting not only agricultural sector, but also the rural economy as a whole; vi. More costly and time-consuming enforcement of formal laws on collateral and titled land.
3. Lower risk-bearing ability and higher vulnerability
vii. Higher incidence of poverty and larger percentage of female-headed households due to male rural-urban migration; viii. Lower level of human capital due to lack of access to basic services, like education, health care and social assistance.
4. Lower commitment of politicians to rural areas
ix. Lesser attention given by politicians to rural areas because these are far away from their lobbying networks, and usually, the rural folks are usually not an effective pressure group. x. More urban-biased (e.g., ruling classes and/or better-off households) legal frameworks and per-capita investments.

2.3 The approaches to agricultural credit provision

At present, throughout the developing countries, credit for rural farm households is provided within two approaches: *poverty reduction* and *finance system.* They are different in terms of their performance, financing source, targeted clients and outcomes. This section analyzes the main differences in credit provision of these two approaches, and then, suggests a more suitable model of credit provision, especially for billions of small farmers in developing countries.

2.3.1 Poverty reduction approach

Since the early 1970s, the new technologies and commercial seeds used in the green revolution have required high investment, which small-scale farmers could not afford through self-financing. Without access to formal credit, the small farmers tend to fund their financial needs for emergencies via a wide diversity of informal sources, such as community-based financial arrangements, moneylenders, relatives and friends. Informal credit, in particular from money lenders, is characterized by high interest rate. Borrowers, therefore, are still stuck in debt burdens and poverty.

To enable these investments, funds from governments and various sponsors were poured into agricultural development banks and projects that, in their turn, granted subsidized credit to small farmers for specific agricultural production plans (Brau et al., 2004; Klein et al., 1999). The agricultural development banks' performances, therefore, strongly depend on subsidies of government and donors (but not all). Normally, their kind of credit service is characterized by low interest rates and non-physical collaterals (Dufhues, 2007; Quach Manh, 2005; Sauli et al., 2017).

The large-scale provision of this easily accessible credit was considered a central mechanism of the agricultural development strategies in each region or country (Klein et al., 1999). It was expected that improved credit access could enhance technology adoption and increase agricultural production in terms of quality and quantity, and thus, improve farmers' income and other socioeconomic issues in rural areas (ibid). In some cases, the larger access of the poor to preferential credit can indeed be linked to lower poverty rates.

However, on the other side, because of low interest rates, the demand for credit is always likely to exceed the loanable funds of formal providers. Consequently, lenders create non-price obstacles to allocate their available funds

and exclude the poor and the smallholder farmer clients. Hodgman (1960) called this "credit rationing" and other authors (Demirgüç-Kunt et al., 2008; Dufhues, 2007; Zeller, 1994) called "involuntary exclusion of the extremely poor". Kozel (2014) also stated that poverty alleviation in developing countries has been more and more difficult for lack of suitable ways to reach the poorer people and lift them out of poverty.

Typically, there are two dimensions to measure the performance of a particular microfinance institution (MFI): breadth and depth of outreach (Shakil, 2011); these measurements can also be applied to other rural financial institutions. The *breadth* (i.e. coverage) refers to the total number of clients served by the financial institution. The *depth of outreach* is measured by the proportion of the poorest of the poor reached, wherein, the poorer the engaged borrowers are, the greater is the depth of a financial institution. Thus, the financial self-sufficiency of lenders, which is understood as the lender's performance without external subsidies, is ignored (Brau et al., 2004). Moreover, the effectiveness of subsidized credit in improved agricultural productivity and income of farmers also seem not to be attended to.

Briefly, the poverty reduction approach with heavily subsidized credit suffers from criticisms of many scholars (Claudio, 2003; Dufhues et al., 2005; Hollis et al., 1998; Quach Manh, 2005; Sergio et al., 2000). They have shown that subsidized loan agencies are more fragile and have obtained lower effectiveness, i.e., are less sustainable than the unsubsidized units that are funded through depositors of savings. These subsidized credits have not been very successful in terms of depth of outreach, e.g., the extreme poor are still excluded from the formal credit market. Furthermore, the increasing debt burden of the public sector derived from subsidies would also require another approach of credit provision which would tackle similar concerns and better support for smallholder farmers.

2.3.2 Financial system approach

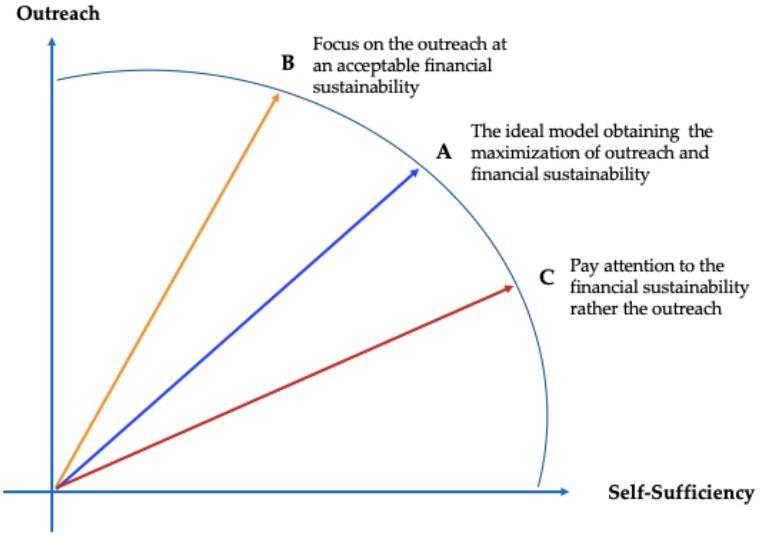
In the early 1990s, there was a transformation of financial development from the non-market approach which focused on the subsidized credit-based provision Schoombee (1998) to market-oriented approach. This new approach aimed to provide credit services to the disadvantaged citizens in society without a direct subsidy of governments and donors. The conceptual foundations of this approach are supported by researchers from the Ohio State University's Rural Finance Program. They found that the reasons for failure of most rural credit agencies in several developing countries were "lack of institutional viability" (Claudio,

1994), and they focus on the financial sustainability as the only crucial indicator for successfully providing credit service to the poor (Brau et al., 2004; Kumar, 2012).

This market-oriented approach is inextricably linked to financial liberalization; it requires new concepts and methodologies to enable financial self-sufficiency without subsidies (Quach Manh, 2005). The main innovations are: (i) lending technologies that reduce transaction costs and repayment risks; (ii) using social collateral instead of physical one; (iii) client-focused portfolio of services and products that tailor to the diversified demands, especially that of the poor and small farmer clients; (iv) interest rate based on reasonable profit; (v) well-managed information systems and (vi) specialized staff training and their higher effectiveness (Brau et al., 2004; Claudio, 2017; Quach Manh, 2005; Zeller, 1994). Under ideal conditions, comprising inside and outside factors, the financial system was able to achieve, not only financial sustainability but also high and deep outreach. It means that both lenders and borrowers obtain high benefits from participating in the rural credit market. However, it is rare to establish the perfect conditions.

In order to achieve sustainability, the MFIs have to (1) set the interest rate high enough to cover total operational costs and develop the value of its equity in long-term; (2) pay adequate savings interest rates to encourage voluntary savings that can increase the loanable funds; (3) maintain minimum administrative costs through efficient lending techniques and well-managed information systems to support screening of borrowers, processing loans, collecting debts and mobilizing savings; (4) improve continuously their transparency on majority of their activities to make the finance system an attractive unit for investors and donors (Kumar, 2012; Yaron, 1992). Obviously, the institutional sustainability perspective heavily focuses on the supply-side of finance, whereas, the poverty lending advocates mainly concentrate on the demand-side aspects of financial development as well as its impacts on rural wellbeing (Kumar, 2012).

Many empirical studies ((Hermes & Lensink, 2011; Quach Manh, 2005; Rahman et al., 2002; Robinson, 2001; Von Pischke, 1996)) show that there is a trade-off between financial self-sufficiency and the outreach of subsidized credit programs (Figure 2.1)



Source: Author's illustration adapted from Quach Manh (2005) and Robinson (2001)

Figure 2.3: The trade-off between financial sustainability and outreach

Note: Direction A is likely the best model obtaining the twin goals of the financial outreach and self-sufficiency. Direction B pays more attention to the outreach (maximum credit access), while direction C focuses on the goal of profitable ratio, leading to the financial exclusion of many poor people and smallholder farmers.

According to Hudon (2010), the subsidies are able to increase the quality of credit service, but do not affect the conditions of the loan contracts nor the coverage and accessibility of the poor. In addition, D'Espallier et al. (2013), examining the effectiveness of 23% of the global unsubsidized microfinance institutions, identified several strategies to obtain financial self-sufficiency. The main tools are: higher interest rates, restriction of the accessibility of the poorer clients and female customers. Consequently, the disadvantaged citizens cannot access credit and improve their livelihood through loans for new productive opportunities to escape their poverty trap. While financial self-sufficiency is important, the primary objective of microfinance remains alleviating poverty and empowering the poor and other disadvantaged people in society. Given their tools for self-sufficiency, these microfinance institutions seem to ignore their priority.

To sum up, the two approaches to agricultural finance differ widely in terms of targeted customers, operational modalities as well as characteristics of loans being transacted (Table 2.3). However, they have one problem exisiting in common: small farmers are often excluded from the formal financial markets, including credit.

Table 2.3: Main differences between two these approaches

	Poverty reduction approach	Financial market approach
Sources of funds	Governments and donors	Mostly voluntary deposits
Subsidies	- Many subsidies (interest rates, loanable fund, …) - Weak, passive and subsidized-based institutions	- No or few subsidies - Active and independent institutions
Main target	Outreach	Sustainability
Targeting clients	Almost poor borrowers as beneficiaries	Larger range of customers: borrowers and savers; rural and urban; on-farm and off-farm
Feature of loans	- Subsidized interest rate - Limited loan size	- Market-based regulations - High borrowing interest rate due to high risk, high transaction cost
Range of services	Focus on subsidized credit	Diversity of services (credit, saving, transfer money, insurance)
Problems existing	- Difficulties in management; - Exacerbating budget deficits; - Exclude the poor because of opportunisms and corruption.	Exclude the poor and small scale farmers due to lender's prejudices and high interest rate.

Source: Authors' synthesis based on Le Thi Minh Chau (2014) and Quach Manh (2005)

2.3.3 Value chain financing approach

Overall, the two approaches to agricultural finance mentioned above differ widely in many aspects. The traditional one, supported by donors and state, aims to provide subsidized credit to poor households, while the new approach, based on savings, focuses on the active households or near-poor households (Le Thi Minh Chau, 2014). The new approach argues that delivering loans to the poorest of the poor is likely harmful to both the borrowers and lenders because these targets lack basic physical asset and income-generating opportunities, that reduce their ability of repayment (Claudio, 2017; Le Thi Minh Chau, 2014). Arguably, innovative financial approach is needed to reach the poorest of the poor and boost the smallholder farmers within the agriculture sector. Thus, a combination of the two approaches above is likely applicable in developing countries like Vietnam ((Duong et al., 2002; Quach Manh, 2005).

As mentioned above, providing affordable credit services plays a crucial role in the achievement of poverty alleviation and agriculture development. These

approaches have many draw-backs on demand-side and/or supply-side that hinder smallholders' access to formal loans for productive opportunities which can improve the quality of their lives. Moreover, access to credit is not the only problem in the chain, e.g., maintaining the product's quality is also an issue or improper farming practices or low post-harvesting technologies.

According to IISD (2015), agriculture finance involves a wide range of facilities related to the chain players; productive infrastructure systems; research and development activities. In parallel with these, agriculture finance encompasses four groups of financial demand, namely: (i) farmers and agribusinesses; (ii) transactions among participants along the chain, (iii) rural infrastructure investments and (iv) institutions generating knowledge and innovation. To develop a more sustainable agricultural value chain, both the private and the public actors are required to participate and support at various levels (local, national, global), from both inside and outside financial sources (ibid).

Coates et al. (2011) suggest that the most suitable model for agricultural development is to approach the sector by sub-sector and meet tailor-made financial needs throughout that specific value-chain. Besides agricultural producers, the participants of a value-chain comprise input suppliers, collectors, processors, wholesalers, exporters and retailers. More broadly, these sub-sectors also include secondary chain actors, who provide ancillary services like transport, storage, technical assistance and so forth. All of these actors are covered by the system of agricultural value chain financing (AVCF). Box 2.2 summarizes several concepts related to this topic.

AVCF has increasingly been applied worldwide, especially by agricultural development agencies, developing nations and agriculture-based regions. It is apparent that not only small-scale farmers, but also other participants of the chains, are stuck in the financial shortage. As a result of the unavailability of money and working capital, their business capability and chain's development are limited (Miller, 2012). The comprehensive value-chain approach might be the more inclusive and increase breadth and depth of agricultural finance (Miller et al., 2010). Indeed, this approach provides tailored services and products along a specific value chain in order to reduce the financial cost and risk, enhance the effectiveness of the chain actors and increase the competitiveness of the chain as a whole (AfDB, 2013; HLPE, 2013; Miller, 2012; Miller et al., 2010). More broadly, it is considered a promising approach to reach the triple bottom line (economic, social and environmental sustainability) of green microfinance, in

which the environmental issue is the weaker element of the earlier approaches (Allet et al., 2015).

Box 2.2: Definition of key terms

Value chain: The set of actors and their value-adding stages involved in transferring a specific agricultural product from producers to final consumers. In agriculture, there are several phrases, such as "farm to fork" or "field to table", equate with these processes and flows.

Value chain analysis: Identifying the actors and factors affecting the performance and relationships among participants in the chain as well as driving constraints, hence, answer how can improve productivity, efficiency, and competitiveness of the industry and how can tackle these constraints.

Value chain finance: referring financial services and products as well as supporting activities flowing to and/or through value-adding actors to meet their specific demand and overcome driving constraints, thereby facilitating the growth of the chain.

Internal value chain finance refers to the financial sources occurring inside the agri-chain among participants. For example, input suppliers provide in-kind credit to a farmer (i.e., trade credit) or wholesalers finance in advance inputs to farmers and buyback agreement (i.e., contract farming).

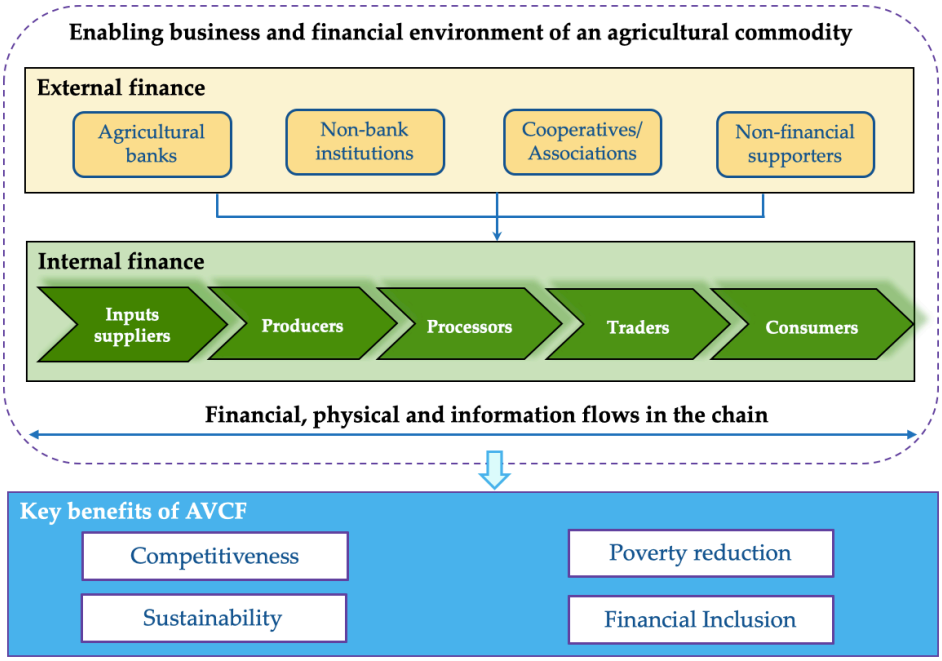
External value chain finance implies the funds derived from outside the agri-chain, whereby banks and other financial institutions create one-to-one relationships via contractual agreements with different actors.

Source: Miller (2012); AfDB (2013)

According to AfDB (2013), the AVCF approach plays a crucial role in agriculture-based economies because of four underlying advantages (Figure 2.4) as follow. *Firstly*, AVCF may enhance the competitiveness of agricultural product and the chain. For domestic and international trades, the rapidly changing consumers' tastes have become the more important market driver. Thus, without linkage among players in the chain, the gap between products at farm gate and consumers' desire is widened, resulting in a reduction of not only the price and quantity of products sold, but also the economic benefit of all participants in the chain.

Secondly, AVCF is able to boost agricultural development towards sustainability. In order to end extreme poverty and hunger and to leave no one behind, sustainable livelihoods for rural households are the first priority

worldwide. Self-sustaining livelihoods can be reached through agriculture development by ensuring food security, fostering environmentally sustainable livelihoods via the use of natural resources and strengthening resilience against shocks (De La O Campos et al., 2018).



Source: Author's illustration adapted from Miller et al. (2010) and AfDB (2013).

Figure 2.4: Financial sources existing in a typical agricultural value chain and its impacts

In reality, the poor are small- scale producers with tiny investments capacity, and their businesses are running under difficult and constraining conditions. Therefore, proper financial services would likely secure the best possible investment choices, which would significantly help them to achieve better incomes by transforming their farming production from subsistence to commercialization[1]. Specifically, AVCF promotes sustainable agricultural development through four aspects: (i) enhanced farmers' investments and

[1] There are three levels of market orientation: subsistence, semi- commercial and commercial system. Parallel to these are significant differentiations in terms of farming system, farmers' objective, input management, and household's income sources.

productivity, (ii) improved farmers' income and livelihood, (iii) balanced regional development via forward and backward linkages in the chain and (iv) enabled inclusive growth.

Thirdly, AVCF can enhance poverty reduction by addressing the grassroots' reasons for poverty, i.e., lack of access to affordable and full-range financial services. This lack of access holds small-scale farmers in the vicious cycle of poverty. The exclusion from the formal financial systems negatively affects not only the smallholders' production stage by lower investment in terms of quality and quantity of inputs used, but also their bargaining power with marketing actors (Nurkse, 1966). Their income, therefore, is undermined by both on-farm and out-farm drawbacks. Access to appropriate financial services (and other external supports) promises to be able to include the poor in the finance system, break the vicious cycle of poverty and lift the poor out of misery (Figure 2.5).

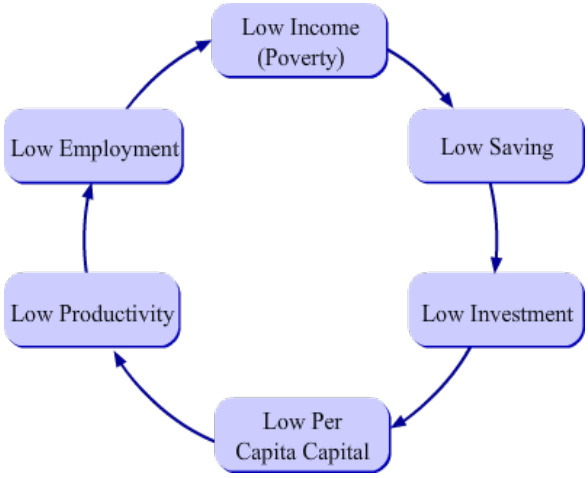


Figure 2.5: Vicious Circle of Poverty and Economic Development of Nurkse (1966), quoted by Hashim et al. (2016).

It can be seen that financial shortage negatively affects not only production stage, like lower productivity and quality due to lower dosage of seedlings, fertilizers, and pesticides than recommended, but also their power bargaining with marketing actors. Their income, therefore, is undermined by both on-farm and out-farm drawbacks. Access appropriate financial services (and other external supports) is promising the breaking point of the vicious cycle of Poverty, lifting the poor out of their miserable lives.

Finally, AVCF improves financial inclusion in the agricultural sector. The limited access of the poor from agricultural finance can thus be characterized as an exclusion, and the AVCF might enable their inclusion. Financial inclusion is defined as the common access of disadvantaged individuals and businesses to useful and affordable formal financial services, such as savings, credit, and insurance, etc., which are delivered in a responsible and sustainable manner (Fungáčová et al., 2015; World Bank, 2018d). The growth and development of a country significantly depend on the expansion of banking and financial services to the currently financially excluded class of citizens in the economy (Michael et al., 2014). The excluded citizens, including small farmers, possess untapped valuable potentials that could be of tremendous benefit to the economy at large. The unavailability of formal credit sources leads to the expansion of the non-banking services, which negatively impacts on financial stability and economic growth (Bruhn et al., 2014).

Unfortunately, financial inclusion still is a big challenge in less developed nations, and then, small and agribusiness are still excluded from formal financial sources due to the reasons enumerated in Table 2.4. Indeed, in the national large-scale programs of India and China, huge gaps on financial access were found, like maintaining active banking accounts and using these accounts (Ethiraj (2012). For example, from newly opened accounts, only less than 20% were actually used. Thus, the programs' impact on the smallholders tended to be modest and lower than that expected by the governments and donors.

Suppliers rarely have full insight in the heterogeneous demands of rural households and agribusiness for financial goods and services because the process requires cost and is time-consuming. As a result, credit services are often mismatched with the needs of the borrowers and/or are used ineffectively; small farmers are then excluded from the formal financial market.

Moreover, the globalization of the food chains has further isolated the small-scale farmers from the economic environment – and being smallholders, they gradually become unviable economic units (Rapsomanikis, 2015). They seem to be excluded not only from financial markets, but also from the general development stream of humanity. The AVCF approach shows promise of offering a systematic solution to achieve the triple goals: *connect* the poor smallholders with their community and society, and obtain both *financial* and *ecological* sustainable livelihoods from farm- and non-farm activities.

Table 2.4: Main reasons of financial exclusion for small farmers and agribusinesses

Demand side	Supply side
- Being small-size and unregistered entities; - Reports of cash-flows and income are no/low value in auditing and decision-making process of banks to lend; almost small farmers have not got recordkeeping. - Weak organizational capacity, geographical isolation and unskilled labor resource; - Fluctuation of productivity, yield and price; - Inadequacy of post-harvest management practices and technology leading to wastage and losses; - Lack of productive infrastructure; - Inadequate integration of value chain; - Seasonality in businesses leading to non-standard and irregular repayment schedules; - Lack of collateral and property rights; - Inadequate or lack of access to input, output and supportive market.	- High covariant risk related to price volatility, diseases, weather; - High transaction cost due to small size loan, low population density, higher loan servicing costs and high information costs and poor infrastructure; - Lack of technical innovation to evaluate creditworthiness and risk of borrowers; - Low availability of specialized products to adequately and timely serve the financial need of chain actors; agro-based enterprise financing; - Prejudice of financiers that agriculture as a low-profit activity; - Lack of proper risk-mitigation measures and mechanisms; - Lack of infrastructure such as bank branches at the 'last-mile', especially in remote areas;

Source: Author's synthesis, adapted from AfDB (2013); Oliver et al. (2014)

Besides these convincing benefits of AVCF mentioned above, the study expresses its important role in fostering agricultural investment, as well as in reaching the effectiveness and efficiency of chain participants. Almost empirical recent studies demonstrate that AVCF, on the one side, promotes agricultural investment and innovation through internal financing as well as improvement banking credit access of chain actors, on the other side, creates opportunities for the producer to transfer risks to chain actors (Claudio, 2017).

The work provides two different ways of AVCF to enhance producers' investment and their income. The traditional vision relates to direct financing of

chain actors (input suppliers, processors, marketing enterprises, etc.) for farmers via sale on credit, advance payments on the harvest, direct loans against harvest receivables, and so on. The funding sources may come from informal actors with verbal agreements or a well-established organization, with its own assets and legal contracts. Therefore, the production phase of farmers optimizes in terms of farming practices and input used despite limited funding.

However, these actors frequently provide insufficient credit volumes, especially long-term credit for fixed assets. Indeed, the financial flows among participants are temporarily transferred to another actor within the same chain. It likely a "*zero-sum game*", in which the resource availability for the chain as a whole does not change. In fact, not only farmers but also other chain players face with financial shortages. They need credit access (i.e., external funds) to meet their specific liquidity needs (Calvin et al.,1980), and linkages under the AVCF approach are able to improve the creditworthiness of these actors.

In reality, formal lenders frequently face difficulties in farmers' disbursement because of a series of heterogeneous and intangible traits. Therefore, decision-makings of formal lenders often rely on physical collateral (certificate land use), which is considered a great constraint of small farmers and agribusiness to access credit. However, farmers participating in the contracts/linkages likely possess some important traits, such as specific skills, experience, adaptive capacity, and diligence, etc., that contribute to the success of their cooperation. These characteristics also determine the assessment being creditworthy or not but not easy to observe by financial intermediaries due to their lack of proximity.

By observing the relationship or linkages between a farmer and a primary actor in the chain, the financial lenders can evaluate partly the producer's capability and willingness to repay. This is considered as an implicit method of the screening of creditworthy clients, to be handled by primary actors within the chain. Therefore participating in the value chain help not only farmers but also other participants to improve the creditworthiness and allow them to access loans from a formal financial institution. With formal credit access, the financial availability becomes a *positive-sum game*, in which the total investment in the chain as a whole increased as well as the Production Possibilities Frontier improved (Calvin et al., 1980).

Besides investment increased through internal and external financing, the AVCF approach also creates much diversity of risk-mitigating mechanisms for farmers. Farmers participating in an effective value chain often tend to have better performance through learning and the offer of non-financial services

provided by different actors throughout the chain (e.g., technical assistance, technology transfer, human capital development, market information, commercial links, quality control, and others). These links, whereby, can help them to obtain productivity increased and better risk-mitigating mechanisms. For example, contract farming contributes to alleviating the market and natural risks faced by farmers due to the guarantee of sellers related to fixed prices. Results of the farmers' price stability are their stable agricultural income and investment increased. Furthermore, the performance of other chain actors (e.g., input provision, processing, and marketing activities) also maintained stably.

To sum up, financing along the agricultural value chain still is considered an effective approach to optimize the performance of main chain actors through sufficient and timely funds as well as non-financial services derived from inside and outside the chain. For farmers, the AVCF approach can help them to improve farming practices by learning and the offer of technical assistance from other chain actors, to facilitate affordable credit access as well as to transfer risks to others via linkages in the chain.

2.4 Conclusion

Literature tells us that farmer households have to cope with many credit constraints derived from both supply-side and demand-side factors. On the supply side, key constraint comes from the quantity-rationed strategy of lenders regulating a binding credit limit per household borrowers. Moreover, the formal credit providers also maintain their prejudice about agricultural investment and farmer-borrowers' capability in generating low profit. Therefore, banks are not willing to lend to farmers. Consequently, many farmers receive an insufficient amount of credit, or even nothing. With regard to demand-side constraint, it comes from households' awareness about: interest rate (too high to pay), transaction cost (e.g., time-consuming and inconvenient location) and risk aversion (e.g., fear of loans and/or landless). All these characteristics result in a voluntary avoidance of formal credit, especially collateral required.

In developing countries, the rural credit market, including borrowers, lenders, and market conditions, is diverse. There are many kinds of clients in rural areas and they have specific demand for credit which is related to the wide diversity of agricultural products and the low level of commercialization. Moreover, features related to agricultural projects of households with high risk and small credit volume of households reduce banks' interest in lending. In

addition, market conditions in rural areas result in a high transaction cost for both lenders and borrowers. This coexistence of formal and informal sectors in the rural credit market has been well-documented. Informal lenders tend to provide a loan with minimum constraints, compared to formal loan providers.

The credit access for agricultural production and welfare of households in developing countries and Viet Nam is still controversial because of negative and positive impacts. Arguably, highly effective credit packages require a harmonious participation among lenders, borrowers and an appropriate financial infrastructure. Moreover, credit provision alone is not sufficient to develop the agricultural sector and rural areas, but it should be associated with other agricultural services, such as facilitating agricultural production and increasing efficiency of loans.

In developing countries two approaches include financial services provision: poverty reduction and agriculture finance system. The first approach mainly provides subsidized credit with low interest rate funded by governments and donors to widen the extent of reach, (i.e., the number of the poor and small farmers accessing credit). Loanable funds of credit providers, therefore, heavily depend on subsidies, which is a part of public expenditure. Under the second approach, financial institutions provide credit service based on market principals, and aim to achieve financial self-sufficiency without public subsidies. However, the latter's high interest rate is the main constraint of the poor and small farmers to successfully access such credit sources.

Overall, the trade-off between the outreach to household borrowers and the financial sustainability of lenders should prompt development planners to use a new approach of credit provision in rural areas. Based on literature search, the author believes that value chain financing is the more promising approach to provide the client-based credit services to participants along the chain. The value-chain financing creates a financial ecosystem, which does not only meet specific credit demand of each chain actor, but also facilitates the product, information and financial flows.

3.

Agricultural production and its financial suppliers in Viet Nam

This chapter sketches an overview of the agricultural production in Vietnam, where this is still considered the primary sector of the economy. Neoclassical economists agree that the agricultural production strongly depends on land, labor and capital, which together determine the agricultural output (David, 1816; Marx, 2004; Mill, 1848; Smith, 1776). Regarding agricultural investment, this section focuses on the agricultural credit suppliers in rural areas, which are considered the most important source for loans of producers to meet their financial needs. However, access to these and other financial services has barriers for farmers. This chapter is almost entirely based on secondary data published by the General Statistics Office of Vietnam, some international organizations and financial suppliers in Viet Nam.

3.1. Agriculture production and its determinants

3.1.1 Agriculture in Vietnamese Economy

Vietnam started its agrarian reforms by embedding these into its socio-economic reforms (i.e., *Đổi Mới*) in December 1986. Implementing the *Đổi Mới* reforms, the country went into transition from the rigidities of a centrally planned into a market-oriented economy, although it still operated under the State's governance. The reforms had five major aims, namely: (i) developing the private sector, (ii) increasing agricultural output, (iii) shifting the investment from heavy to light industry based on the national comparative advantages, (iv) stimulating the production towards the Export-Led-Growth and (v) attracting foreign investment (Nguyen, 2010).

Under the *Đổi Mới* process, the Vietnamese government promulgated numerous policies related to agriculture and rural development. For the agricultural sector, two most important policies centered on land-use and de-collectivization (Nguyen, 2010; Sauli et al., 2017). The land-use policy dismantled the country's collective agriculture system, minimized the overwhelming position of the public sector and expanded the role of the private sector in the economy through the Private Enterprise Law in 1990 (revised in 2000 and 2003).

However, to be able to arrive in this destination, the country first began with allocating agricultural land from state cooperatives and enterprises to households for long-term cultivation (Resolution 10, 1988). The Land Law (1993) was

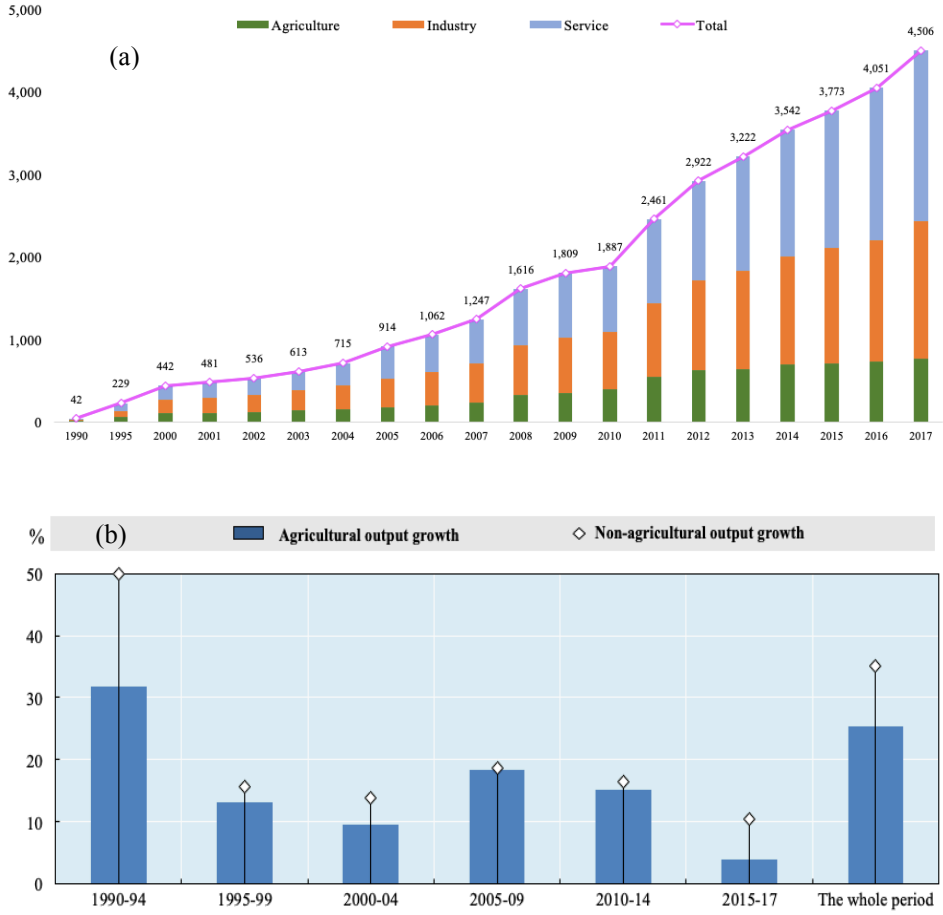
revised by the reformers in 2003 and 2013. The revised Land Law reinforced further collective agriculture. It recognized land property rights of households by allowing them to *inherit, transfer*, *donate*, *lease* and *mortgage* their land-use right. In this context, the Vietnamese Government carried out an extensive titling program. it issued nationwide Land-Use Certificates (LUCs) to households. Two types of LUCs were issued, the Red Book for the residential land and the Pink Book for agricultural forestry land with estimated values of 70% and 50%; respectively, of the total value regulated by the State.

In 2000, nearly 11 million LUCs were issued to households, making this the largest titling program in the developing world (Do Quy Toan et al., 2007). With the LUC in their hands, rural households could use this as collateral to access banking credit, so they could invest in agriculture and meet other needs. Since 1995, Viet Nam signed six regional and over 100 bilateral free-trade agreements worldwide (Sauli et al., 2017). In addition, Viet Nam also participates in various international organizations, including the Association for South East Asian Nations (ASEAN) since 1995; the Asia-Pacific Economic Cooperation (APEC) since 1998; the ASEAN Economic Community (AEC) since 2015; and the World Trade Organization (WTO) since 2011; Trans-Pacific Partnership Agreement since 2016 and EU–Vietnam FTA (EVFTA) since 2018. In essence, these inter-governmental organizations have provided frameworks for negotiating trade agreements and enforcing participants' compliance to laws and regulations. Moreover, these international integration policies have opened the road for expanding export, especially agricultural products, developing economy, creating employment and improving welfare of local households.

Overall, the reforms have created favorable conditions for farm households and the private sector to optimally exploit their human and physical resources. The reforms propelled the agricultural sector to hit the highest point of its output and growth. For example, in 1988, Vietnam already produced enough to meet its domestic food demand, a striking contrast in 1987 when the country imported more than 460,000 tons of food. In 1989, Vietnam recorded the world's third-largest exporter of rice, helped handle regional food shortages and gained a large amount of foreign currencies for the country (Dang et al., 2006; Nguyen, 2010).

In less than three decades, Viet Nam's GDP has increased more than 107 times, from VND 42 million in 1990 to VND 4,506 million in 2017 (Figure 3.1a). According to World Bank (2019), the *Đổi Mới* revolution has spurred the economic growth and transformed Vietnam from one of the world's poorest nations into a lower middle-income country in 2010. The national poverty reduction also achieved impressive results; the poverty rate fell from nearly 60

percent in the early 1990s to about 21 percent in 2010 (Kozel, 2014), and further dropped to about 6% in 2017 (GSO, 2017a). Viet Nam's GDP per capita growth is among the fastest in the world. Even when the global context may be volatile, the Vietnamese economy has proven resilient (Embassy of the Netherlands et al., 2017).



Source: Viet Nam GSO, 1990-2017

Figure 3.1 (a, b): GDP and its growth by the economic sectors in Vietnam (Unit: mil. VND)

However, in recent years, the momentum of the reform has weakened because various policies for the transitional economy in the 1990s do not apply anymore to the current context (Ian et al., 2010; Nguyen, 2010). This current stagnation of the Vietnamese agricultural production is reflected through its lower growth rate than that of previous agricultural production cycles and of the non-

agricultural sector (Figure 3.1b). The growth rate of both agricultural and non-agricultural outputs decreased after 1994.

Globally, Viet Nam achieved the highest growth of about 32% in agricultural production and 50% in the remaining sectors from 1990 to 1994. However, the annual growth registered lower -- only 3.8% in agricultural activities and 9.5% in the whole economy between 2015 and 2017; the decline was more prominent for agriculture. The growth rate of the agricultural sector achieved lower than that of non-agricultural activities (industry and service sector) over the three last decades. Obviously, faltering agricultural performance reduced its share of the national GDP from 40.5% in 1991 to 15.3% in 2017, despite agriculture being the main livelihood for approximately three-fourths of the rural population and over 90% of the poor nationwide (GSO, 2017a). Moreover, the reduction of agriculture's contribution to the growth of the national GDP by 0.5% annually is mainly due to a decreasing primary employment in this sector (Embassy of the Netherlands et al., 2017).

Apparently, after agriculture's miraculous economic growth had resolved food security issues in the first decades, its performance slumped; it no longer attracted people to invest. The first agricultural growth based on policies relating to land and increasing inputs (especially chemical fertilizers and pesticides) are no longer effective. Moreover, Vietnam suffers from environmental pressures due to pollution and the impacts of climate change; adaptation requires more eco-friendly farming practices that are more complex for farmers to learn and adopt. However, there is still a large room to increase agriculture production through technical innovations, improve productive infrastructure and enhance access to markets, extension and financing services (Bain, 1993; Bui et al., 2018; Ian et al., 2010; Nguyen, 2010; Sauli et al., 2017).

3.1.2 Agriculture production and its determinants

In principle, farming output is influenced by four main components: land, total factor productivity (TFP), labor and capital use in the agricultural sector. Therefore, below we analyze the factors affecting agricultural production and identify ways to address the drawbacks.

- *Agricultural Land-Use*

Overall, Viet Nam's territory stretches over 15 latitudes with a length of about 1,650 km and a total natural land area of 332,123 ha (GSO, 2017a; VNMNRE, 2014). Based on the natural conditions on climate, topography, geography, and soil structure, Vietnam is divided into six agro-ecological

regions. On the continental part, 16 major river basins account for 80% of the country's total area. Among them, the two largest river systems are the Red River in the North and the Mekong River in the South. These River Deltas contribute to the fertile alluvial soil and favorable conditions for agricultural development.

However, the majority of Viet Nam's land (72%) is hilly and mountainous, therefore, agricultural production is performed in plains and deltas, and on moderately sloped and terraced land in mountainous areas. In general, agricultural land is characterized by small, scattered and fragmented plots. Fragmentation is considered one of the biggest obstacles to mechanizing and applying high-tech farming practices. In 2017, the size of the agricultural land was 12,178,000 ha, accounting for 34.8% of the country's total land area (WorldBank, 2017). Moreover, agricultural land per capita of Viet Nam is 0.129 ha per person, which is much lower than the global ratio of 0.646 ha/person (ibid). The average agricultural area per farmer household slightly increased from 1.15 ha in 2011 to 1.47 ha in 2016 (Table 3.1), mainly due to the expansion of land-use for forestry and aquaculture (GSO (2016a). Nearly 70% of rural households have agricultural plots smaller than 0.5 ha, and therefore considered as smallholders.

Table 3.1: Distribution of agricultural land in agro-ecological zones of Viet Nam

Regions	2011			2016		
	Agri. land (ha)	Farmer HHs (000)	Agri. land per HH (ha)	Agri. land (ha)	Farmer HHs (000)	Agri. land per HH (ha)
1. RRD	771	1,750	0.44	795	1,348	0.59
2. NMM	1,596	1,789	0.89	2,123	1,778	1.19
3. CC	1,882	2,215	0.85	2,200	1,862	1.18
4. CH	2,000	743	2.69	2,422	807	3.00
5. South-East	1,355	537	2.52	1,362	467	2.92
6. MRD	2,607	1,833	1.42	2,623	1,573	1.67
Total	**10,211**	**8,867**	**1.15**	**11,527**	**7,835**	**1.47**

Source: GSO (2016b)

Note: RRD = Red River Delta; NMM = Northern Middle Mountain; CC = Costal Central; CH = Central Highlands; MRD = Mekong River Delta.

Nationwide, the more than 76 million tiny plots were divided among over nearly 8 million farmer families (Nam, 2017). Thus, on average, each rural household has 9.7 plots for their cultivation. An estimated 4% of the cultivated lands are non-cultivated edges of the fields (ibid). The fragmentation of the plots not only reduces the land availability, especially in the context of the scarcity of

cultivated land, but also hinders farming efficiency and further mechanization of the agriculture sector. Many recent studies have suggested that accumulation and concentration of land through market principles may increase the effectiveness of land-use and agricultural production in Viet Nam (Chung, 2018; Nam, 2017; Vien, 2017).

Nationwide, the relative labor input in the agriculture sector has been reduced from over 68% in 1991 to about 40% in 2017 (Figure 1.5). According to Embassy of the Netherlands et al. (2017), this reduction of primary agriculture-based employment contributes to the annual reduction of the share of agriculture in the national GDP by 0.5%. Reduced number of workers in the sector is a consequence of the industrialization and modernization policy of the Vietnamese government, as stipulated in the 10-year socio-economic development strategy. The shift follows the strategy to structurally reduce the labor input and contribution to the GDP of agriculture, and concurrently increase the shares of industry and services.

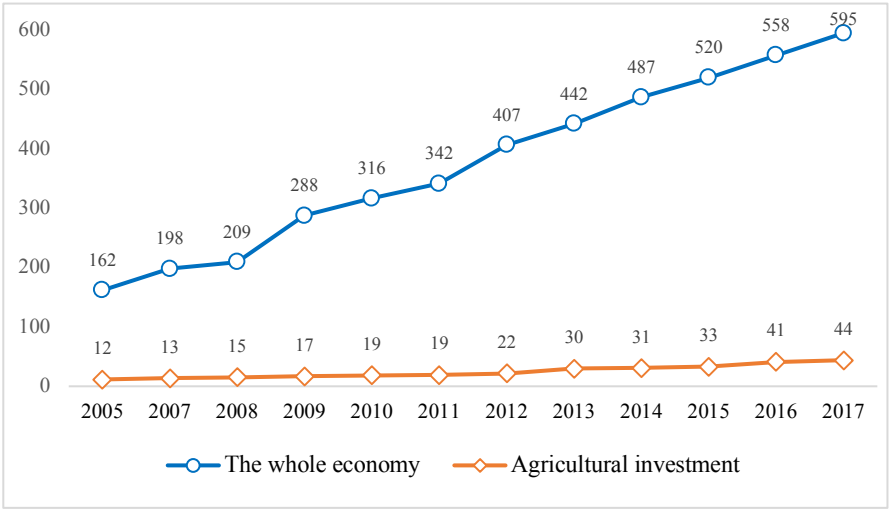
❖ *Agricultural investment*

To maintain food security and improve farmers' profits, investment remains essential for agricultural growth. This section shows the paradox between the role and potential of agricultural investment on economic activities. Although, agricultural investment increased by 12.9% per annum between 2005 to 2017, this investment accounted for a mere 5.6% to 7.4% only (average 6.5%) of the total investment in the Vietnamese economy (Figure 3.2). As mentioned above, the agriculture sector contributes about 20% to the GDP and is the major livelihood of three-fourth of its citizens nationwide. Thus, the investment is relatively low and might hinder the agricultural development and its effectiveness.

Surprisingly, the investment in the agriculture sector is able to gain much higher than the remaining activities (Figure 3.3). The author's regression analysis shows that the agricultural output increases by 17.57 billion VND for each 1 billion VND invested, while the non-agricultural output makes 7.06 billion VND only from 1 billion VND. Moreover, if the investment level were close to zero, the corresponding output of agriculture is still 85 billion VND due to the physical inputs: natural resources and labor.

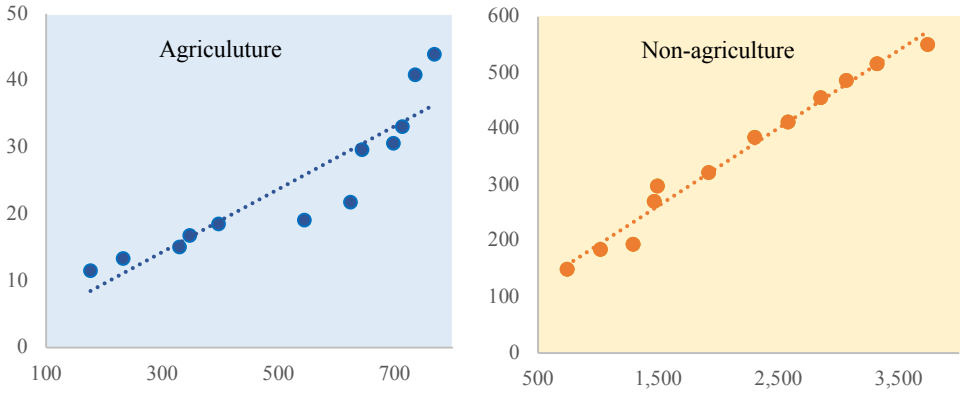
In contrast, the non-agriculture turnover will be negative (-341 units of money) without additional investment. However, agricultural investors and policymakers should pay attention to the risks of farming as the agricultural output is constantly fluctuating compared to its predicted line, while the non-

agricultural output continues to stay closely to the trend line. This fluctuation is mainly due to price volatility. Next to access to credit and marketing, lack of technical knowledge is a large drawback for Vietnamese farmers, especially for the smaller ones.



Source: GSO, 2005-2017

Figure 3.2: Agricultural investment in Vietnam (Unit: 1000 billion VND)



$Y = 85.77 + 17.57X + \varepsilon$

$R^2 = 0.812$; P-value (X): 0.000

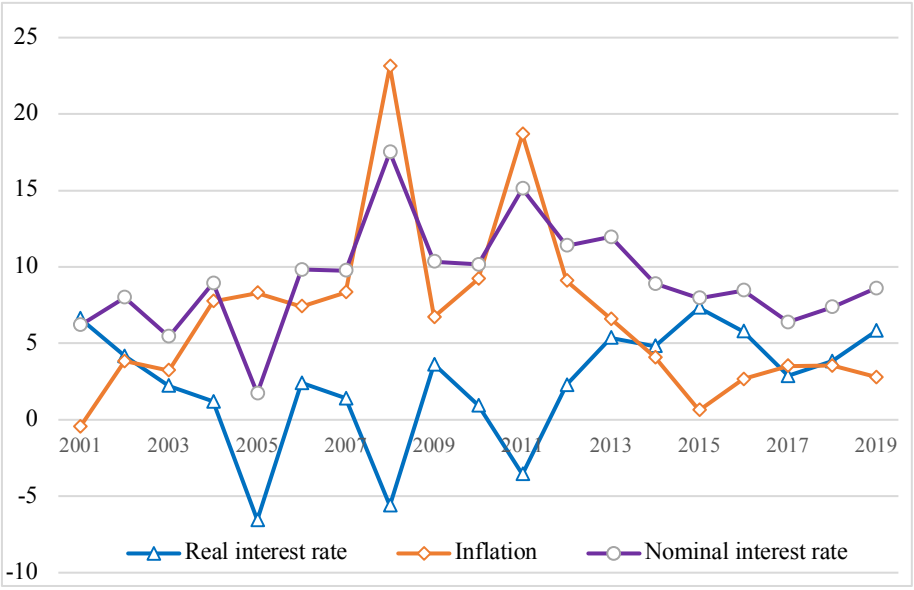
$Y = -340.9 + 7.06X + \varepsilon$

$R^2 = 0.979$; P-value (X): 0.000

Source: author's calculation based on data of GSO (2017a)

Figure 3.3: The relationship between investment (X-axis) and output (Y-axis) in Vietnam from 1995 to 2017.

Clearly, interest rates play an important role in regulating the cash flow among investment, savings, and consumption in the economy. Generally, inflation and interest rates in Viet Nam over the past 20 years have fluctuated strongly (Figure 3.4), which is considered a major barrier to invest in not only agriculture but also non-agricultural sectors. Specifically, in the period 2001-2012, Vietnam's inflation rate fluctuated dramatically, for example, 23.1% in 2018. Since then, the real interest rates became negative. However, in the last 5 years, the inflation rate has shown signs of decreasing and more stable at 3%. A stable business environment is a prerequisite for the private sector to access cheap capital and expand production and business activities.



Source: World Bank, 2019[2]

Figure 3.4: Inflation, Real and nominal interest rate in Viet Nam (%)

According to an IMF's report in January 2020[3], Vietnam's average lending interest rate over 5 recent years varies from 7-9%/year for both short- and long-term loans. This rate is much lower than other regional countries like Indonesia 10.01%; Mongolia 16.81%; Bangladesh 9.62%; India is 9.4%; Myanmar is 16%.

[2] https://data.worldbank.org/indicator/FR.INR.RINR?locations=VN

[3] https://www.imf.org/~/media/Files/Publications/CR/2019/1VNMEA2019002.ashx

This contributes to the improvement of investment and competitiveness of agricultural and non-agricultural products in the international market.

❖ *Labour Force*

After the *Đổi mới*, labor productivity in Viet Nam's agriculture increased quickly. For example, the annual growth rate of agricultural VA during the 1990s was 7.9%, it temporarily increased to 13.7% in the 2000s and maintained a rate of 8.1% from 2010 to 2017 (GSO, 2018). The Vietnamese agriculture sector had the highest growth rate in the world over the three last decades (Embassy of the Netherlands et al., 2017).

However, the value of agricultural output per labor unit remains lower than that in other Asian countries (Table 3.2). Moreover, the gap among Viet Nam and most other South East Asian countries in terms of agricultural labor productivity is widening; Viet Nam and Cambodia have achieved the lowest value, while Malaysia has always obtained the highest. In 2000, Malaysia's labor productivity reached 10,426 USD/labor unit, almost 18 folds compared to Viet Nam's 585 USD/labor unit. And this gap among two nations became approximately 25-fold in 2015: 19,818 and 806 USD/labor unit, respectively.

Table 3.2: Agricultural productivity of Viet Nam and other neighbor countries

Countries	2000	2005	2010	2015
Agricultural value-added per worker (USD/labour)				
Vietnam	585	661	719	806
Malaysia	10,426	12,910	15,962	19,818
Thailand	1,446	1,643	1,860	2,106
China	774	930	1,160	1,465
Cambodia	575	652	767	798
Compared to other countries (times)				
Vietnam	1.00	1.00	1.00	1.00
Malaysia	17.82	19.53	22.20	24.59
Thailand	2.47	2.49	2.59	2.61
China	1.32	1.41	1.61	1.82
Cambodia	0.98	0.99	1.07	0.99

Source: VNPI (2017)

❖ *Total Factor Productivity (TFP)*

Total Factor Productivity (TFP) reflects the efficiency of labor and capital inputs used to produce output, and is used as an indicator for the residual effects. Viet Nam's TFP of the agricultural sector rose steadily from 1990 to 2010 (averaging 2.65% per year) due to the positive impact of *Đổi mới* reforms. However, while it was stronger than that in Indonesia, India and the Philippines, and equal to that in Thailand, Viet Nam's TFP slowed down in the 2000s and lagged behind that of China and more recently also to that of Malaysia (VNPI (2017).

Although Viet Nam has obtained several outstanding achievements, basically, the growth model still relies heavily on capital and natural resources. From 2011 to 2015, the growth of TFP was based mostly on capital (97%), while that of the Vietnamese economy was for about half based on capital. The TFP of that economy registered negative from 2006 to 2010, recovered in the following five years, but remained lower than that of agriculture. Growth in the agricultural sector would strongly depend on capital (including natural resources), thus, credit provision becomes a crucial role in the Vietnamese economy. Also, the low level of skilled labor in agriculture could result in a negative impact on the agricultural output (GSO, 2017).

Four factors affect agricultural output: land, labor, capital and TFP. Viet Nam has recently recognized reductions in agricultural land and labor input, due to land occupation by industry and urban population. Therefore, increasing agricultural investment and its effectiveness are considered the key tools to boost the agricultural sector and improve farmers' income. Data from 46,995 households living in 3,133 communes in the six agro-ecological regions revealed that agriculture is the main source of livelihood of 99.8% of rural communes. About 80.3% of the respondents reported that their lives would be improved if agriculture would performed well (GSO, 2016a). The most cited obstacle restricting their agricultural development was the lack of capital and credit access: 56.4% in 2006 and 49.0% in 2016. Obviously, there is an urgent need to have a better understanding of the agricultural credit market and the obstacles of farmers to access credit as desired. In the next section, the author describes the financial market in Viet Nam in order to answer the question of why many farmers cannot access credit from formal and informal credit providers.

3.2 Agricultural credit suppliers in Viet Nam

3.2.1 Policy framework for mountainous areas and agricultural credit

As the poorest area of the country, the Vietnamese Government pays attention to the policy system for social-economic development of the region. According to the Decision 1064 /2013/QD-TTg about the systematic plan on socio-economic development in the NMM region to 2020[4], there are five priority programs/ projects, including: transportation infrastructure, electricity, irrigation, education & training, and healthcare. To parallel with it, the financial budget is allocated and transferred to the province based on the targets approved by the central government. For example, in Lao Cai, there are 56 legal regulations supporting to households and business[5] with the specific beneficiaries, such as the poor, farmer households, farm, ethnic minorities, small-medium enterprises (SMEs), etc.,. Specifically, the province issues the plan No. 238/2018/KH-UBND about supports SMEs operating in Lao Cai province[6], in which the main tasks relate improvement banking credit access and competitiveness; development skilled labor; supports SMEs participating linkages and value chain; and so on.

Concerning agricultural support framework, the Vietnamese Government has launched a diversity of updated regulations considering among others global integration. We cite: Decision No. 62/2013-QD-TTg to stimulate the *linkages between farmers and agro-enterprises* through land concentration in order to increase quality and competitiveness of agricultural products; Decree No. 115/2008/ND-CP about the *exemption of irrigation fee;* Decision 719/2008/QD-TTg about supporting fund for *epidemic livestock diseases outbreak* through Government's compensation; Decree 42/2012/ND-CP on the *development of rice-farming land;* Resolution No. 26/2012/QH13 on *public investment* for agriculture, farmers and rural areas; Program 135 - the large-scale and most important *poverty reduction strategy* targeted on ethnic minorities and remote areas; etc. In addition to the general legal regulations that apply nationwide, initiatives started for *specific commodities* (rice, pork, coffee, tea, rubber, pepper,

4 http://vbpl.vn/TW/Pages/vbpq-toanvan.aspx?ItemID=76248&Keyword=

5 https://www.laocai.gov.vn/1365/95214/69878/403218/56-chinh-sach-ho-tro-nguoi-dan-dn/56-chinh-sach-cua-tinh-ho-tro-nguoi-dan-doanh-nghiep

6 https://vanbanphapluat.co/ke-hoach-238-kh-ubnd-2018-thuc-hien-chi-thi-15-ct-ttg-ho-tro-doanh-nghiep-nho-va-vua-lao-cai

sugar) or *disadvantaged regions* (reduction of income tax rate, agro-inputs support, provision preferential credit with subsidized interest rate).

Table 3.3: Several main programs regarding rural credit for smallholder farmers

STT	Program (Loan for)	Max. of loan (mil. VND per HH)	Interest rate* (%/month)	Banks disbursed
1	Decree 55/2015/ND-CP about the credit policy for agriculture and rural development	200 mil. VND without collateral	Negotiation	VBARD
2	Decision No. 68/2013/QD-TTg on the supportive policy on reduction of agricultural losses	100% of the value machine	Reduce 100% in the early two years and 50% in the 3rd year.	VBARD
3	Resolution 30a/2008/NQ-CP about the supportive policy for sustainable poverty reduction and Program 135	Subsidy of inputs (%) based on agricultural production	Interest-free or discount of 50% from formal lenders.	VBARD, VBSP
4	Decision No. 2085/2016/QD-TTg about the special policy for ethnic minorities in disadvantage areas in 2017-2020.	50	Reduce 50% of lending interest rate for poor households.	VBARD
5	Decision 78/2002/NĐ-CP for poor households and other policy beneficiaries	30	0.55	VBSP
6	Safe water and environmental sanitation (Decision 62/2004/QĐ-TTg)	12	0.75	VBSP
7	Production and business in disadvantaged areas (Decision 31/2007/QĐ-TTg)	30	0.75	VBSP
8	Loan for ethnic minorities in disadvantaged areas (Decision 54/2012/QĐ-TTg)	20	0.10	VBSP
9	Loan for creating jobs Decision No. 71/2005/QĐ-TTg	20	0.75	VBSP
10	Loan for preferential families Decision 71/QĐ-TTg	30	0.65	VBSP

Source: Author's aggregation

Regarding agricultural credit policies, the Vietnamese Government controls loanable fund and interest rates through the establishment and nurturing of two state-owned banks the VBSP and VBARD. In parallel with the targeted programs, there are a lot of responding policies issued to facilitate the access credit, such as Decree No. 55/2015/ND-CP on *credit for agriculture and rural development* (trusted/non-collateral loans); Decision No. 68/2013/QD-TTg *on subsidised credit for purchasing agricultural machineries* to reduce agricultural losses; Decision No. 2085/2016/QD-TTg on the specific policy to *support ethnic*

minorities and mountainous areas in the period of 2017-2020. However, the effectiveness of these supporting policies has been controversial because the majority of indicators designed at the central level are likely not suitable for specific regions or provinces due to the differences in terms of socio-economic situations (Table 3.3).

In earlier chapters we demonstrated the consensus that insufficient funding reduces farmers' potential and agricultural productivity. This implies that improving access to formal credit and its effectiveness for increasing agricultural production might break the vicious cycle of poverty in the disadvantaged provinces, like Lao Cai.

3.2.2 Agricultural credit suppliers in Viet Nam

According to World Bank (2018b), there is a large gap between the actual banks' supply and the demand of households for savings and credit services in Vietnam (Table 3.3). Slightly more than 25% of the adult rural population has a bank account, and this rate is almost 58% on average in the lower middle-income countries. Vietnamese clients have a high demand for both savings and credit, about 57% and 49%; respectively, but the proportion of people accessing banks is lower, about 15% and 22%, respectively.

Table 3.4: The rate of Vietnamese adult using financial services in 2014 - 2018

Indicators	Viet Nam (1)	LMI group* (2)	Comparison (3) = (2) – (1)
1. Banking account in 2018, by individual characteristics (%)			
Adults belonging to the poorest 40%	20.3	50.7	30.4
Adults living in rural areas	25.2	57.6	32.4
2. Saving rate (%)			
Saved at a financial institution, 2018	14.5	15.9	1.4
Saved at a financial institution, 2014	14.6	14.4	-0.2
Saved any money	57.4	39.7	-17.7
3. Credit rate (%)			
Borrowed from a bank, 2018	21.7	9.8	-11.9
Borrowed from a bank, 2014	19.5	10.0	-9.5
Borrowed from relatives or friends	29.5	30.4	0.9
Borrowed any money	49.0	42.9	-6.1

Source: World Bank (2018b); Note: *LMI = lower middle income countries

The gap between the two indicators indicates the potential of the formal transactions and the actual volume of informal financial transactions. For instance, among the 57% of the population having a demand for the savings service in 2018, only about 15% saved their money in banks. Moreover, from 2014 to 2018, the low reach of banking services hardly improved in Vietnam as well as in other Lower Middle Income (LMI) countries. The low reach of banking services likely is an exponent of the difficulties to access financial services, and that potential clients still prefer the informal alternative.

As part of the economic renovation in the late 1980s, banking reforms were implemented concurrently; the system evolved from mono-bank to a two-tiered bank system. In the latter, the State Bank of Viet Nam (SBV), the national monetary authority, manages finance, credit and banking system, with the major task of ensuring the country's proper economy inflation and growth. To pursue this tasks, the central bank uses a diversity of instruments under the monetary policy that affects directly and indirectly the performance of operating banks (2-tier), and the option to adjust interest rates and loanable funds.

The above reform expanded the financial services to the newly emerging private sector, including farmer household and business units in both urban and rural areas. Prior to 1990, formal financial institutions provided credit only to state enterprises and cooperatives; therefore, the private sector could not access credit from formal institutions.

Since 1993, Decree 14/CP issued by the Vietnamese Government allowed farmer households and other business units to access formal credit in order to meet their requirement for production and business projects. This opening of lending policy contributed to the success of Vietnamese agriculture in the 1990s, not only in handling the domestic food shortage, but also in making Vietnam a large agricultural exporter in the international market. In the national strategy of economic development, agriculture is always considered the foundation for the whole economy. In line with this, rural and agricultural credit are powerful tools for creating capital for agricultural and rural development.

To spur the twin goals of agricultural development and poverty reduction, the Government established and nurtured two state-owned and well-intended banks, the Viet Nam Bank for Agriculture and Rural Development (VBARD) and the Viet Nam Bank for Social Policy (VBSP). In addition, international non-government organizations (NGOs) have facilitated an enabling environment by supporting a dynamic financial market in Vietnam. As a result, the proportion of rural households accessing formal credit has increased significantly over the last two decades. However, as elsewhere, a large portion of poor households remain

outside the reach of formal credit that could allow them to invest on their agricultural production, and then, improve their income and livelihood.

Being a commercial bank with 100% of its capital owned by the central Government, **VBARD** is considered a powerful tool for developing the agricultural sector and rural areas. Due to the financing power and various support from the central Government, VBARD continuous to perform as the leading actor in implementing credit policies for agricultural and rural development based on Decree 55/2015/ND-CP and Decision 2213/QD-TTg. Moreover, VBARD also contributes to the goal of poverty alleviation through the reduction of its lending interest rate for rural clients in the 64 poorest districts belonging to 18 provinces following Resolution 30a/2008/NQ-CP. Under this policy, VBARD provides preferential loans to enable farmers to purchase their agricultural inputs, and agribusiness clients to acquire their working capital in disadvantaged regions. Maximum payment period is 12 months with an annual lending interest rate at 4 to 6 percent. Because of its multi-facetted role, VBARD remains the most important actor in the rural financial market.

Similarly, **VBSP** is wholly owned by the central Government, and provides incentive credits to the lower market segments, including poor households and other disadvantaged customers; thus, offering them the opportunity to escape from poverty and improve their lives. As regulated in the Decree 78/2002/ND-CP, VBSP's mandates are to provide concessional lending to the poor and other "social policy" clients. Currently, VBSP is offering 18 targeted programs that correspond to different beneficiaries as defined by the Government.

Government support comes in various forms: (i) budgetary allocation and the government-guaranteed loans for funding its portfolio growth; (ii) subsidies to cover its negative financial spread and cost of operations; (iii) 2% compulsory deposits from SOCBs and (iv) tax exemptions.

By the end of 2017, VBSP had 631 district-level branches and 11,162 transaction offices covering all provinces, districts and communes nationwide. In addition, VBSP has collaborated with local authorities and socio-political organizations to establish and manage over 183,000 savings and loan groups to gather poor, near-poor households and other policy beneficiaries needing a loan. This creates favorable conditions for poor customers, especially in remote areas, to access preferential loans, and probably to contribute to the achievement of Government's goal.

In 2017, there were over 6.7 million customers getting a loan from VBSP and this bank always has the largest coverage in the financial system in Vietnam.

VBSP's credit has assisted about 4.5 million poor households to overcome poverty, 3.5 million disadvantaged adolescents to study and 630 thousand poor households to build a house. VBSP also created 9.9 million sanitation facilities and 3.4 million jobs for rural workers.

The People's Credit Fund (PCF) was established in 1995 and transformed to the Cooperative Bank of Vietnam in 2013 by the State Bank of Viet Nam (SBV). PCFs and other social-political organizations were established with partial support of charter capital from the Central Government. PCFs' financing sources are mainly based on capital mobilization from members and contributions from the Central People's Credit (maximum 15%). Their operations are based on cooperative principles, self-help and mutual support as well as market-orientation rules. Lending and mobilization interest rates of PCFs are always higher than those of VBARD and VBSP. By the end of 2017, there were 1,182 PCFs covering over 10% of the total communes nationwide and serving about 1.6 million clients, among which half was poor.

Kim Anh et al. (2014) listed 34 **Microfinance Institutions** (MFI) acting as semi-formal financial providers in Viet Nam. MFI organization is an effective tool to contribute to sustainable poverty reduction through credit and useful activities for rural families; i.e., agricultural production and financial management at household level, which are based on the share within the members' organization. However, these entities face many challenges derived from the competitors, both VBARD and VBSP. Another reason indicated is the legal framework (regarding the required reserve ratio, registration fee and others), which increases the operational cost of MFIs. These institutions cover only a mere portion of the total outstanding loans (0.8%) and clients (4.4%).

Available data from the Ministry of Foreign Affairs reveals that as of 2007, about 650 **Non-Governmental Organizations** (NGOs) invested 217 million USD in Viet Nam [7]. The NGOs' aid programs particularly focused on the disadvantaged areas to pursue hunger eradication, poverty alleviation, and agricultural development towards sustainability. Support comes from World Bank, IFAD, AECID (Spain), JICA (Japan), BORDA (Germany) and others. According to the Ministry of Agriculture and Rural Development (MARD)[8], the NGOs' projects apply often a systemic approach, providing not only credit, but also technical advice and training farmers on appropriate technologies. Moreover,

[7] http://www.mofahcm.gov.vn/en/mofa/ctc_quocte/un/nr040819155753/nr060928111253/ns070731092928/view

[8] https://baomoi.com/hop-tac-nong-nghiep-voi-cac-to-chuc-phi-chinh-phu/c/6528161.epi

beneficiaries include, next to farmers, the agribusiness and the allied actors (Sauli et al. (2017); World Bank, 2018), and thus their approach looks like the value chain financing approach mentioned in Chapter 2.3.3. The Minister of MARD confirmed the positive results of agricultural NGOs in the project areas (ibid). Unfortunately, most of these programs have short duration (on average, 1-3 years), are small and rarely linked with the (inter)-provincial development strategies and agricultural planning.

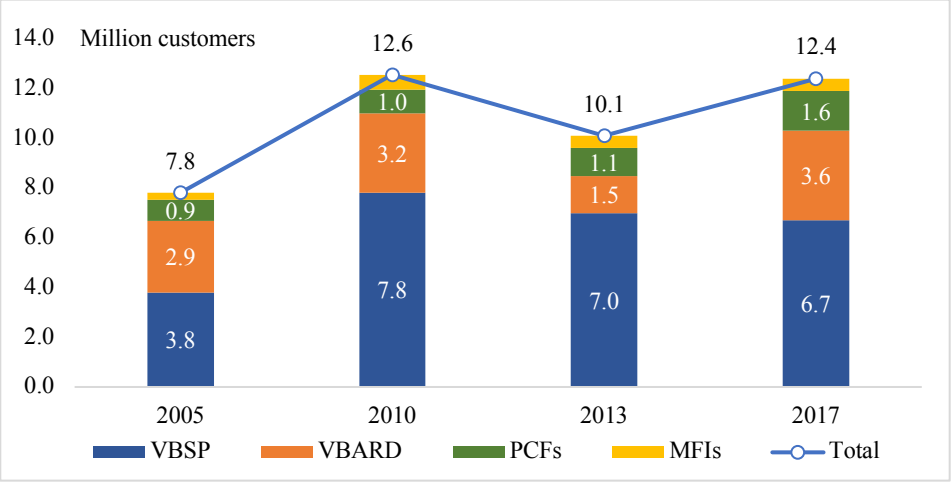
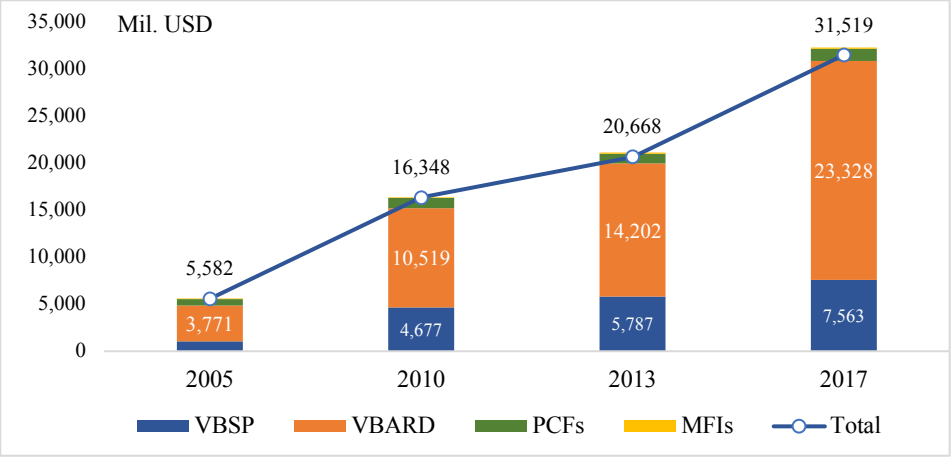


Figure 3.5: Total household clients participating the credit market in Viet Nam



Source: Annual report of VBARD, VBSP, PCF in 2017; the MFIs' figures cited from Kim Anh et al. (2014).

Figure 3.6: Loan credit provided by formal and informal lenders in Viet Nam

Overall, between 2005 and 2017, the formal credit market rapidly increased in terms of the outreach from 7.8 million to 12.4 million customers (Figure 3.5), and the total outstanding loan from USD 5.6 billion to USD 31.5 billion (Figure 3.6). The annual growth of the credit volume of VBSP (22%) was slightly higher than that of VBARD (18%), while the annual increase of active account loans of these banks was also low, 5.3% and 2%, respectively. In terms of household borrowers, VBSP consistently accounted for the highest proportion in the total rural financial market, fluctuating from 48% in 2005 to 63% in 2013, with an average share of 57%. VBARD followed as the second-largest provider with a proportion of 29% in 2017. Concerning the total outstanding loan, VBARD was often the largest financial provider with a marketing share at nearly 70% over the observed period. In contrast, PCFs and MIFs only accounted for a small share, although they seem to be more effective in reaching the poor.

Aside from formal financial providers, many farmer households also borrow money from other financing sources through their networks. For example, **tontine** is regulated by Decree No. 144/2006/ND-CP dated on November 27 2006, and its interest rate follows Law No. 91/2015/QH13 dated November 24, 2015 (Article No. 468).

Informal financing coming from moneylenders and relatives, friends are very common in rural areas. Traders who provide agricultural inputs also enlarge their performance by becoming financial suppliers as well, with in-kind and money credits being their main activity. The common characteristics of these financing sources are short-term and have flexible procedures; some have no-collateral requirement, but most moneylenders do and farmers can lose their land. The applied lending interest rates depend on the relation between lenders and borrowers.

Normally, loans from relatives and friends have zero interest rate, while other informal loans have high interest rates compared to that of banks. However, many farmer households still accept and/or prefer these to banks because of its simplicity, flexibility and convenience. The coexistence of a wide variety of rural lenders in developing countries like Viet Nam is well-documented in various studies (Barslund et al., 2008; Dufhues, 2007; Klein et al., 1999; Le Thi Minh et al., 2012; Madestam, 2014; Quach Manh, 2005; Sauli et al., 2017; Tang et al., 2017; Thanh Tam, 2011; Zeller, 1994). Authors argue that the reasons for this coexistence are the weak management of the public authorities and the financial shortage of borrowers without access banking credit ((Dufhues, 2007; Germidis et al., 1991; Sauli et al., 2017).

3.3 Conclusion

This chapter first described the general agricultural development in Vietnam after the "Đổi mới" reforms. Overall, Vietnam's agriculture sector has experienced a rapid growth during the two decades of the 1990s, but in recent years its growth has slowed down. Among the agricultural inputs (land, labor, capital TFP), capital plays an important role because of the high impact on agricultural growth.

The second part in this chapter sketched the landscape of credit providers in rural areas of Viet Nam. VBARD and VBSP are two state-owned banks, fully supported by the Government to address its policies of rural development and poverty reduction. Currently, the two banks cover a wide network across most districts and communes, and make loans accessible to most farm households. VBSP provides preferential credit packages to low-income customers following government regulations, while VBARD provides credit to customers with higher incomes. VBARD accounted for the largest share in terms of outstanding loan, while VBSP registered the highest quantity of household clients.

Despite the presence of the above intermediaries, access to credit for agricultural production remains the biggest obstacle for farm households (GSO (2016a). Alongside this obstacle is the systemic approach of many NGO-led projects, which is considered by MARD as an effective way to boost the agricultural sector. This approach is about similar to the agricultural value chain financing, but is not yet widespread in Viet Nam. To expand agricultural value chain financing, Viet Nam needs to create a favorable policy framework for the grass-root level and banks.

4.

Research site and Methodology

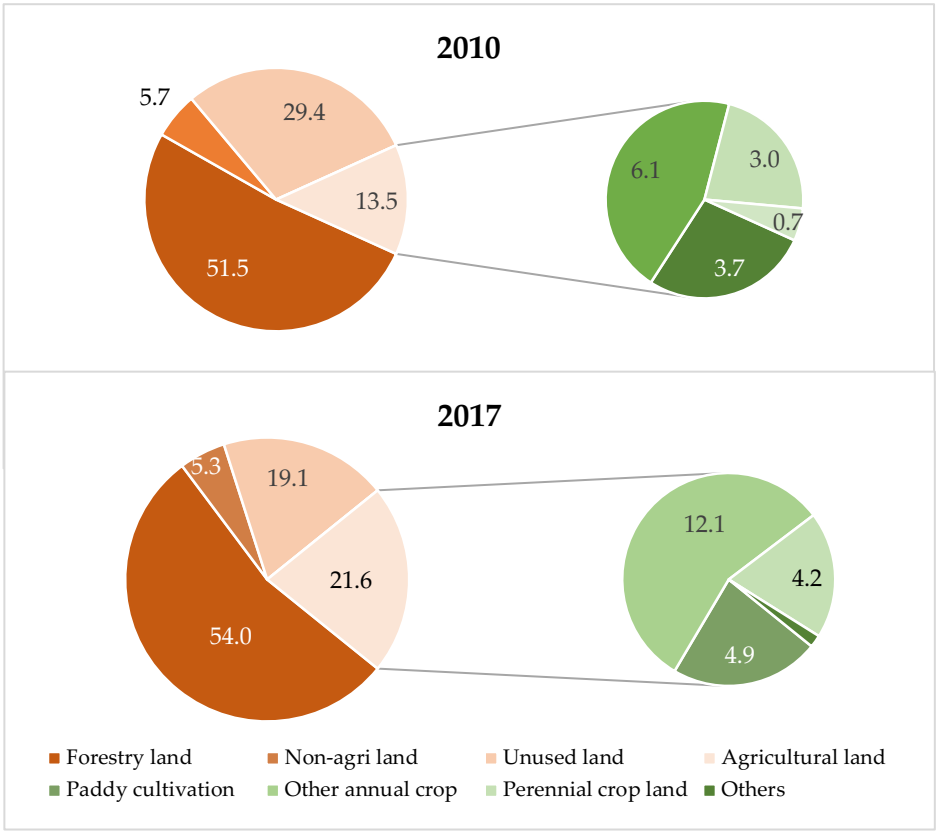
The first part of this chapter provides general information about the study site, Lao Cai, one of Viet Nam's poorest provinces in the northern mountainous areas, and discusses the strategies implemented to facilitate agricultural activities based on the local characteristics, including nature- and human-related factors. The second part presents the analytical framework (sample selection of districts, communes, villages, households and other relevant stakeholders), the data collection methods and analysis.

4.1. Research site

4.1.1. General information about Lao Cai province

Lao Cai province is endowed with favorable natural conditions for agricultural development, but its actual production is far from reaching its potential, although the agricultural sector plays an essential role in rural development and local economy. Lao Cai is a mountainous border province located in the Northern Midlands and Mountain (NMM) region of Viet Nam, which is the largest ecological area (31%), and concurrently, the poorest of Vietnam (GSO, 2017a). Among the ten poorest provinces of Viet Nam, nine provinces are located in the NMM region, and Lao Cai is ranked as the 6th poorest (MOLISA, 2016). The north of Lao Cai is adjacent to Yunnan Province, China, with a border of 203 km. The province is contiguous with Ha Giang, Yen Bai and Lai Chau province. The natural land area of Lao Cai is 6,364 km^2, accounting for 1.9% of the total national area and ranking 19th in area among 63 provinces nationwide. Lao Cai comprises Lao Cai city and 8 other districts called Bac Ha, Bao Thang, Bao Yen, Bat Xat, Muong Khuong, Sa Pa, Si Ma Cai and Van Ban.

As a mountainous province, Lao Cai's terrain is complex with highly stratified altitudes, creating various small and different sub-climate zones. The majority of Lao Cai's land has an altitude of 300 to 1000 m, compared to sea level. However, with 3,143 m the mountain Fansipan is the highest in the Indochinese Peninsula (comprising Vietnam, Laos, and Cambodia); hence, its nickname "the Roof of Indochina". Along with its complicated topography, the climate in Lao Cai is also diverse and its weather is subject to quick changes in time and space. Generally, Lao Cai experiences a dry cold climate from October to March, and the tropical monsoon season with rains between April and September. The annual average temperature is 21°C, but that of the highland areas has a wider range than that of the lowlands.



Source: Lao Cai SO, 2010; 2017

Figure 4.1: Land use in Lao Cai and its structure, 2010 – 2017

This type of climate is considered very suitable for temperate crops and plants, which is an important advantage of Lao Cai in agricultural production. Next to the tropical rice, this province produces the highly demanded temperate vegetables, flowers, fruits, herbs, cold-water fish (salmon) etc. However, the mountainous regions, including Lao Cai, are considered the agricultural production zone, but are being affected the heaviest by climate change. These regions may even experience an increase in events related to extreme weather: cold, snow, droughts, flash floods, landslides etc. in the near future ((LaocaiDARD, 2016)). Thus, increased risks of farming and households' vulnerability, due to crop failure and damaged infrastructure may occur.

As a mountainous province, unfortunately, only part of the land area of Lao Cai is appropriate for agriculture. The area of agricultural land significantly increased from 86,099 ha in 2010 to 137,964 ha in 2017 (Figure 4.1), which

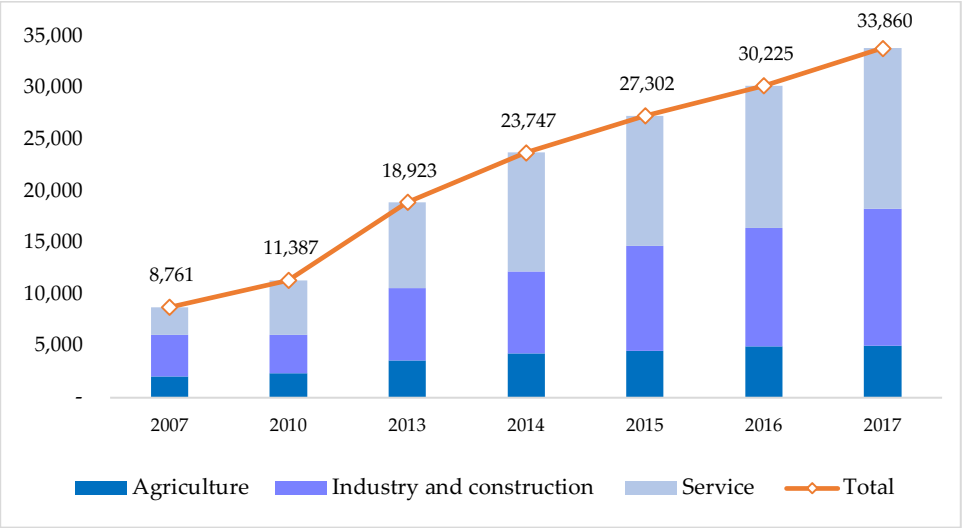
replaced a corresponding reduction of the unused land area. These figures represented an increase in the proportion of agricultural land from 13.5% to 21.6% between 2010 and 2017, respectively. However, the agricultural land per capita remains low, only 0.195 ha per person, compared to the global rate of 0.665 ha (WorldBank, 2017). Besides the increase of agricultural land, the forest area has also raised slightly.

There is consensus that judicious land use is crucial for sustainable economic development towards. On the reverse, irrational land use leading, e.g., to deteriorated, contaminated and abandoned land could generate a series of negative effects on the agricultural sector, rural development and economy (Liu, 2018). As the quantity of unused land decreased, we could conclude that the land-use policy in Lao Cai is working well. We could also assume that a larger portion of the total land area is well-exploited and is positively impacting on agricultural development, food security, poverty reduction, livelihood of rural local people and the provincial economy as a whole.

4.1.2 Social and economic development

The population distribution in Lao Cai is sparse with the density of 109 people per km^2, compared to 305 people/km^2 nationwide (LaocaiSO, 2017; WorldBank, 2017). There are 29 ethnic minority groups living in harmony, accounting for 64.1%. Generally, ethnic minorities live in remote communes in eight districts of the province under harsh socio-economic conditions. In 2017, about 77% of the total provincial population lived in rural areas (ibid), where agricultural production is their main source of livelihood and income.

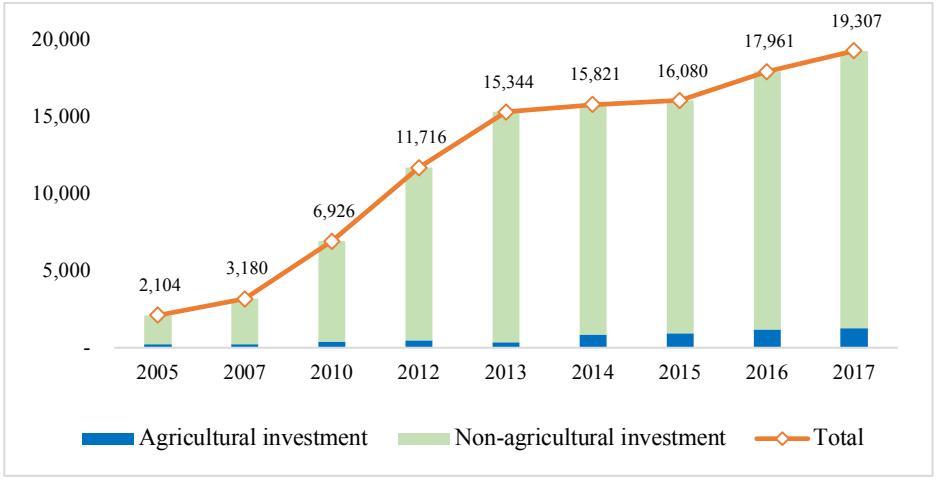
During the last decade, the Gross Regional Domestic Product (GRDP) of Lao Cai increased from 8,761 billion VND in 2007 to 33,860 billion VND in 2017, i.e., a growth rate of 16% per annum (Figure 4.2). Among the three economic components, the service sector obtained the highest annual growth rate, 22%, and the agricultural sector, the smallest, 10%. The latter share decreased sharply over the last ten years, from 24% to 15% of GRDP. This transformation is also encouraged by local authorities, policymakers and investors.



Source: Lao Cai SO, 2007 – 2017.

Figure 4.2: Total value of economic activities in Lao Cai (Unit: Bil. VND)

LaocaiSO (2017) reported that the share of agricultural investment in the total investment in provincial economy more than halved between 2005 and 2017, from about 11% to approximately 5% (Figure 4.3).



Source: LaocaiSO (2014)(2005 – 2017)

Figure 4.3: Investment in agriculture and non-agriculture (Unit: Billion VND)

This trend is similar to that of the national level, as indicated previously. The growth rates of agricultural and non-agricultural investment in this period were

12% and 23% per year, respectively. Therefore, the gap between the two economic activities and its outputs also has become wider.

The average real income per capita of Lao Cai people has increased during the last decade, from 409,000 VND in 2006 to 2.4 million VND in 2016 (Table 4.1). This represents a growth rate of close to 22% per annum and is higher than that of the national level: 19% per year (GSO, 2017a). Therefore, the income gap between people living in Lao Cai and elsewhere in Viet Nam has become smaller.

Table 4.1: Monthly average income per capita (thousand dongs)

	2006	2008	2010	2012	2014	2016
Whole country	636	995	1,387	2,000	2,637	3,098
Urban	1,058	1,605	2,130	2,989	3,964	4,551
Rural	506	762	1070	1,579	2,038	2,423
Lao Cai	409	664	850	1,155	1,803	2,387
Urban	893	1476	1537	2,378	4,584	5,380
Rural	276	456	641	783	997	1,501

Source: LaocaiSO (2006 – 2017); GSO (2017a).

Table 4.2: Poverty in Lao Cai and Viet Nam, 2012-2017 (Unit: %)

	2012	2013	2014	2015	2016	2017
Lao Cai						
Poverty rate	27.69	22.21	17.61	34.30	27.41	21.80
Near poor rate	11.61	12.67	12.65	9.98	10.52	10.79
Viet Nam						
Poverty rate	9.60	7.80	5.97	9.88	8.23	7.20
Near poor rate	6.57	6.27	5.62	5.20	5.41	5.32

Note: Since 2015, the new baseline of poverty with higher level of income has been applied. Source: MOLISA et al. (2018), quoted by Cowater Sogema (2018).

There is a gap in average real income between people living in urban and rural areas. At the national level, the income gap decreased over time: income in rural areas was twice lower in 2006 but 1.8 times in 2016 compared to that of the

urban citizens. During this period, the income of rural laborers increased by 19%, while that in the urban areas increased by 17.6%. In contrast, at the provincial level, this disparity has enlarged over that same decade from 3.2 to 3.6 times. In other words, the urban people in Lao Cai have a higher level of income than that of the average urban people in Viet Nam, while the rural people in Lao Cai earn an average income much lower than that in the country. Thus, inequality income among urban and rural citizens in Lao Cai has enlarged, which contrasts with that in Viet Nam in general and with the expected outcome of the national policy.

Despite achieving impressive accomplishments in recent years, the poverty rate in Lao Cai still remains high, on average, it was approximately three times higher than the national rate (Table 4.2). Similarly, the provincial rates of near-poor households were twice as high in proportion to the country. Nevertheless, the percentage of near-poor households remains high, despite a large portion of households being able to break the vicious poverty cycle.

The gaps in terms of poverty rates among ethnic groups in Viet Nam as well as in Lao Cai are huge. Nationwide, in 2016, the average poverty rate among ethnic minorities was 45%, while that among the ethnic majority (Kinh) was only 13% in 2006 and reduced to 3% in 2016 (World Bank, 2018c). In Lao Cai, particularly, the poverty rates among the Mong and Dao people were 75% and 56%, respectively; while that of Kinh people was just under 10% (Cowater Sogema, 2018; MOLISA et al., 2018). In addition, in upland areas, a large number of ethnic minorities, deriving about 75% of their total income from agricultural activities, still live in miserable conditions (Kozel, 2014). A poor productive infrastructure system combined with difficult access to the agricultural input/output markets and affordable credit contribute to the depth and severity of poverty (ibid).

To sum up, poverty has become less serious for the province, but attempts to help the group move out of poverty has, likewise, become more and more difficult. Kozel (2014) also concluded that the progress of poverty reduction in Viet Nam has “well begun but not yet done”. Moreover, a big challenge for economic development and social stability is the increasing income inequality in Lao Cai. Thus, planners need to improve agricultural development support services to help the remaining poor escape from the poverty trap. Agricultural credit and other agricultural services are considered the prerequisites to sustainable agricultural production.

Box 4.1: Updated poverty profile in Viet Nam

i.	Characteristics of the poor in Viet Nam today:
ii.	Settle predominately in rural and remote areas;
iii.	Depend heavily on subsistence agriculture;
iv.	Work on small-scale agricultural land and/or investment;
v.	Suffer from natural and man-made disasters;
vi.	Possess low educational qualification and limited job skills;
vii.	Lack physical, human, social capital to be evaluated as credit-worthy;
viii.	Belong to the disadvantaged group because of their cultural identity as ethnic minority;

Source: Kozel (2014); World Bank (2018c)

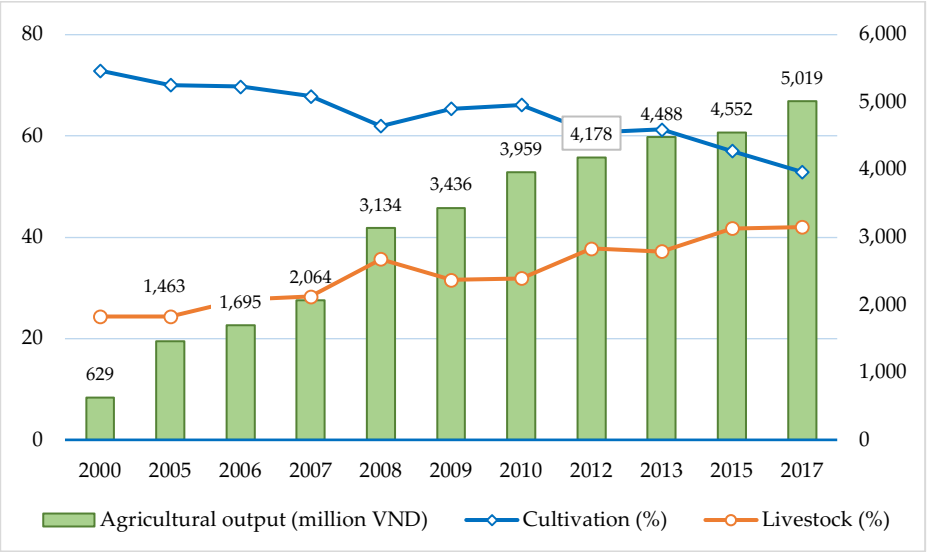
4.1.3 Agricultural production in Lao Cai

Lao Cai is endowed with comparative advantageous agro-ecological conditions for developing the agro-forestry-based economy (Pan Nature, 2017). Based on the national development strategy[9], Lao Cai also created, in the Development Plan (No. 144/2013/KH-UBND), regulations to encourage commercially oriented agricultural production and adopt advanced technologies for farming. Under these regulations are a list of defined products to support, including special rice[10], vegetables and flowers, temperate fruits, medicinal plants, indigenous black pigs, cattle, cold-water fish and others. Furthermore, the regulations also encourage the transformation of crop-based to livestock-based agriculture.

Overall in Lao Cai, the agricultural sector increased by 14% per year from 2000 to 2017 (Figure 4.4), with the share of livestock production rising quickly from 24% in 2000 to 42% of the agricultural value in 2017. This meant a parallel decrease in crop production. Due to the scarcity of arable land, livestock plays a crucial role in mountainous economies.

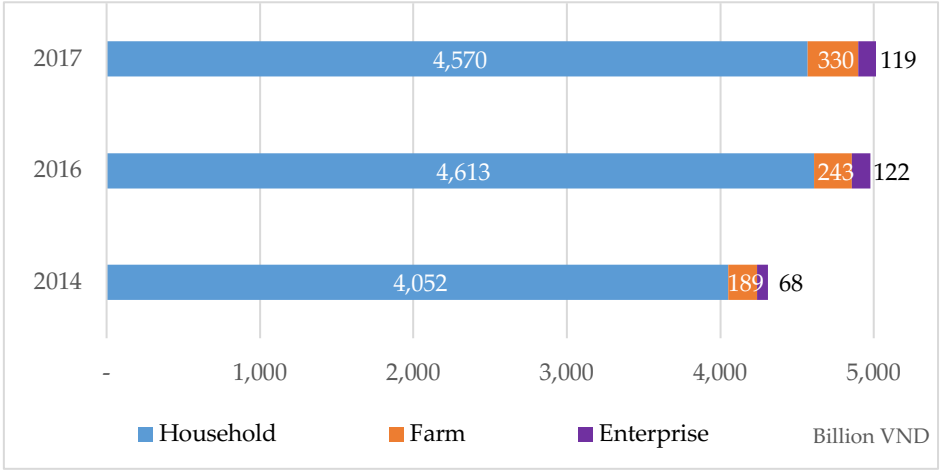
[9] The policies regard to special medicinal plants development (Decree 65/2017/ND-CP); encouraging agricultural investment (Decree 57/2018/ND-CP); encouraging the linkages among chain participants (Decree 98/2018/ND – CP); etc.

[10] It consists of Seng Cu, Khau Nam Xit and Tham Duong rice.



Source: LaocaiSO (2014)(2000 – 2017)

Figure 4.4: Gross agricultural output and its structure by sub-sectors



Note: the average revenue of large farms during the observed period is estimated by staff working at Department of Agricultural and Rural Development of Lao Cai. The remaining data are taken from Lao Cai SO, 2014 – 2017.

Figure 4.5: Gross agricultural output and its structure by actors generated

The main agricultural production actors or entities, like elsewhere, are households, farms and enterprises. Based on available statistical data, the author estimates that households are the largest producers, accounting for over 90% of

the total value of agricultural production in Lao Cai (Figure 4.5). Their farming output is decisive for the food security of almost the entire local population, and plays an essential role in agricultural production. Unfortunately, the agricultural production at household level suffers from drawbacks; the generated output increases minimally to about 4% per year only.

Despite a high annual growth rate (about 20%), large farms and agribusinesses contribute little to the total agricultural production value of the province: 6.6% and 2.4% only in 2017, respectively. In particular, the contribution of agribusiness is low compared to that in the NMM region and the country: 3.5% and 10%, respectively (Pan Nature, 2017). The number of agricultural companies have declined in recent years: only 22 agricultural enterprises in 2014, but only 18 remained in 2017, accounting for 1.6% and 1.2% of the total number in the province (LaocaiSO, 2014). In addition, the agribusinesses are mostly small and medium enterprises with an average capital of less than 10 billion VND (about USD 435,000) and less than 10 employees (ibid). Agribusiness can play a crucial role in connecting farmers to the customers.

To sum up, given a choice among other economic activities, investors would least likely choose agriculture production in mountainous areas like Lao Cai. The author, thus, analyzed obstacles and opportunities to access agricultural credit, as well as related enabling environment at the local, interregional and national levels, which would be helpful for farming households and agribusinesses.

4.2. Research methodology

4.2.1. Analytical framework

The author combined both quantitative and qualitative analyses by identifying:

1. the available agricultural credit market and/or financial suppliers for local farmers (Figure 4.6). These financial suppliers were classified as formal, semi-formal and informal financial providers for agricultural activities in Lao Cai. Two banks in the rural market were studied: VBARD and VBSP. These state-owned banks provided subsidized credit to achieve the Government's mandates, including poverty reduction, agricultural and rural development. A majority of local households were the banks' target clients. The findings aimed to answer the question, "Where can farmers borrow money if they needed money?"

2. the credit demand of farm households. Credit demand was determined as the residual of the total demand of households for investment opportunities minus their internal supply available; or the financial sources of farm households embracing internal supply (i.e., equity) and external funds (borrowed sources) (Calvin et al. (1980));

3. the financial needs of households for their agricultural production and credit gap among credit demand and actual credit access. Based on the demand-side and supply-side interviews, the author identified the credit gap among them, and then, suggests main relevant implications to improve the credit access of households and to use effectively obtained loans.

4. The lending as practiced in the agricultural value chain of the Seng Cu rice. In doing so, the study identified the specific financial demand and actual credit obtained by particular actors along the chain and compared this with an ideal agricultural value chain financing approach. Based on this, the author points out the factors hindering effective agricultural value chain financing in the locality.

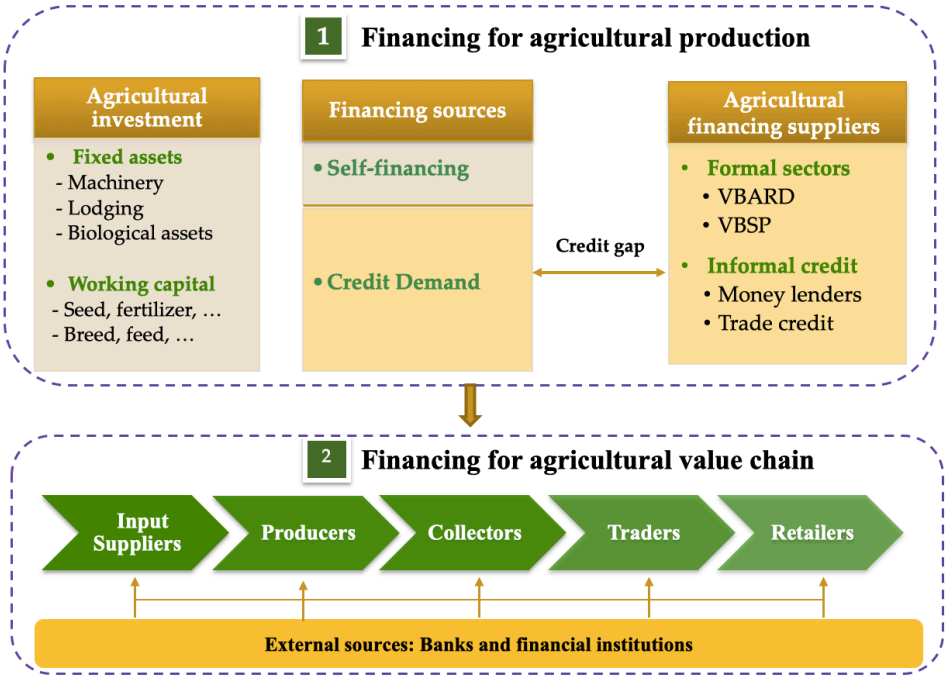


Figure 4.6: Analytical framework

4.2.2 Research site

As mentioned in the research design and analytical framework, there are two main contents in this study: (i) an examination of agricultural credit market and (ii) an analysis of lending related to the Seng Cu rice value chain in Lao Cai. The stratified random sampling method is considered as the most suitable in the case of a heterogeneous population (Shallabh).Thus, this was used to select districts, communes and villages below.

❖ *Financing for agricultural production*

Among total 8 districts in the province, the study selected three agriculture-based districts namely: Bao Thang, Muong Khuong, and Bat Xat (see Figure 4.7 and Table 4.3). These selected sites were stratified by underlying well-defined criteria. Three districts were selected by using three criteria: (i) the level of agricultural production, which is estimated through agricultural output and its share in the total value of economic activities. (ii) the development level of the banking sector in terms of credit volume, loan contracts, the average growth rate; (iii) the poverty rate of the districts. Among the three districts complying with the criteria, Bao Thang had the highest level of development, followed by Bat Xat and Muong Khuong, respectively.

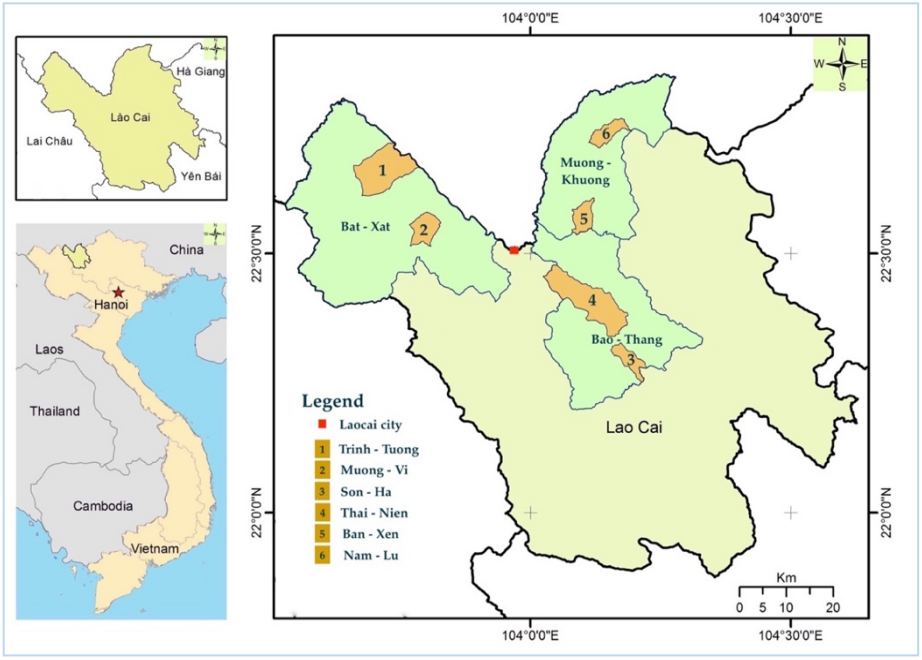
Table 4.3: Main characteristics of Lao Cai province and selected districts

Items	Lao Cai	Bao Thang	Bat Xat	Muong Khuong
1. Share of agriculture in GRDP (%)	16.0	29.8	20.7	47.3
2. GO/ hectare of agricultural land	51.2	64.9	57.1	43.6
3. Poverty rate (%)	27.4	11.4	28.3	37.4
4. Ranking of poverty rate	-	Lowest	Medium	Highest

Source: Lao Cai SO, 2017

At the communal level in each selected district, the author chose two communes with a distinct level of agricultural development, as suggested by the government officers. The criterion for the choice was whether a commune

received the Government's subsidies regulated at 135[11] and/or 30A[12] programs (poor commune) or not. Based on the assumption that, people living in the poor villages tend to borrow money at VBSP, and, people living in better-off villages often take a VBARD's loan, the author collected primary data from household respondents (see 4.2.3 (iv)).



Source: Author's own elaboration

Figure 4.7: The map of research site in the agricultural credit market

❖ *Financing for Seng Cu rice value chain in Lao Cai*

In Lao Cai, rice plays a vital role in cultural life and economic activities. There are two typical agro-ecologic zones for rice growing, upland and lowland. In upland, rice is planted in small-terraced plots on hillsides. Because of water limitations, the majority of upland rice is cropped once a year in the wet season.

[11] See at http://mis.chuongtrinh135.vn/default.aspx?T=4&db=31

[12] https://thuvienphapluat.vn/van-ban/EN/Van-hoa-Xa-hoi/Resolution-No-30a-2008-NQ-CP-of-December-27-2008-on-the-support-program-for-fast-and-sustainable-poverty-reduction-in-61-poor-districts/86655/tieng-anh.aspx?tab=7

In contrast, lowland rice is grown twice a year in larger and flat fields receiving water from a well-constructed irrigation system (Figure 4.8b). This is convenient not only in terms of water provision, but also of other productive services, e.g. extension and financial services.

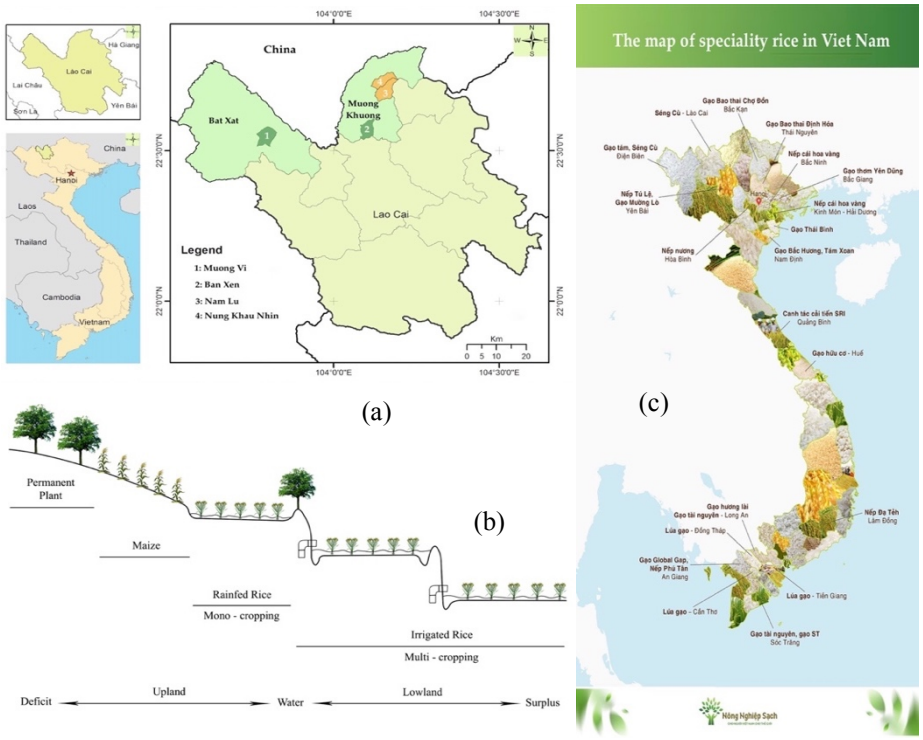


Figure 4.8. The map of research site in the Seng Cu rice value chain

The agricultural value chain lending in Lao Cai was studied by using the Seng Cu rice (SC) because of the following reasons:

(i) Lao Cai is endowed with various natural advantages for rice cultivation, such as favorable temperature, low latitude, sunshine duration and others (LaocaiSO, 2016). Rice that is planted in low-latitude areas having high solar radiation and cool nights can have higher yields and better quality that rice in high-latitude areas (Maclean et al. (2013). Lao Cai's two districts, Bat Xat and Muong Khuong, are the largest SC rice production zones, accounting for nearly 70% of the total planted area (LaocaiDARD, 2016).

Within these two districts, we selected the four largest SC rice-production communes (see Figure 4.8 a).

(ii) Only Seng Cu from Lao Cai is ranked in the special rice list of Viet Nam (Figure 4.8 c) and often has the highest selling price in the domestic market.

4.2.3. Data collection and sampling

The study collected both secondary and primary data for the qualitative and quantitative analyses.

4.2.3.1 Secondary data collection

We used archival research (Angrosino, 2007) in gathering all previous reports and relevant official statistics about the given regions. We collected data on the national emerging concerns the socio-economic situation in the locality. First, this step allowed us to identify the proper research sites (3 districts of the total 8 districts in the province) and a representative agricultural product for the study (Seng Cu rice). Second, these data sources supported and/or allowed us to compare the primary data that we collected from the fieldtrips in the next steps. Moreover, the secondary type of documents served as basis for our literature review and discussion. These consisted of articles, books, consultancy reports, technical notes, project reports, government official reports, policy documents, and so on.

4.2.3.2 Primary data collection

We used four methods for primary data collection (MacIntosh et al., 2015) namely: (i) participant observation, (ii) in-depth interviews, (iii) key informant interviews and (iv) household survey.

(i) Participant Observation

Credit and income issues in Vietnam, especially related to informal lenders and borrowers, are really sensitive and delicate, and thus not easy to ask directly. For this reason, participant observation plays a crucial role in collecting data from both formal/direct and informal/cross-check sources in order to achieve a valid analysis of demand-side and supply-side with the best way possible.

We used the participant observation method, an ethnographic research approach, in which the researchers live with local people and participate in their daily activities, but at the same time, keep a distance from them (Quang, 2014; Emerson et al. (1995); Fetterman (2009); Kelly, 2005). The results we obtained from this process affected (the results of) other data collection methods that we used.

(ii) In-depth interviews

The study conducted two sets of in-depth interviews, including credit providers and chain participants in the Seng Cu rice value chain.

In the earlier set, we collected data on credit provision by conducting 24 interviews with financial suppliers at the provincial, district and communal levels. Focusing on the credit provision by VBARD and VBSP, the results of this step harvested the total outstanding loans and its structures according to the main customers, duration of loan and repayment method, over the five recent years. We also collected the opinions of the bank officials during the interviews.

In the latter set, to get data on Seng Cu rice chain, we did 33 in-depth interviews with 33 stakeholders: 9 small collectors, 12 large collectors and 12 retailers. The authors gathered the performance of these actors in order to analyze cost and benefit involved in the chain; data about their financial needs and their obstacles to obtain the requested amount of bank credit were, likewise, gathered.

(iii) Key informant interviews (KIIs)

For KIIs, we interviewed the local managers which we grouped in three:

Ten key persons as the representative of local authorities at three administrative levels (1 province, 3 districts, and 6 communes). They provided general information about the policies on the economic development and agricultural supports.

Ten officials working at (sub)department(s) of Agriculture and Rural Development in accordance with the three administrative levels mentioned above. The author collected information and opinions about agricultural extension and support as well as existing obstacles of agricultural development.

The representative of State Bank of Vietnam in Lao Cai – he helped the author in synthesizing the current policy system on providing credit to customers, especially to households and rural areas.

(iv) Household survey

For the first main content, *financing for agricultural production*, 193 households were surveyed to capture the cross-sectional micro data on (i) general characteristics of respondents and households; (ii) farming activities, actual and desired investment; (iii) features of credit sources obtained, as well as advantages and/or disadvantages in access; and (iv) the impacts of each credit source on households' agricultural credit and their lives. To do that, we conducted the following steps:

1/ Collected the list of borrowers from the head of villages. We took the list of the non-poor village from VBARD and the list of the poor village from VBSP. The heads of the villages knew exactly which households were borrowing at VBARD and/or VBSP because of the regulation of the lending group (see more at section 5.2.2).

2/ Selected 50% of the respondents by using the stratified random sampling method based on their total agricultural investment and farming activities (livestock or cultivation, or both). The author worked with the head of villages to have a quick overview of agricultural production and the range of investment of villagers.

3/ Chose non-borrowing households through the snowball sampling technique. This method was introduced by Biernacki and Waldorf (1981) and widespread applied in qualitative sociological research that is hard to identify and approach potential respondents through the formal way (e.g. drug users, HIV-infected people). The non-borrowing households maybe belong to groups: (1) not need credit because of financial sufficiency; (2) credit access constrained; or, (3) self-exclusion due to negative thinking about credit. The study interviewed quantity of non-borrowing households equally the number of village borrowers.

Table 4.4. The explanation of households interviewed

Districts	Villages and communes	Total villagers	Banks' borrowers	Borrowers	Non Borrowers	Total surveyed HHs
		(1)	(2)	(3) = (2)*50%	(4) = (3)	(5)=(3)+(4)
Bat Xat	1. Tan Thanh*	60	22 [a]	11	11	22
	2. Na An	69	53 [b]	27	26	53
	Sub-total	129	75	38	37	75
Bao Thang	3. An Dao	111	40 [a]	20	20	40
	4. Do Ngoai*	115	41 [b]	20	20	40
	Sub-total	226	81	40	40	80
Muong Khuong	5. Na Nin	75	21 [b]	10	11	21
	6. Na Pac Doong*	45	17 [a]	9	8	17
	Sub-total	120	38	19	19	38
	Total	475	193	97	96	193

Note: * the communes belong to the poverty reduction grants (30A, 135 program);

[a, b] represents for the VBARD's and VBSP's borrowers, respectively.

For example, in Bat Xat district, we chose Tân Thanh village (belonging to poor commune namely Trịnh Tường) and Ná Ản (belonging to non-poor commune: Mường Vi). At the time of the survey, there were 22 VBSP's clients

and 53 VBARD's borrowers in these villages. 50% of them were selected randomly in proportion to the total population. Thereafter, we interviewed 11 households who were not borrowing at VBSP in Tân Thanh and 22 households who were not borrowing at VBARD in Ná Ản by using the snowball technique (Table 4.4).

To get the lending data in the Seng Cu rice value chain, we used a structured questionnaire and conducted individual interviews with 160 Seng Cu rice producers. Within four communes in Figure 4.8 (b), we selected 160 households for interviews: 80 upland and 80 lowland Seng Cu rice growers. The sample size was determined by the formula introduced by Cochran (1977):

$$\mathbf{n} = \frac{\mathbf{Z^2} \times \boldsymbol{p} \times (\mathbf{1} - \boldsymbol{p})}{\mathbf{e^2}}$$

Where, **n** is the sample size; **Z** is the statistical value containing the area under the normal curve (e.g., Z = 1.96 for 95% level of confidence); **p** is the estimation proportion of a feature existing in the population (the p-value is often equal to 0.5); and **e** is the level of precision desired (7.75%).

These were the data we collected:

i. the specific characteristics of the household;
ii. SC rice farming practices and input management and
iii. costs and income generated from SC rice production as well as other activities (e.g., breeding livestock, wages, salary, and business); and
iv. the farmers' feedback on agricultural credit and extension.

Table 4.5 visualizes time of data collection and research design described below.

(i) Group Discussions

Through group discussions, we validated the collected data on current obstacles to agricultural production, credit constraints, the loans as desired and their relationship in the lending group. In addition, perspectives of farmers about the contract farming with enterprises were recorded. In 2017 and 2018, six group discussions were conducted at the studied communes. Each group included 8 to 10 farmers or Seng Cu rice growers. All participants shared their opinion on the relevant topics.

Timing	Methods	sample size	Main information collected
1- Financing for agricultural production			
Sep-Nov, 2018	Face-to-face interviews	193 farm households in 3 selected districts (Bao Thang, Muong Khuong, Bat Xat)	- General characteristics of households; - Agri. investment; self-financing and credit demand; - Credit access and credit constraints.
2017, 2018	In-depth interviews	- 8 interviews with the managers of VBARD and VBSP in the province and districts - 6 clerks managing the credit disbursement. - 10 other communal and village authorities	- Outstanding loan of banks from 2010 to 2017 - Lending portfolio of banks; - Challenges in providing agricultural credit; - Lending procedures
2018	Key informant interviews	- 1 manager of State Bank of Vietnam in LC - 6 the heads of communes studied.	The policy system on providing credit to the agricultural sector and rural areas.
2- Financing for Seng Cu rice value chain			
Sep-Nov, 2016	Face-to-face interviews	160 Seng Cu rice growers in Bat Xat and Muong Khuong district	- Farming practices and linkages with chain actors; - IC, GO, VA of their cultivation; - Financing needs and actual credit access.
Feb, 2017	Group discussion	6 groups including 8 to 10 SC rice growers	- Credit constraints - Advantages and disadvantages of contract farming
June, 2017	In-depth interview	- 9 small collectors, 10 large collectors, and 12 retailers. - MKC and TPC	- Characteristics of chain participants; - Input and output market; - IC, GO, VA of their business; - Financing needs and actual credit access.
2017	Key	- 10 interview with the	- Policies on the economic

4.2.4 Data analysis

Besides the qualitative description, the author also applies the quantitative analyses, including *comparative data* and *econometrics* based on the cross-sectional database collected from households surveyed, which is the main object in this study.

4.2.4.1 Group classification and comparative data analysis

There is consensus in microeconomics about the existence of ***economies of scale***, both in the agriculture sector and other economic activities. Indeed, the average cost per unit likely decreases if the size of production increases (Krugman, 1980; Stigler, 1958). This real-world phenomenon results partly from the more favorable purchasing of input-production sources at larger scale of production (Dymond (2015). In this study, we grouped all households surveyed into three categories: small, medium and large scale according to the total agricultural capital cost.

The definition of small-scale farming may change over time and space, but farmland is the most common and stable criterion (See Box 4.2). However, the appropriate threshold of farmland depends on the local context, and if the classification would only depend on the land size, it might miss two considerations. *Firstly*, many agricultural activities are more or less associated with cultivated land (e.g., livestock); or land-related costs also vary strongly and are affected by soil quality, irrigation, topography and other natural conditions. Clearly, it is necessary to distinguish smallholder farmers versus larger entities based on the more comprehensive indicator than the land area owned. *Secondly*, in mountainous provinces like Lao Cai, agricultural cropping land is scarce, and investments in the terraces and other irrigated plots have been high. In 2016, for example, the agricultural lands per household in the NMM region and Lao Cai were at 1.19 and 0.82 ha, respectively (GSO, 2017b). Most rural households have areas smaller than 1 ha, and thus using the global threshold of 2 ha makes no sense.

The criterion ***total agricultural capital cost*** in the last year was used to classify the surveyed 193 households into three groups. The households were considered small-scale if their agricultural cost was among the 25% having the smallest cost (i.e. 50 small-scale farmers). Medium-scale farmers were those with investment ranking between 26% to 75% (i.e., 94 medium-scale farmers). Large-scale farmers belonged to the highest quintile of agricultural cost (49 households). Based on this classification, we then compared the effectiveness of agricultural production among different groups and their credit accessibility.

Box 4.2: The different definition of smallholder farming in developing countries

In Argentina, agricultural producers operating a farm under the following criteria are considered smallholders:

- They are working directly on the farm;
- They do not rent permanent labour but they can hire temporary labour.
- Upper limits vary in the different regions of the country as follow: farm size from 500 to 5,000 ha; cultivated size between 25 (in irrigated oases) and 500 ha; cattle is 500 head.

In Brazil, family farming is clearly defined by law when meeting simultaneously the following conditions:

- It has the total land area being smaller than 4 times the size of a "fiscal module" – a concept considering a basic need of a rural household and varying from 50 to 100 ha;
- It can apply the forms of a collective property if the share of each owner is under four times, compared to the size of a fiscal module.
- Use predominantly family labor;
- Household's income is mainly derived from agricultural production and allied economic activities;

In Mozambique, the classification into small, medium or large scale is based on cultivated area and livestock population. A farm is considered as small scale if:

- Its cultivated area less than 10 ha without irrigation or fruit trees; or,
- Its cultivated area is smaller than 5 ha with irrigated land, fruit trees or plantation or less than 10 head of cattle,
- Livestock farm has less than 50 heads of sheep/goats/pigs or less than 5 000 head of poultry.

In Mozambique, 99 percent of farm holdings have less than 10 ha, representing 70 percent of farmland.

In India, the typology of agricultural households consisting of five- size classes: "Marginal" below 1 ha;

- "Small" between 1 and 2 ha;
- "Semi-medium" between 2 and 4 ha; "Medium" between 4 and 10 ha;
- "Large" above 10 ha.

According to Indian Statistics Office, there were 99.2% of total agricultural households operating less than 10 ha (marginal to medium-size holdings) and they manage 88.2% of the total cultivated area in 2005.

Source: HLPE (2013)

The criterion ***total agricultural capital cost*** in the last year was used to classify the surveyed 193 households into three groups. The households were considered small-scale if their agricultural cost was among the 25% having the smallest cost (i.e. 50 small-scale farmers). Medium-scale farmers were those with investment ranking between 26% to 75% (i.e., 94 medium-scale farmers). Large-scale farmers belonged to the highest quintile of agricultural cost (49 households). Based on this classification, we then compared the effectiveness of agricultural production among different groups and their credit accessibility.

We used two groups to collect and analyze credit access, constrained and non-constrained; a cross-comparative analysis among subgroups on the impacts of credit access on agricultural production and other welfare aspects of the households was done.

To test whether the differences between the groups mentioned above are significant, we used descriptive statistics, the Student's T-test and Kruskal-Wallis Test (Green et al., 2010; StatisticSolutions, 2013). The Student's T-test was applied to determine whether the sample means of two-scaling (i.e., continuous) parameters are significantly different. In this study, the T-test was done to examine the statistical hypothesis on the role of credit access in agricultural production through the Intermediate Cost (IC), Gross Output (GO) and Value-added (VA) indicators (Figure 4.9). We compared the credit access, constrained versus non-constrained, the influence of demographic features on Seng Cu rice production (upland versus lowland producers), and the impact of financial availability on technical efficiency.

To examine whether the means of two or more *non-parametric* and independent variables are significantly different, we used the Kruskal-Wallis Test. The advantages of this test are that it does not assume the sets of observed data coming from a particular distribution, and that a one-way ANOVA on ranks can be done. In this study, the Kruskal-Wallis test was applied to test the differences among the three household groups (small, medium and large scale) based on their agricultural production (IC, GO, VA).

4.2.4.2 Cost -benefits analysis and agricultural capital cost

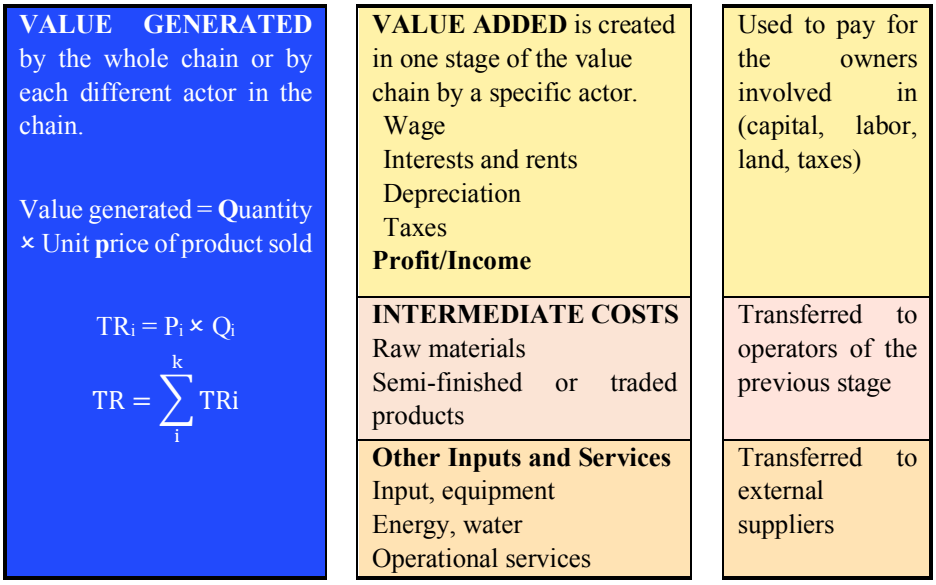
In order to evaluate the performance of chain actor and the finance of a particular value chain, it is necessary to have a good understanding of their cost and benefits. Based on performance and the financial flows in the chain, the author identified the weak actors in the chain, and then, recommends ways on upgrading the actors' capability in particular, and on strengthening the whole chain in general.

The collected data in this study were analyzed through indicators (Figure 4.9) of the value-added analysis by using the program Value Links 2.0 (Springer-Heinze, 2018). These three main indicators are defined as follows:

(i) Intermediate Cost **(IC)** includes the total value of purchasing variable inputs (goods and services) used the agricultural production cycles.

(ii) Gross Output **(GO)** is the total value of main and by-product outputs generated.

(iii) Value Added **(VA)** is the total worth created on agricultural production and calculated the following equations: **VA = GO – IC**



Source: Adapted from Springer-Heinze (2018)

Figure 4.9: Main indicators applied in the Costs and Benefits analysis

Throughout our study, we used the intermediate cost indicator, which refers to agricultural investment and costs related to physical and cash-cost inputs of chain actors. Therefore, the agricultural capital cost is calculated based on the debts invested in these inputs.

In fact, farming actors get credit from many lenders, therefore, the cost of capital is derived from the weighted average cost, which widely known as the weighted average cost of capital (WACC) introduced by Miles and Ezzell (1980). In Viet Nam, currently, the income tax charged on farmers is zero, therefore, WACC is calculated simply as follow:

$$WACC = \frac{Di \times IDi \times tDi}{\sum_1^n Di} \qquad i = 1 \text{ to } n$$

Where, D_i is the household's debt i; I_{Di} is the interest rate of Di; t presents borrowing duration of D_i; n is the total number of household's debt. For example, Household A has the total investment in 12-last month = 100 (USD), in which:

- 40 USD self-financing (cash accumulation + home-made inputs), which is assumed zero cost of capital.

- 25 USD borrow from a bank for buying/building assets; interest rate: 1%/month; duration: 12 months

- 20 USD borrow from input trader for purchasing animal feedings; interest: 1.6%/month; duration: 6 months

- 15 USD borrow from a money lender to buy commercial seeds; interest: 3%/month; duration: 3 months.

Based on this capital structure, we can calculate the capital cost for this household.

R= 25 × 0.01*12 + 20*0.016*6 + 15*0.03*3 = 6.27 (USD)

WACC = 6.27/(25+20+15) = 0.1045 (or 10.45%/year)

4.2.4.3 Determinants of farm households' access to credit

To assess which factors determined the probability of an applicant to obtain a loan, and whether the bank did credit rationing or not, we used a Multinomial Logistic Model (MLM). First, we assumed that commercial banks (i.e., VBARD) allocate credit service in order for the potential borrowers to obtain utility-maximization. Second, we represented P_{ij} (j = 0, 1, 2) as the probability in accordance with three actual cases of an applicant: j=0 (fully rejected from VBARD); j=1 (received partly) and j=2 (fully received as desired). The MLM specification, written for three probabilities, was introduced by Maddala (1986) and applied by Rahji et al. (2009) as follows:

$$P_{ij} = \frac{\exp(\alpha_j + \beta_j X_i)}{\sum_{k=0}^{2} \exp(\alpha_j + \beta_j X_i)} \qquad j = 0, 1 \text{ or } 2 \qquad \text{(Eq. 1)}$$

In which, β_i is the estimated coefficient of the parameters (X_i) explaining its effects to the probability of the result of credit rationing ($Y_i = j$). In the model, there are 7 continuous variables and 5 categorical variables. Table 4.6 presents names of variables, its measurement and expected signals in the model.

Table 4.6. Variables description and a priori signals in the MLM model

Variables	Measurement	Expected signs	
		Sub-model 1 (Y=0/Y=1)	Sub-model 2 (Y=2/Y=1)
I - Continuous variables			
X_1: Age	Years	+	-
X_2: Dependency ratio	Dependents/total members	+	-
X_3: Agricultural labor	Persons	-	+
X_4: Cultivated land	Sao (1 sao = 360 m^2)	-	+
X_5: Non-farm income	Million VND	-	+
X_6: Loan amount required	Million VND	-	+
X7: GO of project	Million VND	-	+
II - Categorical variables			
D_1: Gender	1 if male, 0 otherwise		
D_2: Social status	1=Good, 0=otherwise	-	+
D_3: Loan's purpose	1= livestock; 0= otherwise	+/-	+/-
O_1: VBARD's dynamic [a]	Taken value 1, 2, or 3	-	+
O_2: Education level [b]	Taken value 0 to 4	-	+

[a] represents for 3 studied districts, including Bao Thang =3; Bat Xat = 2Muong Khuong = 1.
[b] devotes for 0 = Never go to school; 1 = Primary finished; 2 = Secondary finished; 3 = High school; 4 = Higher level.

Practically, the estimated coefficients of the reference group (Y=1) in the models were normalized to zero (Maddala, 1986; Rahji et al., 2009). Moreover, a significantly positive coefficient of a variable is understood, as this factor led to a higher possibility of being in the observed group, compared to the reference group, vice versa. All coefficients in the model were automatically calculated in one-stage by the maximum likelihood estimation (Czepiel, 2002) via the SPSS® software.

4.2.4.4 Impacts of internal and external financing on technical efficiency of Seng Cu rice producers

To estimate the impacts of input management and socio-economic characteristics on the technical efficiency of Seng Cu rice producers, we used the stochastic frontier analysis (SFA) model. Among independent variables, the study focused on the financial availability of producers, which reflect partly the state of banking credit access (i.e., external financing of the chain). Moreover, the study also pay attention to Integrated Pests Management (IPM) application of households surveyed, who not only were financed advance high-quality rice

inputs, but also received technical assistance from other chain actors. It is considered some kinds of internal financing within the chain.

In general, the SFA specification is written following the equation below:

$$Ln(Y_i) = \beta_0 + \beta_i\, Ln(X_i) + V_i - U_i \quad \text{(E.q 2)}$$

$$|U_i| = \delta_0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \ldots + \delta_{11} Z_{11} \quad \text{(Eq. 3)}$$

Where:

Y_i and X_i represent for the output (productivity: kg/ha) and inputs used (in quantity) of the i^{th} household, respectively; n is the sample size; β is the estimated coefficients of the parameters (X_i). In the equation 2, the Cobb–Douglas production function was applied to estimate the impacts of 4 continuous variables related to farming practices of SC rice producers on their paddy productivity. It consists of: seed rate; fertilizer cost; pesticide cost; and labor for optional works.

V_i is the symmetric randomness caused by measurement error and other random factors, like weather, diseases, etc. It is assumed to be independently and identically normally distributed $N(0,\delta_v^2)$;

Table 4.7. Variables description and a priori signals in the SFA model

	Measurement	**Mean**	**Expected signs**
Effective factors			
X_1: Seed rate	Kg/ha	51.86	-
X_2: Fertilizer cost	1000VND/ha	7,930	+/-
X_3: Pesticide cost	1000VND/ha	2,686	+/-
X_4: Labor	Man-day/ha	34.61	+
Ineffective factors			
Z_1: Ethnic	1 = Minority; 0 = otherwise	42%	+/-
Z_2: Education	Year of schooling attendance	6.1	-
Z_3: No. of labor	Persons	2.6	-
Z_4: Experience	Years of SC rice growing	7.2	-
Z_5: Financial availability	1= Sufficient; 0= otherwise	56%	-
Z_6: Contract farming	1= Contracted; 0= otherwise	38%	-

U_i is non-negative randomness causing technical inefficiency in the SC production of the i^{th} household. In the equation 3, there are 6 independent variables related to socio-economic characteristics of households, which

directly and indirectly influence on on-farm performance (X_i). Table 4.7 presents names of variables, its measurement, mean and expected signals in the model. It is noted that if an ineffective variable (Z_i) has a *significantly negative sign*, it has a *positive effect on output*, and vice versa.

In the models, all variables were converted into a natural logarithm (Ln) in order to minimize heteroscedasticity. The estimated results, therefore, reflect the elasticity of an input factor causing the change in independent variable. Specifically, it tells us by what percentage the paddy productivity changed if there is a 1% change in a given variable input, *ceteris paribus*. All parameters in the models above were automatically calculated by the one-stage estimation under the Frontier 4.1 Program written by Coelli (1996).

4.3 Conclusion chapter and the limitation of the study

Although Lao Cai province is mountainous and only about 1/5 of its land is arable, the natural conditions for agricultural development are judged as favorable. Nearly 80% of the local people engage in farming activities as their main livelihood. Overall, the total production (GRDP) of the province increases annually with 16% in the last decade.

Among three economic components, the agricultural sector had the slowest growth (10%) and its share in the economy was reduced from almost 24% to below 15% of GRDP. This stagnation of the agricultural sector can be explained by the reduction in investment from 11% to a mere 5% of the total investment in the economy. In addition, the farm households, producing over 90% of the agricultural production, are facing various drawbacks as well as constraints to access agricultural credit.

The second part of this chapter explained the methodology and the reasons for the selection of the study sites. In order to answer the research questions, this part described the processes of data collection and the methods used by the author to analyze the data.

Looking back on the whole journey of this research, the author identified two limitations in the research design. The design might have benefited from an inverted chronological order of the two main components in this study. The survey on the SC value chain was done first, but it would have been better to conduct the research on the agricultural financial market before.

By lack of resources, the study focused only on credit service, while nearly ignoring other financial services (savings and insurance). It is evident that the three services are closely linked together and supporting each other, and overall,

the agricultural production. Therefore, future studies should consider other products and services, like savings, insurance, technical assistance, extension, irrigation, etc., which still are the challenges that farmers face in their journey to sustainable agricultural production.

5.

Financing system for agricultural activities in Lao Cai province

This chapter presents the results of our in-depth interviews with the credit suppliers. To have a good understanding of the credit provision in Lao Cai, we conducted eight in-depth interviews with the province and 3 district branch heads of VBARD and VBSP. Moreover, we interviewed six clerks and 10 relevant authorities on credit disbursement in six communes and villages. To obtain the supply-side and demand-side comparisons, we used the information on credit rationing from borrowers among 193 surveyed households in 2018.

The chapter is organized into two main sections. The first gives an overview of financial suppliers as regulated by the central government, and the second describes the provision of credit service by two state-owned banks. The discussion here focuses on lending procedures, credit rationing and lending products of these banks. We point out several interesting findings and then suggest ways on how to boost tailored credit services for households and for general agricultural development.

Most of this chapter were already published in two articles:

"*Impacts of Credit Access on Agricultural Production and Rural Household's Welfares in Northern Mountains of Vietnam*". Asian Social Science 15(7):119, 2019. http://www.ccsenet.org/journal/index.php/ass/article/view/0/39949

"*Agricultural Credit Rationing by agricultural banks in Northern Mountains of Vietnam,* submitted to Economic System (ISSN: 0939-3625) in May, 2019.

5.1. Overview about agricultural credit in Lao Cai

5.1.1 Overview of banking industry in Lao Cai province

The banking sector in Lao Cai was established in 1991with only two state-owned banks then, VBARD and BIDV. After two decades, today, the province hosts diverse financial providers: 12 banks and 2 non-institutional organizations having their own equity and transacting services formally, semi-formally and informally. These financial providers also receive direct Government's subsidies, i.e., non-reimbursable aid (Figure 5.1 and chapter 5.1.2). Simultaneously, total credit volume doubled from 18,193 billion VND in 2013 to 42,720 VND billion in 2017, with an annual growth rate of almost 24% (See Table 5.1 and Appendix, Table A.1).

Table 5.1: Total outstanding loan and its structure of formal providers in Lao Cai

Indicators	2013	2014	2015	2016	2017
Outstanding loan (Bil. VND)	18,193	24,059	31,920	40,542	42,720
The structure based on the economic activities					
Agricultural provider (%)	43.24	39.02	38.01	34.89	31.28
Non-agricultural provider (%)	56.76	60.98	61.99	65.11	68.72
The structure based on operational purpose					
Non-profit banks (%)	31.73	25.35	18.75	15.59	14.70
Commercial banks (%)	68.27	74.65	81.25	84.41	85.30
The structure based on the owned-state					
State-owned entities (%)	93.60	91.18	85.59	80.61	80.39
Non-state entities (%)	6.40	8.82	14.41	19.39	19.61

Source: Authors' calculation from the banks interviewed, 2018

At present, there are four big commercial banks (VBARD, BIDV, Vietcombank, and Viettinbank) whose all loanable capital is owned by the state, and two non-profit entities (VBSP and VDB). The state-owned banks dominate the total credit volume of the banking sector in Lao Cai. In 2013, they recorded 93.6% credit volume, but this decreased to 80.4% in 2017. VBARD and VBSP provide agricultural credit to rural households; BIDV and Lien Viet Post Bank has just started its rural market, but focus only on savings.

Other banks do not intend to serve the rural market and farmer households because of the following reasons/prejudices: i) high transaction costs because of small loan amount and dispersed population; ii) agricultural investment frequently suffers from both human- and nature–related risks, leading to a high non-repayment risk of borrowers; iii) difficulty in competing with VBARD and VBSP in terms of lending interest rate, number of transaction points and relevant infrastructure. For example, VBARD has 8 transaction points in the city and 16 branches scattered all over 8 districts of Lao Cai province. Meanwhile in 2018, VBSP covered the rural market through 164 communal transaction points and 2,456 Saving and Credit Groups (SCG). VBSP's staffs are paid by Government and are thus government officials.

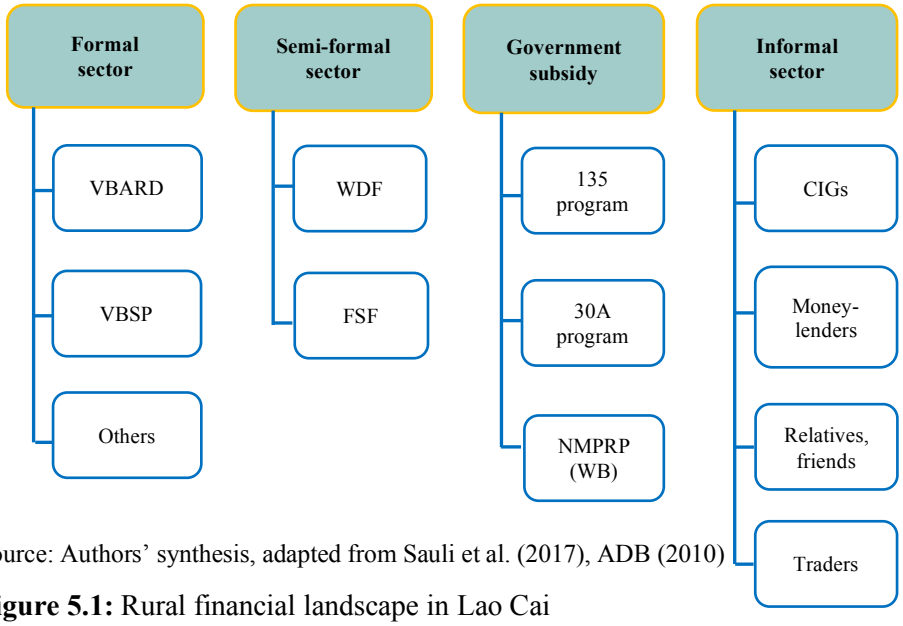
VBSP and VDB, both non-profit entities serve the low-income households and dedicate their funds in building the rural area's public infrastructure. In 2017, these entities contributed to an improved infrastructure; which in turn, reduced the poverty rate from 34% in 2015 to 22% (TKLaoCai, 2017). These contributions spurred the central government to slightly increase the stream of

subsided capital to the province in recent years. VBSP and VDB registered a growth rate of 2.3% per annum in outstanding loan between 2013 and 2017, while that of commercial banks, 31.0% per year.

To sum up, the authors forwards here three major features of the banking sector in Lao Cai province: (i). the outstanding loan of these banks increased significantly during 5 recent years. (ii) Among financial institutions, just VBARD and VBSP confirmed that they provide agricultural credit to farmers and agriculture-based actors (just VBARD). The proportion of agricultural credit volume decreased quickly compared to non-agricultural credit. (iii) State-owned banks accounted for a dominant proportion in the total outstanding loan of the banking sector during the observed time.

5.1.2 Overview of main financial providers in research site

In Lao Cai, farmers can access this formal credit but also a wide range of other financial sources (Figure 5.1), comprising three typical ones (formal, semi-formal and informal) and direct Government's subsidies (i.e. non-reimbursable aid). This diversity is related to the characteristics of the province: poor neighboring provinces, mountainous areas, various ethnic minorities and several border provinces.



Source: Authors' synthesis, adapted from Sauli et al. (2017), ADB (2010)

Figure 5.1: Rural financial landscape in Lao Cai

Abbreviations: VBARD – Vietnam Bank for Agricultural Development; VBSP – Vietnam Bank for Social Policy; WDF – Women Development Fund; FSF –Farmer Support Fund; NMPRP-2 – the second Northern Mountain Poverty Reduction Project; CIG – Common Interest Group.

Note: In Lao Cai, People's Credit Fund just operates at two transaction points in Lao Cai city, Pho Moi and Cam Duong wards, therefore, it does not appear in rural areas.

As described earlier in Chapter 3, to spur to the goals of agricultural development and poverty reduction, the central government establish and nurture two state-owned and well-intended banks, VBARD and VBSP. These two banks cooperate together to serve different segments of rural credit market. While VBSP serves low-income borrowers, VBARD provides credit services to higher income customers. Understandably, with huge and multifaceted subsidies (initial and additional capital, interest rate subsidies, required reserve ratio; tax and other financial obligation remissions), two banks have many advantages in credit provision performance compared to other competitors. As a result, these can tighten the performance of existing financial entities (FSF, WSF) and set up the high barrier against the entrants (Lienviet Post Bank, BIDV, etc.).

Indeed, VBARD and VBSP has a overwhelming proportions in the rural market. In 2017, in terms of outstanding loan, VBARD and VBSP accounted for 81.2% and 18.5%, respectively, of the credit provision in the rural market of Lao Cai (Figure 5.2). Total household borrowers were clients of both VBSP (64%) and VBARD (34%).

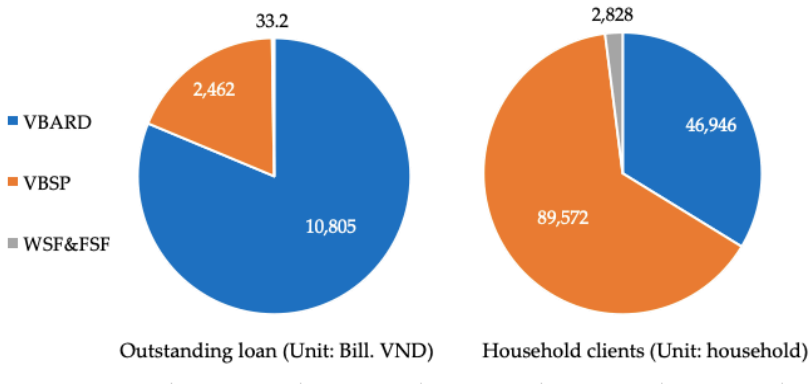


Figure 5.2: Market share of (semi)-formal credit providers in Lao Cai

There are two semi-formal institutions: the Farmer Support Fund (FSF) and the Women's Support Fund (WSF). Their funds come from the contribution of members and the provincial authorities (20-30% of total charter capital). Due to limited capital, both organizations account for a mere share of the rural credit market. These two organizations were hardly mentioned during the (household) surveys, and are thus not widely known.

Table 5.2: Strengths and weaknesses of formal and semi-formal financial providers

Entities	*Strengths*	Weaknesses
VBARD	• Possesses the largest network and the highest facilitating asset to provide credit service in rural areas; • Owns great loanable fund because of SBV's support; • Gains subsidized interest rate from Government; • Meets all eligible credit demand because of diversity of portfolio service, like loan size, interest rate, term and purpose; • Enjoys the right to choose the best farmer clients, so the bank takes advantages in repayment risk.	• The conflicting and ambiguous goals create difficulty in assessing its effectiveness; • Maintains high rate of credit volume to make up for the loss of relationship (SOEs); • Not much targeted smallholder farmer clients and/or agricultural development; • Collateral requirement hinders many potential customers; • Non-interest fees raise the transaction cost of clients and access-constraints.
VBSP	• Focuses on the rural poor and significantly contributes to poverty reduction; • Seems to have slightly increased its transparency recently; • Gains various privilege from Government; • Keeps good relationship with local government; • Requires no collateral, provides low interest rate and long-term maturity.	• Heavy subsidized credit as the national fiscal burden; • Depends on subsidized funds; • Holds no financial sustainability because lending interest rate cannot cover the operational cost; • Shows high leakage among eligible beneficiaries and others; • Operates on cumbersome and ineffective personnel system; • Pays no attention in loan's use.
FSF, WSF	• National network. • Strong government backing and support from local government • Combine credit provision with • technical assistance.	• A mandatory saving to become a member • Small credit amount • Inadequate skills, staffing for credit service. • Not focus on the poor.

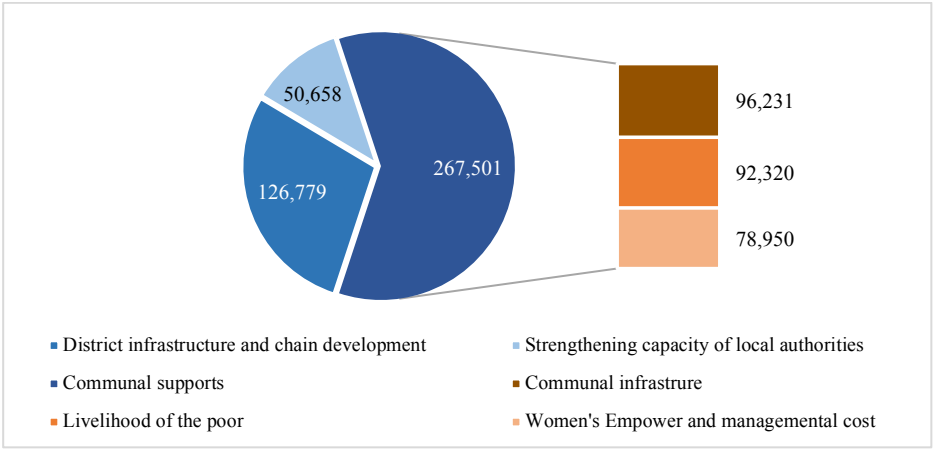
Source: Author's synthesis and partly adapted from Dao (2002)

However, these institutions do not only provide credit, but they also give non-financial support, such as advice on advanced agricultural practices, skills on family's financial management, etc. Unfortunately, their operational expansion faces stiff competition with VBSP. VBSP's loans are larger and lower in interest rate, and without the mandatory saving. As a result, many adherents of

the FSF and WSF have left these entities, and requested formal loans. In 2017 alone, more 900 members (34%) in the province left the WFS.

Briefly, VBARD and VBSP obtain the success in covering the rural financial market. However, its credit provision strongly depends on local authorities, which raises the administrative costs to borrowers and/or national budget, or both. On the one hand, this way is considered the strength because it can reduces the transaction cost of screening loans. However, on the another hand, it contains latent risks for borrowers when their loan application needs to go through many "gatekeepers" to reach to the bank. A summary of strengths and weaknesses of formal and semi-formal providers in Lao Cai province is presented in Table 5.2.

The NMPRP was the largest of the province's five international projects supporting agricultural and rural development. This was funded by World Bank (110 USD million) and stayed the longest (2015-2018) among other entities. The project aimed to increase the income level of rural households in selected communes and key agricultural value chain in the province (World Bank, 2015). Under the AVCF approach, the project focus on 4 main parts (Figure 5.3): (i) supports to agricultural production and livelihood of the poor through CIGs; (ii) improvement of productive infrastructure in communes (road, bridge, clean water and irrigation system); (ii) the productive and institutional capacity of local governments and communities; and (iii) agricultural value chain development through agribusiness supports, chain linkages and infrastructure in the district level (World Bank, 2015).



Source: Department of ODA project management; Unit: Million VND

Figure 5.3: Total investment of the NMPRP project and its structure

The project has obtained positive results in improving farmers' livelihoods and developing a number of specific value chains in four selected districts. As of the year 2018, about 1,022 CIGs brought economic opportunities to 12,781 beneficiary households; 45.9% of these were classified as poor. Livestock dominated the loan's goals and accounted for 93.5% of the approved and implemented sub-projects. The WB project has helped 68% of total beneficiaries getting out the poverty and ensuring food security (NMPRP's Final Report). This is an appropriate direction to develop the agriculture sector in the locality.

Concerning direct Government's subsidies (135[13] and 30A[14] programs), many criticize the effectiveness of these programs in agricultural development and poverty reduction. According to current regulations, the poor farmers living in these disadvantaged areas, like Lao Cai province, receive direct financial support for agricultural inputs, equivalent to 10 million VND (USD 450). Household beneficiaries choose some kinds of specific inputs for crop and/or livestock production in the list of communal authorities suggested. Normally, seedlings of rice and maize, fertilizer, piglet, chicken are selected. The information will be transfer toward bottom-top movement through the village, communal, district, and provincial levels. After that, the Department of Agriculture and Rural Development will choose the appropriate suppliers to buy and deliver toward top-bottom.

Generally, the time for conducting this process is a minimum of two months and, unfortunately, the results of our survey are presented below. (i) the quality of agricultural inputs is managed loosely, especially breeding. Many surveyed households revealed that they had to crop with livestock's diseases' after few days receiving. (ii) In cultivation, Sengcu rice cultivators in Nam Lu commune reported that time to receive was too late, usually in June, for planting the new season. It is noted that this commune belongs to the upland area, water therefore just is available from May to October (see chapter 7). As a result of the late receipt of seedling, local farmers used it as food.

Although there is high density of rural credit sources, farmers still face difficulties in access credit for their agricultural production plans. Consequently, they normally resort to informal credit as an alternative option, despite knowing that moneylenders and input suppliers lend money at exorbitant interest rates, which they often cannot afford to pay. Some farmers go to their relatives and/or

[13] http://mis.chuongtrinh135.vn/default.aspx?T=4&db=31
[14] https://thuvienphapluat.vn/van-ban/EN/Van-hoa-Xa-hoi/Resolution-No-30a-2008-NQ-CP-of-December-27-2008-on-the-support-program-for-fast-and-sustainable-poverty-reduction-in-61-poor-districts/86655/tieng-anh.aspx?tab=7

friends to access non-collateral low-interest loans. Informal loans usually have low transaction cost: no lengthy appraisal process and no paperwork or travel time, and the terms of the loan are well-understood. The advantages or strengths, seem to be the historical reason for the existence of such credit sources, and nationwide, they are called "black" in this mountainous province. Table 5.3 summarize the main strength and weaknesses of NGOs project, Government's programs and informal sectors. Notwithstanding its weaknesses, the imperfect financial market in Lao Cai causes the poor small farmers to borrow against high interest rates in case they urgently need cash. The next section discusses several reasons hindering farmers to access formal credit and answers the question, "Who are the main borrowers of the banks' loanable capital".

Table 5.3: Strengths and weaknesses of informal providers and other programs

Entities	*Strengths*	Weaknesses
NMPRP project/ Foreign NGOs	• Reaches the poor effectively • Defined clearly its targeted customers. • Well-informed and experienced in microfinance matters. • Possesses appropriate technical assistance. • Focuses on sustainability and self-management of the poor.	• Tenders high operating cost. • Covers small population and are isolated. • Possesses low financial fund. • Depends on subsidized funds. • Lacks the size in scope to reach sustainability
Gov.'s programs	• National network. • Strong government backing and support from local government • Combine credit provision with • technical assistance.	• In-kind inputs supports may not matc with beneficiaries' demands; • No financial sustainability. • Inadequate skills, staffing for credit service.
Informal sources	• Offers a wide-range of services and clients • Tenders flexible loan amount and maturity • Uses appropriate lending technique and simple procedure • Offers non-collateral loans, disburses quickly and tenders' low transaction cost. • Manages well default risks	• Tenders high borrowing interest rate (moneylender). • Possesses limited loanable fund. • Covers small population and are isolated. • Showcases financial sustainability and a good example for public credit program.

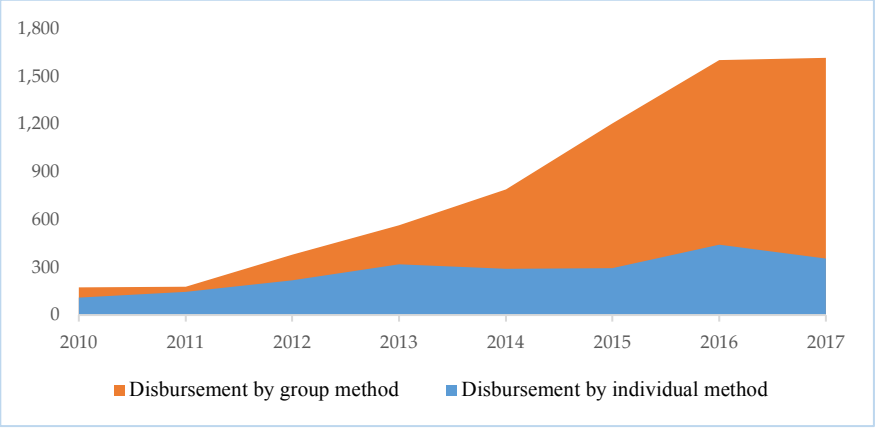
Source: Author's synthesis and partly adapted from Dao (2002)

5.2 Credit provision of VBARD and VBSP in Lao Cai

5.2.1 The lending procedures of VBARD and VBSP

In Lao Cai, most rural borrowers access formal credits through lending groups in order to reduce transaction cost for both of lenders and small borrowers. VBARD's borrowers have to be members of joint-liability lending group (JLLG), and those of VBSP have to participate in a Saving and Lending group (SLG). This method of disbursement is relatively popular in the rural areas in developing countries, also called the community-based (Zeller, 1994) or solidarity (Hermes, Lensink, et al., 2011) method.

The heads of both banks affirm that they use the social network as non-physical collateral that helps the poor to access their credit. In 2017, 97% of VBSP's credit volume was disbursed through lending groups. The share of credit volume disbursed through SLGs at VBARD raised from 62% in 2010 to 82% in 2017, while the credit volume of individual loans stabilized after an initial increase (Figure 5.4).

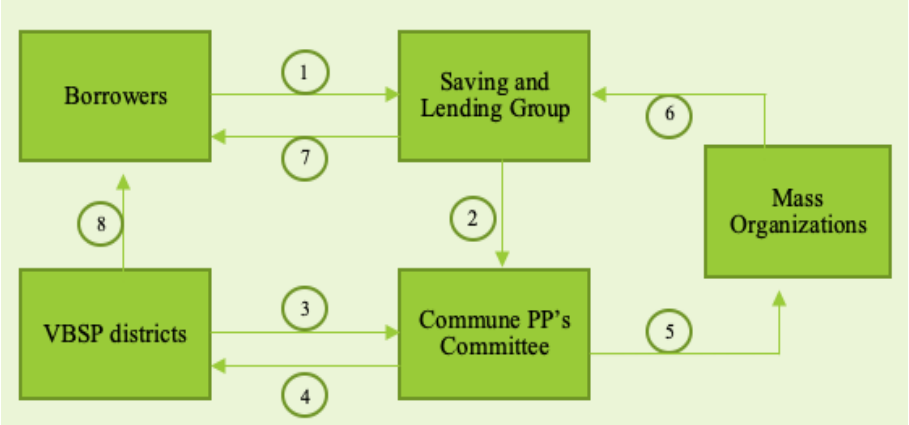


Source: In-depth interview and annual reports of VBARD (2010 – 2017)

Figure 5.4: Agricultural credit of VBARD disbursed through group and individual method (Unit: Bil. VND).

Both the VBSP and VBARD use an eight-step procedure to approve a loan (Figure 5.5). The lending procedures between them differ on one point. Regarding VBSP's subsidized interest rate, the eligible borrowers have to be elected publicly in annual village and commune meetings, including the representative of Commune People's Committee (CPC), Mass Organization

(MO), the head of villages and all villagers. For VBARD the Poverty Board of the CPC ranks the village borrowers.



Source: Household survey and in-depth interview, 2016 - 2018

Figure 5.5: Lending group procedures of VBSP and VBARD in Lao Cai

The eight steps can be described as follows:

1) Eligible borrowers apply for loan to the lending group (SLG/JLLG) which is composed of one leader and 9 to 49 members. Eligible borrowers (i.e., the poor and non-poor households) are selected either publicly or by the Poverty Board.

2) The head of the lending group or the Poverty Board issues the list of approved households, which is sent to the CPC.

3) The CPC and MO provide confirmations as guarantees.

4) The head of lending group brings the completed profile to the district branch bank. At this step, there is an oral discussion between him and the clerk about each applicant.

5) The bank approves and announces to the commune which households can borrow how much.

6) The commune informs the MO and the head of the SLG/ JLLG.

7) The head of lending group tells the households about their loan amount, date, place and other required procedures.

8) Clerks of VBSP coordinate with the head of JLLG/ SLG to disburse money to households at the communal office.

Thus, to receive a formal bank loan, a farmer has to join the JLLG or SLG and her/his loan aspiration to be approved by other group members. Next, s/he has to have good relations with local leaders, in particular the four authorities in charge of the screening process (i.e., the leader of the JLLG, the head of village, MO and CPC). The fourth step is the assessment by the group leader. He plays a crucial role in decision-making process of the clerk. In practice, credit officers seldom conduct field trips to collect reliable information and monitor their targeted clients using loans. Overall, the probability of a loan approved depends on the information given by the local network. In other words, the better the local relations a borrower has, the higher probability s/he gets a loan. This reality is also confirmed in the previous studies by Dufhues et al. (2002) and Okae (2009).

The household surveys reveal that *social status* of borrowers has the strongest impact on the result of their loan received, and not the agricultural production capacity and repayment risk. This finding confirms that "nepotism" is relatively widespread in rural areas of Viet Nam. It means that local authorities can give favoritism to their relatives and parentages, meanwhile other potential applicants cannot access credit because of worse assessments. Obviously, evaluation biased may effect on the decision-making process of clerks. Among 92 applicants unsatisfied with VBARD's loan, 17% reported to have expressed their opinions about the inconsistencies with the communal policies of the decision on their loan request. For example, if one of the local authorities does not like the borrower, he/she may a lower loan amount or even get rejected; sometimes, the power to accept or reject seems to be used as a reward or punishment.

Another difference between VBARD and VBSP is the *collateral requirement*. To get a loan, VBARD requires a collateral (i.e., LUC) while VBSP does not require it. As regulated[15], rural clients nationwide can take a non-collateral loan up to 100 million VND from VBARD and/or 50 million VND from VBSP. The bank officers explained that LUC is considered as VBARD's *psychological strategy*, which forces borrowers to honor their financial obligations. They also revealed that the real estate market in rural areas, especially in uplands, has very low liquidity. Therefore, in the case of borrowers' default, the bank faces difficulties in selling their land at public auctions, like the urban areas. Moreover, they are also unable to expel the poor households from

[15] Regulated at Decree 55/2015/ND-CP about the preferential credit policy for agriculture and rural development.

ethnic minorities from their homes because of the sensitivity regarding human rights.

From the viewpoints of households, residential land and their houses are their most important assets associated with their whole life. Many farmers, therefore, prefer keeping their red book and remain poor, instead of making it their collateral in taking a loan. This is a case of self-exclusion of smallholder farmers – deciding by themselves not to participate in the rural credit market. Thus, only 15% of the land having LUC was used as collateral for loans (World Bank, 2018a).

5.2.2 Credit rationing of VBARD and VBSP Lao Cai

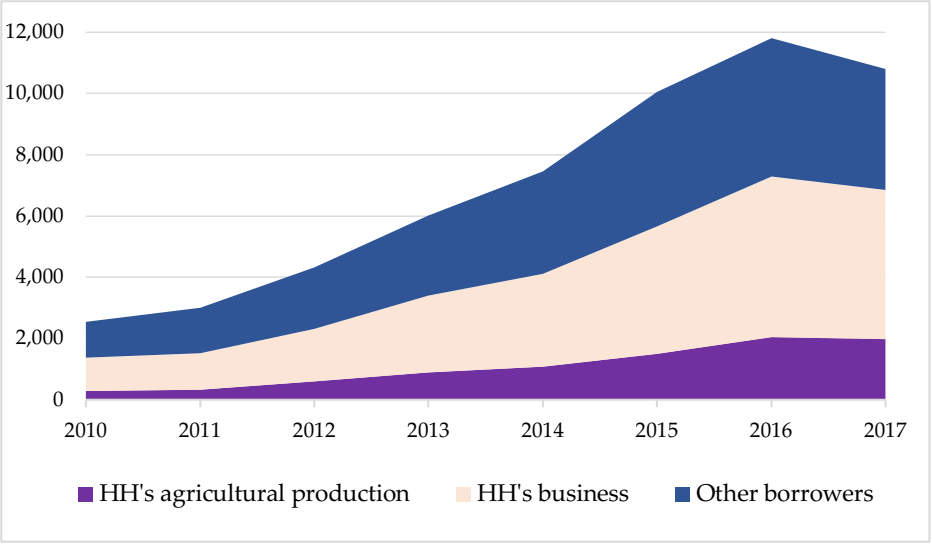
Credit rationing is limiting the amount of the loans by the lenders for particular borrowers, even if the latter are willing to pay higher interest rates. With smaller loans, these borrowers are unsatisfied. This section scrutinizes the credit allocation of VBARD and VBSP regarding the disbursement of loans lower than what was requested by the borrower even when the amount was legally allowed.

❖ *Credit allocation by VBARD Lao Cai*

According to the head of VBARD Lao Cai, the bank provides credit to agricultural and non-agricultural enterprises, and to households for their business and farm. From 2010 to 2017, the credit volume devoted for household borrowers increased by 32.1% per annum, but accounted 18.3% only (Figure 5.6). Based on current regulation, poor farmers and non-poor farmers in the disadvantaged communes may borrow money with a 50% lower interest rate (before 2017) or a rate of 7.5% per year (after 2017). The central Government is responsible for the bank's losses related to the interest. Currently, the published savings interest rate of VBARD is around 7.0% per year. The representative of VBARD stated that lending for agricultural production is the riskiest, and that transaction cost for disbursement and enforcement of financial obligations is the highest. This opinion greatly influences the bank’s decision-making on lending the farmers.

Loans for non-farm business of households and enterprises accounted for 45% and 37%, respectively. These clients get credits with commercial lending interest rate. The cross-check interviews with credit officers working at other banks revealed that state-owned enterprises (SOEs) are considered zero-risk customers. This often accounts for a large proportion in the total credit volume of VBARD, not only in Lao Cai, but also in the country. Although this has

improved a little recently, the preferred credit allocation to these two customers is also an obstacle for farmers to access the demanded amount of credit.



Source: Internal reports of VBARD Lao Cai, 2010 – 2017

Figure 5.6: Outstanding loan of VBARD Lao Cai by main borrowers and loan's purpose **(**unit: Bill. VND)

After completing all lending procedures described in Figure 5.4, farmer applicants receive the decision of VBARD's on their approved credit amount. The decision can be: i) receive nothing (Y=0); ii) receive a partial loan, i.e. being smaller than the sum their desire (Y=1); and, iii) receive a loan as applied for (Y=2). Among the 193 surveyed households, 148 respondents had applied a loan at this bank. Of this number, almost half (48.3%) received nothing, 14.2% of received a partial loan, and 37.8% got a full loan. The partially attributed loans were 65-80% of the demanded amount. Based on household characteristics, almost all Y-0 applicants are the poor with the lowest education level, the smallest cultivated land, the least non-farm income and the smallest agricultural production (Table 5.4). In contrast, the fully satisfied group (Y=2) scored better on these four criteria.

The Multinomial Logit Model (MLM) of the 148 households confirms that the screening process for the unsatisfied loan group is poor and achieves only 9.5% of correctness (Table 5.5). The incorrectness is caused by: (i) underestimated repayment risk of borrowers who should not have received a loan

(43% of partly received); (ii) Eliminated potential customers (48% of this middle group) who are capable of repaying debt given their agricultural assets. Obtaining the best scenario with higher exactness of credit allocation brings mutual benefits not only for both borrowers and lenders, but also for the local economy.

Table 5.4: The household's variables used in the VBARD's credit rationing

Variables	Fully rejected (n=71)	Partly received (n=21)	Fully received (n=56)	Kruskal Wallis Test
I - Continuous variables				
X_1: Age	44.26	45.23	44.41	0.78
X_2: Dependency ratio	0.37	0.40	0.35	0.80
X_3: Agricultural labour	2.34	2.86	2.66	0.07*
X_4: Cultivated land	15.07	22.06	29.49	0.00***
X_5: Non-farm income	6.31	12.50	21.75	0.01**
X_6: Loan amount required	20.89	55.28	69.25	0.00***
X_7: GO written in application	36.11	69.69	111.32	0.00***
II- Categorical variables				
D_1: Gender [a]	49.30	71.43	76.79	-
D_2: Social status [a]	5.63	40.86	55.36	-
D_3: Loan for livestock [a]	36.62	42.85	57.14	-
O_1: VBARD's dynamic [b]	1.65	2.05	2.27	-
O_2: Education level [b]	1.23	1.95	2.11	-

Note: [a] These variables are dummy, its figures in the table denote the percentage of observations taken value at 1.

[b] These two explanations are the ordinary variables. Even the average of this norm is not much meaningful, but it reflects little the distribution of observations.

The loan's purpose on livestock achieved the highest exponent in both models, implying its strong effect on the decision of the bank on approved credit. Clearly, in model "Y=0 versus Y=1", small households applying for a loan to raise livestock have a lower probability to get a loan approved, compared to loans for crop cultivation. Larger households observed through the second model (Y=2 versus Y=1) have a higher success rate if they borrowed for livestock development. Indeed, small-scale livestock projects with poor facilities get more

often struck by diseases and other defaults [16], while well-equipped and managed projects prevented these risks.

Table 5.5: Determinants of VBARD on the loan requests based on a Multinomial Logit Model

Variables	Rationed (Y=0 vs. Y=1)			Fully received (Y=2 vs. Y=1)		
	Coeff.	SE	Sig.	Coeff.	SE	Sig.
Intercept	12.34***	2.89	0	2.75	2.70	0.31
X_1: Age	-0.09**	0.03	0.01	-0.03	0.03	0.31
X_2: Education	-2.01**	0.76	0.01	0.71	0.73	0.33
X_3: Dependency ratio	-1.10	0.85	0.2	-1.19	0.85	0.16
X_4: Number of laborers	-0.52	0.40	0.2	0.64*	0.38	0.09
X_5: Agricultural land	-0.06*	0.03	0.06	0.02	0.02	0.22
X_6: Non-farm Income	-0.04*	0.03	0.09	-0.01	0.01	0.55
X_7: Loan size required	0.02	0.02	0.3	0.04*	0.02	0.07
X_8: GO expected	-0.01	0.02	0.36	-0.01	0.01	0.13
X_9: VBARD's dynamic	0.51	0.48	0.29	0.57	0.47	0.22
D_1: Gender	0.32	0.70	0.64	-0.5	0.69	0.47
D_2: Social relationship	-1.56*	0.87	0.07	1.54**	0.69	0.03
D_3: Loan for livestock	2.11**	0.98	0.03	2.43**	1.00	0.02

Variance parameters

The reference category is: Partly received (Y=1). Pseudo McFadden (R^2): 0.432

Likelihood ratio (χ^2): 127.49 (Sig. 0.00) Goodness-of-Fit: 307.17 (Sig: 0.06)

Percent correct of predictions

Observed	Fully rejected	Partly received	Fully received	Overall
Expected Fully rejected	63	2	6	89%
Expected Partly received	9	2	10	9%
Expected Fully received	8	2	46	82%
Total	54%	4%	42%	75%

Note 1: ***, **, and * indicates the statistically significance at 1%, 5% and 10%, respectively.

Note 2: The signals of the estimated coefficients in the first sub-model (Y=0 versus Y=1) need

[16] The cold of the winter in mountains leads animals to weaken and die due to low-quality stables and lack of fodders.

to be interpreted in the reverse way, meaning that an exponent having a *negative* signal affects *positively* to the probability of getting a partly loan, and *vice versa*. For the second model (Y=2 versus Y=1) the signals of the exponents reflect the nature of things.

In Lao Cai, authorities encouraged large-scale livestock development through preferential credit and direct subsidies[17], which explains the high probability of getting a loan for livestock if the other criteria are satisfied. This finding confirms the finding in Tunisia by Foltz (2004) that intensive farming plans are able to more successfully access formal credit; small farmers face more difficulties than others.

Social relationship is the second-highest exponent and positively affects the result of the bank's credit decision. This is consistent with the results of earlier studies done in rural Viet Nam (Duong et al. (2002) Khoi et al. (2013) Barslund et al. (2008) and (Hoang et al., 2012). This confirms that with the community-based lending method, social collateral is an indispensable and essential tool to estimate the borrowers' repayment capability – which is VBARD's highest concern. However, as mentioned above, the assessment of local authorities may be biased by nepotism.

With regard to household characteristics, the higher education level, the larger agricultural land ownership and the higher non-farm income are a proxy for the repayment capability. Borrowers who possess these characteristics get a higher probability of loan approval. This findings agree with the findings in the previous studies (Chaudhuri et al., 2012; Duong et al., 2002; Khoi et al., 2013; Nuryartono, 2007; Rahji et al., 2009). Generally, education connected to human capital (skill, knowledge, technology), influences the repayment capability.

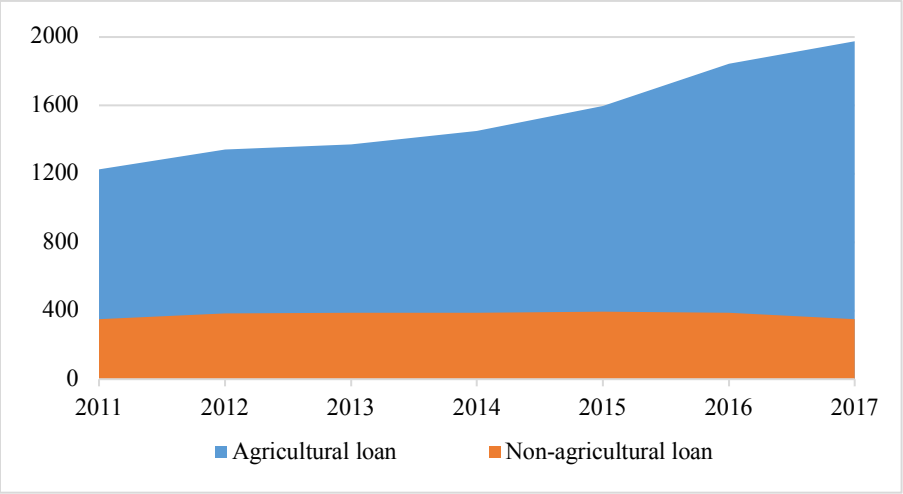
The positive sign on the amount of the credit implies that the bank prefers larger loans to reduce transaction costs. If banks do not give small loans, how can small-scale farmers become creditworthy and access preferential credit as government expects; most likely, they get excluded from the formal credit market (Smith, 2001).

❖ *Credit allocation of VBSP*

VBSP supports agricultural development through its subsidized loans provided to the poor and other disadvantaged citizens, whose main livelihood is agriculture. The share of agricultural loans increased from 78% in 2011 to 85%

[17] Decision No. 2545/2014/QĐ-UBND on livestock development during 2015 to 2020 and the orientation to 2030.

in 2017 in the total credit volume (Figure 5.7). Its average annual growth rate was 8.3%, while the credit volume of non-agricultural activities, including loans for education, housing, water of the poor, was stable. The agricultural loans of VSBP certainly played an important role in the reduction of poverty in recent years.



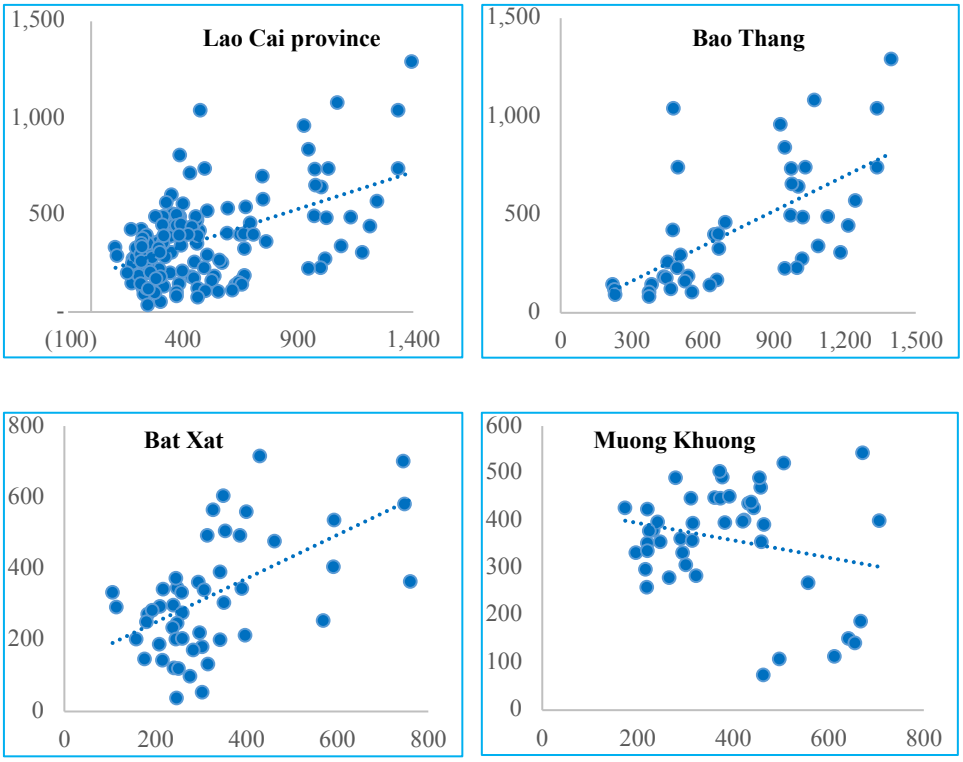
Source: VBSP Lao Cai

Figure 5.7: Credit allocation of VBSP Lao Cai by loan purposes

Analyses on the data of poor households and the credit provision of VBSP from 2015 to 2017 in 52 communes showed loan attribution differences between district branches in (Figure 5.8 and Figure 5.9). More of VBSP's credit flowed in Bao Thang district which had a higher rate of poor households; communities with more poor households got more loan, compared to those with less poor households. This contrast with Muong Khuong, where the poor living in such communes faced more constraints to access credit of VBSP; the slopes in both figures for Muong Khuong are negative, indicating that not only the number of poor clients but also the credit volumes in poorer communes were smaller. In Bat Xat, the performance of VBSP was at the intermediate, the slope of its trend line in Figure 5.8 is positive, and that in Figure 5.9. is negative.

These figures reflect the effective performance of the VBSP branches in achieving poverty reduction and agricultural development, in which VBSP Bao Thang obtained the best branch, and Muong Khuong obtained lower than expected. For example, in 2017 alone, Bao Thang had the lowest poverty rate (15%), followed by Bat Xat (27%) and Muong Khuong (47%) with corresponding value addition from one hectare of cultivated area generation 65;

57 and 44 million VND (BaoThangSO, 2017; BatXatSO, 2017; MuongKhuongSO, 2017).



Source: Department of Labor, War Invalids and Social Affairs; VBSP in selected districts in 3 years, 2015 – 2017

Figure 5.8: The relationship between the number of poor households (vertical axis), and the VBSP's outreach (number of households borrowing) in the communes selected.

On the contrary, the credit provision of VBSP Muong Khuong token place under - expected. More detailed, the poor and small-scale farmers living in better communes can more easily borrow money with a higher amount loan compared to others, *vice versa*. In fact, this comes from both the bank (transaction cost and risk avoidance) and the borrower (few economic opportunity) as well as the poor infrastructure. According to Kozel (2014), the poverty reduction in Northern Vietnam seems that more and more difficult. Therefore, in order to boost the poverty alleviation and agricultural sector, clearly, it is necessary to have the comprehensive support system for disadvantaged areas, not subsidized credit alone.

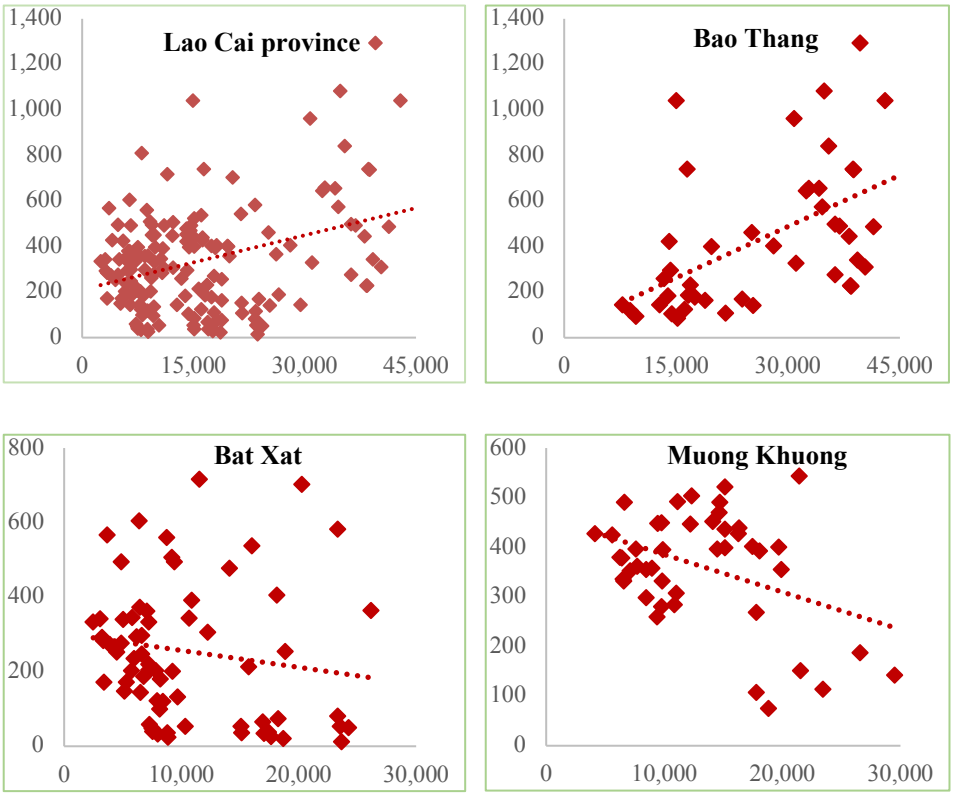


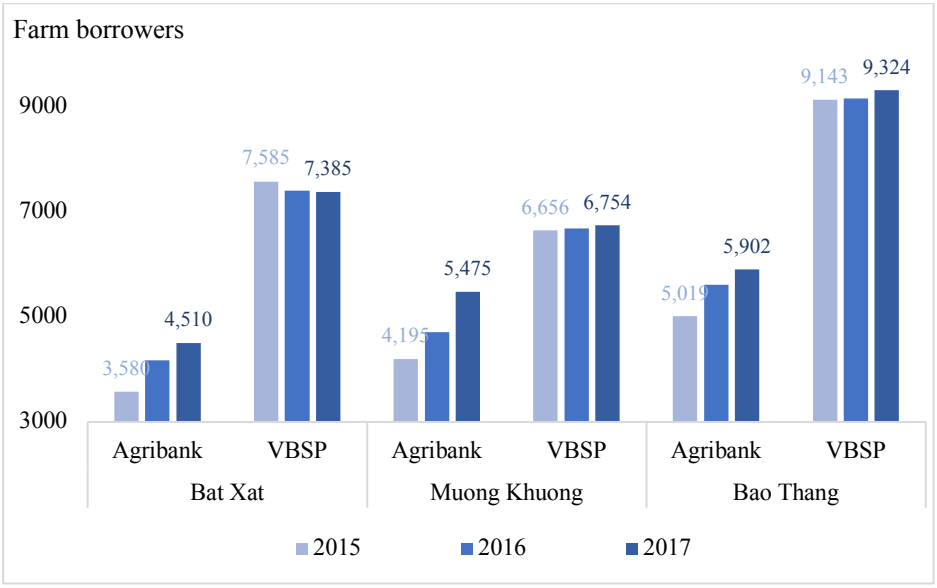
Figure 5.9: The relationship between the number of poor households and the VBSP's outstanding loan (in million VND) in the communes

5.2.3 Lending products of the formal financial sector

In the three districts, the outreach to farm households of VBARD increased, while that of VBSP remained stable between 2015 and 2017 (Figure 5.3). Households were able to get a loan to finance their agricultural production activities. This trend aligns with the differences in poverty rates and agricultural productivity of these districts. In 2017, Bao Thang recorded a poverty rate of 11.4%; Bat Xat, 28.3% and Muong Khuong, 37.4%; the average values of farming output in the same year, correspondingly for the three districts, were 64.9, 57.1 and 43.6 million VND per ha.

VBSP addresses the poorest segment to expand their agricultural activities. According to the heads of VBSP districts, on average, over 75% of the poor population in the province gets a preferential credit to develop their livelihood. After the first step out of poverty, having accumulated some capital themselves,

they shift to borrow money at VBARD, the commercial bank serving the higher-income customers. Thus, these two banks indeed serve each a different market segment.



Source: VBARD and VBSP at district branches

Figure 5.10: Outreach of the formal financial sector in the research site

From 2013 to 2017, the total credit volume of the three VBARD's branches grew (Table 5.6); Bat Xat district grew the highest 32.2%; followed by Muong, 19.5% and Bao Thang, 16.4% per annum. The VBARD in Bat district head said that recent agricultural production performance generated high profit for farmers, especially for those who raised vegetables during the off-season. Moreover, contributing to the capital extended by the bank is the monitoring of farming practices by local authorities which pushed farmers to produce better quality crops. Agricultural cooperatives in the communes have linked with trading enterprises in other provinces; therefore, motivating further the bank's willingness to meet farmers' financial needs.

In contrast, Bao Thang district farmers' profit and debt repayment capability were undermined in recent years. Often considered the agricultural pioneer of the province, Bao Thang farmers mostly raise livestock (pigs, chickens), and the related output accounts for approximately 40% of the province's total livestock value. In 2016-2017, farmers suffered from weather disasters and price volatility; this explains the slight reduction of VBARD Bao Thang's total credit volume.

Table 5.6: Outstanding loan and its structure based on the loans' schedule

	2013	2014	2015	2016	2017
VBARD in Bao Thang district					
Total outstanding loan (Bil. VND)	546	688	966	1,096	1,001
- Seasonal payment (%)	45.6	47.9	39.9	37.0	38.3
- Fixed payment (%)	54.4	52.2	60.1	63.0	61.7
VBARD in Bat Xat district					
Total outstanding loan (Bil. VND)	270	338	461	647	844
- Seasonal payment (%)	9.2	13.3	16.5	5.3	10.9
- Fixed payment (%)	90.8	86.7	83.5	94.7	89.1
VBARD Muong Khuong district					
Total outstanding loan (Bil. VND)	221	258	310	405	450
- Seasonal payment (%)	28.7	11.3	87.0	66.1	63.0
- Fixed payment (%)	71.3	88.7	13.0	33.9	37.0

VBARD's branches practice two methods of repayment: fixed and seasonal. Borrowers with the fixed payment take a loan at the beginning loan contract and payback the total principal once upon the maturity. Borrowers often take a "lump sum" loan, which ensures the total financial need in the whole agricultural production cycle. A higher interest, therefore, is generated due to the longer duration and the larger principal. Moreover, if farm households have another financial demand, they have to make a new loan contract, which is often costly and time-consuming.

Table 5.7: The structure of outstanding loan based on the loans' duration

	2013	2014	2015	2016	2017
VBARD in Bao Thang district					
- Short-term credit (%)	48.4	49.3	43.8	39.9	34.9
- Long-term credit (%)	51.6	50.7	56.2	60.1	65.1
VBARD in Bat Xat district					
- Short-term credit (%)	54.5	42.3	41.7	42.5	34.4
- Long-term credit (%)	45.5	57.7	58.4	57.5	65.6
VBARD Muong Khuong district					
- Short-term credit (%)	58.1	46.2	38.0	31.0	23.5
- Long-term credit (%)	41.9	53.9	62.0	69.0	76.5

Source: VBARD at 3 selected districts

In contrast, seasonal loans allow the flexibility of borrowers to receive amount of money in their agricultural investment or repay bank loans at the harvesting time for as long as the total loan size is under the credit line. This method meets better the irregular cash-flows (in and out) of borrowers in only one loan contract. Besides, borrowers can reduce their interest due by shortening the length of repayment and taking out a smaller principal.

Based on in-depth interviews with clerks, they preferred the fixed and long-term loans because the management required is simple. Between 2013 and 2017, VBARD in Bao Thang and Bat Xat mainly provided fixed and long-term credit, while Muong Khuong gave seasonal and long-term loans (Table 5.6 and Table 5.7). The proportion of seasonal and long-term loans of VBARD in Muong district, as well as in other branches, increased rapidly from 2013 to 2017. Long term loans reduce the transaction cost, but require credit officers and local authorities to exercise good management and monitoring of the borrowers' financial obligations. This explained the high proportion of fixed loan repayments. The head of Bat Xat's stated that the bank finances new agricultural projects, which need long-term maturity in order to finance fixed assets.

Table 5.8: Outstanding loan of VBSP devoted for agricultural production in the research site

	2015	2016	2017	Growth (%)
VBSP Bao Thang				
Outstanding loan (mil. VND)	275,798	318,977	352,125	12.99
Total household borrowers (HH)	9,143	9,167	9,324	0.98
Amount loan per borrower (mil/HH)	30.16	34.80	37.77	11.89
VBSP Bat Xat				
Outstanding loan (mil. VND)	178,388	211,348	234,935	14.76
Total household borrowers (HH)	7,585	7,410	7,385	-1.33
Amount loan per borrower (mil/HH)	23.52	28.52	31.81	16.30
VBSP Muong Khuong				
Outstanding loan (mil. VND)	186,985	218,982	242,635	13.91
Total household borrowers (HH)	6,656	6,687	6,754	0.73
Amount loan per borrower (mil/HH)	28.09	32.75	35.92	13.08

Source: VBARD at 3 selected districts

VBSP in Lao Cai provides 16 preferential credit packages to disadvantaged citizens and devotes the largest proportion of its total credit volume for agricultural production, which is considered the most important income source

for the poor. VBSP's branches posted high growth rates of the total outstanding loan and loan size per farm borrower from 2015-2017, with a stable number of household borrowers within the same period (Table 5.8). The high growth of loans corresponds to the increasing financial needs of households as they expand their agricultural production. All loan contracts provided by VBSP are long-term and require one-time repayment only. In practice, the VBSP's clerks rarely visit household borrowers to collect information about credit use and its effectiveness. This lack of monitoring may lead to use of loans for non-productive purposes, without income generation, and to higher non-repayments.

5.3 Discussion and Conclusions

In Lao Cai, to support the national goals of agricultural development and poverty reduction, two state banks provide loans to farmers (Chapter 3.1). VBARD provided both subsidized credit and commercial loans to higher-income customers, while VBSP provided preferential loans to the poor and non-poor households, and other social beneficiaries. In the formal rural credit market, VBSP and VBARD had a dominant market share likely quasi-monopoly in terms of the total credit volume and household clients. Two semi-formal institutions, FSF and WSF, accounted for a meagre share, although they also provided useful non-financial support. However, their performances are hindered by VBSP's larger loans with lower interest and without the mandatory savings, and more than 900 members (34%) left the WFS.

This feature of the Vietnamese financial systems is criticized. According to Sauli et al. (2017), the public sector in Viet Nam is still too much involved in the banking industry, for example, five state-owned commercial banks account for about 40% of total assets. Instructed by government, these banks have been providing a large share of low-interest credit to large state-owned enterprises with weak quality business plans (Dufhues, 2007). As a result of the loss-making relationships, the credit risks and the non-performing loan ratio of the banking sector in Vietnam are relatively high (Sauli et al., 2017; Thanh Tam, 2011).

This situation looks like in Lao Cai province. The credit officers in other banks revealed that a large proportion of the total credit volume of VBARD was devoted to state-owned enterprises. This loss-making relation has been condemned by international sponsors and researchers (Dufhues, 2007; WorldBank, 2014). Indeed, besides farm households, VBARD also provided credit to non-farm households and enterprises accounting for 45% and 37% of the total credit volume of the bank in 2017, respectively. As a result, farmer

borrowers have to suffer from the unfair credit allocation, although they are main targeted borrowers as regulated by the central government.

Concerning credit products, both VBARD and VBSP dominantly provided long-term credit, meanwhile our household survey reveals that farmer borrowers need both short-term and long-term loans. In addition, VBSP only offered fixed-repayment loans, meanwhile VBARD provided a wider diversity of lending portfolios: seasonal and fixed. Obviously, seasonal loans matched well with the financial needs of most agricultural borrowers, while this also reduced their total interest charge. However, the proportion of seasonal loans is limited because credit officers prefer fixed and longer loans requiring relatively less administration and follow-up. Thus, many farmer's demands for short-term credit as working capital were subject to credit rationing as the banks feared high transaction costs.

Three principles of using loans effectively include: short-term loans finance operating costs, intermediate-term credit offers for agricultural machinery and long-term ones are used for real-estate investments (Murray, 1980). Local banks supply a large proportion of short- and medium-term loans as requirements of subsistence-farming borrowers (Mir Kalan et al. (2008). In this study, we found that both banks did not pay attention to the actual credit demand of clients. Arguably, providing unsuitable credit may lead to agricultural production of farmers being unprofitable and increase the non-repayment risks.

Both VBARD and VBSP Lao Cai disbursed mainly through the lending group method requiring households to get a good assessment from local authorities. The MLM models showed that the social network of households impacted on the result of their credit requests to VBARD, i.e., socially isolated households suffered from credit rationing. The majority of smallholdings were assessed as low creditworthy, and their loan application was fully rejected by VBARD. Consequently, 48% of those, who were capable to repay, received an unsatisfactory amount, while in contrast, 43% of the applicants getting a smaller loan than desired had a too low-repayment capability.

Similarly, the poor living in poorer communes faced more difficulties to access VBSP's credit than others. Dufhues et al. (2002) confirmed that the lending group method eliminated many potential households from getting formal loans and investing in agriculture. Moreover, Claudio (2017) also stated that lending groups enhance the difficulty for bank officers to evaluate applicants and to make the right decisions in disbursement. Varghese (2004) affirmed that the bank-moneylender collaboration is likely an excellent alternative to the lending group method to remove the asymmetric information problem. Okae (2009),

Zeller (1994), and Sauli et al. (2017) pointed out that the outstanding advantage of socio-politic conventions or pressure makes the level of default being close to zero.

The lending group method used by VBRAD and VBSP in allocating credit is an obstacle that small farmers face to access the preferential credits designated for them. In practice, credit officers did not visit their customers both *ex-ante* and *ex-post* disbursement, and their screenings strongly depended on the assessment of the head of the lending group and other local authorities. Thus, information about borrowers is both weakened and distorted from bottom to top. Obviously, bank officers themselves need to visit potential borrowers and relevant productive facilitation to make accurate decisions on lending.

6.

Financial demands and credit constraints of farm households in Lao Cai

This chapter has four parts. The first part analyzes the performance of agricultural activities of the surveyed households in Lao Cai and the financial sources granted to them. The 193 household samples were grouped into small-, medium- and large-scale agricultural cost. The results indicate that the effectiveness of agricultural production of small- and many medium-scale households is low, because they used either (i) home-made inputs with low quality, or (ii) inputs financed by in-kind credit from input suppliers or by borrowed money. These two sources have high interest rates, leading to an unprofitable agricultural production.

The second part describes the households' loans and estimates the impacts of credit access on agricultural production, and the third part summarizes the constraints to formal credit access. Small-scale households receive smaller formal loans against higher interest rate compared to others, while they are the main target of the Government's subsidized credit packages. Nevertheless, the acquired formal credits have positive impact on agricultural production and its structure. Options to enhance the accessibility and effectiveness of loans are discussed in the fourth sections where we draft also some conclusions.

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http://www.ccsenet.org/journal/index.php/ass/article/view/0/39949

6.1 – Agricultural production and financial demands

6.1.1 Main characteristics of farm households

Over 70% of the 193 surveyed households in 2018 are part of one of the 25 ethnic minorities (Table 6.1). A small proportion (17%) of the total respondents obtained the high school diploma and most of them (54%) fulfilled secondary school. Among those with the lowest education level, the majority (40%) belong to the small household group.

Small farm households have the least members in their family and the highest dependency ratio of 0.7. It means that the earning member in these households suffers from the heavier burden to take care of the non-productive members. In contrast, a working person in large households has less pressure, compared to others.

Table 6.1: Socio-economic characteristics of households

Features	Unit	Small (n=50)	Medium (n=94)	Large (n=49)	Total (n=193)
Ethnic **					
Kinh majority	%	22.4	31.9	34.0	29.4
Ethnic minority	%	77.6	68.1	66.0	70.6
Age of HH's head N/S	year	44.9	42.8	50.7	45.3
Farm size and labor					
No. of family members N/S	person	3.9	4.4	4.5	4.3
Number of agri. labor *	person	2.3	2.6	2.9	2.6
Dependency ratio *	%	0.7	0.7	0.5	0.6
Education **					
Primary and lower	%	40.0	26.6	24.5	29.5
Secondary	%	44.0	55.3	63.3	54.4
High school	%	16.0	18.1	14.3	16.6
Agricultural land ***					
Annual crop	ha	0.35	0.56	0.62	0.54
Perennial plant	ha	0.21	0.31	0.46	0.32
Wealth state **					
Poor	%	58.0	47.9	16.3	42.5
Near poor	%	36.0	37.2	20.4	32.6
Better off	%	6.0	14.9	63.3	24.9
Social capital ***					
Good	%	12.0	24.5	79.6	35.3
Not good	%	88.0	75.5	20.4	64.7
Main type of farming	Cultivation-based		Mix	Livestock-based	

Source: Household survey, 2018

Note: ***, **, * and N/S indicate the statistically significance at the 1%, 5%, 10% level and not significant in the Kruskal Wallis Test, respectively.

On average, the households cultivated 0.84 ha, with 60% of the area being devoted to annual crop. The large-scale households have land (1.08 ha) twice as much as that of the small households (0.56 ha), while that of the intermediate group has about the average. Small-scale households not only hold the smaller area, but also their land is often located far from the village. In addition, the majority of small-scale households live in uplands, without public irrigation system, while the larger households have (more) plots in lowlands served by the public irrigation system.

Concerning the social network, majority of the small and medium households (88% and 76%, respectively) perceived that they did not have a good relationship with local authorities, while, only a minority of large households (20%) felt the same.

In Lao Cai, agriculture is main income-generating activities of local farm households (Figure 6.1). Specifically, the share of agriculture in total value addition, on average, was 72%. Although the non-farm income of the small households reached only 8.8 million VND in 2018, it occupied the highest proportion in their total value addition (45%), compared to the remaining groups. In contrast, the non-farm income of the large group of households is 22 million VND; it accounted for the smallest proportion (24%).

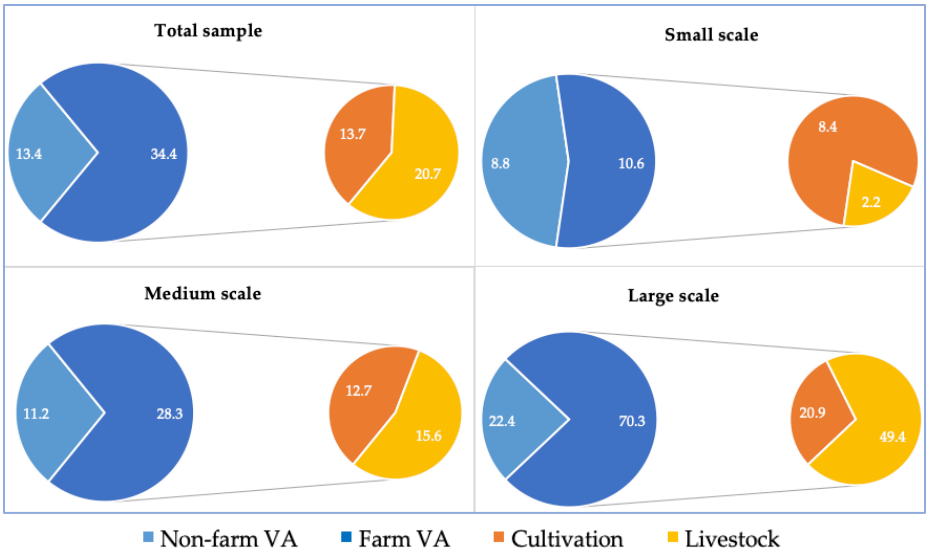


Figure 6.1: Livelihood of local households and their value added structure

The prominent trend in the farming activities of small households is cultivation instead of livestock husbandry because they just spend a few days on sowing, transplanting, maintenance and harvesting time. While livestock producers have to take care of the animals daily (collect fodder, prepare feed, and give water, clean, etc.). Moreover, the shocks regarding natural hazards and selling prices experienced in the past prevent small-scale households from making new investment in raising animals. During their spare time, they can move downtown to seek part-time work to earn money "without investment and risks". Therefore, their sources of additional income come from non-farm

activities, being engaged as seasonal worker; e.g., as porter, construction worker, housekeeper, etc.

In contrast, for medium and large households, agriculture still remains an attractive income-generating activity, and they spend most of their time on farming operations. Therefore, agricultural value addition occupied over 70% in their livelihood. Within agricultural activities, medium and large households invested more in livestock than cropping, which accounted for 55 and 70% of agricultural value addition, respectively. In the context of scarcity of arable land in mountainous areas, the livestock-based farming is considered a suitable way to enrich the households' livelihood.

However, many farmers reported that they suffered from animal disease outbreaks and volatility of the selling price. The market price depends on local wholesalers and the importing policy of China, and farmers may not have identified the best channels for their product, or entered into a contract with a purchasing enterprise. For example, in 2017 alone, almost all pig producers in Lao Cai, as well as in Viet Nam experienced a heavy shock regarding market price and volume: the average selling price of live pigs decreased from 50,000 VND/kg in March to 20,000 VND in September 2017. This strongest reduction over the two last decades was caused by import policies of China, which is the largest consumer market of Viet Nam. Currently, the export to this market is mainly based on spot contracts or verbal agreements. Consequently, households had to pay all the production cost and took most losses in the chain.

6.1.2 Agricultural production and financial needs of farm households

Typically, the livelihood production systems can be characterized as: subsistence, semi-subsistence/ semi-commercial and commercial in producing crops and animals. Smallholdings mainly belong to the subsistence and semi-subsistence groups with a low level of marketable products, while the medium and large farm households aim to produce for the market. Many medium-scale farmers have productive opportunities, but need to obtain credit to finance their projects.

Table 6.2 presents the huge differences among three household groups in terms of their investment in cultivation and livestock as well as their value added. Regarding agricultural investment, clearly, small households had the lowest investment level at 8.3 million VND during the past 12 months at the time of survey. Medium and large households spent about 34 and 115 million VND, respectively.

The farming activities of the small-scale households focused on cultivation, accounting for 68% of their agricultural investment and 79% of their added value. They mainly exploited natural inputs (land, rainfall and sunshine) and used home-made agro-inputs (self-storage seeds, manure and green fertilizer). Moreover, they hardly invested in animals, even if they would like to raise more animals for food security and/or for their children's nutrition, but they were afraid of diseases and lacked money to build the facilities.

Table 6.2: Agricultural production of households divided by different scales

	Small (n=50)	**Medium** (n=94)	**Large** (n=49)	**Total** (n=193)
Cultivation *(million VND)*				
Intermediate Cost	5.7	9.5	17.6	10.6
Gross output	14.0	22.2	38.5	24.2
Value-added	8.4	12.7	20.9	13.7
Livestock *(million VND)*				
Intermediate Cost	2.6	24.2	97.8	37.3
Gross output	4.8	39.8	147.2	58.0
Value-added	2.2	15.6	49.4	20.7
Proportion of livestock in farming activities *(%)*				
Intermediate Cost	31.7	71.8	84.8	77.9
Gross output	25.6	64.1	79.3	70.5
Value-added	20.9	55.0	70.3	60.2
Efficiency of agricultural production				
Cultivation's VA/IC	1.5	1.3	1.2	1.3
Cultivation's GO/IC	2.5	2.3	2.2	2.3
Livestock's VA/IC	0.8	0.6	0.5	0.6
Livestock's GO/IC	1.8	1.6	1.5	1.6

Note 1: In this table, all comparisons are statistically significant (less than 5%) in the Kruskal Wallis Test, except the efficiency ratios (VA/IC and GO/IC) of cultivation;

Note 2: Gross Output includes marketed products and home consumption.

Therefore, their farming activities depended strongly on natural conditions, for example, rice mono-cropping in uplands from May to October or husbandry in the spring-summer season, when ruminants easily find feed. This also

explains why these farmers obtained very high effectiveness and efficiency ratio (GO/IC and VA/IC). In fact, agricultural products generated have not met their home consumption. In the winter-spring months (December to April), their foods depended on subsidy policies for hunger eradication of the Vietnamese Government.

In contrast, among two subsectors of agriculture, the medium and large households paid more attention to livestock development. This is a meaningful economic activity in mountainous areas because it requires small agricultural land but high capital. Its proportion in the total intermediate cost was 72% and 85% of medium and large households; and generated 55% and 70% of total added value, respectively. Better financial availability allowed them to use a large quantity of commercial inputs, such as certified seeds, chemical fertilizer, pesticide, industry animal feeds and energy.

In terms of efficiency, large-scale households were less efficient in the use of materials for their farming operations because they often produced mono-product and used almost commercial inputs, which were often brought from outside of the province. Compared to the medium-sized households, they used mainly the available materials in the locality and home-made inputs They recognized that developing both cultivation and livestock at the same time (i.e., mixed farming system)., can take advantage of the inputs from both. For instance, rice straw and corn stalks were used as food for beefs; these were combined with animal wastes and used as organic fertilizer (compost); etc. More broadly, this farming system also helped rural households reduce pathogens related to digestive and respiratory diseases from animal wastes without right treatments (Bui Thi Lam et al. (2018)).

To finance agriculture operations, the households used four financial sources: (i) self-financing from the previous years' savings; (ii) home-stored/made inputs, like seed, manure fertilizer, breeding, fodder, and so on; (iii) borrowing money from the local banks, private money lenders, friends and (iv) input suppliers through input trade credit (Table 6.3). The banks lent at reasonable interest rates (9-13% per year), but sometimes the borrowers had to pay non-interest fee and waited longer for loan disbursement (2-3 weeks).

Meanwhile, buying with delayed payment from input suppliers can ensure that agricultural inputs are used timely. These credit providers often apply the *distinguished interest rate strategy*, which is based on the non-repayment risk of borrowers and negotiation. Its lending interest varies from 20% to 40% per year. Most traders do not provide credit for animal feeds because they consider this a high risk commodity due to many diseases (e.g. H5N1 in poultry, African

cholera in pig production, …) and market price fluctuations, e.g., in 2017 as described earlier.

Table 6.3: Financing sources of agricultural investment of local households

Sources	Small (n=50)	Medium (n=94)	Large (n=49)	Total (n=193)
Its value (Unit: 1000 VND)				
Cash accumulation	0	6,768	31,429	11,276
Home-made in-kind input	2,526	7,233	21,499	9,636
Buy by borrowing money	4,330	15,448	43,446	19,676
Buy in trade credit	1,444	4,291	19,056	7,302
Total	8,300	33,740	115,430	47,889
Its proportion (%)				
Cash accumulation	0.0	20.1	27.2	16.7
Home-made in-kind inputs	30.4	21.4	18.6	23.0
Buy by borrowing money	52.2	45.8	37.6	45.4
Buy in trade credit	17.4	12.7	16.5	14.9
Total	100	100	100	100

Source: Own calculation based on the household survey, 2018

Note: All average indicators are statistically significant at 1% in the Kruskal Wallis Test.

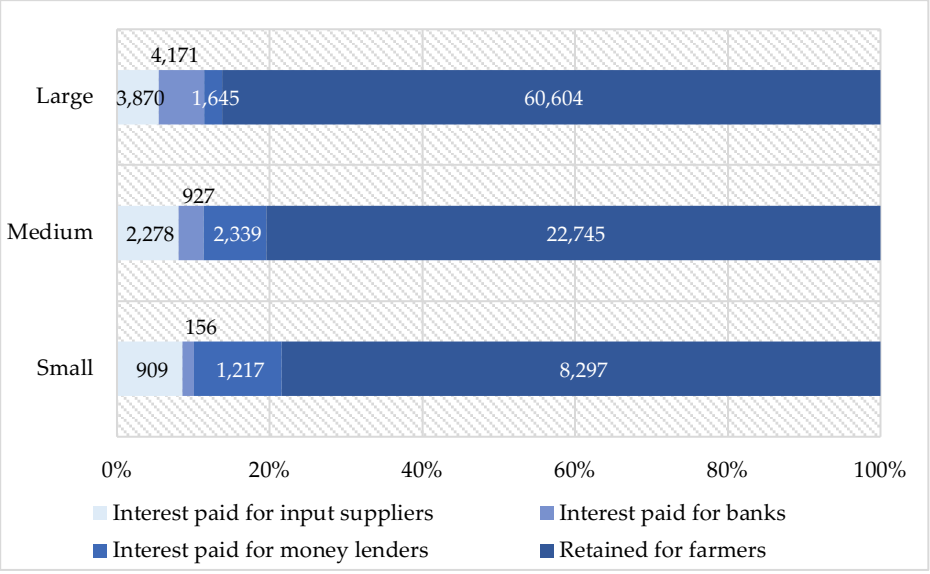
Small-scale farmers, do not have savings, i.e., money accumulated from last year's added value, sometimes they were in debt (Table 6.3). They financed their agricultural costs mainly from two external sources: loans and local input suppliers, contributing 52% and 17%, respectively. Small-scale farmers were often assessed as high non-repayment-risk borrowers and could not access formal loans; therefore, they suffered from higher interest rates compared to others. Their home-made inputs occupied approximately 30%, including seed (42% of the total seed cost); manure fertilizer from animal wastes (17%), breeding (10%), and fodder (65%). It is noted that home-made seeds and breeds often have lower quality than the commercial ones. As a result, small farmers achieved lower productivity and quality of output, thus lower income.

Medium-scale households, financed their agricultural inputs dominantly by borrowing money, accounting for 46%, followed by self-

financing. These households had high potential, but could not farm without external financing because their cash accumulation is limited. They desired to borrow more money from banks to build better breeding facilities and disease-isolation system.

Large-scale households funded their agricultural inputs by using their accumulated cash, and also by loan as it easier for them to access external financing sources. Moreover, these households often had sufficient collaterals and often assessed as creditworthy; thus allowing them to borrow from banks loans against a lower interest rate. They also invested in productive infrastructures, which allowed them to control risk better than others.

Therefore, some input suppliers established partnerships with them. In this case, large farmers were charged a bank's interest as a baseline rate, and then, plus a premium rate (about 3% per year). For example, VBARD's lending average interest rate (baseline) was 10% per year at the time of survey, after adding 3% per year, the total interest rate charged by input suppliers was 13% per annum. In addition, several large-scale households established production groups, and collective buying and selling groups, composed of 5-10 households to claim a discount from input agents.



Source: Own estimation based on the household survey, 2018

Figure 6.2: The interest paid for using capital and its share in the total agricultural value addition of households surveyed

Figure 6.2 shows the share of interest paid in the total agricultural value-addition of the three household groups in 2018. In this estimation, the benefit retained from farmers is calculated by total value-added minus interest paid to external capital owners (e.g., banks, money lenders, input suppliers). The farmer's benefit consisted of depreciation, unpaid family labor, and profit (see Figure 4.9). Interest from external financing accounted for nearly 2.3 million VND from the total VA of small-scale farmers (Figure 6.2). Small farmers spent 22% of their total VA on seasonal financing of inputs; the large-scale farmers spent almost the same (20%), while, this cost for medium-scale households was on average 14%. The cost of using capital in agricultural production is relatively high for all.

6.2 Characteristics of households' loans

6.2.1 Main characteristics of loan obtained

This section presents the analysis on the existing loans of households at the time of survey in 2018. For VBARD's loans, large farmers had the biggest loan size, being more than twice the amount of the small-scale household's loan (Table 6.4). The loan size of the medium-scale households was intermediate. Unfortunately, the small-scale households were charged with interest rates higher than the other two. The length of the loans was also shorter for the small-scale (20 month) compared to the medium-scale (24 month) and the large-scale (29 months).

The amounts of the loans provided by the VBSP were not significantly different among the three groups. However, the amounts of the loans were smaller than those from the VBARD: loans for small-scale and medium-scale were about 2/3rd, and those of large-scale about 1/3rd of the average. Because of highly subsidized policy and favorable conditions, beneficiaries were able to easily access the non-collateral loans, and rarely complained about lending procedures. Many VBSP borrowers (30%) considered this loan as the "welfare cake" without enforcement of financial obligations. Concerning length of repayment, all loans of VBSP were long-term: on average 42 months. Some households reported that they forgot the principal when borrowing. They just remembered when the head of lending group came to collect the quarterly interest. Clearly, they lacked motivation to pay the debt.

Table 6.4: Loan's characteristics obtained by households surveyed

Items	Small (n=50)	Medium (n=94)	Large (n=49)	Total (n=193)
VBARD				
Number of borrowers	10	44	22	76
Loan size (Mil. VND)**	45.83	55.58	96.66	63.49
Interest rate (%/month)*	0.85	0.79	0.66	0.77
Duration (months)	20.50	23.56	29.14	24.65
VBSP				
Number of borrowers	22	42	15	79
Loan size (Mil. VND)	31.36	32.38	33.67	32,44
Interest rate (%/month)	0.65	0.64	0.69	0.65
Duration (months)	42.29	42.57	42.40	42.45
Money lenders				
Number of borrowers	19	30	7	56
Loan size (Mil. VND)	10.42	11.93	13.29	11.89
Interest rate (%/month)	3.47	3.52	3.63	3.53
Duration (months)	5.32	7.17	10.43	7.52
Relatives and friends				
Number of borrowers	15	23	4	42
Loan size (Mil. VND)	6.87	10.61	11.25	9.80
Interest rate (%/month)[b]	0.58	0.61	N/a	0.70
Duration (months)[b]	7.27	9.76	5.33	7.99

Source: Household survey, 2018

Note: ** and * indicates the statistically significant level at 5% and 1% in the Kruskal Wallis Test, respectively; other comparisons of average indicators are not significant.

The amounts of the loans provided by the VBSP were not significantly different among the three groups. However, the amounts of the loans were smaller than those from the VBARD: loans for small-scale and medium-scale were about 2/3rd , and those of large-scale about 1/3rd of the average. Because of highly subsidized policy and favorable conditions, beneficiaries were able to easily access the non-collateral loans, and rarely complained about lending procedures. Many VBSP borrowers (30%) considered this loan as the "welfare cake" without enforcement of financial obligations. Concerning length of

repayment, all loans of VBSP were long-term: on average 42 months. Some households reported that they forgot the principal when borrowing. They just remembered when the head of lending group came to collect the quarterly interest. Clearly, they lacked motivation to pay the debt.

Table 6.5: Feedbacks of households about financial providers

Source	**Ordered feedbacks (±) about credit source**
VBARD	(+) Largest amount size compared to others
	(+) Low interest (0.50 – 1.1%/month)
	(-) Non-interest fee per one loan contract
	(-) Complicated procedures
	(-) High transaction cost (disbursal time, travelling and probability of the reject)
	(-) Mandatory to have collateral or an insurance contract
VBSP	(+) Non-collateral requirement
	(+) Low interest (0.55 – 0.9%/month)
	(+) Convenience due to transaction point at the commune.
	(-) Relationships with the head of lending group and communal civil(s)
	(-) Unfriend behavior of credit officers
FSF, WDF	(-) Mandatory for saving requirement as a cost
	(+) Useful supports for agricultural production and other skills
	(+) Higher interest rate (FSF: 0.7-1.0%/month; WSF (1.0-1.5%/month)
Money lenders	(+) Very quick disbursement if approved
	(+) Simple procedures
	(-) Very high interest rate (2.5-5.0%/month)
Relatives and friends	(+) Verbal agreements without any documents required
	(-) Reduce the borrower's voice in their relationship and community.
	(+) Low interest rate (zero or a small gifts)

Source: Household survey, 2018

The overall features of this informal credit sources are non-mortgage, simple procedure, small-size and short-term: 5 to 10 months (Table 6.4 and 6.5). These loans were almost spent on urgent expenditure, like education fees, health problems and diseases of crops and/or animals. The rural households stressed

that they always paid attention to their position in the clan and close-kin relationships, and they did not want to over-exploit their important relations with them, because that might, perhaps, lower their position.

Surveyed households said that each credit source has different advantages and disadvantages, and these maintained a dynamic competition within the rural financial market (Table 6.5). Although VBARD and VBSP had the advantage of the subsidized credit packages from the Government, their credit provision still received many negative feedbacks from surveyed households. Complaints stemmed from household borrowers who suffered from non-interest fees which were given to the head of the lending group, or to the relevant credit officer to accelerate the screening process. Besides the complaints about the collateral requirement, some households also felt uncomfortable about the mandatory requirement to buy an insurance contract, even if this reduced the interest rate to 0.1% per month. These weaknesses of the formal credit providers have opened the way for informal credit to flourish in rural areas.

6.2.2 Credit use and the role of credit sources in agriculture production

Although the formal loans were intended for agricultural production, households used their loan for various purposes (Table 6.6). In essence, farm's finance is fungible between production and consumption purposes, thereby agricultural credit can be transferred from agriculture activities to other operations (Khandker et al., 2016). Thus, the role of credit is not only in agriculture-related activities, but also in other multiple dimensions of rural households.

Table 6.6. The use of loans obtained by the households from the main credit sources in Lao Cai

Purposes / Sources	Loan was used for …. (%)				
	Cultivation	Livestock	Consumption	Non-farm	Others
VBARD	50.00	23.68	15.79	7.89	5.26
VBSP	36.71	63.29	48.10	3.80	5.06
Money lenders	8.93	25.00	50.00	8.93	16.07
Relative, friends	7.14	21.43	90.00	9.52	4.76

Note: some loans had more uses, thus % are higher than 100.

The VBARD loans scored best regarding the investment for intended purposes: 50% for cultivation, and 24% for livestock. The households seemed to be aware of the role of VBARD's loan in their farming activities and took responsibility for their debts. Table 6.7 also illustrates the significantly positive impact of VBARD's credit on both cultivation, livestock, and living expenditure. Understandably, the higher farm value-added, the better the return of investment was. This is a good sign, but the number of households being able to access leaves much to be desired.

Although VBSP's loan was smaller, the borrowers used these loans for both agricultural production and household consumption. The borrowers mainly spent their loans on buying, i.e., sheds for animals, buffalo (for land preparation and transport after harvest) and a few agro-inputs. A loan of 30 million VND would be enough to buy one buffalo costing 15-25 million VND, materials for a simple stable and a few agro-inputs. The buffalo, a fixed asset, is an important investment for upland households in reducing the length of time and labor work in the field, although it is not enough to boost agricultural productivity and food security.

Table 6.7. Correlations among the loan size of each credit sources and household's activities

Terms	VBARD	VBSP	Moneylenders	Relatives
Cultivated land	0.120	-0.100	.363**	0.285*
IC cultivation	0.491**	-0.057	-0.154	-0.115
GO cultivation	0.374**	0.052	-0.200	-0.142
VA cultivation	0.124	0.122	-0.208	-0.138
IC Livestock	0.423**	-0.029	0.199	0.305*
GO livestock	0.621**	0.019	0.188	0.119
VA livestock	0.607**	0.112	0.139	-0.167
Living cost	0.347**	0.238*	0.202	0.233

Source: Authors' calculation

Note: ** and * indicate the significance of Pearson correlation at the 5% and 1% level, respectively; other correlations have not been clearly.

Informal sources, such as the money lenders, considered loan size vis-à-vis size of land; there is positive relationship between loan size and the cultivated area of borrowers (Table 6.7). Indeed, agricultural land plays an important role in the decision-making of money lenders, because if borrowers could not repay

their financial obligations, money lenders would confiscate their land. Some rural households stated that they could not risk to become landless and without housing, as they considered land and house sacred and most valued properties. Moreover, if they were to lose their agricultural land, they would become poorer because their low education level.

6.3 Impact of credit access constraints on agriculture

6.3.1 Households with and without credit access constraints

About 55% of the surveyed households were constrained to access formal credit (Figure 6.3). There were three kinds of unsatisfied clients: (i) The group of borrowers who received a loan which was lower than the amount they applied for. They were often the medium- scale household, and their socio-economic characteristics were evaluated low by local authorities. (ii) the application was fully rejected. (iii) they are self-exclusion due to lack of information and negative feelings about debts. The reasons (Table 6.1) behind the low amount and/or no loan granted at all include, among others, low-income, limited agricultural land and labor, low education and low social status (from ethnic minority). Briefly, physical collateral and social capital prevented the poor and smallholder farmers from obtaining an adequate loan from banks.

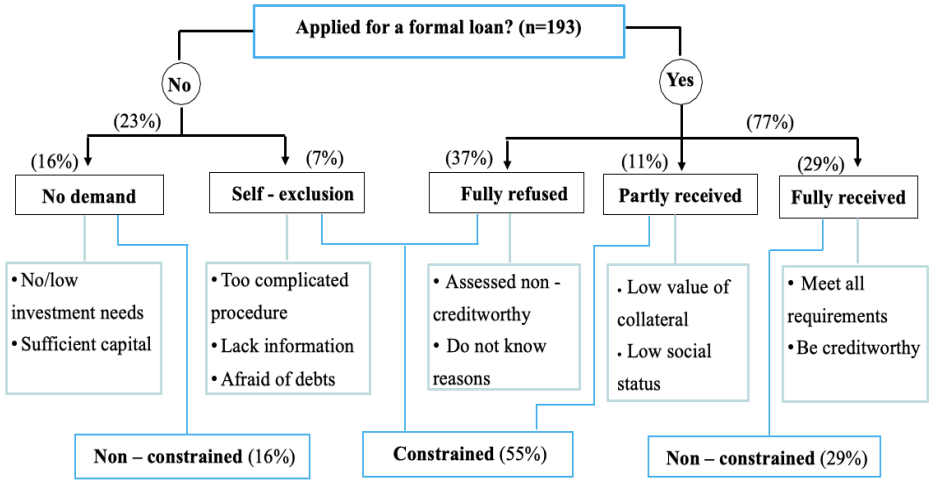


Figure 6.3. Classification of (non-) credit constrained households (Figure adapted from Zeller et al. (1996), but the rates are from this study).

Tipping the scale in favor of the households without credit access constraints, they got higher amounts of loans (formal and informal) compared to those with constraints (Table 6.7). For example, they took loans of 43 million, being nearly twice the amount of those who were constrained. With the loan, they invested more in their agricultural production and got higher output than those households with credit access constraints. Compared to medium- and large-scale groups, the difference between constrained and non-constrained households among the small-scale groups was the largest difference in terms of loan amount.

For informal loans, the results showed significant difference among households with and without credit access constraints for all three groups; thus, if households (small-, medium- and large-scale) were hindered from getting formal credit access, they used the informal sources as an alternative. In this case, the smaller the scale of the household, the smaller also was the *take-out* loan. The loan amount attributed to medium- and large-scale households was larger than that given by the formal credit providers to small-scale households for their agricultural production.

On the structure of financial source, 95% of the non-constrained households' agricultural investment was financed by formal credit. Meanwhile, the share of formal credit in the remaining household group was lower (70%). Many households having constraints (>40%) reported that they were only able to invest a meager amount for their agricultural production, because they could not get loans from banks. They also said that the informal lenders tendered unaffordable interest for their loans.

The structure of financial access differentiates the total interest paid to capital owners by constrained and non-constrained borrowers (Table 6.8). Smallholdings being credit-constrained paid 2.2 million VND interest in 2018. The informal lenders' high interest rate forces the constrained households to borrow money from them on a short-term basis, and pay off their loans by using their wages from doing seasonal off-farm work. In this situation, small constrained households carry a debt burden which undermines their income; their accumulated cash was -6.6 million VND.

Likewise, the surveyed medium-scale households went to informal lenders for their loan which carried 4.9 million VND interest. On the average, they invested the highest amount of capital (11.5%) with an outstanding debt of -2.6 million. Although they invested the highest, they were stuck in financial shortage, because when provincial authorities issued the relevant supporting policy on livestock, they scaled-up their livestock production with limited

experience and volatile price in 2017. As a result, they suffered financial loss. Two things they would need to float above this situation: credit and technical support from authorities, so they could enhance their efficiency.

Table 6.8: Financial indicators of credit-constrained and non-constrained household borrowers

Unit: VND million; %

Terms	**Small** (n=50)			**Medium** (n=94)			**Large** (n=49)		
	Group A	Group B		Group A	Group B		Group A	Group B	
HHs in group (%)	38	62	-	55	45	-	88	12	-
Formal loan	41.0	14.8	***	45.5	33.0	**	53.7	37.5	N/S
Informal loan	2.1	8.4	***	3.7	9.7	**	1.2	15.0	***
Interest rate paid	3.8	2.2	**	4.6	4.9	N/S	5.3	4.4	N/S
Cash accumulation	2.7	-6.6	**	10.1	-2.6	**	42.6	23.3	**

Source: Author's calculation

Notes: Group A = Non-constrained HHs; Group B = Credit access constrained HHs

***, **, * and N/S indicate the significance of T-Test at the 0.01; 0.05; 0.1 level, and not significant, respectively

Three household groups obtained a high cash savings: the non-constrained medium households and the large-sized farm households (both constrained and non-constrained). In practice, almost all of them were able to manage their agricultural costs, because these were financed mostly by formal credit providers. Thus, enhancing credit accessibility and efficiency in loan use can make agricultural production robust at the grassroots level.

6.3.2 Impact of credit access constraints to agricultural production

Both small- and large-scale households' access to credit for cropping significantly and positively affected IC, GO and VA, but not for the medium-scale (Table 6.9). Since then, small-scale households tended to improve investment in cultivation with the goal of food security, while medium-scale households expected to increase investment in livestock to increase their income. For livestock production of small-scale group, although credit access positively impacts on investment but its influence on value addition was insignificant. The positive effect of successful credit access on livestock' VA of the medium and large-scale households were clearly proved.

In principle, the higher the VA/IC ratio, the higher is the efficiency of agricultural investment. Both the access-constrained and non-constrained households obtained higher effectiveness in crop than in livestock production for all three farm categories (Table 6.8). The non-constrained small-scale households obtained higher efficiency in both crop and livestock production than the constrained ones, while for the medium households, efficiency improved for the livestock only, but not for the large-scale households. Apparently, smaller farm households had more spare time to invest in livestock. Positive impacts of credit access were also observed in other household welfares indicators (non-farm income and living expenditure), especially smallholdings (Bui Thi Lam, Ho Thi Minh Hop, et al. (2019). The medium-scale group which got a formal loan invested this mainly in livestock and not in crops, which explains, respectively, the increase and stability of the VA/CI.

Table 6.9. Comparison between households being non-constraints and formal credit access constraints

Terms	Small-scale (n=50)			Medium (n=94)			Large scale (n=49)		
	Group A	Group B		Group A	Group B		Group A	Group B	
Input and output agriculture production *(mil. VND/household)*									
1. IC cultivation	6.8	5.0	**	9.3	9.6	N/S	18.5	11.3	**
2. GO cultivation	18.9	11.0	**	22.3	21.8	N/S	40.3	25.4	**
3. VA cultivation	12.1	6.1	**	13.0	12.2	N/S	21.8	14.1	*
4. IC Livestock	1.8	3.2	*	24.0	24.3	N/S	109.0	61.5	***
5. GO livestock	4.1	5.3	N/S	42.9	35.7	*	156.0	90.9	***
6. VA livestock	2.3	2.2	N/S	18.9	11.4	**	50.7	29.4	**
VA/IC ratio									
Cultivation	1.8	1.2	***	1.4	1.3	N/S	1.2	1.3	N/S
Livestock	1.3	0.7	**	0.8	0.5	***	0.5	0.5	N/S

Source: Authors' calculation

Notes: Group A = Non-constrained HHs; Group B = Credit access constrained HHs

***, **, * and N/S indicate the statistically significance at 1%, 5%, 10% and insignificant in the T-test, respectively.

Although the positive impacts of credit access in the effectiveness of cultivation and livestock in the large-scale households are clear, that of efficiency has not been clarified yet. The diversity of farming activities (annual

crops, perennial plants, pigs, horses, sheds, etc.), as well as the distinct phases in the production cycle made it difficult for us to convert uniformly and to compare properly the different input and output values given the limited sampling (n=49). Thus, for this study, we could not prove yet the positive impact of credit access on efficiency.

6.4. Discussions and Conclusions

Considering economies of scale, the local agricultural production had one contrasting element: the small- and medium-scale holdings obtained higher efficiency measured as VA/IC (Value Added/Intermediate Cost) than that of the large-scale farmers. In general, the efficiency of crop production was higher than that for livestock farming. However, the medium-scale farmers took more advantage of the mixed crop-livestock farming system by using relatively cheaper inputs: crops providing animal feed and animal providing manure. In contrast, the large-scale households often focused on only one type of crop or animal (pig, poultry, ruminants), and used intensively commercial inputs against high cost. Small-scale farmers obtained very high efficiency. However, in fact, their farming activities depended strongly on natural conditions, for example, rice mono-cropping in uplands from May to October or husbandry in the spring-summer season, when ruminants easily find feed. And, agricultural products generated have not met their home consumption and they still needed food subsidies for hunger eradication of the Vietnamese Government

Without financial accumulation (savings) and access to bank credit, farm households faced three challenges: (i) lower levels of inputs than those recommended by extension, (ii) low quality home-made inputs, and (iii) higher interest rate (20-40 % per year) for their informal loans, compared to the banks' rate (9-13 % per year). Small-scale farmers financed their agriculture inputs mainly through loans from money lenders (52%) and local input suppliers (22%). Their interest cost accounted for 22% of their total agricultural value addition making their agriculture unprofitable and food supply, insecure. To complement their livelihood needs, the chronically poor among them sought temporary jobs as hired workers in/near towns; some abandoned their fields.

The large-scale farm households were more often assessed as creditworthy than the smaller-scale farmers, as they had more labor, more collateral, lower financial dependency ratio and higher educational level (i.e., more physical, financial and human capital) than the small and medium-scale farmers. Moreover, the lending group method hindered credit access for most small-sized

and many medium-sized farm households due to their low social capital; i.e., the social relation with the leaders of those groups was the most critical factor in the approval of loan applications, as found by Machalek et al. (2015)). To maintain social networks in rural areas of Viet Nam, local people must participate in clan parties and/or village events. These require financial contributions and the poor/small farmers often have not got money for that. Besides this, small households also faced psychological barriers (self-exclusion) in obtaining credit. Consequently, the dynamics on credit access of the three household groups exposed at least two paradoxes.

The first paradox is that the poorest, the main eligible beneficiary of the Governments' preferential credit policies, faced the most constraints. Small farmers wanting to loan from VBARD suffered from three disadvantages: smallest loans, shortest duration to repay and highest interest rate. These inequalities faced by the disadvantaged households were supposed to be eliminated by their access to preferential credit. However, banks considered the higher interest rate a reasonable compensation, because providing credit service to small households generated not only a higher transaction cost, but also, a larger non-repayment risk. The latter explained why the poor households suffered from higher interest rate than the better-off households in Lao Cai; Saito et al. (1981) found similar mechanisms in the Philippine rural credit market. This contrasts with the traditional finance theory supporting a negative relation between the loan's duration and the lending interest rate, as well as a positive effect of loan size on interest under the price discrimination strategy (Murphy et al., 1977; Varian, 1989): if a borrower has a small and shorter-term loan, while all other factors remain constant, s/he will pay lower interest rates. The three-fold disadvantages of small households confirmed the irrationality of lower amount size and shorter duration, but higher lending interest was found in Barbados (Moore et al. (2003).

The second paradox shows that the larger-scale beneficiaries had easier access to the subsidized loans of VPSP, and they rarely complained about the lending procedures. In the past, VBSP reached about 98% of the poor households and disadvantaged groups (Thanh Tam (2011), and was reportedly able to reduce poverty. This finding was not confirmed as the poverty rate is still high in the NMM region. VBSP's credit provision presents several limitations: (i) The majority of small and medium households did not have a good relationship with local authorities, which hindered them from getting a satisfactory loan; (ii) Eligible beneficiaries were replaced by non-poor households, i.e. leakage; (iii) Credit officers did not pay attention to the

effectiveness of loan use by borrowers, which is a factor in the non-repayment risks of households. Similar cases and conclusions were drawn from studies in Kao Bang and Bac Kan provinces, also located in the NMM region, that the VBSP's decision-making was without proper assessment of agricultural investment plans or training in the proper use of the loans which led to a high default risk (Sauli et al. (2017).

According to Woller et al. (1999), the first dimension of outreach is easy to measure by counting the customers, but the quality of credit, with its outcome, is more difficult to evaluate. In fact, the current regulation (Decree No 78/2002/ND-CP) only focuses on the first dimension, and does not request an assessment of VBSP's effectiveness. As a result of VBSP's low effectiveness, the poverty reduction in NMM region of Viet Nam seems to be more and more difficult, as confirmed by Kozel (2014).

Although there prevails a much higher interest rate charged by moneylenders compared to that of the banks' rate, many farmers still preferred these informal loans for short term needs due to quick disbursement and simple procedures, often without requiring collateral. The latter seems more convenient in some situations than being unable to take action upon their troubles (FAO, 2017). This demands for a more balanced perspective on the role of private lenders in Lao Cai and Viet Nam in general. In Viet Nam, private moneylenders have, next to the above mentioned advantages, also reliable information about customers (Duong et al., 2002; Giang, 2004; Hieu, 2017; Khoi et al., 2013; Le Thi Minh Chau, 2014). Many researchers suggest to combine the lending model of both formal and informal sectors to take advantage of the unlimited loanable fund of banks and the effectiveness of private lenders in the screening and enforcing financial obligations (Diagne et al., 2000; Madestam, 2014; Varghese, 2004).

The comparative analyses between the credit-access-constrained and non-constrained households showed that formal credit significantly contributed to the increase of agricultural production of the borrowers. Specifically, the non-constrained households among the small-scale groups, invested more in both cultivation and livestock production, and then, obtained higher output and gross value addition than those of constrained households. Credit access facilitated the households to shift their farming system toward livestock and markets. In the context of the scarcity of cultivated land, livestock played an essential role in local livelihoods and poverty reduction. In conclusion, to spur the agricultural sector and rural development, financial concerns above must be removed through collaboration among multiple stakeholders in the agricultural value chain: households, banks, enterprises, cooperatives, traders, processors and other related activities.

7.

Agricultural value chain financing: a case study of Seng Cu rice in Lao Cai

We analyzed the financial need of the three main actors participating in the production side of the SC rice chain (i.e., credit demand-side) and their obstacles in accessing credit from two banks. Thereto we interviewed 160 SC rice producers, 9 small collectors, 11 large collectors, 12 retailers and Tien Phong Cooperative (T.P.C) to collect both quantitative and qualitative information. On the supply-side, we held 4 in-depth interviews with the heads of VBARD and VBSP branches at Muong Khuong and Bat Xat district from 2016 to 2018.

The decision-making role of the Bank on lending was commonly based on individual chain actors, instead of considering the whole chain in the locality. Constraints related to collateral led to the fact that the majority of key chain actors (producers, collectors and enterprises) received a lower amount of credit than requested. In many cases, the weak chain linkages among farmers and enterprises were not able to build up the trust of bank in order to finance chain actors. The combination of internal and external financing sources in the chain creates a financial ecosystem, in which most specific financial demands were properly satisfied on time.

Parts of this chapter are published as:

(i) *"Improving the Technical Efficiency of Sengcu Rice Producers through Better Financial Management and Sustainable Farming Practices in Mountainous Areas of Vietnam*. Sustainability 2018, 10, 2279. https://www.mdpi.com/2071-1050/10/7/2279,

(ii) ''*Realisation of Higher Value Added of Seng Cu Rice Value Chain in Viet Nam*', in the book, "*Food Value Chain in ASEAN: Case Studies Focusing on Local Producers*. ERIA Research Project Report FY2018 No.5, Jakarta: ERIA, Page 52─86. http://www.eria.org/uploads/media/8.RPR_FY2018_05_Chapter_3.pdf, and

(iii) "*Value chain financing approach: A good way to sustainable agricultural growth in Viet Nam*", accepted conference paper, Springer and Vietnam National of University in November 2019.

(iv) "*Improving Agricultural value chain financing: a case study of Seng Cu rice chain in Lao Cai*", accepted article in Vietnam Journal of Agricultural Sciences (ISSN: 2588-1299) on September, 2020.

7.1. Overview of Seng Cu rice value chain

7.1.1 Seng Cu rice value chain map and financial demands of participants

The SC rice value chain has five main actors: (i) input suppliers, (ii) producers (upland and lowland), (iii) small collectors in uplands, (iv) large collectors in downtown's districts and/or Lao Cai city, and (v) retailers, paralleling with the five value-adding phases in the chain. The paddy rice goes through six underlying marketing channels (Figure 7.1) from producers to consumers, namely:

Channel 1: Upland producers => Muong Khuong Cooperative => Customers

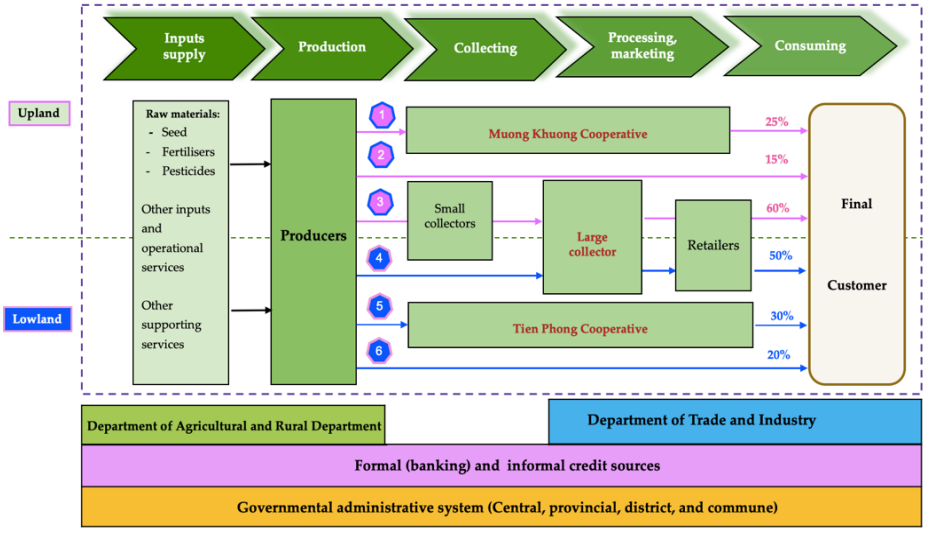
Channel 2: Upland producers => Final customers

Channel 3: Upland producers => Small collectors => Large collectors => Customers

Channel 4: Lowland producers => Large collectors => Retailers => Customers

Channel 5: Lowland producers => Tien Phong Cooperative => Customers

Channel 6: Lowland producers => Final customers



Source: In-depth interviews, 2016-2017.

Figure 7.1: Marketing channels of Seng Cu rice in Lao Cai

It is estimated that nearly 2,000 hectares in the provinces devoted to SC rice production in 2017, generating approximately 10,000 tones of paddy output. The household survey and Key Persons interviewees carried out in 2016 – 2017 estimated the consuming structure of SC rice as follow: 1.8% of total paddy output was stored by SC growers to become seeds in the next season (i.e., self-production seed); 16.6% was spent for home consumption to create some traditional dishes of the special events; 49.7% of total SC paddy was consumed in the provincial market and the remaining volume (31.9%) is delivered to high-end markets of the Northern region, in which Ha Noi city is the dominant market.

Among the chain participants, the producers and the large collectors (Tien Phong Cooperative: TPC, Muong Khuong Cooperative: MKC and large collectors) play essential roles in the quality management of rice as well as in development of the chain. The growers determine the yield and quality of paddy rice in the production phase, while the large collectors perform multiple post-harvesting tasks (e.g., collecting, storing, processing, trading, delivering) and decide on the quality of milled rice and the value-addition in every stage. In the next session, the study focus on these key chain actors in terms of their performance in the chain and their financial needs as well as their actual funds used.

7.1.2 Seng Cu rice production and financial sources of producers

❖ *Main characteristics of Seng Cu rice producers*

In Lao Cai, almost cultivated lands (upland and lowland) is devoted to rice farming (Figure 4.8.b). The uplands have unpredictable rainfall, therefore, more 60% of cultivated land in uplands are able to plant one crop of rice per year. The remaining area can grow twice crops but it often faces drought in the first half of the season and flood in the second half. In contrast, lowlands have public irrigation system that meets its water needs during the entire cropping season.

However, upland areas are better endowed under natural conditions: cooler temperature, better soil, higher altitude make for a better quality of SC rice compared to that grown in the irrigated plains of Lao Cai and other provinces in the NMM region. In fact, over 5 years ago, SC rice was listed as a special rice of Viet Nam[18], and its selling price often fetches the highest in the domestic

[18] https://vnexpress.net/thoi-su/ban-do-cac-loai-gao-dac-san-o-viet-nam-3768497.html

market. The high income from SC rice makes it an important cash crop for Lao Cai farmers, especially for upland growers.

Table 7.1: Farming practices of rice production in uplands and lowlands

Characters	Terraced uplands	Irrigated lowlands
Producers	Ethnic minorities (≈90%)	Ethnic majority (≈70%)
cropping numbers	Mostly one rice-crop per year	Twice crops per year
Irrigation system	Rain-fed and self-made pipe system	Public irrigation
Commercial inputs used	Very low because of lack of money and unavailable inputs market	Intensive farming practices (even abuse) in order to maximize paddy yields
Mechanization state	Totally depends on manpower and animal traction because of difficulties from the terraced plots	High machinery used, including land preparation, harvesting, threshing, etc.
Labor use	Family labor	Both family and hired labor

Given the differences in terms of irrigation and (non) -mechanized farming practices, SC rice growers in uplands have a significantly lower intermediate cost than those in the irrigated lowlands (Table 7.2) in terms of lower quantity and cheaper inputs used. As a result, SC rice producers in uplands obtained lower productivity than the remaining ones, 4.4 and 5.3 tones/ha, respectively.

Overall, lowlanders used more commercial inputs (e.g., seed, fertilizer, pesticide, and cash-cost operating services) because they have advantages in cash accumulation and access more diversity of external funds from banks, enterprises in the chain, and informal actors. By contrast, upland producers applied a high proportion of home-made inputs because they lack of saving and poor access to external financing. For example, uplanders received small percentage of funding from banks, traders and money lenders (23%); meanwhile, external credit accounts for 45% of the cost for the lowland SC producers.

More detailed, of the 160 surveyed, 56% of the upland growers used 'self-produced' seeds, and they exchanged these with other local producers (22%). It means that only 22% of them purchased certified seeds compared to 85% of lowland producers. Experienced farmers and local extension staff agree that seed is the most important input for SC rice production because it directly influences the quality and productivity of rice. Although many upland growers

know about the role of the SC rice seed, they could not buy it because of its expensive price: 80,000 – 130,000 VND/kg at the local markets.

Table 7.2: Total SC rice intermediate cost and its source of investment

Items	Terraced uplands (n=80)	Irrigated lowlands (n=80)	All (n=160)
Total IC (1000 VND/ha/year)			
1. Seed	1,641	3,426	2,533
2. Fertilizer	4,476	7,025	5,750
3. Pesticide	1,209	4,088	2,649
4. Operational services	441	2,458	1,450
Total	*7,766*	*16,997*	*12,381*
Source of investment (%)			
i. Cash accumulation	9.3	28.4	18.9
ii. Home-made inputs	57.1	25.6	38.5
iii. Credit from banks & informal actors	14.6	26.9	23.5
iv. Credit by enterprises and input suppliers	8.8	18.4	15.8
v. Gov. subsidies in seeds and fertilizer	10.2	0.7	3.3

Concerning chemical inputs, the majority of lowland producers tend to abuse these kinds of inputs in order to maximize the yield of paddy. Meanwhile, upland growers applied it a few due to their financial shortage and the unavailability of inputs market. Indeed, manure mainly are used by the upland farmers, while chemical fertilizers are applied strongly by the lowland farmers. The latter apply nearly 3.4 times more pesticide than the former: 4.1 and 1.2 million VND/ha, respectively. One of the objective reasons for this difference is that upland areas have lower temperatures, thus fewer pests and insects. Similarly, upland farmers use manual labor and animal power for most operational activities (land preparation, planting, and harvesting), while lowland farmers often use machines and operating services. To reduce manual labor, many upland (55%) and lowland (28%) producers want to loan money from banks to buy small agricultural machinery.

Almost upland farmers belong to the poor ethnic minority people who receive a subsidy from Government (Program 135). At the year of the survey conducted, farm households receive all seeds of Seng cu rice based on their registered rice-growing area and 8 kg NPK per sao (360m^2), or an average value of 707,000 VND per household, accounting for 10% of the total production cost.

However, these certified seeds mostly come too late, due to water availability, for their production cycle that starts in May and ends in October. The Lao Cai Seed Centre tends to deliver them SC rice seed that they harvest in the lowlands in June only. Consequently, upland growers still used mainly home-made seed to cultivated and certified subsidized seed for food. Only a few lowlander farmers benefitted from this policy.

7.1.3 Performances and financial sources of large collectors

Large collectors consists of TPC, MKC and other large collectors located in downtown's districts or Lao Cai city. Among them, TPC is considered as the leading actor in the SC rice chain. TPC exploits the trademark, "Seng Cu Rice Lao Cai", and pays attention to innovation and high technologies. Moreover, it plays an important role in the quality management from production to processing and marketing.

Table 7.3: The marketable products of the TPC with other SC rice actors

Products	TPC	Other marketing actors
I. Selling price of main products		
1. White rice	D32,000/kg	D26,000–33,000/kg
2. Brown rice	D33,000/kg	Not produced
3. Germ rice	D80,000/kg	Not produced
4. Seng Cu alcohol	D50,000/liter	Not produced
II. Other products		
5. Lower class of SC paddy	Ingredient for Seng Cu alcohol	Not much attention to quality
6. Broken rice	Ground as baby food at D25,000 /kg	Sold at D6,000/kg as animal feeding
7. Hull	Energy (like fuel) for cooking Seng Cu alcohol.	Sold at a much lower price or thrown away
8. Bran	Skin-care product	Sold at much lower price, like animal feeds
III. Rate of milled rice recovery		
Rate (%)	65.7%	60-65.0%

TPC signs up contract-farming with 57 SC rice producers and funds in advance high-quality inputs, like certified seeds, organic pesticide and special rice fertilizers. In addition, TPC assigns one technician who collaborates with

farmers and takes charge of disease control. The cooperative helps farmers to harvest and collect fresh paddy rice at the fields. It not only enhances TPC's linkage with farmers, but also prevents farmers from mixing ordinary paddy with that of the Seng Cu and side-selling by farmers, which took place in the past.

To obtain the best quality of the Seng Cu special rice, TPC invested in the modern processing machinery such as dryer, miller, polisher, classifier (for removing black rice and others), wrapper and vacuum-packer. This state-of-the-art processing technology enables T.P.C to recover a higher rate (66%) of milled rice, compared to that of M.K.C (60%) and of the large collectors (65%). To add more value on Seng Cu rice, T.P.C continuously innovates its products such as white rice, brown rice, germ rice, and alcohol. Moreover, it invests in research on by-products such as broken rice and bran (Table 7.3). In contrast, other large collectors focus only on one traditional product, the white rice. Their products are not packaged carefully, and high-quality shelf life of SC rice milled is for 2-3 weeks only, while that of T.P.C, the standard package is for 3 months.

Table 7.4: Cost and Benefit Analysis of the TPC and large collectors

Products	**TPC**	**Other large collectors**
I. Cost and benefit generated in a business year		
1. Paddy purchased (ton)	700	800
2. Total cost (mil. VND)	10,631	11,575
3. Total revenue (mil/ VND)	16,085	14,240
4. Total value added (mil. VND)	5,454	2,665
Cost and benefit generated in 1 kg of dried paddy converted		
5. Unit selling price (1.000 VND)	22.98	17.80
6. Intermediate costs (1.000 VND)	15.19	14.47
7. Value added (1.000 VND)	7.79	3.33
8. Gross profit (1.000 VND)	5.48	2.72

The portfolio of marketable products explains the significantly higher value addition of TPC over that of other large collectors (Table 7.4). For example, in 2017, although TPC collected less paddy rice, TPC's total value-added investment enabled them to gain twice more than the average collector. Another

market advantage for TPC is its focus on the national market, while other collectors distribute paddy and/or rice mainly around Lao Cai city and other surrounding provinces (Yen Bai, Tuyen Quang). This explains partly the difference in selling prices and the higher value addition and profit of TPC.

In addition, TPC's management enables them to maintain the quality and diversity of other high value-added products of SC rice, and, to generate higher value addition for the producers participating in this channel. Among the six channels (Figure 7.1), in the TPC channel the farmers gained nearly 12,000 VND/kg of rice sold, followed by 11,200 VND/kg in the channel (3) of the small and large collectors (Bui Thi Lam, Tran, et al. (2019).

7.2. Financing for Seng Cu rice value chain

7.2.1 An overview of financing sources existing in the value chain

Figure 7.2 reveals the financial flows (internal, external financing sources) and the commodity movement (inputs, paddy, rice) through the SC rice chain. Notably, credit demands of SC rice chain participants include short term credit for operational cost and long term for fixed assets.

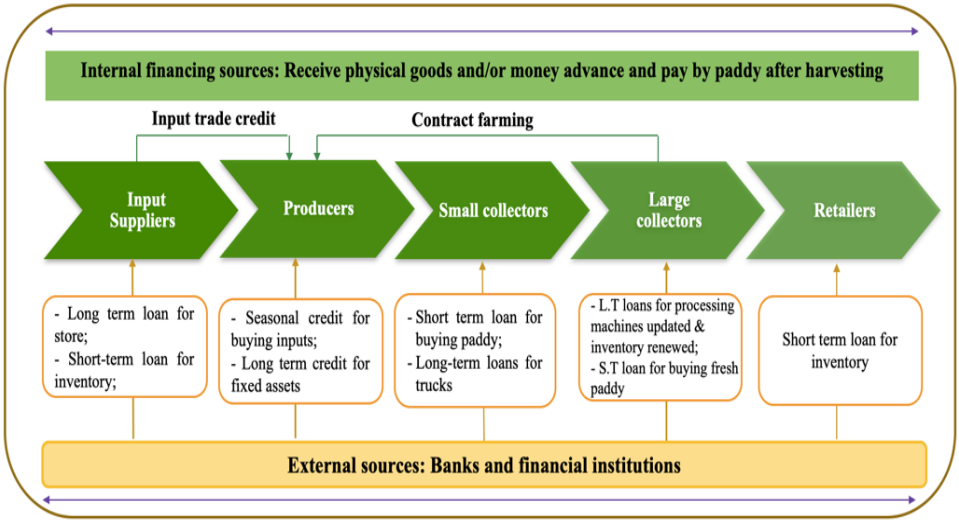


Figure 7.2: Financial needs of key actors in the SC rice value chain in Lao Cai

Overall, each chain player has specific credit demands, which depends on their available cash accumulation/equity (+) and costs required from their economic activities in the chain (-). Among external financing going from

outside the chain, banking credit plays the most important source due to its availability in terms of large loanable fund, flexible duration (short and long term), and low interest rate. As the weakest financial point, internal financing within the chain mainly devoted for producers through vertical and horizontal linkages among participants.

Table 7.5 demonstrates the main financing sources of SC rice chain actors, including self-financing/capital equity, internal and external financing. Overall, chain participants maintain their performances by owning capital, varying from 54% to 80%. The second most important financing sources in the chain comes from banks; and, on average, chain actors also borrow money from banks (VBARD with commercial rates and VBSP with preferential ones). Unfortunately, almost them needs a larger credit to optimize their performance, this finding will be expressed in the next session. In the chain, lowland SC rice producers received funds in advance through contract farming by TPC and MKC. Besides this, at the time of survey, Viet-Japan Fertilizer Company also provided input trade credit to lowland farmers in the Ban Xen commune, Bat Xat district.

Table 7.5. Main financing sources of SC rice chain actors (%)

Sources / Actors	External financing			Internal financing		Self-financing
	Banks	Gov. subsidies	Informal loan	Trade credit	Contract farming	
Upland grower	10	10	15	0	5	60
Lowland grower	20	1	8	10	17	54
Small collector	30	0	10	0	0	60
Larger collector	40	0	0	0	-5	65
T.P cooperative	25	5	20	0	-10	60
Retailers	20	0	0	0	0	80

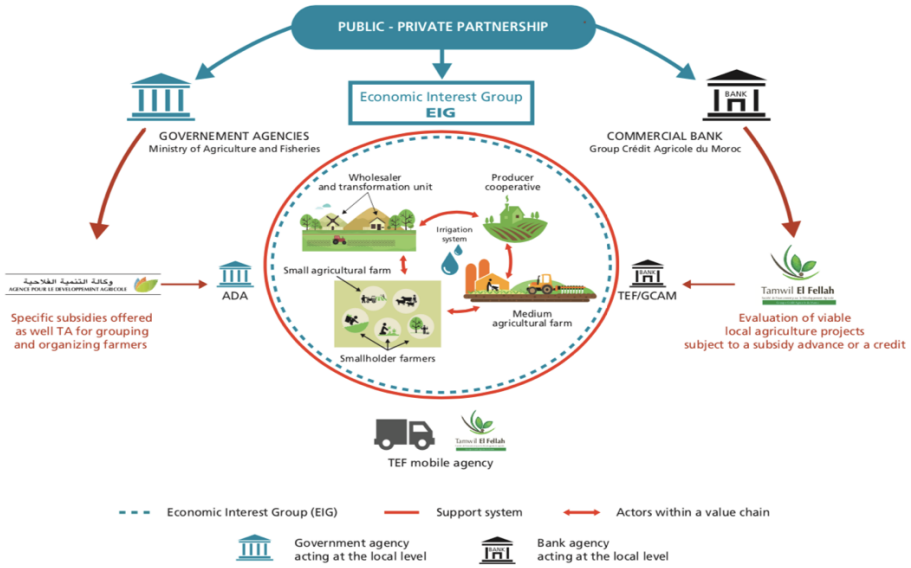
7.2.1 Internal financing among key chain actors

This study identified two internal financing sources of the SC rice value chain, which derived from the horizontal and vertical linkages in the chain. However, the volume of funding is still small and short-time, and only a few producers benefit in the chain.

❖ CIGs – a horizontal linkage

CIGs are a type of economic interest group (EIG) which are considered as a socio-economic development instrument (Figure 7.3). EIGs are flexibly established with a diversity of legal purposes, in which the priorities are to

attract potential resources and develop agriculture in society. In doing so, a financial and non-financial ecosystem and a well-served infrastructure are created to meet value chain development requirements and/or local economy (FAO et al. (2016). In this system, both Government and banks also participate to meet the financial demands and other supportive activities in the chain; thus creating a multi-stakeholder relationship that shows all actors supporting each other.



Source: FAO et al. (2016)

Figure 7.3: EIGs – a power tool for socio-economic development in Morocco.

CIGs are vertical links of 10 to 20 Seng Cu rice producers. This model is more popular in uplands than in lowlands. About 333 Seng Cu rice-growing households belong to 21 CIGs in the two communes of Muong Khuong district. Among the CIG members, 73% was classified as poor. CIG members get at least three benefits:

Firstly, they often share their work in the field (e.g., preparing land, managing disease, etc.), discuss and learn together agricultural knowledge and advanced technologies. They have reduced labor cost because of shared labor in transplanting and harvesting activities. In addition, working together allows most rice plants to grow at the same time/stage (from vegetative, reproductive, to ripening), thus maximizing efficiency use of water, harvesting machines and

other related things. Altogether, this shared labor among farmers results in higher productivity and better quality of paddy rice (GRiSP, 2013), and reduced paddy losses.

Secondly, some CIGs are also a social network in which, e.g., respondents, for their urgent needs, borrow money without paying interest from other members. It is self-managed and called the credit revolving fund (FAO, 1995). Many CIGs also take advantage of the "together buy, together sell" method (i.e. collective marketing), and get better prices based on the increase of bargaining power in the commercial transactions and higher discounted rate due to buying in bulk. Clearly, CIGs contribute to increased profits of farmer members in general, and SC rice producers in particular.

Thirdly, farmer members benefit from CIGs by having an improved access to and participation in productive services, like extension and contract-farming with enterprises (e.g., with TPC and Muong Khuong Cooperative). They benefit from technical trainings granted by the enterprise linkage.

Next to many advantages of this vertical linkage, some CIGs in SC rice chain still have existing drawbacks. Some leaders of CIGs find it difficult to tackle/resolve conflicts arising between poor and non-poor members. Non-poor farmers complained about the non-diligence of poor members to conduct a common mission of the group. By contrast, poor farmers felt about unfriendly behaviors of higher-income farmers, which hinder them to proactively connect with others. Here, it is necessary to conciliate and create a supportive relationship among group's members by the leader of the groups.

❖ Vertical linkages between farmers and enterprises

TPC has signed contracts with 57 producers in Muong Vi commune, Bat Xat district. If producers request for inputs, like certified seeds, organic pesticide and fertilizers, TPC prefunds their requests. Unfortunately, TPC's working capital is limited, and hinders it from prefunding the producers, especially during harvesting of fresh paddy. In 2017, TPC collected 700 tons of paddy rice, which is only 5% of the total SC rice paddy in Lao Cai province. This volume of paddy rice used less than 30% of TPC's machinery capacity. Because the machinery is underutilized, depreciation cost is relatively high and profit is low. Clearly, to fully utilize the plant capacity, TPC needs to increase its harvesting and collection of paddy rice by increasing its equity, so it could sign more contracts and meet fully the prefund requests of producers. But presently, TPC lacks financial capacity to contract a bigger number of farmers.

In addition to increase quality, TPC could provide improved technical assistance/trainings that would help contracted farmers increase their productivity and secure their future income by setting a selling price at an agreed time through forward contract, and not through spot transaction with local traders. The work of Bui Thi Lam et al. (2020) indicated the significantly impacts of contract farming on benefits of linked producers in terms of quality of inputs used, productivity, selling prices of paddy and value addition.

Another key enterprise is the Vietnam-Japan Fertilizer company (VJF). VJF makes contracts with SC rice producers in Ban Xen commune, Muong Khuong district. VJF provides fertilizer (with technical assistance as to when is the right time to apply, what is the right type, and how is right application done). To access this *in-kind* credit, growers first register the land area in which they plan to cultivate SC rice with the communal authorities; next, they indicate the quantity of fertilizer that they would need for the upcoming cropping season. Then the assigned local authorities examine their land and desired fertilizer. After this assessment, the communal center then confirms and guarantees that the SC rice producers are included. Finally, the communal officials sign a contract with VJF. The contract stipulates that the rice producers will receive fertilizer, and in turn, pay back after harvest.

In total, VJF has provided 5 tons of rice fertilizer for 10 ha of Seng Cu rice in the commune. This type of farmer-engagement by VJF is termed as the *Input Trade Credit* enterprise (Miller et al. (2010). Besides the advantages of having good quality of fertilizer, the borrowers also receive technical assistance on disease control and sustainable farming practices from company technicians. Most respondents who contracted with JVF stated that the learning they had from the technical assistance enabled them to reduce the amount of fertilizer[19] and the cost by close to 8%. The JVF fertilizers contributed to increasing their crop production by almost 15%.

7.2.2 External financing of SC rice chain

As described in Chapters 5 and 6, VBARD and VBSP dominate the formal rural credit market in Lao Cai. For example, in 2017, in terms of the outstanding loan, VBARD and VBSP accounted for 81.2% and 18.5%, respectively, of the credit provision in the rural market of Lao Cai. Total household borrowers were

[19] On average, 18 kg NPK (16.16.8+13S) per sao (360m^2) was applied to the treatment plot, meanwhile, 60 NPK Lao Cai and 2 kg Urea per sao, the producers' traditional amount, was applied to the control area.

clients of both VBSP (64%) and VBARD (34%). Under the rural credit market like the quasi-monopoly, the rural customers are restricted in the choice of services and cannot do anything about the quality of services offered by the banks (Bui Thi Lam, Ho Thi Minh Hop, et al., 2019). Indeed, our findings indicate that almost chain participants have high financial demand, however, they face many obstacles to fill it.

Table 7.6: Credit access status of key Seng Cu chain actors in Lao Cai

	Interviewees have …		Credit size (mil. VND)		
Actor	… credit demand	… credit access	Volume desired	Volume received	Satisfied extent (%)
Producers (n=160)	136	97	41.2	26.6	67.2
Small collectors (n=9)	6	5	120	80.0	83.3
Large collectors (n=11)	10	10	1,000	750	75.0
TPC (n=1)	1	1	6,000	2,000	33.3
Retailers (n=12)	8	6	200	150	75.0

Among the 160 Seng Cu rice producers, 136 households (85%) wanted to borrow money from banks to finance their agricultural production, including SC-rice growing. To produce more, households want to buy: (i) inputs, especially certified seeds and fertilizer; (ii) cattle for traction and transportation (upland producers); (iii) small agricultural machinery for land preparation, planting, harvesting, drying, etc. However, among 136 households having applied for loans, only 97 households (71%) were able to access credit; their obtained credit represented 67% of the desired total amount (Table 7.6).

The average credit amount given to farmers was 26.6 million VND only, while the desired amount was 41.2 million VND. All lowland farmers obtained more credit from VBARD and VBSP than all upland producers, 32.1 million and 21.1 million, respectively. The majority of credit demand of lowlanders were met by these two banks, while upland farmers still faced many obstacles to access formal credit, which derive from not only low socio-economic characteristics but also the more frequent natural disasters taken place in uplands (Figure 7.4).

In the end of July, 2017

The middle of August, 2017

Beginning of September, 2017

Figure 7.4: Seng Cu crop failure by flood in the uplands of Lao Cai

Most farmers in uplands needed both short-term credit for commercial seed and fertilizer, and long-term loans for the irrigation system maintenance. In practice, most loans obtained by upland farmers are small and long-term loans,

from 10 to 20 million, provided by VBSP and VBARD. This loan helped them to buy a cow (accounting for 70-80% of borrowed money) or to improvise home-made water system. The remaining money was often spent on consumption, followed by agro-inputs, including SC rice. Partly due to these low investments, the agricultural productivity of SC rice in the uplands remained low. The upland farm households have debts, and, many of them worry about their debt when the repayment date approaches, which implies that the bank faces high non-repayment risk.

Without formal credit access, producers fell in three following scenarios: (i) investing lower as the dosage recommended by local extension; (ii) using mainly home-made inputs, which often have lower quality than commercial ones, especially seeds; (iii) buying inputs with later repayment and suffering from a high interest rates; (iv) borrowing money from informal credit (moneylenders with high interest rates and/or relatives, friends with lower/zero rate).

The findings show that the investment of upland growers in SC rice production was lower the that of lowlander (Table 7.2 above). Half of the lowlanders and 64% of up-landers confirmed that they could not apply farming practices as recommended due to financial shortage, which leads to sub-optimal use of their inputs, regarding timing, quantity, and distribution. As a result, irrigated lowland rice often yields higher than upland rice, 5.3 and 4.4 ton/ha, respectively.

As described previously, the TPC attempts to manage the quality of SC rice throughout (i) finance in advance high quality inputs for farmers via contract farming, (ii) collection fresh paddy in the field and pay by cash and (iii) using modern machinery system. Therefore, TPC always have high credit demand from commercial banks. TPC's total assets reached 6.4 billion VND with an equity capital of 3.75 billion VND (55%). With their total fixed asset (LUC of 500m^2, building, and 2 trucks), TPC borrowed 2 billion VND from VBARD against an interest rate of 11.8%/year. TPC would need to borrow a short-term loan within 5 months at the harvesting time (May to July and September to October). The remaining amount was financed by family members, private money lenders and other enterprises. However, all these financing sources still are short term and TPC has to pay back anytime, therefore, TPC cannot proactively use. With 700 tons of paddy collected, this volume just used less than 30% of TPC's machinery capacity. This under utility leads to a high depreciation cost and low profit.

Small collectors and large collectors, on the other hand, borrowed money from banks and received an average 83% and 75% of the requested amount, respectively (Table 7.6). Compared to other participants, these satisfied rate are higher, meanwhile their performances are less than other chain actors.

The credit gap among the demand of chain actors and their loan size obtained is explained by banks' credit provision and the strict risk-avoidance strategy. As regulated by the Decree No. 55/2015/ND-CP, farm households can borrow from VBARD the amount of up to 50 million VND without collateral. Moreover, farm households having a contract with a purchasing enterprise can take a non-collateral loan of 100 million VND. In addition, the Government has issued Decree No. 98/2018/ND-CP (formerly Decision No. 62/2013/QD-TTg) to stimulate linkages between producers and enterprises, in which agribusinesses are also facilitated access to banking credit. However, in practice, in order to minimize risks, VBARD requires collateral, like the land-use certificate (LUC); they lend up to 70% of the LUC's value based on the Government's regulation or up to 50% of the value estimated by the land market price. Consequently, almost chain actors (producers, collectors, and, TPC) face credit constraints related to collateral. Although the SC rice chain, especially TPC and producers linked with TPC, has high potential, VBARD's decision-making still relies on collateral.

In Lao Cai, a provincial project aimed provided LUCs to all households since 2014, which belongs to the national land titling program nationwide. Until 2019, the project has not delivered any LUC to households. The process of obtaining LUC in Viet Nam takes time and is complicated due to the perpetual splitting of family plots. Many adults got married and established an independent family, but they did not get LUCs yet. As a result, 2-4 households own together one family LUC, therefore, only one household can use the LUC as collateral. In uplands, local farmers have to face more credit constraints than lowlanders. In-depth interviews with VBARD's representatives show that lending on upland areas faces higher transaction cost, higher natural risks, and lower value at the real-estate market. These are the reasons why bank officials consider lending to upland farmers as riskier than lending to lowland ones.

Clearly, the participating of VBARD in the chain is able to remove various financial challenges and promote their economic performance that are limited and the effectiveness that is still low. In doing so, VBARD need to change the mind-set focusing on potential agricultural chains, like Seng Cu rice chain, and

assess directly the repayment capability of customers through reliable information, not just focus on collateral as currently.

7.2.3 Impacts of financing sources on SC chain development

As mentioned above, without external funds, individual chain actors just can operate within their capital equity/saving. As a result, their effectiveness and efficiency obtain under-optimal level. For example, TPC need more credit (4 billion VND) to expand contract farming; collect more fresh paddy to exploit better the modern machinery system invested, which used only one-third of its capability. As a result, TPC has to suffer from the high depreciation, which undermine their profit. Similarly, other chain actors needs more credit to optimize their economic activities. In this section, the study focus on the impacts of internal and external financing source on SC rice production by growers, who play an important role but they often the weakest point in the chain.

To do that, the study uses SFA model estimation to determine the factors affecting the technical efficiency (TE) level in two rice ecologies (upland and lowland). The results estimated determinants are displayed in Table 7.7. Our findings show that, the mean TE score of the SC rice production in uplands, lowlands, and all surveyed households was 85.5%, 88.3%, and 86.9%, respectively. It means that there is still a great opportunity to enhance paddy yield through improving farming practices and input management.

More detailed, the results of the maximum likelihood estimation (MLE) suggests that almost growers should reduce seed rate and increase time for applying advanced techniques in order to increase paddy productivity. Additionally, based on the fact that lowlanders are abusing inorganic fertilizers and other agro-chemicals to maximize output and highlanders invest less due to financial shortages, the study gives reasonable advice to these farmers in order to achieve higher paddy productivity as well as protect the environment. Clearly, eco-friendly agriculture will open up many opportunities for high-quality Vietnamese rice in high-end market segments.

Concerning determinants outside the fields (Z_i), these factors affect directly and indirectly on input management of growers; in turn, influence on technical efficiency. The most remarkable point is that growers having financial readiness obtained significantly higher TE level than others. Indeed, the household survey reveals that financial availability helps them not only buy commercial inputs with high quality and proper dosages as their desire, but also apply inputs timely. To do that, they need access affordable loans, especially banking credit. Unfortunately, nearly 50% of SC rice producers needed credit demand got

unsatisfied loans from banks, especially uplanders. Therefore, they could not invest in long-term assets or buy more commercial inputs. For example, upland producers want to borrow money to create the self-made irrigation system because of the absence of public irrigation, which is just invested in lowland areas. They also need long term credit to buy cattle for land preparation, traction, and transportation.

Table 7.7. The Maximum Likelihood Estimate results of the SFA function.

Variables	**Upland** (n = 80)		**Lowland** (n = 80)		**Combined** (n = 160)	
	Coeff.s	SE	Coeff.s	SE	Coeff.s	SE
Efficiency factors						
Constant	8.70***	1.01	8.39***	0.42	8.53***	0.37
X_1: Seed rate	-0.11*	0.10	-0.12**	0.05	-0.22***	0.06
X_2: Fertilizer cost	0.07*	0.05	-0.04	0.03	0.04	0.03
X_3: Pesticide cost	-0.07	0.04	-0.02**	0.01	0.05*	0.01
X_4: Labor	0.07*	0.03	0.05***	0.02	0.07**	0.02
Inefficiency factors						
Constant	0.45**	0.16	0.49***	0.09	0.63***	0.09
Z_1: Ethnic	-0.52**	0.19	-0.03	0.05	-0.09	0.06
Z_2: Education	-0.02	0.02	-0.02***	0.01	-0.02**	0.01
Z_3: No. of labor	0.05	0.06	-0.03	0.02	-0.02	0.03
Z_4: Experience	-0.03	0.03	-0.01	0.01	-0.03***	0.01
Z_5: Financial availability	-0.36***	0.10	-0.10**	0.05	-0.21***	0.07
Z_6: Contract farming	-0.19	0.10	-0.14***	0.05	-0.18***	0.06

Note: ***, **, and * indicates the statistically significance at 1%, 5% and 10%, respectively; others are not significant.

Besides financial availability, participation in a contract with enterprises also has positive impact on TE level of almost producers. Overall, farmers linked with enterprises obtain TE higher than others by 1.8%. This coefficient in the lowland model was 1.4% and not significant in the upland model. As described previously, farmers participating in linkages with TPC and/or VJF were financed in advance not only high-quality rice-producing inputs, but also received technical assistances to properly apply inputs and manage diseases, water level. It is important to note that SC rice has good perfume attracting insects and pest, and then, bring pathogens and other harmfulness. Therefore, technical assistance play an essential role in improvement of productivity and risk mitigation, in turn, farmers' income.

Next to financing sources, the study also points out the effects of individual characteristics of producers on their efficiency in SC rice production. Specifically, education and experience in SC rice growing has a positive effect on producers' production, especially in lowlands. It is explained that lowlands have higher temperature than uplands, therefore, farmers here suffer from more diseases, which require them to have to apply many advance technologies and experience.

Briefly, Figure 7.5 illustrates the average TE of different SC rice groups and its frequency distribution. The slightly lower technical efficiency of the upland Seng Cu rice farmers is reflected by their eco-friendlier farming practices, like applying low chemical inputs. Indeed, the technical efficiency of upland growers obtained 85.5%, compared to that of lowland farmers at 88.3% (Figure 7.2). Combined with other factors mentioned earlier (cool temperature, good soil, high altitude) the resulting rice quality commands high price which compensates for the lower yield. However, there is a large room to improve their income by increasing both their commercial inputs and area planted to certified SC rice instead of other varieties.

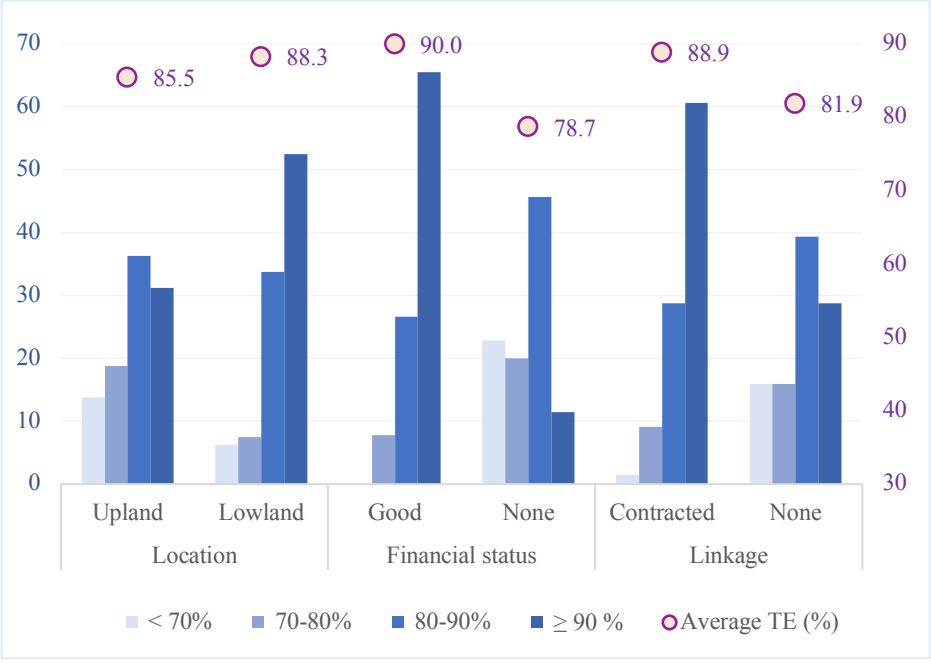


Figure 7.5. Average technical efficiency level of SC rice producers (the right axis) and its frequency distribution (the left axis).

Similarly, figure 7.5 shows that 66% of farmers with the best financial sources obtained the highest technical efficiency (>90%). Indeed, these households confirmed that their farming practices achieved optimally due to timely and correct application of all required inputs. The above finding aligns with the 71% of the SC rice growers who got a satisfactory loan at banks to fund their inputs. On average, farmers having good finance obtained higher technical efficiency than those having limited financial capital, 90% and 79%, respectively.

The technical efficiency of farmers having contracts with enterprises is higher than that of non-contracted farmers, 89% and 82%, respectively. Farmers involved in contractual agreements benefited from in-kind inputs (as needed) and technical assistance from enterprises. This reflects the common evidence in mountainous areas of Vietnam: farmers lack money to purchase and apply timely agricultural inputs and/or to invest otherwise in agricultural production, because they have limited savings (Hien et al. (2003); Binam et al. (2004); Chaovanapoonphol et al. (2009); Bäckman et al. (2011); Chandio et al. (2017); (Kompas, 2002); Binam et al. (2004).

The findings are consistent with a vast of empirical studied on other commodities showing the positive effect of contract farming on farming productivity and technical effciency (Ajao & Oyedele, 2013; Nguyen et al., 2015; Saigenji & Zeller, 2009; Wang et al., 2014). These findings, however, seem likely inconsistent with the several arguments of Rehber (2007), who show a lot of latent drawbacks of contract farming, especially small farmer, such as delays in delivery or payment, or both; bargaining power; and, regulations about marketable quantity of output and its selling price. In addition, the study of Nguyen et al. (2015), who indicated that the influence of contractual agreements on tea productivity was still ambiguous. Luckily, in this study, Seng Cu rice is an attractive production and bring high economic value for producers, especially ethnic minorities and the poor, small households. Moreover, contract farming still a good tool to boost agricultural production and strengthen the value chain working better for the poor (M4P, 2008).

7.3 Chapter discussions and conclusions

7.3.1 Chapter discussions

It is a common belief that the right finance at the right time contributes to greater efficiency, better quality of agricultural products; hence, increased incomes. Broadly, the financial and technical needs of chain participants were

met, this would allow them to optimize performance and maximize their contribution to the chain development and the agricultural sector as well. This is clearly seen in the case of SC rice, whose market-oriented production requires strict timing of farm activities and the needed labor and other inputs before and after harvest (Key et al., 1999). More broadly, the value chain financing significantly contributes to obtaining a *triple bottom line*, (Planet, People and Profit); the term is coined by John Elkington (2013).

In Viet Nam, the Government has introduced many types of System of Rice Intensification (SRI), for example, 3 Gain and 3 Reductions (3G3R), meaning that reducing the quantity of seeds, fertilizers, and pesticides used leads to the increase rice productivity, quality, and efficiency. These are the same meaning with other, like Low-Input Sustainable Agriculture (LISA) (Tan, 2009), Good Agricultural Practice (GAP) (FAO, 2007), Sustainable Crop Production Intensification (SCPI), and so on (Mishra et al., 2016; Murray, 2012). In essence, these farming practices have in common: optimal usages of natural and human resources without negative impact on the ecosystem. However, top-down government policies and the weak local extension systems cause to low effectiveness of extension programs (World Bank, 2004). As per Bui Tan Yen et al. (2013), farmers in Northern Viet Nam could not apply the recommended techniques because of their financial shortage and constraints on accessing credit. Our study indicates that the TPC's contract farming related to finance in advance high-quality inputs, follow-up IPM adaptation, and technical assistance is an effective way to obtain the 3P goal mentioned above. Similarly, this approach helps also marketing actors to operate better and get higher profits.

The households survey reveal that a large of upland and lowland farmers applied improper farming practices, which not only reduced efficiency but also were harmful for the environment (Bui Thi Lam et al., 2018). Specifically, compared to local extension's recommendation, lowland growers overused of nitrogen (N) by 84% and of phosphorus (P) by 19%; meanwhile, uplanders applied too much N at 51% but a smaller amount of Kali at 31%. In addition, lowland growers abused pesticides to protect plants instead of natural enemies. This imbalanced nutritional usage causes negative effects on the diversity of the ecosystem, the water-holding capacity of soil, and degradation (Bhattacharyya et al., 2015; Bünemann et al., 2006; Zhang et al., 2005).

Using the SFA function, the study shows that SC rice technical efficiency significantly increase 1% if lowland growers reduce 3% of Urea fertilizer and 2% of pesticide (Bui Thi Lam et al. (2018)). Besides this, among all respondents in lowlands and uplands, SC rice growers received technical assistance through

contract farming obtain productivity and TE higher than others. TPC suggested to farmers the eco-friendly farming practice through apply Integrated Pest Management (IPM), using organic pesticide and other high-quality inputs. Besides this, financing availability allows farmers buy and apply commercial inputs timely to optimize paddy productivity. These findings showed that farmers in an effective value chain financing, who receive both credit access and technical assistance, can obtain to the sustainable farming practice, following the principle "gain more for less" (World Bank (2016a). As per FAO et al. (2016), the AVCF needs involvement of multiple stakeholders, including both private and public actors, or the private and public relationship. However, further research needs to be conducted to sharpen these recommendations in particular agricultural chains and regions.

7.3.2 Conclusions

Our analysis showed that the main chain participants, including producers in lowlands and uplands, small and large collectors and retailers have specific financial demands. Almost of them face financial constraints due to a lack of collateral, and the strict risk-avoidance strategy of banks, especially VBARD.

Overall, 85% of the 160 SC rice producers had financial demands, while 71% having applied a banks' loan successfully accessed credit with an average amount of 26.6 million VND, which was lower than their desired amount (41.2 million VND). Lowland producers obtained a higher loan size than upland producers, 32.2 and 21.1 million VND, respectively. Lowlanders have more advantages in funding rice cultivation, not only higher self-financing, but also easier access to banking credit and to in-kind credit provided by enterprises (i.e., input trade credit and contract-farming).

By contrast, upland producers needed both short-term credit for commercial inputs and long-term credit for buying livestock and maintaining the irrigation system of their terraced plots. Unfortunately, they received smaller credit volume than the amount that they desired. They often bought livestock, followed by goods for consumption, and then, agro-inputs, including SC rice seeds. Currently, the home-made inputs account for 66% of the production cost; neither their investments, nor productivity and income have improved clearly. Many households were worried about how they would repay their debt, which implies the non-repayment risk of banks.

Likewise, TPC, a main actor in the lowland SC rice chain, needs more capital to contract and finance simultaneously greater number farmers, and consequently increase harvest of paddy rice which would then allow them to

maximize the use of their machines. TPC collects and pays fresh paddy in the field to prevent growers from mixing ordinary rice with SC rice and from breaking the contract by side-selling. The five months from harvest till sale, TPC would need 6 billion VND, but they only borrow 2 billion VND. To compensate for this deficit, TPC partly fills its financial shortage by borrowing money from private lenders who charge a much higher interest rate. This does not only reduce the profit of TPC, but also keep the benefit of farmers being low. In contrast, the small and large collectors face constraints in accessing credit to build warehouses and fund part of their trade.

Using the SFA model, the study indicated the positive impacts of internal financing (i.e. contract farming) and external financing (i.e., financial readiness or banking credit access). These SC rice growers obtained the best condition in their agricultural production, in turn, productivity and TE score increased. Unfortunately, the percentage of producers successful access both financing sources is still limited due to financial shortage and poor credit access of enterprises in the chain, like TPC.

Given the above description, major point for improvement, for example, would be at the bank, where an assessment is needed for the entire chain, meaning all the key actors in the chain, and not only on a piecemeal basis. In order to boost the agricultural sector, Vietnam needs to facilitate ease of access to banking credit and other appropriate measures by the leading actors in the chain, like TPC. Clearly, VBARD's strict risk-avoidance strategy is a major barrier that the participants in the entire value chain continuum face when accessing credit. Thus, removing this heavy obstacle becomes an important task for policymakers.

Figure 7.6: Miserable work of upland farmers and their financial needs

8.

Conclusions and Recommendations

The final chapter of this Ph.D. thesis consists of three parts. The first provides general discussions, as well as comparisons with other studies, on the notable findings of the previous chapters. Chapters 5 analyzed the agricultural credit provision of financial providers in the rural credit market in Lao Cai. Chapter 6 analyzed credit demands and the actual credit constraints of local farmers as well as the impact of credit access on the agricultural production. Next, chapter 7 showcased the innovative approaches of credit provision through the Seng Cu rice agricultural value chain; here, drawbacks were also discussed. The second part concludes briefly the research results in Lao Cai and the third part presents the author's recommendations based on the findings of this study.

8.1. General Discussions

Four constraints. Although local farmers can borrow money from many credit providers to finance their farming operations, in practice, the formal rural financial market is dominated by two state-owned banks, VBARD and VBSP. VBSP provides credit to low-income clients and VBARD serves higher-income customers. This state of the formal rural credit market was also shown in the neighboring provinces of Lao Cai by Dufhues (2007) and for the country by Thanh Tam (2011). Notwithstanding the strong financial supports from the Government, the credit provision by these two banks is a constraint for interested farmers, especially smallholdings, including those in the Seng Cu rice value chain, in at least four underlying ways.

Lending group method. Firstly, most loan contracts of rural banks were disbursed by the lending group method[20], thus confirming the observations from previous works (Dao, 2002; Quach Manh, 2005; Sauli et al., 2015). However, Linh et al. (2019) indicated that there is also an individual lending scheme, as shown by VBARD, and a combined method of both individual and group, as shown by VBSP. The lending group method reduces transaction cost for both lenders and borrowers (FAO, 2017; Klein et al., 1999), and helps banks to mitigate non-repayment risk due to high social pressure and politics in the locality (Okae, 2009; Sauli et al., 2017; Thomas et al., 2011; Zeller, 1994).

Under the lending group method, local authorities participate in the screening process before disbursement, manage appropriate loan use and enforce

[20] https://vbsp.org.vn/wp-content/uploads/2019/03/Cho-vay-h%E1%BB%99-ngh%C3%A8o-08Mar19.pdf

financial obligations of borrowers. Because clerks rarely visit credit applicants, social capital of applicants measured by the assessment of local authorities played a crucial role in the banks' decision-making. Claudio (2017) stated that bank officials cannot make right decisions among various loan applications because " they look all the same". Our findings confirmed that nepotism and opportunistic behaviors are being reflected through the leakage of subsidized credit packages. Similar incidents were found in previous studies in Viet Nam (Dufhues, 2007; Giang, 2004; Hoang et al., 2016). Related studies, not only in Viet Nam but also in other developing countries (Barslund et al., 2008; Khoi et al., 2013; Thomas et al., 2011; Thomas et al., 2013), have confirmed the disproportional impact of social capital on the probability of borrowing. For example, rural borrowers having strong relationships with the group leaders and occupying higher social position/status in the community face no constraints in accessing credit.

Bank's credit rationing. Secondly, local farmers faced the barrier of credit rationing by banks: 45% and 37% of the total credit volume of VBARD Lao Cai in 2017 was respectively devoted to enterprises and business households. Consequently, the remaining loanable fund was too small, thus the loans for the farmers had to be rationed. Banks often picked the highest potential clients, among the farm borrowers, based on their collateral, social capital and written loan applications; and therefore, often excluded smaller farmers.

Although our available data did not allow us to conclude that state-owned enterprises were the main customers of VBARD in Lao Cai, we used cross-check interviews and published reports (Dufhues (2007) to support our argument. Sauli et al. (2017) and Thanh Tam (2011) found that the relation between state-owned banks and state-owned enterprises raises the non-performing loan ratio, and thus puts the banking sector in danger of a systematic collapse. World Bank (2014) and Thanh Tam (2011) questioned the ambiguous effectiveness of these banks in Viet Nam, stated as very good in official reports.

Size of land area and LUC. Thirdly, small-scale farmers faced a twin constraint, that of having small land area and without LUC. In contrast, large-scale farmers owning sufficient land with LUC easily obtained loans from VBARD. They owned, on the average, more than 1ha, while medium- and small-scale farmers had slightly more than half only of that area. Thus, the credit demands of all large-scale households were fully satisfied, in contrast to only 20% of small-scale farmers having accessed to VBARD's credit. Specifically, the large-scale farmers obtained as much as 96.7 million VND, while the small-scale ones, on average, only 45.8 million VND. Likewise, lowland producers in the

Seng Cu rice value chain, who often had LUC, obtained higher amounts of loan than their upland counterpart; 32.2 and 21.1 million VND, respectively.

Mismatched credit needs. Fourthly, farmer-borrowers faced the constraint of mismatched credit lending needs vis-à-vis the credit lending products offered by the banks. The former usually had a mix of short- and long-term credit demands, and preferred seasonal loans; but both banks provided mostly long-term and fixed loans only. In principle, effective loans are those which farmers can use for their short-, intermediate- and long-term financing needs for their operating costs, agricultural machinery and long-term real-estate investments (Murray, 1980). Mir Kalan et al. (2008) found that local banks supply a large proportion of short- and medium-term loans to satisfy subsistence-farm borrowers, a category in which most smallholders fall. Our research indicated that banks were not willing to offer short-term loans to farmers due to high transaction cost per a loan contract, and also not willing to offer seasonal loans due to difficulty in managing these. This mismatch of rural banks credit products with their clients' needs reduces the effectiveness of agricultural production.

Besides the four constraints mentioned above, there exists a prejudice on "high risk but low profit" attached to small-scale farmers among the bank officers. Although smallholders were supposedly the main eligible beneficiaries of subsidized loans, in paradox, they received the smallest loans with the shortest payment period, and the highest interest rate. Similar observations were confirmed by Moore et al. (2003) in Barbados, and Saito et al. (1981) in the Philippines. This high interest rate concept contradicts with that of the traditional finance theory on price discrimination strategy: lower interest for smaller loans (Murphy et al., 1977; Varian, 1989).

Benefits of credit access. Our study demonstrated that credit access has positive impacts on (i) expanding agricultural investment, especially by the farmers with small and medium financial turn-over, and, consequently, (ii) increasing their value addition. Pham et al. (2019), Duong et al. (2014), Lensink et al. (2012) and Stewart et al. (2012) found that better credit access encouraged more economic opportunities, and enhanced households' income, welfare standards, human capital and physical assets.

Shifting made easy through credit. Small- and medium-scale farmers with credit access were able to shift quickly from crop- to livestock-based farming. Livestock raising played an essential role among farmers with small land area, and increased turnover and diversified their income sources. Increasing productivity and income from high-value products, including livestock, is an effective way of reducing poverty through agricultural production (Davis, 2006).

For example, Latin America's livestock development policy facilitated access to credit of small livestock keepers to produce beyond survival level and to mitigate risks with animal health services. In the last three decades, worldwide zero hunger and poverty reduction efforts have converged on the reduction of the traditional staples in favor of livestock raising (Ugo et al. (2008) (Timmer, 2010; Ugo et al., 2008).

Other needs met with credit. For this study, successful credit access enabled the small farmers to meet their food and financial needs for their agricultural production in Lao Cai. Without access to credit, they were forced to migrate to towns to find temporary work which resulted in abandoning their fields, and consequently, lower productivity and deeper poverty. Our observations indicate that supporting small farmers through credit access and guiding them to invest in economic opportunities related to high-value products (i.e., Seng Cu rice or livestock) might trigger an effective pathway of agricultural growth and poverty reduction. In contrast, some researchers have found insignificant effects of credit access on the small farmers' agricultural/ household income (Le Trung Hieu et al., 2017; Phan et al., 2014). Other researchers have argued that the unclear effect of credit on rural household's income, brought about by the latency of financial programs, would require at least ten years to reach impact (Nguyen et al., 2007; Nguyen et al., 2018).

Innovative financing approaches. While, the pivotal role of rural banks in agricultural development and poverty reduction during the period of 1990-2000s is undeniable and recognized worldwide (Cuong et al., 2015; Nguyen et al., 2018), there is still a large room to improve formal finance for agricultural activities in Lao Cai. In Chapter 2.3, we identified the value chain financing approach as an effective way to finance agriculture and help small farmers connect to the credit market. Since the green revolution in early 1970s, Vietnam's rural banking sector has been providing credit under the poverty reduction approach. However, this is a much criticized approach because it failed to reach the poor, improve agricultural development over the last decade, and reduce the growing burden on the national budget (Claudio, 2003; Dufhues et al., 2005; Hollis et al., 1998; Quach Manh, 2005; Sergio et al., 2000).

Combined approach. To tackle this concern, Quach Manh (2005) has suggested the mixed approach which combines the pure poverty reduction and the pure financial system approaches. In this combined approach, rural banks partly receive subsidy from government and sponsors to obtain a balance between financial sustainability and social purposes. An example, very similar to this, is the agricultural value chain financing (AVCF) which focuses only on specific

agricultural value chain (Le Thi Minh Chau (2014). Recently, across Viet Nam, several related studies have determined the potentials, successes and limitations of the AVCF approach (Guce, 2008; Luan, 2019; Luan et al., 2019; Sauli et al., 2017; Sauli et al., 2015).

Barriers of SC rice chain development. The SC rice value chain in Lao Cai shows two main barriers hindering the performance and value addition/income of the chain participants. These are the weak financial capability of the chain participants and the superficial involvement of the local banks in the chain. Most farmers lacked the required collateral to be able to access credit, and suffered from the bank's risk-avoidance strategy. For example, among the 85% of the 160 SC rice producers having applied for credit, 97 households (71%) were able to access credit, but on average, their actual take-home loan size was only 26.6 million VND, instead of the 41.2 million VND which they originally requested.

Lowland producers obtained a higher loan size than upland producers, 32.2 and 21.1 million VND, respectively, even if the latter had more financial needs. As a consequence, the SC upland producers could neither maintain the irrigation system of their terraces, nor purchase the recommended inputs (seeds, fertilizer). They used more home-made inputs (57% of the total cost) but produced 22% less paddy than lowlanders. The stochastic frontier analysis estimation also showed that enhancing their financial status could increase the technical efficiency of the SC upland rice growers by 3.6%.

Agribusiness versus bank's requirement. TPC, the key actor in the chain, contracted and financed the farmers' inputs in advance during planting and paid in cash the paddy at harvest. However, during the harvest season, TPC could borrow only 2 billion VND against their needed amount of 6 billion VND. Consequently, TPC used only 30-50% of the capacity of their processing plant due to shortage of paddy. Although TPC had the reputation of being known for its positive value addition and a good distribution system for retailing in the main markets, these did not merit the banks' decision to relax their required physical collateral. Thus, TPC borrowed money from private lenders charging higher interest rates that undermined their profit. Similarly, the large collectors also faced constraints in accessing long-term credit to build warehouses and better machinery systems. The participation of banks in the AVCF approach might remove most financial needs of the actors, and thus, facilitate the agricultural development.

8.2 Conclusions

Although the central government has channeled various financing sources to rural areas in Lao Cai as an attempt to raise agricultural investment, and, in turn, productivity and income, farmers still faced many obstacles from both banks and farmers themselves. The two rural banks, VBARD and VBSP, used the assessments of local authorities to decide on credit approvals. Those poor and small farmers having weak relationships with the head of the lending group and without LUCs were excluded or suffered credit rationing the banking credit. LUCs were a primary requirement for farmers to get loans from VBRAD, but it does not requires from VBSP.

VBARD's priority given to enterprises and business households resulted in credit rationing of the remaining 18% of the total loanable fund for farmers. As a result, large scale households having more social, physical and human capital successfully accessed VBARD's credit. The MLM estimation revealed that the rate of incorrectness in credit rationing of VBARD limited the access of many potential medium farmers to satisfactory loans. At VBSP the trend was similar; the poorer and smaller farmers faced more challenges to get the loans which were intentionally designed for them.

The credit products of both above banks mismatched with the needs of the borrowers. The banks provided mainly long-term and fixed-repayment loans; while farmers needed both short-term loans for operational cost and long-term loans for fixed assets and agricultural machinery. Consequently, small farmers often turned to informal credit sources to finance their agricultural inputs.

Local farmers used three sources to finance their agricultural cost: (i) savings and 30% from home-made inputs; (ii) loans from banks (r = 9-13% per year) or money lenders (r = 30-50% per year); (iii) in-kind credit from inputs suppliers (r = 20-40% per year). Without savings and access to bank credit, small farmers borrowed from the following sources (in order of importance): traders, moneylenders and banks. They paid high interest rates to all of these lenders. In contrast, the medium-farm households financed their agriculture cost as follows: 42% from savings and home-made inputs, 46% from formal loans and 13% traders. Likewise, large-farm households financed their agriculture cost as follows: 46% from savings and home-made inputs, 38% from formal loans and 16% from traders.

High interest paid by smaller farmers led to unprofitable agriculture production and negative cash accumulation. Their food insecurity was due both

to low investment and small farm area. In 2018, their interest payments accounted for 22% and 20% of the agricultural value-addition of small- and medium-scale farmers, respectively, while this was 14% for large-scale farmers.

Formal credit significantly contributed to the increase of agricultural production for households who did not have constraints in borrowing money from formal lenders. Specifically, the non-constrained households among the small-scale groups invested more in both cultivation and livestock production, and then, obtained higher output and gross value addition than those of constrained households. Credit access facilitated the households to shift their farming system toward livestock and markets.

The common credit constraints such as the lack of collateral and strict risk-avoidance strategy of banks in the SC rice value chain also extended to the other chain actors. For example, upland producers need credit to create/repair the self-made pipe system to flow water in their plots; they also need money to buy cattle or small agricultural machines to reduce manual labor; and they need credit to increase commercial inputs. Similarly, large collectors had difficulty in accessing credit for warehouses and machinery. Moreover, the key actor in the chain, TPC, could not access enough credit to prefund its contracts with farmers because banks required collateral and did not consider their high value addition and high demand for their products. Therefore, TPC borrowed money from private lenders with higher interest rate. As a result, its profit and that of the contracted farmers was reduced. To sum up, participation of bank in the chain plays an essential role in achievement the effective value chain financing and agricultural development.

8.3. Recommendations

Improving agricultural finance in terms of quantity and quality depends on four relevant actors participating in the rural financial market. Based on our study, we have identified four relevant groups for our recommendations: (1) farmers; (2) agribusiness and other chain participants; (3) Rural banks; (4) Policy-makers.

8.3.1. Recommendations for farmers

Farmers in Lao Cai faced two constraints in their agricultural production: (1) improper investment in inputs; (2) difficulties in accessing reasonable credit.

Investment in inputs. Agricultural extension services need to equip/train farmers on various farming operations appropriate for their specific needs; e.g., proper use of inputs like fertilizer and pesticide, etc. To improve their financial management and investments, farmers need to learn how to record cash flows,

i.e., do *bookkeeping*, related to each kind of farming activity. To facilitate group learning, farmers should be encouraged to actively join and participate in agricultural production communities such as CIGs, Farmer's Union, etc. Belonging to any of these groups would enable them to learn from each other, e.g. on better home-made inputs, access to lower input prices, better product prices and cheaper loans for urgent financial needs.

Accessing reasonable credit. Local farmers need to also create awareness on different credit sources and how they could access reasonable loans from these sources: (i) CIG's, (ii) agribusiness through contract farming, and (iii) rural banks. Their creditworthiness can be enhanced by improving their (i) social and human capital by group training (knowledge and skills) and group activities (shared labor); (ii) capability to produce more and better; (iii) compliance with the contractual agreements signed with banks and/or enterprises, especially appropriate loan use.

8.3.2 Recommendations for agribusiness

To access banking credit, agribusinesses need to enhance their creditworthiness by reducing three existing weaknesses:

- Standardize the financial reports according to the current regulation;

- Increase the use of banking service in transactions, which allows banks to capture cash flows of agribusiness;

- Enhance the management capability and the effectiveness of loan use.

8.3.3 Recommendations for banks

Both banks must collaborate with local authorities to increase effectiveness of loan uses. Bank officers must visit borrowers to verify information, instead of requiring LUC as collateral, and depending on the evaluation by local authorities.

Rural banks should change its mind-set regarding farming and focus on their legal target customers: farmers, agribusiness and agriculture allied activities.

Rural banks need to examine specific credit demands of chain participants, and adjust their credit product to these demands.

Rural banks also need to participate in the chain and assign credit officer(s) to gather accurate information about the main key chain actors, estimate their creditworthiness based on the repayment capability of individual actors as well as the potential of the whole chain. These clerk(s) are responsible for monitoring main economic transactions in the value chain.

8.3.4 Recommendations for public authorities

Key intervention would be for policy makers to formulate and enact a comprehensive sustainable agriculture policy that would include not only finance, but other aspects as well. Agricultural finance requires broad public intervention and such interventions can either be useful (food security and increase income) or harmful (structural debt and land-loss) for beneficiaries. Agricultural commodity markets are public assets associated with basic human needs and human greed, therefore developing requires active policy and extensive work, and not agricultural finance alone.

The involvement of public authorities at the provincial and national level plays a crucial role in the realization of two key pillars: (1) well-managed subsidized finance for agriculture and rural development; (2) agricultural value chain financing. As regulated in Circular 62/2016/TT-BTC, its performance is evaluated through three main criteria: debt recovery ratio, non-performance loan ratio, and credit growth. These indicators just focus on outreach (the number of clients and outstanding loan), but do not aim to support the goals of agricultural development and poverty reduction.

Thus, we recommend to Government and/or provincial authorities the following: (i) separate the dual functions, commercial and social, of the two state banks, VBARD and VBSP. At the minimum level, VBARD just focus on commercial credit and VBSP provide only subsidized credit. At the higher level, VBARD needs to be privatized, which can increase the effectiveness, transparency, and accountability. (ii) evaluate the effectiveness of each subsidized credit package. In the short term, the direct outcomes of subsidies need to be assessed, for example, poverty reduction, agricultural growth and rural infrastructure, even the satisfaction of rural and/or ethnic minority borrowers after using banking credit. The impacts of subsidies in the longer term and larger scope must also be conducted frequently by provincial authorities and/or independent organizations.

There is no legal framework to support agricultural value chain financing, which encourages banks to participate in value chains. Until now, the Vietnamese Government issued the Decree. No. 98/2018/ND-CP regarding the incentive policy for development of linkages in production and consumption of agricultural products, which are forms of value chain linkages among farmers, enterprises, cooperatives and so on. As proved earlier in the literature review of AVCF approach, financial flows among chain actors in the chain likely a "*zero-sum game*", in which the resource availability for the chain as a whole does not

change. Therefore, chain actors need credit access (i.e., external funds) and the public sector need new legal framework. In the up-to-date regulation above, it still does not mention the participation of rural banks in the chain, especially VBARD. Therefore, we suggest that it is an urgent need to enact new legal regulation about this shortage.

Besides this, weak productive services (extension, irrigation, education, and training) and infrastructure (road, electricity) in northern mountainous areas lead to sub-optimal agricultural production and high transaction cost in trading. Therefore, we recommend to design agricultural development strategy focusing on specific value chains for each of the six ecological zones. The (central or provincial) Government may provide public facilities, like large-scale storages, to support contract farming and operational costs. The favorite conditions also stimulate the private enterprises (collectors, processors and traders) to invest in chain facilitations.

At the provincial level, institutions need to protect registered trademarks, such as Seng Cu rice and other special products, and support the leading chain actors like TPC. At the communal level, nepotism and other opportunistic behaviors must be removed, even it is not easy, through enhanced democracy and the propagation of reliable information to local farmers.

References

ADB. (2000). Finance for the Poor: Microfinance Development Strategy.

ADB. (2010). Microfinance Assessment of Asian Development Bank TA-7499-VIE: Developing Microfinance Sector in Vietnam, Manila, Philippines.

AfDB. (2013). Agricultural Value Chain Financing (AVCF) and Development for Enhanced Export Competitiveness. In A. D. Bank (Ed.): African Development Bank Tunisia.

Akerlof, G. A. (1970). The Market for" Lemons": Quality Uncertainty and the Market Mechanism, 84Q. *J. ECON, 488*, 489-490.

Akram, W., Hussain, Z., Sial, M., & Hussain, I. (2008). Agricultural Credit Constraints and Borrowing Behavior of Farmers in Rural Punjab. *European Journal of Scientific Research, 23*(2), 294-304.

Allet, M., & Hudon, M. (2015). Green microfinance: Characteristics of microfinance institutions involved in environmental management. *Journal of Business Ethics, 126*(3), 395-414.

Angrosino, M. (2007). *Doing ethnographic and observational research*: Sage.

Bäckman, S., Islam, K. Z., & Sumelius, J. (2011). Determinants of technical efficiency of rice farms in North-Central and North-Western regions in Bangladesh. *The Journal of Developing Areas, 45*(1), 73-94.

Bain, L. V. (1993). *Rural Poverty, Vietnamese Agriculture, and Major Agricultural Policies.* Paper presented at the Upland Agriculture in Asia. Proceedings of a Workshop Held in Bogor, Indonesia April.

Baltensperger, E. (1978). Credit rationing: issues and questions. *Journal of Money, Credit and Banking, 10*(2), 170-183.

BaoThangSO. (2017). The Statistical Yearbook: The Social and Economic Data of Bao Thang district.

Barslund, M., & Tarp, F. (2008). Formal and informal rural credit in four provinces of Vietnam. *The Journal of Development Studies, 44*(4), 485-503.

BatXatSO. (2017). The Statistical Yearbook: The Social and Economic Data of Bat Xat district.

Baydas, M. M., Meyer, R. L., & Aguilera-Alfred, N. (1994). Credit rationing in small-scale enterprises: special microenterprise programmes in Ecuador. *Journal of Development Studies, 31*(2), 279-288.

Bhattacharyya, R., Ghosh, B. N., Mishra, P. K., Mandal, B., Rao, C. S., et al. (2015). Soil degradation in India: Challenges and potential solutions. *Sustainability, 7*(4), 3528-3570.

Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological methods & research, 10*(2), 141-163. doi: https://doi.org/10.1177/004912418101000205

Binam, J. N., Tonye, J., Nyambi, G., & Akoa, M. (2004). Factors affecting the technical efficiency among smallholder farmers in the slash and burn agriculture zone of Cameroon. *Food policy, 29*(5), 531-545.

Boucher, S. R., Guirkinger, C., & Trivelli, C. (2009). Direct elicitation of credit constraints: Conceptual and practical issues with an application to Peruvian agriculture. *Economic Development and Cultural Change, 57*(4), 609-640.

Brau, J. C., & Woller, G. M. (2004). Microfinance: A comprehensive review of the existing literature. *The Journal of Entrepreneurial Finance, 9*(1), 1-28.

Bravo-Ortega, C., & Lederman, D. (2005). *Agriculture and national welfare around the world: causality and international heterogeneity since 1960*: The World Bank.

Bruhn, M., & Love, I. (2014). The real impact of improved access to finance: Evidence from Mexico. *The Journal of Finance, 69*(3), 1347-1376.

Bui Tan Yen, Visser, S., Chu Thai, T., & Stroosnijder, L. (2013). Constraints on agricultural production in the northern uplands of Vietnam.

Bui Thi Lam, Ho Thi Minh Hop, Philippe, B., Dogot, T., Tran, H. C., et al. (2019). Impacts of Credit Access on Agricultural Production and Rural Household's Welfares in Northern Mountains of Vietnam. *Asian Social Science, 15*(7), 119-133. doi: 10.5539/ass.v15n7

Bui Thi Lam, Tran, H. C., Ho, T. M. H., Eiichi, K., & Philippe, L. (2019). Realisation of Higher Value Added of Seng Cu Rice Value Chain in Viet Nam. In K. Eiichi (Ed.), *Food Value Chain in ASEAN: Case Studies Focusing on Local Producers* (pp. 52-86). Senayan Jakarta Pusat 10270, Indonesia: Economic Research Institute for ASEAN and East Asia (ERIA).

Bui Thi Lam, Tran Huu, C., Azadi, H., & Lebailly, P. (2018). Improving the Technical Efficiency of Sengcu Rice Producers through Better Financial Management and Sustainable Farming Practices in Mountainous Areas of Vietnam. *Sustainability, 10*(7), 1-19. doi: https://doi.org/10.3390/su10072279

Bui Thi Lam, Tran Huu Cuong, Ho Thi Minh Hop, Nguyen The Kien, & Lebailly, P. (2020). *Value Chain Financing Approach: A Good Way to Sustainable Agricultural Growth in Vietnam*

. Paper presented at the Global Changes and Sustainable Development in Asian Emerging Market Economies, Ha Noi, Viet Nam.

Bui, T. L., Tran, H. C., Azadi, H., & Lebailly, P. (2018). Improving the Technical Efficiency of Sengcu Rice Producers through Better Financial Management and Sustainable Farming Practices in Mountainous Areas of Vietnam. *Sustainability, 10*(7), 1-19.

Bünemann, E. K., Schwenke, G., & Van Zwieten, L. (2006). Impact of agricultural inputs on soil organisms—a review. *Soil Research, 44*(4), 379-406.

Calvin, J. M., Warren, F. L., & Leroy, J. H. (1980). Conceptual framework for analyzing the role of credit in small farm households. The Ohio State University. https://kb.osu.edu/bitstream/handle/1811/67314/1/CFAES_ESO_707.pdf: The Ohio State University.

CFS. (2015). Connecting Smallholders to Markets. Retrieved from http://www.csa-be.org/IMG/docx/cfs_hlf_final_april24.docx on 21 July 2018.

CGAP. (2003). *Helping to Improve Donor Effectiveness in Microfinance: Financial services for the rural poor. Retrieved from* https://www.cgap.org/sites/default/files/CGAP-Donor-Brief-Financial-Services-for-the-Rural-Poor-Oct-2003.pdf *on 15 July, 2017.*

CGAP. (2012). *A Guide to Regulationand Supervision of Microfinance. Retrieved from* https://www.cgap.org/sites/default/files/Consensus-Guideline-A-Guide-to-Regulation-and-Supervision-of-Microfinance-Oct-2012_0.pdf *15 July, 2017.*

Chandio, A. A., Jiang, Y., Gessesse, A. T., & Dunya, R. (2017). The Nexus of Agricultural Credit, Farm Size and Technical Efficiency in Sindh, Pakistan: A Stochastic Production Frontier Approach. *Journal of the Saudi Society of Agricultural Sciences.*

Chaovanapoonphol, Y. K., Battese, G. E., & Chang, H.-S. C. (2009). The impact of agricultural loans on the technical efficiency of rice farmers in the Upper North of Thailand *Productivity, Efficiency, and Economic Growth in the Asia-Pacific Region* (pp. 279-295): Springer.

Chaudhuri, K., & Cherical, M. M. (2012). Credit rationing in rural credit markets of India. *Applied Economics, 44*(7), 803-812.

Christiaensen, L., Demery, L., & Kuhl, J. (2006). *The role of agriculture in poverty reduction an empirical perspective*: The World Bank.

Christiaensen, L., Demery, L., & Kuhl, J. (2011). The (evolving) role of agriculture in poverty reduction—An empirical perspective. *Journal of Development Economics, 96*(2), 239-254.

Christiaensen, L., & Martin, W. (2018). Agriculture, structural transformation and poverty reduction: Eight new insights: Elsevier.

Chung, D. K. (2018). Land Accumulation and Concentration: Theoretical and Practical Fundamentals for Commodity Oriented Agricultural Development (in Vietnamese). *Vietnam Journal of Agricultural Science, 16*(4), 412-424.

Claessens, S. (2009). Competition in the financial sector: overview of competition policies. *The World Bank Research Observer, 24*(1), 83-118.

Claudio, G.-V. (1994). Stages in the evolution of thought on rural finance. A vision from The Ohio State University. *Economics and Sociology Occasional Paper, 2134.*

Claudio, G.-V. (2003). *Deepening rural financial markets: Macroeconomic, policy and political dimensions.* Paper presented at the Paving the Way Forward for Rural Finance: An International Conference on Best Practices, Washington, DC.

Claudio, G.-V. (2017). *The barriers to agricultural financing and the emergence of new models of financial intermediation for the sector (Chapter 2)*.

Claudio, G.-V., & Douglas, H. G. (1995). State-owned agricultural development banks: lessons and opportunities for microfinance.

Coates, M., Kitchen, R., Kebbell, G., Vignon, C., Guillemain, C., et al. (2011). Financing agricultural value chains in Africa: A synthesis of four country case studies. *Making finance work for Africa. Eschborn-Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ]*.

Cochran, W. G. (1977). *Sampling techniques - Thirrd Edition*: John Wiley & Sons. New York.

Coelli, T. J. (1996). A guide to FRONTIER version 4.1: a computer program for stochastic frontier production and cost function estimation: CEPA Working papers.

Collier, P., & Dercon, S. (2014). African agriculture in 50 years: smallholders in a rapidly changing world? *World development, 63*, 92-101.

Cowater Sogema. (2018). Provincial Engagement Strategy in Lao Cai Province. Retrieve from http://equality.aus4vietnam.org/wp-content/uploads/2018/08/PES-GREAT-Lao-Cai-_EN_27.08.18.pdf on 13 July 2018: Australian Government

Cuong, N. V., Tung, P. D., & Westbrook, D. (2015). Do the poorest ethnic minorities benefit from a large-scale poverty reduction program? Evidence from Vietnam. *The Quarterly Review of Economics and Finance, 56*, 3-14.

Czepiel, S. A. (2002). Maximum likelihood estimation of logistic regression models: theory and implementation. *Available at czep. net/stat/mlelr. pdf*.

D'Espallier, B., Hudon, M., & Szafarz, A. (2013). Unsubsidized microfinance institutions. *Economics letters, 120*(2), 174-176.

Dang, K. S., Nguyen, N. Q., & Pham, Q. D. (2006). *Policy reform and the transformation of Vietnamese agriculture*. FAO, Bangkok (Thailand). Regional Office for Asia and the Pacific eng.

Dao, V. H. (2002). Outreach diagnostic report: Improving household access to formal financial services in Vietnam. *Hanoi, Vietnam, Vietnam-Canada Rural Finance Outreach Project*.

David, R. (1816). The theory of Comparative Advantage.

Davis, J. R. (2006). *How can the poor benefit from the growing markets for high value agricultural products?* . Paper presented at the High Value Agricultural Products Workshop, UK.

De La O Campos, A. P., Villani, C., Davis, B., & Takagi, M. (2018). Ending extreme poverty in rural areas – Sustaining livelihoods to leave no one behind. Rome, FAO. 84 pp. Licence: CC BY-NC-SA 3.0 IGO.

Dembe, A. E., & Boden, L. I. (2000). Moral hazard: a question of morality? *New Solutions: A Journal of Environmental and Occupational Health Policy, 10*(3), 257-279.

Demirgüç-Kunt, A., Beck, T., & Honohan, P. (2008). Access to finance and development: Theory and measurement. *Finance for All? Policies and Pitfalls in Expanding Access*, 21-54.

Diagne, A., Zeller, M., & Sharma, M. (2000). *Empirical measurements of households' access to credit and credit constraints in developing countries: Methodological issues and evidence*: Citeseer.

Do Quy Toan, & Lakshmi, I. (2007). Land Titling and Rural Transition in Vietnam. *Economic Development and Cultural Change, 56*(3), 531-579. doi: https://doi.org/10.1086/533549

Dufhues, T. (2007). *Accessing rural finance: The rural financial market in Northern Vietnam*: Studies on the Agricultural and Food Sector in Central and Eastern Europe.

Dufhues, T., & Buchenrieder, G. (2005). Outreach of credit institutes and households' access constraints to formal credit in Northern Vietnam.

Dufhues, T. B., Dung, P. T. M., Hanh, H. T., & Buchenrieder, G. (2002). Information and targeting policies and their principal-agent relationships--The case of the Vietnam Bank for the Poor. *Quarterly Journal of International Agriculture, 41*(4), 335-362.

Duong, P. B., & Izumida, Y. (2002). Rural development finance in Vietnam: A microeconometric analysis of household surveys. *World development, 30*(2), 319-335.

Duong, P. B., & Thanh, P. T. (2014). Impact evaluation of microcredit on welfare of the Vietnamese rural households. *Asian Social Science, 11*(2), 190.

Dymond, L. H. (2015). *A Recent History of Recognized Economic Thought: Contributions of the Nobel Laureates to Economic Science*: Lulu. com.

Elizabeth, C. (1998). Agricultural Finance: Getting the Policies Right. *Agricultural Finance Revisited.*

Elkington, J. (2013). Enter the triple bottom line *The triple bottom line* (pp. 23-38): Routledge.

Embassy of the Netherlands, & Consulate General. (2017). Agriculture in Vietnam. Published by Embassy of the Netherlands in Hanoi and Consulate General in Ho Chi Minh City.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). Writing ethnographic fieldnotes. Chicago guides to writing, editing. *and publishing. Chicago, IL: University of Chicago Press. Feld, S., & Brenneis, D.(2004). Doing anthropology in sound. American Ethnologist, 31*(4), 461-474.

Ethiraj, G. (2012). Goodbye Financial Inclusion, Hello Financial Identity. Retrieved from http://www.forbesindia.com/blog/the-technocapitalist/goodbye-financial-inclusion-hello-financial-identity/ on 6 August 2018.

FAO. (1995). History of the credit revolving fund. Retrieved from http://www.fao.org/3/AC576E/AC576E02.htm on May, 2019.

FAO. (2007). Guidelines "Good Agricultural Practices for Family Agriculture".

FAO. (2017). Innovative risk management strategies in rural and agriculture finance –

The Asian experience, by Emilio Hernández (ed.), Rome, Italy.

FAO. (2018). Agricultural investment funds for development - Descriptive analysis and lessons learned from fund management, performance and private-public collaboration, by Miller C., Ono T., Petruljeskov M., Rome, Italy.

FAO, & ADA. (2016). *Innovations for inclusive agricultural finance and risk mitigation mechanisms –The case of Tamwil El Fellah in Morocco, by Ramirez, J. & Hernandez, E. Rome, Italy.* .

Fetterman, D. M. (2009). *Ethnography: Step-by-step* (Vol. 17): Sage Publications.

Foltz, J. D. (2004). Credit market access and profitability in Tunisian agriculture. *Agricultural Economics, 3*(30), 229-240.

Friedman, M. (1957). *A Theory of the Consumption Function. Chapter 3: The Permanent Income Hypothesis* Princeton University Press.

Fungáčová, Z., & Weill, L. (2015). Understanding financial inclusion in China. *China Economic Review, 34*, 196-206.

Germidis, D. A., Kessler, D., & Meghir, R. (1991). *Financial systems and development: what role for the formal and informal financial sectors?* : OECD.

Giang, H. (2004). Rural Credit Markets in Vietnam: Theory and Practice.

Gonzalez-Vega, C. (1984). Credit-rationing behavior of agricultural lenders: The iron law of interest-rate restrictions.

Green, S. B., & Salkind, N. J. (2010). *Using SPSS for Windows and Macintosh: Analyzing and understanding data*: Prentice Hall Press.

GRiSP. (2013). *Rice almanac, Source book for one of the most important economic activities on earth (Fourth edition). Los Baños (Philippines): International Rice Research Institute. 283 pages.*: (Global Rice Science Partnership).

GSO. (2016a). Results of the Vietnam Household Living Standard Survey (VHLSS) 2016. General Statistis Office.

GSO. (2016b). The results of Vietnam Rural, Agrucultural and Fishery Census. from https://www.gso.gov.vn/default.aspx?tabid=512&idmid=5&ItemID=18595

GSO. (2017a). Statistical Yearbook of Vietnam: Social-Economical Data from 1990 to 2017. from https://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=18533

GSO. (2017b). *Statistical Yearbook of Vietnam: Socio-economic situation of Vietnam, 1990-2017*. Hanoi, Viet Nam: Statistical Publishing House.

GSO. (2018). Statistical Yearbook of Vietnam in 2018. from https://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=18533

Guce, G. M. (2008). Agricultural Value Chain Financing in Vietnam *Financial Access and Inclusion in the Agricultural Value Chain*: APRACA (Asia-Pacific Rural and Agricultural Credit Association) and IFAD (International Fund for Agricultural Development).

Hashim, A. T., Osman, R., & Badioze-Zaman, F. S. (2016). International Journal of Advanced and Applied Sciences.

Hauswald, R., & Marquez, R. (2003). Information technology and financial services competition. *The Review of Financial Studies, 16*(3), 921-948.

Hermes, N., & Lensink, R. (2011). Microfinance: its impact, outreach, and sustainability. *World development, 39*(6), 875-881.

Hermes, N., Lensink, R., & Meesters, A. (2011). Outreach and Efficiency of Microfinance Institutions. *World development, 39*(6), 938-948.

Hien, N. T. M., Kawaguchi, T., & Suzuki, N. (2003). A study on technical efficiency of rice production in the Mekong Delta, Vietnam by stochastic frontier analysis. *Journal of the Faculty of Agriculture, 48*(1/2), 325-357.

Hieu, L. T. P., Thanh Tien. (2017). Formal Credit and its Impact on Income - Evidence from the Poor Households in Vietnam. *American Journal of Applied Sciences, 14*. doi: 10.3844/ajassp.2017.718.725

HLPE. (2013). Investing in smallholder agriculture for food security. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

Hoang, D. Q., Dufhues, T. B., & Buchenrieder, G. (2012). Do connections matter? Individual social capital and credit constraints in Vietnam. *The European Journal of Development Research, 24*(3), 337-358.

Hoang, Q. D., Dufhues, T. B., & Buchenrieder, G. (2016). Individual social capital and access to rural services in Northern Vietnam. *International Journal of Social Economics, 43*(4), 363-381.

Hodgman, D. R. (1960). Credit risk and credit rationing. *The Quarterly Journal of Economics, 74*(2), 258-278.

Hollis, A., & Sweetman, A. (1998). Microcredit: What can we learn from the past? *World development, 26*(10), 1875-1891.

Hudon, M. (2010). Management of microfinance institutions: Do subsidies matter? *Journal of International Development, 22*(7), 890-905.

Ian, C., Kim, N. B. N., Vu, T. T., & Nguyen, T. P. H. (2010) A Robust Harvest: Strategic Choices for Agricultural and Rural Development in Vietnam. *Accelerating Growth in Agriculture Productivity and Rural Incomes in Vietnam: Lessons from Regional Experiences* The Asia Foundation.

IFAD. (2010). IFAD Decision Tools for Rural Finance (pp. 82). Rome, Italia.

IFC. (2014). Access to Finance for Smallholder Farmers: Learning from the Experiences of Microfinance Institutions in Latin America.

IISD. (2015). *Financing for Agriculture: How to boost opportunities in developing countries*. https://www.iisd.org/sites/default/files/publications/financing-agriculture-boost-opportunities-devloping-countries.pdf

Jaffee, D., & Stiglitz, J. (1990). Credit rationing: Elsevier.

Jaffee, D. M., & Modigliani, F. (1969). A theory and test of credit rationing. *The American Economic Review, 59*(5), 850-872.

Jaffee, D. M., & Russell, T. (1976). Imperfect information, uncertainty, and credit rationing. *The Quarterly Journal of Economics, 90*(4), 651-666.

Jame Chen. (2018). Definition of agricultural Credit. https://www.investopedia.com/terms/a/agricultural-credit.asp.

Johnston, B. F., & Mellor, J. W. (1961). The role of agriculture in economic development. *The American Economic Review, 51*(4), 566-593.

Key, N., & Runsten, D. (1999). Contract farming, smallholders, and rural development in Latin America: the organization of agroprocessing firms and the scale of outgrower production. *World development, 27*(2), 381-401.

Khandker, S. R., & Koolwal, G. B. (2016). How has microcredit supported agriculture? Evidence using panel data from Bangladesh. *Agricultural Economics, 47*(2), 157-168.

Khoi, P. D., Gan, C., Nartea, G. V., & Cohen, D. A. (2013). Formal and informal rural credit in the Mekong River Delta of Vietnam: Interaction and accessibility. *Journal of Asian Economics, 26*, 1-13.

Kim Anh, N., Thanh Tam, L., Manh Cuong, N., Van Thuyet, N., & Thi Tuyet Mai, N. (2014). *Tài chính vi mô tại Việt Nam: Thực trạng và khuyến nghị chính sách*.

Klein, B., Meyer, R., Hannig, A., Burnett, J., & Fiebig, M. (1999). Better practices in agricultural lending. Rome, Italia.

Kompas, T. (2002). Market reform, productivity and efficiency in Vietnamese rice production.

Kozel, V. (2014). *Well begun but not yet done: Progress and emerging challenges for poverty reduction in Vietnam*: The World Bank.

Krugman, P. (1980). Scale economies, product differentiation, and the pattern of trade. *The American Economic Review, 70*(5), 950-959.

Kumar, K. N. (2012). Financial Sustainability, Outreach and Impact of Microfinance Institutions-Is There a Trade-Off? *Nitte Management Review, 6*(2), 53-62.

LaocaiDARD. (2016). Laocai Deparment of Agriculture and Rural Development: Provincial database.

LaocaiSO. (2014). Laocai Statistical Yearbook: The provincial Social and Economic Data Source.

LaocaiSO. (2016). Laocai Statistical Yearbook: The provincial Social and Economic Data Source.

LaocaiSO. (2017). Laocai Statistical Yearbook: The provincial Social and Economic Data Source.

Le Thi Minh, C., Lebailly, P., & Nguyen Tuan, S. (2012). Access to credit of animal production households: a study in Hai Duong province, Vietnam. *Journal Science and Development, 10*(7), 1050-1060.

Le Thi Minh Chau. (2014). *An analysis of access to credit by animal producing households in Hai Duong Province, Vietnam.* Université de Liège Gembloux Agro-Bio Tech, Gembloux, Belgique.

Le Trung Hieu, & Thanh, P. T. (2017). Formal Credit and its Impact on Income - Evidence from the Poor Households in Vietnam. *American Journal of Applied Sciences, 14*(7), 718-725. doi: 10.3844/ajassp.2017.718.725

Lensink, R., & Pham, T. T. T. (2012). The impact of microcredit on self-employment profits in Vietnam. *Economics of transition, 20*(1), 73-111.

Linh, T. N., Long, H. T., Chi, L. V., Tam, L. T., & Lebailly, P. (2019). Access to Rural Credit Markets in Developing Countries, the Case of Vietnam: A Literature Review. *Sustainability, 11*(5), 1468.

Liu, Y. (2018). Introduction to land use and rural sustainability in China. *Land Use Policy, 74*, 1-4.

Loayza, N. V., & Raddatz, C. (2010). The composition of growth matters for poverty alleviation. *Journal of Development Economics, 93*(1), 137-151.

Luan, D. X. (2019). Motivation and barriers to access to formal credit of primary cinnamon producers from the perspective of value chain development in Northwestern Vietnam. *Journal of Agribusiness in Developing and Emerging Economies,*. doi: https://doi.org/10.1108/JADEE-01-2019-0003

Luan, D. X., & Kingsbury, A. (2019). Thinking beyond collateral in value chain lending: access to bank credit for smallholder Vietnamese bamboo and cinnamon

farmers. *International Food and Agribusiness Management Review, 22*(4), 535-555.

Machalek, R., & Martin, M. W. (2015). Sociobiology and Sociology: A New Synthesis.

MacIntosh, R., & O'Gorman, K. (2015). Research Methods for Business and Management. *A guide to writing your dissertation*.

Maclean, J., Hardy, B., & Hettel, G. (2013). *Rice Almanac: Source book for one of the most important economic activities on earth*: IRRI.

Maddala, G. S. (1986). *Limited-dependent and qualitative variables in econometrics*: Cambridge university press.

Madestam, A. (2014). Informal finance: A theory of moneylenders. *Journal of Development Economics, 107*, 157-174.

Marx, K. (2004). *Capital: A critique of political economy*: Penguin UK.

Matin, I., Hulme, D., & Rutherford, S. (2002). Finance for the poor: from microcredit to microfinancial services. *Journal of International Development, 14*(2), 273-294.

Matthieu, D. C., Anshu, V., & Biel, A. (2018). Agriculture 4.0: The future of farming technology.

Mayo, E., & Mayo, E. (1998). *Small is bankable: Community reinvestment in the UK*: Joseph Rowntree Foundation.

Meyer, R. L., & Roberts, R. (2004). *Agricultural finance in Uganda: The way forward*: German Technical Co-operation.

Michael, O. B., & Sharon, O. O. (2014). Financial system, financial inclusion and economic development in Nigeria. *International Journal of Management Sciences, 2*(3), 139-148.

Mill, J. S. (1848). *Principles of political economy, 1936.*: London: Longmans, Green and Co.

Miller, C. (2012). Agricultural value chain finance strategy and design: Technical Note *Food and Agriculture Organization*.

Miller, C., & Jones, L. (2010). *Agricultural value chain finance: Tools and lessons*: Food and Agriculture Organization of the United Nations and Practical Action Pub.

Mir Kalan, S., Humayun, K., Jehanzeb, & Zalakat, K. (2008). Impact of agricultural credit on farm productivity and income of farmers in mountaneous agriculture in Northern Pakistan (A case study of selected villages in Chitral). *Agriculture, 24*(4), 713-718.

Mishkin, F. S. (2007). *The economics of money, banking, and financial markets*: Pearson education.

Mishra, A., Kumar, P., & Ketelaar, J. W. (2016). Improving rice-based rainfed production systems in Southeast Asia for contributing towards food security and rural

development through sustainable crop production intensification. *AIMS AGRICULTURE AND FOOD, 1*(2), 102-123.

Modigliani, F. (1966). The life cycle hypothesis of saving, the demand for wealth and the supply of capital. *Social research*, 160-217.

Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. *Post-keynesian economics, 1*, 338-436.

MOLISA. (2016). Poverty Report of Vietnam Ministry of Labor - War Invalids and Social Affairs.

MOLISA, UNDP, & GSO. (2018). Multidimensional poverty in Viet Nam: Reducing poverty in all its dimensions to ensure a good life for all: Ministry of Labor - War Invalids and Social Affairs.

Moore, W., & Craigwell, R. (2003). The relationship between commercial banks' interest rates and loan sizes: evidence from a small open economy. *Applied Financial Economics, 13*(4), 257-266.

Muhongayire, W., Hitayezu, P., Mbatia, O. L., & Mukoya-Wangia, S. M. (2013). Determinants of farmers' participation in formal credit markets in rural Rwanda. *Journal of Agricultural Sciences, 4*(2), 87-94.

MuongKhuongSO. (2017). The Statistical Yearbook: The Social and Economic Data of Muong Khuong district.

Murphy, M. M., & Ott, M. (1977). Retail credit, credit cards and price discrimination. *Southern Economic Journal*, 1303-1312.

Murray, W. J. (2012). Sustainable crop production intensification. *SUSTAINABLE DIETS AND BIODIVERSITY*, 4.

Nam, D. H. (2017). Promoting linkages between agribusinesses and farmers through accumulation and concentration of agricultural land (in Vietnamese). *Vietnam Academy of Social Sciences*(11).

Nguyen, C., Bigman, D., Van den Berg, M., & Vu, T. (2007). Impact of Micro-credit on Poverty and Inequality: The Case of the Vietnam Bank for Social Policies.

Nguyen, D. A. T. (2010). Vietnam's Agrarian Reform, Rural Livelihood and Policy Issues.

Nguyen, L. T., Hoai Nguyen, A. P., Van Passel, S., Azadi, H., & Lebailly, P. (2018). Access to preferential loans for poverty reduction and rural development: evidence from Vietnam. *Journal of Economic Issues, 52*(1), 246-269.

Nurkse, R. (1966). Problems of capital formation in underdeveloped countries.

Nuryartono, N. (2007). Credit Rationing of Farm Households and Agricultural Production: Empirical Evidence in the Rural Areas of Central Sulawesi, Indonesia. *Jurnal Manajemen dan Agribisnis, 4*(1), 15-21.

OI. (2013). Financing smallholder farmers to increase incomes and transform lives in rural communities. Opportunity International.

Okae, T. (2009). Rural Credit and Community Relationships in a Northern Vietnamese Village.

Oliver, S., Margret, A., Irene, S., Domaro, B., & Bernard, W. M. (2014). How to make agricultural finance work: Uganda experience *Journal of Management and Social Sciences, 4*.

Oluyombo, D. (2013). Do Informal Microfinance Loans Meet the Financial Needs of Rural Dwellers? *Cooperative and Microfinance Revolution. Lagos: Soma Prints Limited*, 129-141.

Orsini, F., Kahane, R., Nono-Womdim, R., & Gianquinto, G. (2013). Urban agriculture in the developing world: a review. *Agronomy for sustainable development, 33*(4), 695-720.

P. Raghuram, & Hymajyoti, S. (2012). *Agricultural Finance and Co-operation. Lecture notes in the Course No. AECO 142, S.V Agricultural College, Tirupati (Andhra Pradesh).*

Pan Nature. (2017). *Northwest Agriculture: Identifying challenges and development directions in the context of climate change (in Vietnamese)*. Ha Noi city: Thanh Nien Publishing House.

Petrick, M. (2005). Empirical measurement of credit rationing in agriculture: A methodological survey. *Agricultural Economics, 33*(2), 191-203.

Pham, T. T., Katsuhiro, S., & Pham, B. D. (2019). Impact of microcredit on rural household welfare and economic growth in Vietnam. *Journal of Policy Modeling, Vol: 41*(1), 120-139.

Phan, D. K., Gan, C., Nartea, G. V., & Cohen, D. A. (2014). The impact of microcredit on rural households in the Mekong River Delta of Vietnam. *Journal of the Asia Pacific Economy, 19*(4), 558-578.

Piot-Lepetit, I., & Nzongang, J. (2014). Financial sustainability and poverty outreach within a network of village banks in Cameroon: A multi-DEA approach. *European journal of operational research, 234*(1), 319-330.

Quach, M., Mullineux, A., & Murinde, V. (2005). Access to credit and household poverty reduction in rural Vietnam: A cross-sectional study. *The Birmingham Business School, The University of Birmingham Edgbaston*, 1-40.

Quach Manh, H. (2005). *Access to credit and household poverty reduction in rural Vietnam: A cross-sectional study.* The University of Birmingham Edgbaston.

Quayes, S., & Rashid, S. (2008). Linkage between production and consumption of an agricultural household. *The Journal of Developing Areas*, 117-134.

Rahji, M., & Fakayode, S. (2009). A multinomial logit analysis of agricultural credit rationing by commercial banks in Nigeria. *International Research Journal of Finance and Economics, 24*(91), 97-103.

Rahman, S., & Charitonenko, S. (2002). Commercialization of Microfinance–Bangladesh. *Asian Development Bank, Manila*.

Rapsomanikis, G. (2015). The economic lives of smallholder farmers: An analysis based on household data from nine countries. *Food and Agriculture Organization of the United Nations, Rome*.

Robinson, M. S. (2001). *The microfinance revolution: Sustainable finance for the poor*: The World Bank.

Rosen, S. (1974). Hedonic prices and implicit markets: product differentiation in pure competition. *Journal of political economy, 82*(1), 34-55.

Saito, K. A., & Villanueva, D. P. (1981). Transaction costs of credit to the small-scale sector in the Philippines. *Economic Development and Cultural Change, 29*(3), 631-640.

Sauli, H., Quang, N., & Emilio, H. (2017). Innovations and inclusive investments for agricultural development in Viet Nam.

Sauli, H., & Quang, N. N. (2015). Rural Finance of Coffee Smallholders in Vietnam - Case Study in Dak Nong Province. Retrieved from https://asia.ifad.org/en_GB/web/vietnam/home/-/news/12394/normal.

Schoombee, A. (1998). The financial systems approach to development finance: origin, evolution and prospects. *Development Southern Africa, 15*(3), 379-398.

Schultz, T. W. (1964). Transforming traditional agriculture. *Transforming traditional agriculture.*

Sergio, N., Mark, S., Richard, L. M., Claudio, G.-v., & Jorge, R.-m. (2000). Microcredit and the Poorest of the Poor: Theory and Evidence From Bolivia.

Shakil, Q. (2011). Depth of outreach and financial sustainability of microfinance institutions. *Applied Economics, 44*(26), 3421-3433. doi: https://doi.org/10.1080/00036846.2011.577016

Shallabh. Sampling Theory: STRATIFIED SAMPLING (Lecture 9). Retrieved 16th March, 2018, from http://home.iitk.ac.in/~shalab/sampling/chapter4-sampling-stratified-sampling.pdf

Smith, A. (1776). *An Inquiry into the Nature & Causes of the Wealth of Nations*: London: Strahan and Cadell, .

Smith, D. (2001). International evidence on how income inequality and credit market imperfections affect private saving rates. *Journal of Development Economics, 64*(1), 103-127.

Springer-Heinze, A. (2018). ValueLinks 2.0. Manual on Sustainable Value Chain Development, GIZ Eschborn, 2 volumes. Volume 1.

StatisticSolutions. (2013). Statistical Analysis. from http://www.statisticssolutions.com/directory-of-statistical-analyses/

Stewart, R., Van Rooyen, C., Korth, M., Chereni, A., Da Silva, N. R., et al. (2012). *Do Micro-credit, Micro-savings and Micro-leasing Serve as Effective Financial Inclusion Interventions Enabling Poor People, and Especially Women, to Engage in Meaningful Economic Opportunities in Low-and Middle-income Countries?: A Systematic Review of the Evidence*: EPPI-Centre.

Stigler, G. J. (1958). The economies of scale. *The Journal of Law and Economics, 1*, 54-71.

Stiglitz, J. E. (1990). Peer monitoring and credit markets. *The world bank economic review, 4*(3), 351-366.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review, 71*(3), 393-410.

Sunil Singh, Y. (2017). Source of Agricultural Credit in India: A Conceptual Study of Indian Agricultural Credit *An International Peer Reviewed Refereed Research Journal, 8*(3), 161-166.

Tan, K. H. (2009). *Environmental soil science*: CRC Press.

Tang, S., & Guo, S. (2017). *Formal and informal credit markets and rural credit demand in China.* Paper presented at the 2017 4th International Conference on Industrial Economics System and Industrial Security Engineering (IEIS).

Thanh Tam, L. (2011). Vietnam rural financial market-Fact dianostics and the policy implications for rural development of Vietnam. *Journal of Economics and Development, 13*(1), 57.

Thomas, D., Gertrud, B., Hoang, D. Q., & Nuchanata, M. (2011). Social capital and loan repayment performance in Southeast Asia. *The Journal of Socio-Economics, 40*(5), 679-691. doi: https://doi.org/10.1016/j.socec.2011.05.007

Thomas, D., Gertrud, B., & Nuchanata, M. (2013). Social Capital and Market Imperfections: Accessing Formal Credit in Thailand. *Oxford Development Studies, 41*(1), 54-75. doi: https://doi.org/10.1080/13600818.2012.753999

Timberg, T., Binh, L., MINH, T., MODAK, N., & HEGGEN, A. (2011). Promoting Sustainable, Market-Based Microfinance: Viet Nam Case Study and Lessons Learned for APEC Economies: Report 211-SO-01.4. Singapore: APEC (Asia-Pacific Economic Cooperation).

Timmer, C. P. (2010). Reflections on food crises past. *Food policy, 35*(1), 1-11.

TKLaoCai. (2017). *Niên giám thống kê tỉnh Lào Cai* (C. T. k. t. L. Cai Ed.). Hà Nội, Việt Nam: Nhà xuất bản thống kê.

Ugo, P.-C., & Joachim, O. (2008). *Livestock as a pathway out of poverty in Latin America: A policy perspective.* . Paper presented at the Internacional Workshop on 'Nuevas oportunidades para sistemas de rumiantes de aptitud

lechera y de doble propósito en Latino América. Viale delle Terme di Caracalla, Rome, Italy. https://www.researchgate.net/profile/Joachim_Otte/publication/265627138_A_Living_from_Livestock_Livestock_as_a_Pathway_out_of_Poverty_in_Latin_America_A_Policy_Perspective/links/5445e5560cf2d62c304d8a3a.pdf

Varghese, A. (2004). Bank-moneylender credit linkages: theory and practice: mimeo Texas AM University.

Varian, H. (1989). Price discrimination, in the Handbook of Industrial Organization: North Holland, Amsterdam.

Vien, T. D. (2017). Land accumulation and agricultural development towards high technology: Policy recommendations (in Vietnamese). *Tạp chí Tia sáng* Retrieved from http://tiasang.com.vn/-dien-dan/Tich-tu-ruong-dat-va-phat-trien-nong-nghiep-CNC-Khuyen-nghi-chinh-sach-10689

VNMNRE. (2014). Viet Nam National Biodiversity stratergy to 2020, vision to 2030. . Ha Noi, Viet Nam: Ministry of Natural Resources and Environment.

VNPI. (2017). Vietnam Productivity Report 2017.

Von Pischke, J. (1996). Measuring the trade-off between outreach and sustainability of microenterprise lenders. *Journal of International Development, 8*(2), 225-239.

Wibowo, S. S. (2015). *Credit Constraints, Risk Sharing, and Household Welfare: The Case of Indonesia, Durham theses, Durham University. Available at Durham E-Theses Online:* http://etheses.dur.ac.uk/11100/.

William G. Murray. (1980). Agricultural finance: Principles and Practice of Farm Credit. The Iowa State College Press, Ames, Iowa.

http://www.emelichar.com/BustRep931123AFBF_01.pdf.

Woller, G. M., Dunford, C., & Woodworth, W. (1999). Where to microfinance. *International Journal of Economic Development, 1*(1), 29-64.

World Bank. (2004). *Making services work for poor people*: World Bank and Oxford University Press.

World Bank. (2014). Vietnam - Financial sector assessment. Financial Sector Assessment Program (FSAP). Washington, DC ; World Bank Group.

World Bank. (2015). Vietnam - Second Northern Mountains Poverty Reduction Project (English). Washington, DC : World Bank Group.

World Bank. (2016a). *Transforming Vietnamese Agriculture: Gaining More for Less*: World Bank.

World Bank. (2016b). World Development Indicators 2016. Washington, DC: World Bank. Doi:10.1596/978–1-4648–0683–4. License: Creative Commons Attribution CC BY 3.0 IGO.

World Bank. (2018a). Climbing the ladder: poverty reduction and shared prosperity in Vietnam.

World Bank. (2018b). Ending the extremely porverty in rural areas: Sustaining livelihoods to leave no one behind. Retrieved from http://www.fao.org/3/ca1908en/CA1908EN.pdf.

World Bank. (2018c). New progress in poverty reduction and prosperity of Viet Nam

World Bank. (2018d). Overview of financial inclusion. from https://www.worldbank.org/en/topic/financialinclusion/overview

World Bank. (2018b). The Little Data Book on Financial Inclusion 2018. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/29654 License: CC BY 3.0 IGO.

WorldBank. (2014). Financial Sector Assessment : Vietnam. Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/20583 License: CC BY 3.0 IGO.

WorldBank. (2017). The annual data of Viet Nam and the world. Retrieved 01/01/2018, from https://data.worldbank.org/indicator

Yadav, P., & Sharma, A. K. (2015). Agriculture credit in developing economies: A review of relevant literature. *International Journal of Economics and Finance, 7*(12), 219-244.

Yaron, J. (1992). *Assessing development finance institutions: a public interest analysis* (Vol. 174): World Bank Washington, DC.

Zeller, M. (1994). Determinants of credit rationing: A study of informal lenders and formal credit groups in Madagascar. *World development, 22*(12), 1895-1907.

Zeller, M. (2003). Rural finance institutions and systems–models of ru ral financial institutions. *Broadening Access and Strengthening Input Market System, 14*.

Zeller, M., Ahmed, A. U., Babu, S. C., Broca, S., Diagne, A., et al. (1996). Rural Finance Policies for Food Security of the Poor: Methodologies for a Multicountry Research Project.

Zhang, Q.-c., & Wang, G.-h. (2005). Studies on nutrient uptake of rice and characteristics of soil microorganisms in a long-term fertilization experiments for irrigated rice. *Journal of Zhejiang University. Science. B, 6*(2), 147.

Appendix

Table A.1: Outstanding loan of formal financial suppliers in Lao Cai

No.	Institution	2013	2014	2015	2016	2017	Growth rate (%)
		Value in billion VND					
I	***Non-profit banks***						
1	VDB	4,001	4,253	3,968	4,053	3,810	-1.22
2	VBSP	1,769	1,842	2,015	2,263	2,467	8.67
	Subtotal	***5,770***	***6,095***	***5,983***	***6,316***	***6,277***	***2.13***
II	***Commercial banks***						
3	VBARD	6,010	7,458	10,040	11,809	10,805	15.79
4	BIDV	3,154	4,032	4,654	6,493	7,825	25.50
5	Viettin Bank	2,096	4,215	5,736	6,609	7,516	37.61
6	Vietcom Bank		137	907	1,454	1,921	20.64
7	Techcom Bank	236	294	270	214	245	0.94
8	Saigion Bank	233	299	365	434	511	21.69
9	SHB	360	559	2,816	4,157	5,375	96.57
10	MB	228	640	696	968	945	42.68
11	Post Bank	1	120	173	1,299	409	50.49
12	HD Bank	13	114	194	703	784	90.17
	Sub-total	***12,331***	***17,868***	***25,851***	***34,140***	***36,336***	***31.02***
III	*Non-institutional entities*						
13	PCF	84	81	71	68	84	0.00
14	WDF	8.6	15.4	14.7	18.2	23.3	28.30
	Sub-total	***92.6***	***96.4***	***85.7***	***86.2***	***107.3***	***3.75***
	Total	**18,193**	**24,059**	**31,920**	**40,542**	**42,720**	**23.79**

Source: Annual reports of banks surveyed, 2018.

QUESTIONNAIRE FOR FARMERS

HSH ID	Date
Commune	District

I/ GENERAL INFORMATION

Name of the HH's head_____ Age _____

Ethnic _____ Gender_____ Phone number: _____

HH size: Adults _____ Children _____ Total _____

Years attended school (including university, if applicable) _____

Participate in extension in last year? (Y/N)

Main job of the HH's head:

☐ Agriculture ☐ Salary ☐ Non-farm business ☐ Other

Please specify kind of other non-farm business(es): _____

Please specify kind of other source(s) _____

Member of Mass Organization: (☐Yes/ ☐No)

☐Farmer ☐Women ☐Youth ☐Veteran

Which benefits have you received when being member of the society?

a) To get quality inputs ☐Yes/ ☐No

b) To get Government's supports ☐Yes/ ☐No

c) For selling produce ☐Yes/ ☐No

d) To access banking credit ☐Yes/ ☐No

e) To access extension serive/technical assistance ☐Yes/ ☐No

Any other, (please specify) _____

II/ Economic activites and its input-output generated in 2016.

Agricultural area (m^2) Own: _____Lease/Rent: _____Unused: _____total _____

Total cultivated land irrigated (%): _____ Rice-cultivated land irrigated (%): _____

	Activities	Quantity (kg)	Price *(VND/kg)*	Value *(VND)*
I	**CULTIVATION**			
1.1	**Cultivation output**			
	- Rice (……m^2)			
	- Maize (……m^2)			
	- Vegetable (……m^2)			
	- Fruit (……m^2)			
	- Perennial crop (……m^2)			
	- Others (……m^2)			
1.2	**Cash-inputs for cultivation**			
	- Seeds			
	- Fertilizer			
	- Pesticide and other chemicals			
	- Rental labour			
	- Others			
1.3	**Self-inputs for cultivation**			
	- Seeds			
	- Fertilizer (manure)			
	- Family labour			
	- Others			
II	**LIVESTOCK**			
2.1	**Output of livestock**			
	- Pig			
	- Cattle			
	- Pourtry			
	- Eggs			
	- Others			
2.2	**Inputs for livestock**			
	- Piglet			
	- Other baby animals			
	- Feedings			
	- Vaccine			

	- Rental labor			
2.3	**Self-inputs for livestock**			
	- Piglet			
	- Other baby animals			
	- Feedings			
	- Family labor			
III	**WAGE**			
IV	**NON-FARM BUSINESS**			
V	**OTHER**			

Compared to in the last year, how is your HH's income?

Increase of over 30% Increase about 10%-30% No change Decrease of 10% Decrease of more than 30%

Which are the reasons of this change, if yes?

Among these incomes, which is the most important source? Why?

Among these incomes, which is the second-most important source? Why?

III/ Seng Cu rice production in 2016

Years of experience in Seng Cu rice growing? _____

How many growing cycles do you have per year? _____

Total SC rice area cultivated in the last year (m^2): _____

Average productivity (ton/ha): _____ Yeild (kg): _____

In which, for sale (%): _____ For home consumption (%): _____

In growing duration, how often do you visit the Seng Cu rice per week? _____

How long you spend for one visit including traveling time (minutes)? _____

3.1 Inputs and output generated of Seng Cu rice production of household

Please fill in values (1000 VND) the average data about one growing season.

	Items	**Quantity**	**Unit price (1000D)**	**Value (1000D)**	**Code** (multi options)

I/	Production cost				
	Land preparation - Machinery service - Labour cost				
	Seeds				
	Fertilizers				
	Pesticides				
	Harvest - Machinery service - Labor cost				
	Transportation				
	Equipment and machinery				
	Energy (Electricity, petrol,)				
	Others				
	Total Costs				
II/	Output				
	Unit selling price of paddy				
	Gross Output (GO)				

Source codes for purchasing inputs: 1=Own (self-produced) 2=Purchased from farmer 3=Purchased from local dealer 4=Provided by Government program 5 = Other (specify)	Source codes for selling output: 6= Sold to another farmer 7= Sold to local trader 8= Sold through contractual agreement 9= sold directly at local market by HH 10 = Other (specify)

How is your satisfaction level of the underlying current performance? (Please tick the appropriate box; 1= Highly Dissatisfied; 5= Highly Satisfied)

Purchasing inputs mentioned above	Level	Reasons explaining (code)?
Seeds		
Fertilizers		
Pesticide		
Rental labour		
Other services		
Selling paddy		

Codes:

1= Quantity	2= Quality	3= Price
4= Time	5= Availability	6= Feelings

Have you got any contractual agreements with SC rice agribusiness? ☐Yes/ ☐ No

If yes, what are regulations among your households and this agribusiness? (focus on quality, price, time, availability and accessibility)

Providing seed ☐Yes/ ☐No

Can you explain this to me? _____

Providing fertilizer ☐Yes/ ☐No

Can you explain this to me? _____

Providing pesticide ☐Yes/ ☐No

Can you explain this to me? _____

Purchasing paddy inputs

Can you explain this to me? _____

Which regulations do you want to change? And why?

3.3 Farming practices

Think about the way you produce Seng Cu rice, do you think you can improve your rice yield? And, how can?

	Barriers to SC rice production and marketing	1= Not at all important 2= A little important 3= Neutral 4= Relatively important 5= Very important
	Access to certificated seeds	
	Price of certificated seeds	
	Quality of seed used	
	Access to fertilizer/pesticide	
	Price of commercial fertilizer/ pesticide	
	Quality of commercial fertilizer/pesticide	
	Access to selling market	
	Selling price of paddy	
	Difficulty in farming practices	

	Lack of technical assistances	
	Difficulty in extension service	
	Difficulty in irrigation	
	Difficulty in banking credit	
	Other (specific)	

3.3 Access to information and extension services

Extension Service Provider and/or technical assistants	Have you received services from them? 1= Yes; 0=No	What type of supports did you are accessed?*	After receiving the advice, did you follow it? 1=Yes; 0=No If not, why?
Agricultural extension center			
Technical training schools			
NGOs (specific)			
Input supply enterprises (specific)			
Marketing enterprises (specific)			
Local trader			
Neighbors or friends			
Other (Please specify)			

* Extension type codes:

1= SC rice farming techniques 2=Inputs usage

3=Water management 4= Post-harvest techniques

5=Advice on output prices 6=Advice on input prices

7=Infor on where to sell 8= Infor on finacial sevices access

9=Other (please specify)

Among these supports, which is the most important needed one? Why?

Among these supportive providers, which is the most important source? Why?

4. ACCESS TO FINANCIAL SERVICES

4.1 Agricultural credit

Q. Is your business profitable during the whole year? ☐Yes/ ☐No

Q. How many months does your agribusiness have negative cash flows? _____

In the case of money shortage, how do you often deal with it?

_____

Q. Does your family keep written financial records of revenues and expenses? ☐Yes/ ☐No

In the last year, did you borrow any money/in-kind inputs for Seng Cu rice production (fill the underlying table)?

	VBARD	VBSP	Relatives	Money lenders	Enterprise
Loan size desire (mil. VND)					
Loan size approval (mil. VND)					
Interest rate (%/month)					
Duration (months)					
Purpose's loan					
Role of credit source (1-5) (Least important → Important)					
Income source(s) for repayment					
Would you borrow from this lender again? (1 = Yes; 0 = No)					
Please rank the sources you would seek (in order of preference)					

Can you explain?

_____

Can you tell me about the usage of loan? (Yes/No)

Loans / Use for	VBARD	VBSP	Relatives	Money lenders
Seng Cu rice Cultivation				
Other crops/plants growing				
Livestock				
Non-farm expenditure				
Living cost				
Pay off another debt				
Other (specific)				

Please tell me about your opinions about the underlying factors affecting to your satisfaction about banking loan? (Rate from 1 to 5, with 1 being least important and 5 very important):

Factors	VBARD	VBSP
1. Convenient location of financial institution		
2. Simpler procedures of loan application		
3. Quick disbursement		
4. Quality of service of financial institution's staff		
5. Reasonable interest rate/cost of borrowing		
6. Convenient repayment schedule		
7. No requirement for immovable property as collateral		
Overall, the average satisfaction		

4.2 Saving service

Do you have any surplus money after paying living cost and agricultural investment?

☐Yes/ ☐No

How do you use it?

☐ Saving accounts at bank (….. mil VND; ….. months; ……. %/year)

☐ As lending privately (….. mil VND; ….. months; ……. %/year)

☐ Investment (specific) ☐ Other (specific)

What is the primary barrier to save your money at financial institutions?

1. No money for saving
2. Far from institutions
3. Not being able to immediately withdraw money
4. Don't trust financial institutions
5. Have not saved money as a local culture
5. Other (specify) _____

Can you tell me what do you want to improve regarding saving service?

_____

4.3 Agricultural insurance service

In the last 2 years of Seng Cu rice growing seasons, did you suffer from any risks, that cause to decrease your paddy rice in terms of quality and quantity? (Fill the table)

Events	Severity*	Impacts	Response	External supports from**
1.				
2.				
3.				

Code: Severity*

(1. Minor 2. Noticeable loss 3. Significant loss 4. Major loss 5. Total Crop failure)

External supports from**:

1. Central Government 2. Local authorities 3. Agribusiness
4. Trader 5. Relatives and friends 6. Others (specific)

Thank you for taking the time to complete this survey.

QUESTIONNAIRE FOR MIDDLEMAN IN THE SC RICE CHAIN

I/ General information

Name of company/entity: _____

Address of company/entity: _____

Name of the respondent_____ Position: _____

Age ____ Ethnic _____ Gender_____ Phone number: _____

Years attended school (including university, if applicable) _____

Years of running business in agribusiness? _____

Workforce:

Permanent employees of the company in total? _____

Seasonal employees of the company at the peak season in total? _____

Assets

How much land do you have? own _____ (ha); lease in/rent in _____(ha)

II/ Assets, building and machinery

Items	Year	Value	Time of expected usage
Building			
Storing			
Transportation means			
Dryer			
Milling			
Polishing machine			

Can you tell me about the underlying items regarding to Seng Cu rice processing and marketing in the last 12 months?

	Quantity	Unit Price (D1000/kg)	Value (mil. VND)
I. Intermediate Cost			

1. Paddy purchase (ton)			
2. Energy (Electricity, petrol, …)			
3. Sacks and nylon bags			
4. Wage (working days)			
5. Interest rate			
6. Depreciation			
7. Tax, fees, …			
8. Others (specific)			
II. Revenue			
9. White rice (ton)			
10. By-product			
Total			
III. Gross income			

In the last 12 months, the company has enough money to ensure the running business as the expectation? ☐Yes/ ☐No

If no, how was money shortage affecting to the company's performance?

In the last 12 months, what kinds of loan the company token (please fill the table)?

	Bank (name)	Non-bank organization	Relative and friends	Private lenders
Loan size desire (mil. VND)				
Loan size approval (mil. VND)				
Interest rate (%/month)				
Duration (months)				
Purpose's loan				
Role of loan (1-5) (Least important → Important)				
Usage of loan: 1=Working capital 2=Fixed assets 3=Other				

Would you borrow from this lender again? (1 = Yes; 0 = No)				

Can you tell me the advantage and disadvantages of each kind of credit mentioned above?

	Bank (name)	Non-bank organization	Relative and friends	Private lenders
Advantages				
Disadvantages				
Satisfaction level				

Thank you for taking the time to complete this survey.