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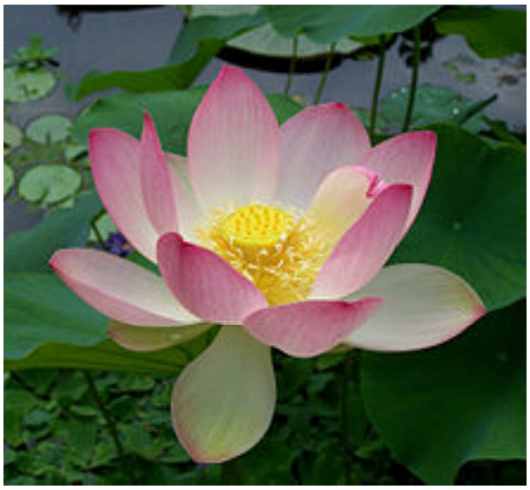

ETUDES ET DOCUMENTS DU GRAESE

# Access to credit and constraints to production and marketing of animal producing households in Hai Duong Province, Vietnam

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# ABBREVIATIONS

| | |
|---|---|
| Fre. | Frequency |
| GDP | Gross Domestic Product |
| GO | Gross Output |
| IC | Intermediate Cost |
| Num. | Number |
| PCFs | People's Credit Funds |
| Per. | Percentage |
| PPRS | Porcine Reproductive and Respiratory Syndrome |
| Kilogram | kg |
| Sao | Sao = 360 $m^2$ |
| S.D. | Standard Deviation |
| VA | Value Added |
| VBP | Vietnam Bank for the Poor |
| VBSP | Vietnam Bank for Social Policies |
| VBARD | Vietnam Bank for Agriculture and Rural Development |
| VND | Vietnam dong |
| mil.VND | Million Vietnam dong |
| bil.VND | Billion (one thousand million) Vietnam dong |

1 USD = 19,100 VND
1 EURO = 26,000 VND

## ABSTRACT

In a context of increasing demand for meat and fish, the animal production sector is seen as a driver of growth for agriculture in Hai Duong Province, Vietnam. However, the growth prospects of this sector seem undermined by a limited credit supply and some non-credit constraints. This study aims to explore access to credit by animal producing households, constraints in animal production and marketing, and the influence of credit and non-credit constraints to animal production. It was found that the formal sector, which for the most part provides credit for production activities, did not meet the credit needs of the animal producers. The credit needs of farmers were often more rationed by commercial banks. Furthermore, some weaknesses of the rural lending apparatus in Hai Duong Province impeded access to credit by households. The credit constrained households accounted overall for 71% of the households surveyed. On the other hand, both the animal-based group and the non animal-based group also suffered from some non-credit constraints including animal disease, substantial rapid increase in feed prices, lack of guidance for feed selection, limited access to relevant market information, high volatility of output prices and weak bargaining power. Within each group, the non-credit constraints caused a similar negative influence on animal production income. Credit accessibility was different among households. As a result, for a given production unit, credit constrained households generated less income than non-credit constrained households. Improving the credit supply and some non-credit constraints is expected to increase income from animal production. The study mainly suggests that the local authorities should support small-scale animal producers to establish animal producer groups to overcome constraints to credit access, production and marketing. Besides strengthening the credit supply to individual borrowers, the formal sector should grant feed purchase credit vouchers to animal producing groups.

# 1. INTRODUCTION

Agriculture has played a crucial role in Vietnam because of its contribution to the economy and rural development. Presently, agriculture contributes 20% of the total GDP and 23% of total export value. Furthermore, agriculture has been very significant in terms of employment generation, as about 71% of the population lives in rural areas and about 60% of the total work force is engaged in agriculture (GSO 2011). Given limited prospects for expanding crop production and changing patterns of demand both in Vietnam and in world markets, development of the animal production sector appears to be an important pillar of any development strategy for agriculture in Vietnam. Of the total gross agriculture output, the proportion from animal production accounted for 19% in 2000 and reached 25% in 2010 (GSO 2011). However, animal husbandry in Vietnam is predominantly confined to small-scale household production units. Presently, small producers supply the majority of the meat in the markets, with most households operating individually in the production and marketing of livestock.

Credit is important for the modernization of small-scale agriculture, as well as marketing development being introduced into rural economics (Hosseini et al. 2012). The rural credit market in developing countries is often described as repressed, imperfect and fragmented. Segments of borrowers commonly have different levels of access to certain types of loans and certain types of credit institutions (Hoff and Stiglitz 1993). Unlike commercial livestock producers, the smallholder producer is seen as having less access to financial capital (Nin et al. 2003). Given the limited financial capital of the poor and small producers, they cannot adopt new production technologies that demand higher investment and higher production costs (Lapar et al. 2006). Access to credit could reduce the constrained financial capital of farmer households and provide working capital for famers to purchase production inputs and apply modern technologies as well.

The Vietnam Bank for Agriculture and Rural Development (VBARD), the Vietnam Bank for Social Policies (VBSP) and People's Credit Funds (PCFs) belong to the formal financial sector of Vietnam are main sources of credit in rural areas. Credit is generally shown to have a significant impact

on agricultural production of Vietnam(Duong and Izumida 2002). However, many Vietnamese experts stated that the credit supply for agricultural sectoris mismatched. There is a relatively large gap between the economic contribution from agricultural sector to Vietnam's GDP and the credit provision for agriculture (Anh 2010; Ha 2010).

Hai Duong Province is located on the Red River Delta of Vietnam with a high density population. In Hai Duong, agricultural land has been significantly reduced due to industrialization (8% in the 2006–2010 period). Currently, 80% of the population lives in rural areas. Agriculture occupies 60% of the total work force (HDSO 2011). The high population and the large proportion of the labor force working in agriculture are putting heavy pressure on rural land. The increasing demand for meat and fish of consumers living in Hanoi capital and surrounding cities, near Hai Duong Province, represents a potential market for farmers in the province. Given limited agricultural land, the expansion and improvement of livestock production not only would generate income but also create jobs for farmers, especially the poor. On the other hand, in recent years, animal production in Hai Duong Province was adversely affected by disease outbreaks and volatility of selling price, causing losses for many animal producers. Therefore, farmers had a high demand for credit to deal with their capital constraint (DARDH 2010). This paper aims to solve following objectives: (i) Explore access to credit by animal producing households in Hai Duong Province; (ii) Investigate constraints in production and marketing at animal producing households; (iii) Analyze the influence of credit and non-credit constraints on animal production; (iv) Provide some policy implications to improve access to credit and non-credit constraints in production and marketing of animal producing households to increase their income.

## 2. METHODS OF THE STUDY

### Selection of the study sites and surveyed households

Hai Duong Province was selected as the study site for the mentioned reasons. In the province, Chi Linh, Kim Thanh, Cam Giang and TuKy districts were selected as representative districts of Hai Duong Province. Then, the selected communes were representative of the characteristics of each district. Finally, the 145 households were randomly selected for data collection.

### Data collection

The primary data were directly gathered by household surveys to collect to obtain information on household characteristics, credit access, production, constraints to production and marketing in the year 2010.

### Group discussion

Two meetings for group discussion were organized in two different communes. The first discussion aimed at exploring of constraints to animal production and marketing. The second one was to investigate of the farmer's assessment about influence of social network on access to credit by animal producing households, and the strengths and weaknesses of the formal sector in the rural credit supply.

### Classification of surveyed households

Most of the surveyed households engaged in integrated animal production, including poultry, pigs and fish. Their production facilities varied in scale. The ratio of annual income from animal production to total household income was selected as a criterion to classify the surveyed households into two groups, the animal-based group and the non animal-based group. The animal-based group obtained an annual income from animal production accounting for over 50% of total household income. It was less than 50% for the non animal-based group. The purpose of this classification is to explore differences in credit accessibility between two groups. Furthermore, within each group, households were grouped into two subgroups, including the non-credit constrained group and the credit constrained group. The criteria for classification of non-credit constrained group and credit constrained

group was applied by the suggestion of Zeller et al. (1996). The non-credit constrained group included households who did not need to borrow money and households who approved for full required amount of loan. In contrast, the credit constrained group included households who lacked money due to having credit need but did not apply for loan, households who were rejected their loan application by banks, and households who were approval for part of required amount of loan.

**Data analysis**

To analyze the data from the households surveyed, the descriptive statistics were employed, in which the Student's t-test, analysis of variance (ANOVA), Fisher (F) test, Ducan test and Chi-square test were used.

*Access to credit analysis*

Some indicators associated with access to credit by households include the number of households that applied for credit, the number of borrowers, the number of households without credit, loan size, the approved loan amounts and interest rates. The credit gap ratio was also estimated. The wider credit gap ratio reflects higher level of credit access constraint. The credit gap ratio was used to analyze the influence of credit and non-credit constraints on income from animal production.

$$\text{Credit gap ratio (\%)} = \frac{\text{(Average amount of working capital needed for animal production – own available working capital for animal production – amount of credit received for animal production) x 100\%}}{\text{Average amount of working capital needed for animal production}}$$

*Cost and return analysis*

Cost and return analysis is applied to estimate the cost and income from animal production (i.e. pigs, chickens and fish). As suggested by Lebailly et al. (2000) and Ton and Huyen (2008), some following indicators were used for the cost and return analysis. *Gross output* (GO) is the total value of production outputs; *Value added* (VA) is the worth that is added to a good or service at each stage of its production or distribution. Value added is the differences between gross output and intermediate cost; *Intermediate cost* (IC) includes purchasing variable inputs (materials and

services); *Return to family labor* is the differences between value added and cost of hired labor, interest payment, taxes, cost of fish pond renting and depreciation.

# 3. RESULTS

## 3.1. Characteristics of animal producing households and their production

As mentioned, the surveyed households raised poultry, pigs and fish. Based on annual income from animal production, they were classified into animal-based group and non animal-based group. The animal-based group included 58 households (40%) and the 87 others (60%) belonged to the non animal-based group.

**Table 1. Information on surveyed households and their production**

| | **Total** | | **Animal-based group** n=58 | | **Non animal based group** n=87 | | **P values** |
|---|---|---|---|---|---|---|---|
| | **Mean** | **S.D.** | **Mean** | **S.D.** | **Mean** | **S.D.** | |
| Age of household head (years of age) | 4.6 | 8.7 | 45 | 7.5 | 46 | 9.3 | 0.79 |
| Education of household head (years of schooling) | 7.3 | 1.2 | 7.5 | 1.3 | 7.0 | 1.1 | 0.55 |
| Family size (persons) | 4.7 | 0.9 | 4.6 | 1.0 | 4.5 | 0.9 | 0.56 |
| Number of workers (persons) | 2.5 | 0.9 | 2.4 | 0.8 | 2.5 | 0.8 | 0.83 |
| Area of cropland (1,000 $m^2$) | 2.5 | 1.0 | 2.2 | 0.9 | 2.6 | 1.1 | 0.06* |
| Area of fish pond (1,000 $m^2$) | 2.8 | 2.3 | 3.5 | 2.4 | 1.4 | 1.2 | 0.00*** |
| Size of poultry flock (birds per year) | 199 | 83 | 223 | 76 | 183 | 70 | 0.10* |
| Size of fatling pigs (head per year) | 20 | 11.9 | 22 | 12.6 | 9 | 3.3 | 0.00*** |
| Household raising-poultry (%) | 100 | | 100 | | 100 | | |
| Household raising pig (%) | 69 | | 98 | | 50 | | |
| Household owning fish ponds (%) | 57 | | 98 | | 31 | | |

Source: Household survey, 2011.

Note: *** and * significant levels at 1% and 10%, respectively.

Statistically, human capital indicators of two groups were insignificant different (Table 1). However, the animal-based group had better experience in animal production than the non animal-based group. In terms of crop land area, both groups had similar landholdings with small area. With limited crop land, expansion and improvement of animal

production could partly contribute to increase farm household incomes. Concerning animal production, the flock size of poultry, herd size of fatling pigs and area of fish pond of the animal-based group were significantly higher than those of the non animal-based group. However, both groups operated their production at small size due to lack of financial capital.

## *3.2. Access to credit by animal producing households*

### *3.2.1. Participation in the rural credit by animal producing households*

As detected from the survey, there was a high demand for credit from farm households in both groups. The animal-based group needed credit to purchase feed, breeding stock, payoff older loans and upgrade fish ponds. The farm households in the non animal-based group could not find stable income from non-farm jobs. Therefore, they desired to borrow money for animal production. The farmers borrowed money from the formal sector or the informal sector. It was also possible for them to borrow from both sources at the same time. Farmers tried to borrow money from the formal sector since its interest rate was significantly lower than the informal sector.

As shown on Table 2, the formal sector became the main credit supplier for the animal producing households. Of the borrowers, 63% received loans from the formal sector, whereas 37% had loans from the informal sector. Within the formal sector, the number of loans from VBARD (48%) was the highest proportion, followed by VBSP (35%) and PCFs (17%). Regarding borrowers of each group, 77% of borrowers in the animal-based group obtained credit from the formal sector, while this figure in the non animal-based group was 52%. In addition, 23% of borrowers in the animal-based group were supplied credit by the formal sector compared to 48% from the non animal-based group. The non animal-based group depended more on the informal credit than the animal-based group. This implies that the credit provided by the formal sector did not fulfill all credit needs of farmer households.

**Table 2. Financing sources of animal producing households**

| | Total | | Animal based-group | | Non animal-based group | |
|---|---|---|---|---|---|---|
| | **Fre.** | **%** | **Fre.** | **%** | **Fre.** | **%** |
| **Borrowers by sector** | **129** | **100** | **57** | **100** | **72** | **100** |
| Formal sector | 81 | 63 | 44 | 77 | 37 | 52 |
| Informal sector | 48 | 37 | 13 | 23 | 35 | 48 |
| **Borrowers receiving loans from both sectors** | **25** | **100** | **11** | **100** | **14** | **100** |
| **Households without loan** | **41** | **100** | **12** | **100** | **29** | **100** |
| **Number of loans** | | | | | | |
| Formal sector | 93 | 100 | 53 | 100 | 40 | 100 |
| - VBARD | 45 | 48 | 32 | 60 | 13 | 33 |
| - VBSP | 32 | 35 | 11 | 21 | 21 | 52 |
| - PCFs | 16 | 17 | 10 | 19 | 6 | 15 |
| Informal sector | 49 | 100 | 13 | 100 | 36 | 100 |
| - Friends and relatives | 33 | 67 | 7 | 54 | 26 | 72 |
| - Village moneylender | 16 | 33 | 6 | 46 | 10 | 28 |

Source: Household survey, 2011.

Note: The total number of those borrowing from the formal sector is lower than the total number of loans from all sources (VBARD, VBSP and PCFs) because a household can borrow money from more than one lender during the same year. It is similar for the total number borrowing from the informal sector.

Regarding loans supplied by the formal sector, 60% of loans in the animal-based group were from VBARD, while only 33% of loans in the non animal-based group were from that source. The tendency of loan supply was also similar for PCFs. The animal based group also had a higher proportion of loans supplied by PCFs than the non animal-based group. In contrast, 21% of loans in the animal-based group were provided by VBSP while 52% in the non animal-based group were supplied by VBSP. Two main reasons for the higher proportion of loans from VBARD and PCFs for the animal-based group: (i) VBARD and PCFs are commercial banks. The lending interest rates of both banks are determined at the same level as that of the other commercial banks but are higher than those of VBSP. The animal-based group needs loans for animal production. Therefore, they accepted the interest rates on loans from VBARD and PCFs; (ii) physical collateral is required from a borrower. However, the

nonanimal-based group, including many of its poorest members, often lacks physical collateral. As a result, they had less access to credit from VBARD and PCFs. The higher proportion of loans from VBSP of the non animal-based group can be explained that the non animal-based group includes many poor, who are targeted clients of VBSP.

Concerning households who were without loans, 41 surveyed households did not get any credit in the year 2010 even though they had credit needs. Some farmers indicated that their families were ranked as non-poor households within the village. Thus, they were excluded as potential VBSP beneficiaries. Others reported that they did not get a loan from VBSP due to limited capital for lending. The remaining farmers did not borrow money either from VBARD or PCFs for various reasons that were mentioned later in Table 6.

**Table 3. Average loan amount by credit source**

Unit: mil.VND per household borrower

| Sources | Total | | Animal-based group | | Non animal-based group | | P values |
|---|---|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | Mean | S.D. | |
| **Formalsector** | | | | | | | |
| -VBARD | 28.2 | 11.3 | 31.9 | 9.8 | 18.8 | 9.7 | 0.00*** |
| -VBSP | 8.4 | 2.6 | 8.5 | 2.8 | 8.3 | 2.3 | 0.70 |
| -PCFs | 25.3 | 6.5 | 25.5 | 5.9 | 24.5 | 8.0 | 0.90 |
| **Informal sector** | | | | | | | |
| -Friends and relatives | 5.6 | 4.5 | 10.2 | 6.0 | 4.3 | 3.0 | 0.04*** |
| -Village moneylender | 10.0 | 6.3 | 14.6 | 4.5 | 7.3 | 5.0 | 0.04* |

Source: Household survey, 2011

Note: *** and * significant levels at 1% and 10%, respectively.

Countrywide, VBARD is the largest credit provider in the rural areas of Vietnam. In Hai Duong Province, VBARD is also the main credit supplier. In terms of loan amounts, farmers borrowed the highest amount from VBARD and the second highest amount from PCFs. VBSP provided the smallest loan. The amount of loans from the informal sector was relatively lower than from the formal sector.

The average loan amount from all credit sources of the animal-based group was relatively higher than that of the non animal-based group. For

example, VBARD's loan portfolio was 31.9 mil.VND for the animal-based group and 18.8 mil.VND for the non animal-based group. However, the informal loan amount of the animal-based group was higher than that of the non animal-based group. This implies that the animal-based group had better credit access from both sectors in terms of loan size than the non animal-based group.

Compared to the non-animal based group, the animal based-group had the higher proportion of households who received loans from the formal sector. The animal-based group borrowed larger loans than those of the non animal-based group. This partly reflects a higher demand for credit and better credit access of the animal-based group compared to the other group as both groups need credit to finance their production and consumption.

**Table 4. Interest rate and maximum loan terms by credit source**

| **Sources** | **Ranges of interest rate** (% per month) | | **Maximum loan terms** (months) |
|---|---|---|---|
| | **Minimum** | **Maximum** | |
| **Formalsector** | | | |
| -VBARD | 1.16 | 1.30 | 24 |
| -VBSP | 0.50 | 0.80 | 24[1] |
| -PCFs | 1.25 | 1.50 | 12 |
| **Informal sector** | | | |
| -Friends and relatives | 0 | 0 | 2 |
| -Village moneylender | 3.00 | 5.00 | 3 |

Source: Household survey, 2011

Note: [1]Maximum of loan term depends on the credit program. The credit program for education provided loans which could have a term up to 60 months.

As for interest rates, in the year 2010, monthly interest rates on loans provided by VBARD and PCFs varied slightly. The change in interest rates of both banks was affected by the interest rate adjustment defined by the State of Bank of Vietnam. Generally, the interest rate of loans supplied by VBSP has not changed in recent years. However, it was different among credit programs and ranged from 0.5 % to 0.8% per month. Village moneylenders charged the highest interest rate compared to the other sources. It ranged from 3.0 % to 5.0% per month. With respect to loan term, it varied from one source to another. Referring to VBSP, the

maximum loan term depended on the credit program. The credit program for education provided loans which could be up to 60 months.

### *3.2.2 Credit use by animal producing households*

Generally, credit was used for production, business and other activities. For production and business, credit was used to purchase breeding animals and feed, upgrade a livestock shelter and/or fish pond, purchase farming equipment and run a small business. For other activities, credit was used to pay school fees, medical fees, house repairs and special events (e.g. wedding or funeral) and pay off old debts. It was found that credit from VBARD and PCFs were entirely used for the purchase of animal stock and feed. Many surveyed borrowers indicated that given the limited amount of their loan, purchase of animals and feed were more important than upgrading an animal shelter.

High proportions (76%) of loans from VBSP were spent by farmers to pay the school fees of their children. Obviously, the credit program for education helped the poor to send their children to a vocational school, college or university. Most of the surveyed households are agriculture based and often lack cash. They cannot get credit from formal credit suppliers in short order for their urgent needs. Therefore, credit from informal suppliers was mainly used for urgent farmer household needs. Loans from informal sources were mainly used for household consumption, especially in cases of emergency (illness, funerals, etc.). Spending on medical fees, a wedding or funeral occupied a high share in the total amount of loans provided by informal lenders. Thus, informal lenders in the rural area play a crucial role in helping to meet the urgent consumption needs of farmer households. However, credit from informal suppliers served for farmers in the very short term.

### *3.2.3 Problems of access to credit from VBARD and PCFs*

Of the total surveyed households, poor households accounted for about one third. Loans from VBSP with preferential interest rates targeted the poor. VBSP's capital for lending is limited. Most of the non-poor realized that they were excluded from VBSP's beneficiaries. Consequently, they did not apply to borrow money from this source. On the other hand, the lending method of VBSP differs from that of VBARD and PCFs. The group

lending method is applied by VBSP while the loan provision with the requirement of physical collateral is mainly used by VBARD and is applied in all cases by PCFs. For these reasons, the following sections only focus on analysis of the behavior of VBARD and PCFs in their capacity as commercial banks responding to the credit demands of farmer households.

**Table 5. Credit access by animal producing households to VBARD and PCFs**

| | **Total** | | **Animal-based group** | | **Non animal-based group** | |
|---|---|---|---|---|---|---|
| | **Fre.** | **%** | **Fre.** | **%** | **Fre.** | **%** |
| **Household with credit need** | **145** | **100** | **58** | **100** | **87** | **100** |
| Household not applyingcredit | 69 | 48 | 11 | 19 | 58 | 67 |
| Credit-applied household | 76 | 52 | 47 | 81 | 29 | 33 |
| Loan application approved | 61 | 42 | 42 | 73 | 19 | 22 |
| *- Loan amount granted in full* | *41* | *14* | *26* | *45* | *15* | *17* |
| *- Loan amount granted in part* | *20* | *28* | *16* | *28* | *4* | *4* |
| Loan application refused | 15 | 10 | 5 | 8 | 10 | 11 |

Source: Household survey, 2011

Both VBARD and PCFs are formal lenders and provide credit requiring physical collateral. In order to obtain credit from banks, households have to submit their loan application form to the banks. As shown on Table 5, 52 % of surveyed households applied for credit to VBARD or PCFs whereas 48% of them needed credit, but did not apply for it. In addition, 42% of households were provided loans whereas 10% of households were refused. For those whose loans were refused, the bank staff responded that it was due to the unavailability of lending capital at the time they applied. The farmers also stated that in the last four months of the year, they were in need of credit to invest in animal production. However, it was more difficult to obtain a loan from banks. Furthermore, 14% of households received their requested loan amount in full (24.5 mil.VND), while 28% of households proposed to borrow 58.5 mil. VND but they were approved a part of the required loan amount (33.5 mil.VND). This implies that many surveyed households lacked to access to credit faced credit access constraints from VBARD and PCFs.

Concerning reasons for not applying for credit, 41% of households not submiting the credit application form to VBARD or PCFs, reported that they actually needed credit for their production, but were afraid of being refused by both VBARD and PCFs (Table 6). Furthermore, 23% of households had no physical collateral. Consequently, they neither applied for credit from PCFs nor VBARD. It is impossible for them to get loans from PCFs if they lack collateral. For VBARD, the government states that farm households can receive loans of less than 10 mil.VND without collateral. In reality, many surveyed households were unable to borrow less than 10 mil.VND since they lacked collateral. It was found that this situation was mainly caused by a lack of relevant credit information from VBARD. This is also due to the fact that VBARD in Hai Duong Province has a tendency to avoid lending small amounts without collateral to farmers because of high transaction costs and risks. This finding relating to physical collateral and its effect on credit access is supported by McCarty (2001), Marsh et al. (2004) and BPN (2008). They also found that VBARD still required the certificate of land use rights as loan security. Therefore, households without certificates had difficulty accessing formal loans from VBARD.

In addition, 29% of households did not apply for credit because they encountered high input and low output prices, disease epidemics, etc., causing uncertainty. They actually wanted to borrow money for their input investment in animal production, but were afraid of being unable to repay loans. And 7% of households complained that the interest rate was too high, leading to a low profit from animal production.

**Table 6. Reasons for animal producing households not applying for credit from VBARD and PCFs**

| | **Frequency** | **Percentage** (%) |
|---|---|---|
| **Household not applying for credit** | **69** | **100** |
| Not needing credit | 0 | 0 |
| Needing credit but did not apply | 69 | 100 |
| - Afraid of risk | 20 | 29 |
| - Afraid of refusal | 28 | 41 |
| - Lack of physical collateral | 16 | 23 |
| - Loan interest rate too high | 5 | 7 |

Source: Household survey, 2011

In summary, it was found that despite having a need for credit, many surveyed households did not apply for credit from VBARD and PCFs due to constraints such an information shortfall on the credit program, being refused, afraid of being unable to repay a loan, lack of physical collateral and high interest rates of VBARD and PCFs.

**Table 7. Household characteristics and relation to VBARD and PCFs lending decision**

| Indicators | Unit | Approved required loan amount in full (n=41) | | Approved part of required loan amount or refused to provide a loan (n=35) | | P values |
|---|---|---|---|---|---|---|
| | | Mean | S.D. | Mean | S.D. | |
| Amount of required loan | Mil. VND | 24.5 | 9.8 | 58.5 | 21.5 | 0.00*** |
| Amount of loan approved | Mil.VND | 24.5 | 9.8 | 33.5 | 7.9 | 0.00*** |
| Age of household head | Years of age | 48.2 | 7.7 | 44.5 | 7.8 | 0.04** |
| Education of household head | Years of schooling | 7.2 | 1.2 | 7.8 | 1.3 | 0.02** |
| Family size | Persons | 4.5 | 0.7 | 4.8 | 1.3 | 0.26 |
| Number of laborers | Persons | 2.5 | 0.7 | 2.6 | 0.9 | 0.74 |
| Area of crop land | 1,000 $m^2$ | 2.7 | 1.2 | 2.6 | 1.2 | 0.84 |
| Area of fish pond | 1,000 $m^2$ | 3.9 | 2.5 | 3.0 | 2.2 | 0.17* |
| Total value of assets | Mil. VND | 132 | 97 | 118 | 65 | 0.56 |
| Size of poultry flock | Birds per year | 226 | 101 | 195 | 87 | 0.16* |
| Size of pig herd | Head per year | 20.9 | 14.3 | 17.7 | 9.3 | 0.30 |
| Non-farm income | Mil.VND | 24.3 | 16.7 | 22.6 | 13.3 | 0.63 |

Source: Household survey, 2011

Note: ***, **, * significant levels at 1%, 5% and 10%, respectively.

In addition, the influence of household characteristics on the lending decision of VBARD and PCFs is analyzed further in Table 7. It seems that the borrowers with a high need for a loan faced constraints from the banks. The P values shown that age, education of household head, area of fish pond, size of poultry flock likely influenced the lending decision of VBARD and PCFs.

### *3.2.4. Social network and its influence on credit accessibility by animal producing households*

It is a general notion that rural financial markets in developing countries are imperfect (Yadav et al. 1992; Ho 2004). A major source of imperfections in rural credit markets is the lack of information that facilitates borrowing and lending transactions. In an imperfect credit market, social capital has a relation to the credit access of rural households (Okten and Osili 2004; Ajani and Tijiani 2009). Social capital is defined as the informal forms of institutions and organizations that are based on social relationships, networks, and associations that create shared knowledge, mutual trust, social norms, and unwritten rules. Social capital is in general accumulated through informal organizations based on social networks and associations (Durlauf and Fafchamps 2005).To enhance access to formal credit, the presence of social networks is necessary in many ways. On the one hand, a social network facilitates information flows between lenders and borrowers, which bring the borrowers closer to credit sources and prevent lenders from adverse selection and moral hazard. On the other hand, social networks, with their pressure, act as a guarantee, which keeps credit performance in the right direction.

In this study, the social network is investigated as the social relationship (i.e. relatives, friends, neighbors, staff members of mass organizations, village heads and moneylenders) for analysis of the linkage between the social network and credit access. It was detected that the credit accessibility of the surveyed households was also affected by their social network. Farm households with a strong social network likely have better credit access from both formal and informal credit sources than others with a weak social network. The positive influence of the social network on credit access of farmers in Hai Duong Province is illustrated in Table 8.

**Table 8. Social network and its positive influence on access to credit by animal producing households in Hai Duong Province**

| | Activities creating a social network | Positive influence on credit accessibility |
|---|---|---|
| Members of mass organizations | - Frequent participation in activities of mass organizations<br>- Sharing knowledge and experience on daily life, production and market information | - Having opportunity to borrow money as part of a VBSP lending group |
| Relatives<br>Friends<br>Neighbors | - Sharing and supporting labor in the critical harvesting season<br>- Supporting with a small amount of money or physical goods in special cases (i.e. going to hospital)<br>- Sharing knowledge and experience on daily life, production and market information<br>- Creating trust in daily life | - Gathering relevant information on credit availability and lending procedure<br>- Receiving loans from a relative, friend or neighbor |
| Staff of mass organizations<br>Village heads | - Activities creating a social relationship between farmers and staff of mass organizations, village heads are the same as that between farmers and the relatives, friend and neighbors | - Gathering relevant information on credit availability and lending procedure<br>- Getting priority as a VBSP borrower |
| Bank staff | - Having the trust of bank staff due to timely paying off of old loans | - Having greater opportunity to get a loan |
| Moneylenders | - Creating trust in daily life | |

Source: Group discussion, 2012

As in many countries, the common lending methods in rural Vietnam (including Hai Duong Province) are group lending and individual lending. VBSP has used the group lending method with the involvement of mass organizations (Women's Union, Farmers' Union, Veterans' Union and Youth Union) and the local authorities to provide credit without the requirement of physical collateral. Targeted clients of VBSP must be members of a mass organization, which enables them to qualify to borrow money from VBSP. Being a member of a mass organization, the farmer creates his/her social network with other members and the staff of the mass organization, which opens opportunities of credit access to them.

In Hai Duong Province, the group lending method has been implemented by VBSP with the involvement of the staff of mass organizations and village heads with responsibility for borrower selection. The staff members of mass organizations and village heads live in the same village

as borrowers, which enables them to get much information on the farm household's characteristics (i.e. human and land resources, production and business, ability to repay a loan). Such information is necessary for them to select farmers who qualify to become borrowers from VBSP. Although this information is important for their decision on selection of borrowers, the relationship with staff of mass organizations is also very important. Among surveyed households, the households who are neighbors, friends and relatives of mass organization staff members and village heads normally have a strong social relationship. As a result, they had more opportunity to obtain loans from VBSP. Obviously, a social network with a strong relationship with staff of mass organizations is an advantage for some farmers, while weak relationship staff members of such organization is a disadvantage for other farmers in term of access to credit.

In Vietnam, under the management of the government, a variety of sociopolitical organizations exist, which play an important role, both socially and economically, in local communities. These mass organizations follow a hierarchical structure with official leaders at the central, province, district and commune levels to implement government strategies and policies. Therefore, the role of mass organizations continues to create both advantages and disadvantages for the rural credit policy.

The social network of farm households not only exists with people living in the same village and commune but also extends to outsiders (i.e. bank employees). Having a good social relationship with the bank staff also enabled farmers to get loans easily. This was a normal occurrence for the individual lending method which was mainly used by VBARD in Hai Duong Province. At the beginning step of the lending procedure, farmers can directly contact the bank staff or directly contact the village head, who was normally responsible for providing of information on credit availability of VBARD. During the survey work, it was found that non-poor households normally contacted the bank staff directly while poor households commonly focused on their relationship with the village head to facilitate their borrowing. Some non-poor households reported that they were already familiar with the bank's employees so they did not need the involvement of the head of village in their borrowing. On the contrary, many poor famers indicated that they lacked information on

VBARD's credit availability and were afraid of being refused. Therefore, the poor famers sought information on credit through the village head before meeting the bank's staff. It indicates that the non-poor famer also had a better social network with persons outside the commune and village, who finally decided to give loan, while the poor famers did not.

Like the social network that facilitates receiving loans from the formal sector, a strong social network with friends, relatives and village moneylenders also results a better chance for farmers to get credit from such informal credit sources.

Briefly, in the rural area of Hai Duong Province, the social network generally brings many benefits to farmers, including sharing of experience on daily life, production experience, market information and credit access.

### *3.2.5. VBARD and PCFs' requirements of physical collateral for loans—Remarks and discussion*

The main collateral, accepted by the formal lenders in Vietnam, is physical collateral in the form of land use certificate. Social collateral in the form of references is also a widespread requirement, particularly for credit supplied by VBSP. During the innovation period initiated in 1986, a series of policies and laws in the agriculture sector, especially concerning land use, were issued. The most important policies were the 1993 land law and its revised versions (1998, 2001), the 2003 land law and Ordinances No. 64/CP (1993) and No. 02/CP (1994) of the government dealing with the regulation of agricultural and forestry land allocation. Under the 1993 land law, farmers were allocated land for long-term and stable use and were granted five rights of land use, namely the rights of transfer, exchange, lease, inheritance and mortgage.

Presently, some emerging problems relate to the requirement of physical collateral by banks in Hai Duong Province. Firstly, in implementation of the land law enacted in 1993, in Hai Duong Province, land use certificates were issued to farm households by the local authorities. The surveyed households, who were allocated land, had been granted their land certificates. It should be noted that under the 1993 land law, land for agriculture, forestry and housing construction are acceptable to receive a land use certificate. Any illegal use invalidates the land use certificate. However, the surveyed farmers indicated that VBARD and PCFs refused to

approve loans when farmers mortgaged the land use certificate for agricultural land. It is likely that the banks are concerned about the reallocation of agricultural land in 2013.[1]

Of the total surveyed households, 16 households (11%) do not possess land use certificates for housing construction. Despite having a credit need, they were not able to receive credit from VBARD or from PCFs due to the lack of a land use certificate or physical collateral. Two reasons leading to people not having a land use certificate are landlessness or illegal use of land for housing construction. This situation seems to be an increasing trend in Hai Duong Province nowadays.

Secondly, in Vietnam, lenders face enormous difficulty in enforcing pledges and mortgages (UNDP 1999; Riedel 2000). In Hai Duong Province, lenders also face the same problem. Banks are not usually allowed to seize land from defaulting farmers, even if the use rights have been pledged. Local authorities in the surveyed communes reported that the land market is still underdeveloped. Only a few households, in fact, sell or buy land, and it is usually traded within the village. In addition, nobody wants to buy land from households that are in debt or bankrupt, because Vietnamese people think that one who buys the land of unlucky household may be become unlucky too, in the future. Therefore, it is difficult for the banks to liquidate the land. VBARD and PCFs, two commercial banks, only put psychological pressure on farmers regarding the possibility of losing their land. None of the villagers or key persons interviewed knows any case of land liquidation in this area. If farmers find out that VBARD and PCFs are not going to liquidate their land in the event of default, the bank might end up in a landslide of bad debts. This finding is confirmed by Wolz (1997). It appears that the underdeveloped legal framework does not prove effective for the use of physical collateral as a risk management tool (Gottwald and Klump 1999).

Thirdly, Decision No. 67/1999/QD-TTg permitted VBARD to provide loans under 10 mil.VND without physical collateral, which loans did not perform well in the study communes. In reality, many surveyed farmers reported that they had to mortgage their land use certificates to borrow money from VBARD. As noted, the role of VBARD is as important as that of the

[1] Under the 1993 land law, agricultural land is allocated for farmers to use for a period of 20 years. 2013 will end the period of 20 years of land allocation. The reallocation of land use will then be done for the next period.

state-owned bank, a main credit supplier in rural areas. However, the favorable credit policy that aimed to make it easier for farmers to borrow money was not implemented up to the expectations of the government, because VBARD is likely overly concerned about loan repayment by farmers.

Fourth, VBARD provides credit to farmers for their agricultural production, however the bank has been not accepted some agricultural outputs (rice, poultry, pork and fish) as physical collateral. On the contrary, VBARD provides credit for borrowers to buy housing and accepts it as physical collateral. Again, VBARD is responsible for the credit supply to the agricultural sectors. However, it is likely very much concerned about the risk in agricultural production.

### *3.2.6. Strengths and weaknesses of the formal sector in rural lending in Hai Duong Province*

An assessment by farmers of the strengths and weaknesses of the formal sector in Hai Duong Province was carried out by group discussion. The advantages or strengths of the formal sector had created opportunities for animal producers to receive loans in the recent years. Yet, the weaknesses of this sector also lead to constraints on the credit accessibility of households.

The formal credit sector provides credit with lower interest rates than the informal sector, particularly village moneylenders. Broadly, loans from the formal sector have a longer term or duration than those from the informal sector. Therefore, many farmers applied to obtain loans from the formal sector. However, there were several weaknesses in the formal sector in terms of lending in the rural area.

Regarding VBSP, some weaknesses in its performance were found. Firstly, VBSP's lending capital was limited. Indeed, the preferential interest rate on loans from VBSP was lower than that of the other formal credit sources. Consequently, attracting savings with a market interest rate was very hard because VBSP did not have an enough interest rate spread to cover the operating and financial costs required for the profitable simultaneous implementation of savings and lending services. Robinson (2001) stated that financial institutions that operate with subsidized loan portfolios cannot afford to be effective in both saving and lending. As a

result, the lending capital of VBSP is limited because it mainly depends on government funding. This situation also was reported by the World Bank (2004). Secondly, loan approval depended greatly on the approval of the village head and the staff of local mass organizations. As mentioned, VBSP used the group-based lending method. The selecting of borrowers by the village head and the staff of mass organizations resulted in some problems, including (i) Credit groups and commune officials being reluctant to include poor households on the list of credit applicants. The non-poor households could obtain credit easily, because they were expected to be more reliable in using credit effectively and repaying credit, which is also confirmed by Dufhues et al. (2002) and Cuong (2008); (ii) The local authorities were also responsible for household poverty assessment, so lists of "poor" borrowers who received the credit subsidies often included local political leaders and their relatives and friends. Thirdly, VBSP provided loans of a relatively uniform amount. As presented, most of the loans from VBSP were about 4.3 mil.VND. Fourthly, because of dependence of VBSP on the capital provided by the government, the loan disbursement of VBSP was irregular. In addition, loan products in the preferential credit program were usually rigidly determined. The amount of loans and terms of loans were prescribed with little regard to the needs of the borrower (Robinson 2001).

With respect to VBARD, the bank faced some weaknesses in rural lending. Firstly, VBARD in Hai Duong Province provided less information on the lending procedure and the credit programs. Although, VBARD also cooperated with the local authorities to provide credit to farmers, this cooperation mainly focused on how to secure their loans or to define the farmers able to repay their loans. Dissemination of information on the lending procedure and the credit programs was very limited. Lack of information on VBARD credit activities was found in all commune offices on the study sites.

Secondly, it was more difficult for farmers to receive loans in the last months of the year. At that time, farmers had a high credit requirement for their animal production to meet the high demand for meat and fish in Vietnam during the lunar New Year festival. This problem can be explained that VBARD supplies credit not only for the agricultural sector but also for non-agricultural sectors (e.g. business, transportation, construction). Some economic sectors have a high credit need in the last

months of the year. VBARD likely prefers to provide credit and may be very interested in lending to non-agricultural sectors than the agriculture sector.

Concerning the PCF system, it is one of three main formal credit sources. Having transaction office located in the communes, PCFs bring a convenience of credit transaction to farmers. It is easier for farmers to contact PCF staff directly. Farmers also save time and transportation costs during their borrowing procedure. However, PCFs operate on two basic principles, to mobilize savings as much as possible and to cover the costs incurred out of the margins in interest rates. The system has to be self-reliant and not dependent on external funds. At present, PCFs lending in rural areas also has some weaknesses. Firstly, this institution seemingly disliked providing credit for the agricultural sector. PCFs likely preferred to supply credit for small businesses or expenses entailed to carry out labor contracts in foreign countries (Taiwan, Korea and Malaysia) because income generation from those activities was less risky than that from agricultural production. Secondly, the requirement of physical collateral was applied for all loans because the main objective of the loans was to create maximum business profits. Like VBARD, PCFs only accepted the land use certificate as physical collateral for lending. With the expansion of transaction offices to the commune level, PCF staff likely had a better understanding of the characteristics of farmer households. However, PCFs had not introduced any flexible requirement for their lending. Thirdly, the source of capital for lending was limited and mainly depended on savings mobilization from local savers. However, the annual amount of savings has been low, due to lack of trust of the local people. In addition, the State Bank of Vietnam allows PCFs to charge higher interest rates than other financial institutions. Therefore, PCFs provided credit with a higher lending interest rate than VBARD and VBSP.

Some weaknesses of the formal credit sector thus created some constraints for the credit accessibility of farmers. Firstly, the uniformity of loan amounts granted by VBSP and irregular disbursement of loans did not meet the actual credit needs of farmer households, especially those that wanted to borrow money for animal production. Secondly, farmers lacked information on the credit program from VBARD not requiring physical collateral. Thirdly, many farmers hesitated to borrow money for their animal production from VBARD and PCFs due to their inability to

meet the physical collateral requirement, the high interest rate or a lack of information on lending.

### *3.3. Main constraintst on animal production and marketing*

Before implementation of the household survey, 12 farmers were invited to participate in the group discussion to identify the main constraints affecting animal production. Then, the result of the group discussion was verified by using the detailed household survey. It showed that the surveyed farmers confronted constraints to both animal production and marketing, including animal disease, substantial rapid increase in feed prices, lack of guidance for feed selection, credit access, limited access to relevant market information, high volatility of output prices and weak bargaining power.

#### *3.3.1. Animal disease*

Animal disease had negative effects on the animal production of the selected households. A little capability in the realm of disease prevention, and poor disease detection, surveillance and control in the veterinary network was main reasons for animal disease.

*Weak capability of animal producers in disease prevention*

Poor knowledge of disease prevention was the main reason for weak capability in disease prevention. Many farmers raised pigs and chickens in poorly constructed shelters with inadequate hygienic. Their awareness of sanitation was limited. About half of the surveyed households participated in the technical training class, but they still had not implemented an appropriate method for prevention and treatment of animal disease. Many animal producers did not applied vaccines because of their high cost and they lacked certainty about the effectiveness of disease prevention. Farmers mainly treated their animals by themselves as disease was detected. They were reluctant to ask private veterinarians because the service cost of disease treatment was high.

In addition, the pig pens and chicken sheds were largely open. Outsiders (mostly traders and neighbors) could easily access them without any preventive measure. It should be emphasized that some pig raisers, chicken breeders and farmers did not inform the relevant agencies about animal disease. Also, they disposed of pigs and chicken with disease in an

open environment. That was one serious reason leading to the epidemic spreading. The problem of epidemic was worsened because some farmers tend to sell their sick or dead animals to recover part of their capital. However, in the communes, veterinary workers were not often paid and had no incentive to report diseases. Besides the low knowledge of disease prevention on the part of farmers, poor hygiene and improper waste treatment in rural areas also contributed to disease infections. In the first three months of 2010, many communes in Hai Duong Province were hit by PRRS, affecting about 9,800 pigs, with 7,300 of them destroyed. Animal losses were estimated at about 20 bil.VND (DARDH 2010). Animal disease was normally not reported due to lack of knowledge.

*Poor disease detection, surveillance and control in the veterinary network*

Field-level disease surveillance and control are carried out by sub-departments of the Animal Health Department of Hai Duong Province. At the grassroots level, veterinary workers included private veterinarians and public veterinarians who are partially paid by the communes. Overall, these veterinary workers had expertise in the livestock sector. However, the veterinary system lacks coherence in the effective use of these veterinary worker resources and the connectivity between the different levels, from the commune to the national level. Close connectivity in the veterinary system is very necessary for a fast flow of reliable information on diseases. Moreover, the veterinary system was mainly a passive surveillance system, reacting to disease reported by field workers. It has very limited capacity for assessing pathogens and disease occurrence.

Livestock disease is not only associated with production, but also with transportation and the meat processing stage. Producers, collectors, slaughterers and processors in Hai Duong Province are the main stakeholders in the livestock value chain. Their awareness of livestock disease was weak. In addition, the veterinary network was also poorly managed. Both of these reasons systematically resulted in the occurrence, outbreak and persistence of disease. Furthermore, Highway 5 passes through some districts of Hai Duong Province. It is the main connection between Hanoi and QuangNinh Province, which borders on China. Chickens from China were illegally transported on the Highway 5 to Hanoi, created a source of livestock disease in Hai Duong Province.

*3.3.2. Substantial rapid increase in feed price*

Agriculture in Vietnam has been shifting from traditional to industrial farming. Because of a high demand for animal and poultry feed as well as the open market-oriented policies of the government of Vietnam, many feed mills were established in just a short time. However, the heavy dependence on imported ingredients such as soybeans and maize, high import taxes, and low domestic yield of these inputs have been considered as the causes of the high livestock feed prices. Industrial feed prices in Vietnam are around 10%-15% higher than in other countries of the region, such as Thailand and China. It is estimated that Vietnam imports about 20%-30% of the volume of raw materials used for livestock feed production, which accounts for 45% of the total value of raw ingredients. High prices of livestock feed directly affect producers as they translate into higher production costs, especially when the prices of livestock products do not increase sufficiently to cover the increased costs. Given the higher complete feed prices, it would seem that the changes in raw material input costs were passed on to famers (Phuong et al. 2010). Information from feed retailers in Dan Chu commune showed that in the period from January 2010 to December 2011, the pig feed price and chicken feed price increased by 37.5% and 41% respectively. In addition, findings from the survey showed that most farmers in both the animal-based group and the non animal-based group purchased a small volume of feed from retailers in the village. 84% of households in the animal-based group and 100% of households in the non animal-based group purchased industrial feed from retailers in the village. Only 16% of households in the animal-based group purchased feed directly from small feed processing factories. Many farmers usually purchased a small volume of feed each time because they did not have the cash to purchase a high feed volume. To purchase a small feed volume from feed retailers, farmers had to spend a higher amount of money due to higher price. Most of them indicated that credit used for feed purchasing would reduce the feed price. The non-credit constrained households in the animal-based group normally purchase feed directly from small factories. Three or four households purchase a large volume of feed together. They also receive a commission from the factory. In brief, it can be concluded that purchasing a small amount of feed per time from the retailer in the village leads to higher feed costs. In addition, the dependence on imported raw

materials for industrial feed processing also caused a substantial rapid increase in feed prices.

### *3.3.3. Lack of guidance for feed selection*

The number of registered feed mills in Vietnam in 2008 was 225, which consisted of 42 foreign, 12 joint ventures and 171 domestic ones. The Red River Delta and the southeast region were the two biggest feed producing areas, accounting for 46% and 29% of the total national feed mills respectively (Phuong et al.2010). Currently, in Hai Duong Province, various types of feeds with different prices are sold on the village market. The price of complete pig feed also differed from one brand to another. Farmers also reported that many feed brands were available in the local market. The private companies were the dominant suppliers of animal nutrition advice. An advertisement for a good feed quality was widely provided by every feed producer. In Hai Duong Province, the government extension services provided a full range of crop management and animal husbandry advice that was heavily oriented towards intensification of production. Extension workers did not provide animal producers with non-technical information on production and marketing, including feed selection advice. It was difficult for producers to select what brand of feed to purchase.

Most farmers in the animal-based group (62%) used both personal experience and advice from feed retailers to select a brand of feed. In addition, about 53% of farmers in the non animal-based group applied the advice of feed retailers in the village for their feed selection. No one received advice for industrial feed selection from an extension worker. Findings on the current situation suggest that government extension services should provide animal producers with information to help them with feed selection.

### *3.3.4. Credit access constraints*

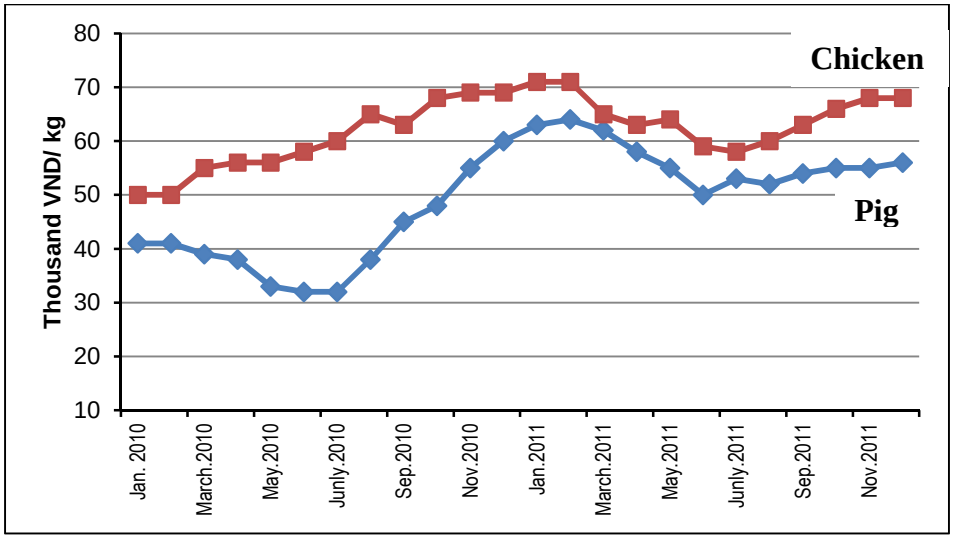
Both the animal-based group and the non animal-based group desired to receive loans from the banks for their production. VBSP mainly provided preferential credit targeted to the poor households for education of their children. Therefore, credit provided by VBARD and PCFs were important for animal production. As mentioned, the surveyed households faced

credit access constraints due to such reasons as a lack of physical collateral, limited access to information on credit programs and the weakness of the formal sector's credit supply in the agricultural sector.

*3.3.5. High volatility of output prices*

The surveyed farmers indicated that market price fluctuation was one of the highest risks leading to major loss of income. Pig prices varied strongly due to both the supply and demand of pork, influenced by disease outbreak and input prices. From data collection in the field survey, it was shown that in 2010, the average price of chicken was 60,000 VND per kg. The average price of a live pig was about 41,000 VND per kg. However, the variation in price was very large (Figure 1). From March 2010 to June 2010, the price of a live pig fell due to an outbreak of PPRS. Disease outbreaks have strong negative effects on pig producers. Losses came not only from sick pigs, but also due to decreased prices due toconsumerconcerns about pork quality. After the disease outbreak (1-2 months), it takes at least one cycle for a pig farmer to recover his initial situation. High prices and the unknown port quality after disease outbreaks were also a problem. In addition, price fluctuation was not only affected by poultry disease but also by illegal imported chicken from China. In Vietnam, sales of low quality Chinese chicken remains uncontrolled, posing a threat to the domestic poultry husbandry industry (DTin News 2012).

**Figure 1. Price volatility of live pigs and chickens**




Source: Livestock collectors in Dan Chu commune, 2011 and 2012

*3.3.6. Limited access to relevant market information*

The lack of an organized livestock marketplace infrastructure means that farmers usually deal with buyers on an individual basis (Nin et al 2003). In the study site, traders living in or outside the village generally provided market information to small farmers. The government information network was not organized in a systematic manner with overlaps between and across various government agencies. Therefore, government institutions were not in a position to supply information that farmers can use in their marketing activities. In addition, market information was not available in a timely manner. With limited access to relevant market information, many surveyed farmers did not know where and to whom best to sell their animal outputs and so be able to obtain a fair price. Given this, farmers were less geared to raise animals targeted to a specific market where they could expect to obtain a fair economic return (Lapar et al. 2003). Supporting this study finding, Binh et al. (2007) also indicated that small livestock producers in Vietnam had limited access to market information. It was difficult for them to plan their production scale in a way that was truly commensurate with consumer demands.

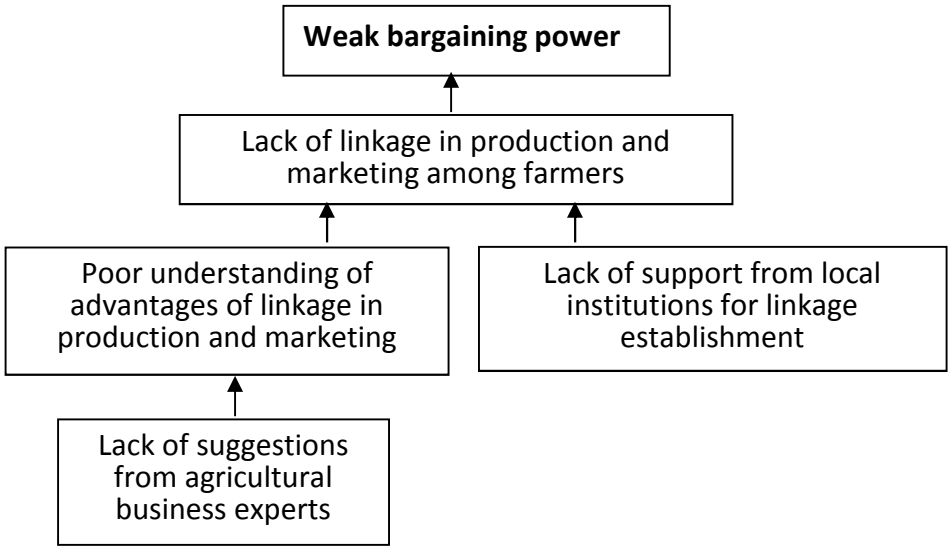
The surveyed farmers gathered output marketing information from various sources. Market information from output collectors, television and input dealers in the village and neighboring animal producers became a main information source. 69 % of surveyed households collected market information from those sources. About 23% of households in the animal-based group also gathered market information directly from feed company sales staff. Most farmers reported that market information from television was also inadequate in terms of forecasting. All farmers indicated that they did not receive any market information from the government extension institutions. It should be highlighted that the surveyed farmers could access market information from some sources. However, the information overlapped and was not consistent. Consequently, farmers had limited access to relevant market information.

*3.3.7. Weak bargaining power of individual animal producers*

Without timely information as a basis for marketing decisions, the surveyed farmers usually were at the losing end in the bargaining process vis-à-vis traders and other agents who have more information due to their

exposure to a wider geographic area and a larger number of market players.

**Figure 2. Reasons for weak bargaining power of individual animal producers**




Source: Household survey and group discussion, 2011

It was found that 100% of the surveyed farmers individually sold their pigs, poultry and fish to collectors at the farm gate. In addition, 78% of the surveyed farmers reported that they were not satisfied with their selling price. All of them indicated that they had no choice in the selection of buyers. As a result, they had to sell their animal products at a lower price than the price they hoped to get. This reveals that the surveyed households who were small-scale animal producers had but low bargaining power during the process of selling their products. As demonstrated in Figure 2, lack of linkage among animal producers in both production and marketing was the main reason for the low bargaining power of the individual animal producer. The surveyed households reported that they did not clearly understand the advantage of farmer group linkage. In addition, they had never received suggestions from agricultural business experts. The local extension institution did not appear to shown any intention of supporting linkage establishment in production and marketing.

Experience worldwide shows that small farmers have much to gain by collaborating through associations or production groups. This type of cooperation increases the farmer's bargaining position with traders and credit suppliers, helps them access and develop technology, and has huge

scale advantages through the bulking of inputs and outputs. Member farmers may not fully understand their obligations in the contract, and concepts like quality and certification may be new to them. But representatives of the group of farmers can help them interface with the traders and processors (Jessop et al. 2012).

*3.3.8. Ranking of constraints to animal production and marketing*

Some main constraints to animal production and marketing were detected from the group discussion. Then, during the household survey, each surveyed household was asked whether it really faced each constraint or not. Finally, the constraint ranking was done separately for the animal-based group and the non animal-based group, which was based on the percentage of responses from the surveyed households. The result of the constraint ranking was presented in Table 9.

**Table 9. Ranking of constraints**

| Constraints | Animal-based group | | Non animal-based group | |
|---|---|---|---|---|
| | Percentage[1] (%) | Ranking position | Percentage[1] (%) | Ranking position |
| Credit access constraints | 55 | 3 | 82 | 2 |
| Animal disease | 53 | 4 | 64 | 4 |
| Substantial rapid increase in feed price | 100 | 1 | 100 | 1 |
| Lack of guidance for feed selection | 31 | 7 | 40 | 7 |
| High volatility of output prices | 67 | 2 | 70 | 3 |
| Limited of access to relevant market information | 47 | 6 | 51 | 6 |
| Weak bargaining power | 51 | 5 | 60 | 5 |

Source: Household survey, 2011

Note:[1] Number of surveyed households who responded that they actually faced each constraint, divided by the number of surveyed households in each group, yielded the percentage in Table 9.

It was found that the substantial rapid increase in feed price was a major problem faced by both groups, because feed expenditure accounted for a main production cost. As a consequence, the substantial rapid increase in feed prices led to increased production costs and cut back on income from animal production. Credit access constraints occurred for both groups and resulted in a lack of cash for investment in animal production.

Credit access constraints were ranked as the second problem for the non animal-based group and as the third problem for the animal-based group. In addition, the high volatility of output prices also caused a high variation in income of both groups. The farmers reported that the high volatility of output prices also made animal production uncertain, which made it difficult to make plans for production as well as impeded their investment in animal production. Next, animal disease was ranked as the fourth position. The farmers entirely accepted the fact that animal disease caused a risk in animal production or losses of their income. The third problem was weak bargaining power. As for weak bargaining power, both groups sold their animal products at lower price compared to their expected price. Thus, weak bargaining power also negatively influenced farmer incomes. Next, limited access to market information was accepted as the sixth problem having a negative consequence on animal production in both the income of the certain year and planning for production in some recent years. Finally, lack of guidance for feed selection made it difficult for farmers to make a selection regarding their industrial feed purchases. As a result, it was listed as the seventh position.

## *3.4. Influence of credit and non-credit constraints in animal production*

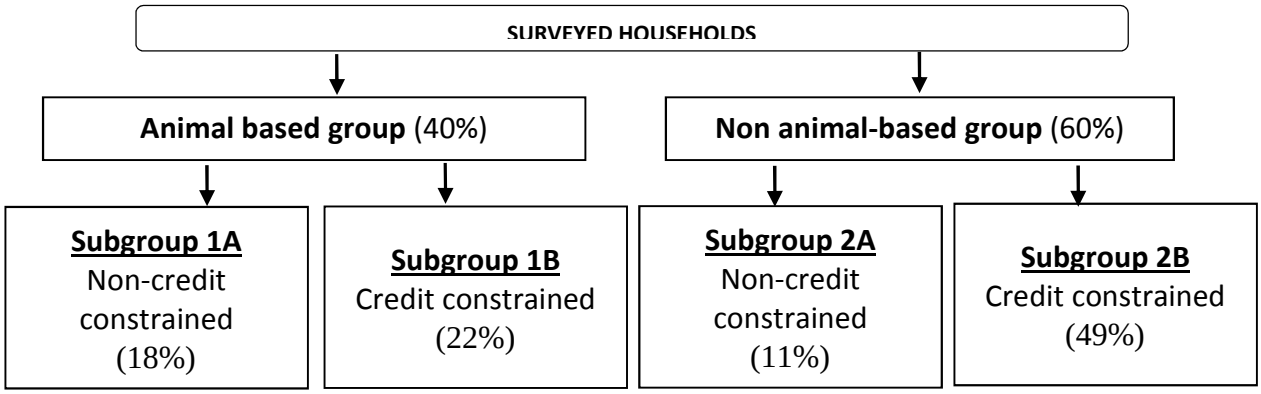
### *3.4.1. Cost and return analysis of animal production*

Agriculture as a sector depends more on credit than any other sector of the economy because of the seasonal variations, the farmer's return and a changing trend from subsistence to commercial farming (Abedulla et al. 2009). When credit is rationed, some borrowers cannot obtain the amount of credit they desire at the prevailing interest rate. In such circumstances, liquidity can become a blinding constraint on many farmer operations. Facing such a situation, households have to choose how to invest and what inputs to buy, depending on the level of credit they receive (Kohansal et al. 2008). Access to credit generally improved efficiency by leveraging cash constraints to buy better quality inputs and services. Thus, easier access to credit for cash-constrained farms would help improve overall efficiency (Akter et al. 2007).

Going back the credit accessibility of survey households (Table 6, subsection 3.2.3), the non-credit constrained group included households who were approved for the full required loan amount by VBARD and PCFs.

In contrast, households of the credit constrained group were approved for a part of a required loan amount or had their loan application rejected or had a need for credit but did not apply for loans. It found that that credit constrained households accounted for 71 % of surveyed households and the credit accessibility were different between animal-based group and non animal-based group (Figure 3).

**Figure 3. Classification of subgroups by credit accessibility**




Source: Household survey, 2011

Regarding cost and return analysis of animal production among subgroups with different credit accessibility, there were significantly differences in return to family labors from animal production among 4 subgroups (Table 10). Generally, return to family labors from animal production of non-credit constrained groups were statistically higher than those of credit constrained groups. Especially, return to family labor from each animal type of subgroup 1A was statistically higher than those of subgroup 2B. The different return to family labor between non credit-constrained groups and credit constrained groups was mainly affected by the different input investment, which directly related to their credit accessibility.

**Table 10. Return to family labor of animal production**

Unit: 1,000s VND

| Return to family labor | Animal-based group | | Non animal-based group | | P values |
|---|---|---|---|---|---|
| | **Subgroup 1A** Non-credit constrained | **Subgroup 1B** Credit constrained | **Subgroup 2A** Non-credit constrained | **Subgroup 2B** Credit constrained | |
| Per 100 birds of chicken | 4,210[a] | 2,639[c] | 3,335[b] | 2,164[c] | 0.00*** |
| Per 100 kg of pig live | 915[a] | 739[b] | 792[ab] | 707[b] | 0.01*** |
| Per 1 *sao* [1] of fish pond | 2,920[a] | 2,507[ab] | 2,355[ab] | 1,938[b] | 0.00*** |

Source: Household survey, 2011.

Note: ****, ** and * are significant levels at 1%, 5% and 10%, respectively;
[abcd]means in the same row without common letter are different at P < 5% by Ducan test. [1]"sao" is common unit used in the Red River Delta, including Hai Duong. 1 sao = 360 $m^2$

More detail of cost and return analysis was presented in Appendix 1. Some main differences in input cost were explained as followed. Firstly, the price paid to purchase feed by subgroups 1A and 2A was lower compared to that of subgroups 1B and 2B, respectively because subgroups 1A and 2A normally paid in cash for their feed purchasing. Subgroups 1B and 2B commonly purchased feeds from village dealers with deferred payment due to lack of cash. Using deferred payment for feed purchasing from the village dealer, subgroups 1B and 2B had to purchase feeds at a high price. Therefore, subgroups 1A and 2A commonly invested a higher amount in feed than subgroups 1B and 2B. It implies that the credit supply plays a very important role in feed expenditure of surveyed animal producers. Secondly, in terms of vaccination and veterinary costs, subgroup 1A and 2A spent more money on prevention and treatment than subgroups 1B and 2B, respectively. It does mean that an increased expenditure for vaccination and veterinary services always results in high productivity. The surveyed farmers reported that cash availability enabled them to use vaccination and veterinary services in a timely manner. Subgroups 1A and 2A normally spent money on prevention. Thirdly, a good breeding quality commonly requires a high amount of money expenditure. With credit access constraints, it was difficult for subgroups 1B and 2B to purchase animal

breeds in good quality. In contrast, subgroups 1A and 2A purchased a better quality of breeds thanks to having no credit constraints. In Hai Duong Province, it is found that a change in price of meat or fish commonly leads to a change in price of livestock breeds or fish breed. If the price of meat or fish increases the price of the animal breeds increase more quickly, because many farmers prefer to raise those animal types. The poor farmers, who lack the financial capital, find it more difficult to purchase a good quality breed.

Focusing on subgroups 1A and 2B, the gross outputs of subgroup 1A were significantly higher than those of subgroup 2B for a given output. The different gross output was due to differences in the selling price and yield. For example, the selling chicken prices of subgroups 1A, 2B were 60,000 and 56,000 VND per kg, respectively. The selling pig prices of subgroups 1A, 2B were 47,500 and 38.000 VND per kg, respectively. Farmers reported that the better quality of livestock products resulting from the better quality of input use enabled them to sell their products at the higher price. As for yield of fish production, raising tilapia subgroup 1A reached about 505 kg per *sao* whereas subgroup 2B obtained 360 kg per *sao*.

It can be concluded that for a given production unit, the non-credit constrained groups generated a higher return to family labor as compared with the credit constrained groups because of higher input investment and higher gross output. It implies that a better credit accessibility created a higher return to family labor from animal production. It should be noted that a better experience in production of animal-based group partly enabled this group created a higher return to family labor than non animal-based group.

### *3.4.2. Influence of credit and non-credit constraints on return to family labor*

As mentioned, credit supplied by VBARD and PCFs were mainly used to purchase variable inputs. Due to limited borrowing amount, credit used for upgrading a shelter or a fish pond and purchasing of production equipment was very small amount. This part aims to analyze the influence of credit and non-credit constraints on return to family labor from animal production.

Traditional measures of the impact of access to credit on economic outcomes have relied on estimates of marginal effects of the loan amount or program membership, both of which have shortcomings. Firstly, program membership and amount of credit demand are potentially endogenous to the outcomes of interest, that is, the participation decisions of individuals within a household. Secondly, the validity of the estimates of impact of the amount depends on the assumptions that at the time of obtaining credit, the credit limit was binding and the program was the only source of credit (Feder, Lau, Lin, & Lou, 1990, as noted in (Diagne and Zeller 2001). The use of the amount borrowed is not appropriate if households decide not to participate in the credit market because it is not an optimal strategy for them or if the marginal impact of credit is negligible (Diagne and Zeller 2001). Thirdly, most credit programs offer a bundle of services such as literacy training, family planning and training for income-generating activities. Hence, it is impossible to separate out the causal effects of credit from the effects due to other services provided (Pitt and Khandker 1998).

In reality, it was difficult to separate the influence of credit and the influence of non-credit factors on income of surveyed households from pig, poultry and fish production. Given the current production and marketing situation, this study attempts to analyze the influence of credit constraints and non-credit constraints on the return of family labor from pig, poultry and fish with the same production unit. Based on the credit accessibility of households, firstly the credit constrained households was defined. Of 104 credit constrained households, the number of credit constrained households of the animal based group and the non animal-based group was 42 and 72, respectively. Next, the scatter distribution of credit gap ratio of all credit constrained households was used to identify a criterion for classification of credit constrained households into different subgroups. The credit gap ratios of credit constrained households ranged from 0-53%. Then, subgroups 1B and 2B were classified into different subgroups, including subgroup 1B(a), 1B(b), 2B(a) and 2B(b) (Table 11). The credit gap ratio can be presented as the level of credit constraints. The higher the credit gap ratio exisits, the higher level of credit constraints occurs.

**Table 11. Subgroup classification by credit gap ratio**

| Credit gap ratio (%) | Animal-based group | | Non animal-based group | |
|---|---|---|---|---|
| | Subgroup 1B Credit constrained | | Subgroup 2B Credit constrained | |
| | Name | Num. households | Name | Num. households |
| Up to 14 | Subgroup 1B(a) | 7 | Subgroup 2B (a) | 15 |
| 15-30 | Subgroup 1B(b) | 10 | Subgroup 2B (b) | 20 |
| 31-53 | Subgroup 1B(c) | 15 | Subgroup 2B (c) | 37 |
| | Total | 32 | | 72 |

Source: Household survey, 2011

Higher input expenditures are presumably associated with higher productivity growth (Saeed et al. 1996). The comparison of return to family labor among subgroups 1B(a), 1B(b) and 1B(c) is shown in Table 12. It was pointed out that subgroup 1B(a) received higher income from pig and fish production than that subgroup 1B(b) and subgroups 1B(c).P values and the Ducan test confirmed that there were significant differences of return to family labor from pig and fish production among three groups. It indicated the lower credit gap existed the higher income famers got. However, return to family labor from chicken production was insignificant among groups.

**Table 12. Comparison of return to family labor among subgroups in subgroup 1B**

Unit: 1,000s VND

| Return to family labor | Animal-based group | | | |
|---|---|---|---|---|
| | Subgroup 1B | | | |
| | Subgroup 1B (a) | Subgroup 1B (b) | Subgroup 1B (c) | P values |
| Per 100 birds of chicken | 2,642 (448) | 2,703 (589) | 2,597 (648) | 0.36 |
| Per 100 kg of pig live | 973[a] (258) | 780[b] (221) | 597[c] (318) | 0.00*** |
| Per 1 *sao* of fish pond | 3,212[a] (215) | 2,812[b] (194.1) | 1,976[c] (466) | 0.00*** |

Source: Household survey, 2011

Note: The values in brackets were standard deviation; *** are significant levels at 1%; [abc]means in the same row without common letter are different at P < 5% by Ducan test.

Furthermore, to investigate the influence of credit and non-credit constraints on reduction in return from animal production per given production unit, firstly the relevant credit constraints and non-credit constraints were selected, based on existing constraints to animal production and marketing, as discussed early. Secondly, farmers were asked whether each factor caused a reduction in their income or not. Finally, the total accumulated percentage was used to rank the level of reduction in return to family labor.

**Table 13. Influence of credit and non-credit constraints on the reduction in return to family labor for subgroup 1B (in the animal based-group)**

Unit: Percentage

| | | **Subgroup 1B** (n=32) | | |
|---|---|---|---|---|
| | | **Subgroup 1B (a)** n= 7 | **Subgroup 1B (b)** n=10 | **Subgroup 1B (c)** n=15 |
| **Related credit constraints** | -Low investment in feed | 71 | 80 | 93 |
| | -Low investment in disease prevention | 43 | 60 | 67 |
| | -Low investment in breed quality | 57 | 80 | 80 |
| | ***Subtotal of accumulated percentage*** | ***171*** | ***220*** | ***240*** |
| **Non-credit constraints** | -High and rapid increase in feed price | 100 | 100 | 100 |
| | -Weak capability for disease prevention and treatment due to lack of knowledge | 57 | 50 | 54 |
| | -Limited access to relevant market information and weak bargaining power | 43 | 60 | 59 |
| | ***Subtotal of accumulated percentage*** | ***200*** | ***210*** | ***213*** |
| **Total accumulated percentage** | | **371** | **430** | **453** |
| **Ranking levelof reduction in return to family labor** | | **I** | **II** | **III** |

Source: Household survey, 2011

Note: Data in Table 13 was presented as a percentage of households who answered that each factor actually caused the reduction in return to family labor.

Among three subgroups, the percentage of households in subgroup 1B(c), who had a low investment on feed, disease prevention and breed quality, was the highest. Of the total households in subgroup 1B(c), 93% had a low

investment on feed quantity; 67% responded that they had a low investment on their disease prevention; 80% complained that their expenditure on breed quality was limited. The data in Table 13 shows that the subgroup with a high credit gap ratio had a low investment in variable inputs for animal production. In other words, the high level of credit constraints of animal producers caused the low level of input expenditure for their production. Concerning non-credit constraints, among the three subgroups there was a similar influence of non-credit constraints on the reduction in return to family labor. It is indicated that, among the credit constrained households, non-credit constraints had a similar influence on the reduction in income. From the discussion, it can be concluded that the households in subgroup 1B were also influenced by non-credit constraints. The households with a higher level of credit constraints had a lower income from animal production than the households with a lower level of credit constraints.

**Table 14. Comparison of return to family labor among subgroups in the subgroup 2B**

Unit: 1,000s VND

| Return to family labor | Non-animal based group | | | |
|---|---|---|---|---|
| | Subgroup 2B | | | |
| | Subgroup 2B (a) | Subgroup 2B (b) | Subgroup 2B (c) | P values |
| Per 100 birds of chicken | 2,439[a] (829) | 2,296[ab] (770) | 1,982[b] (509) | 0.05** |
| Per 100 kg of pig live | 879[a] (370) | 689[ab] (209) | 592[b] (289) | 0.10* |
| Per 1 *sao* of fish pond | 2,720[a] (389) | 2,014[b] (504) | 1,447[b] (593) | 0.00*** |

Source: Household survey, 2011

Note: The values in brackets were standard deviation; *, **, and *** are significant levels at 10%, 5% and 1%, respectively; [abc]means in the same row without common letter are different at P < 5% by Ducan test.

With respect to comparison of return to family labor among credit constrained households of non animal-based group, the return to family labor of subgroups 2B(a), 2B(b) and 2B(c) are illustrated in Table 14. P values show that return to family labor was significantly different among the three subgroups. Given the same production unit, the return

to family labor from animal production of subgroup 2B(a) was highest. The Ducan test confirmed that there was a significant difference of return to family labor between subgroup 2B(a) and subgroup 2B(c). Among the three groups, the variation in income from fish production was higher than that from chicken and pig production because fish production generally needed more capital investment than pigs and chickens. In conclusion, the household group with a low credit gap ratio generates a higher income from animal production than the household groups with the high credit gap ratio.

**Table 15. Influence of credit and non-credit constraints on the reduction in return to family labor for subgroup 2B (in the non animal based-group)**

Unit: Percentage

| | | **Subgroup 2B** (n=72) | | |
|---|---|---|---|---|
| | | **Subgroup 2B (a)** n= 15 | **Subgroup 2B (b)** n=20 | **Subgroup 2B (c)** n=37 |
| **Related credit constraints** | -Low investment in feed | 73 | 85 | 94 |
| | -Low investment in disease prevention | 53 | 65 | 70 |
| | -Low investment in breed quality | 67 | 70 | 86 |
| | ***Subtotal of accumulated percentage*** | ***193*** | ***220*** | ***250*** |
| **Non- credit constraints** | -High and rapid increase in feed price | 100 | 100 | 100 |
| | -Weak capability of disease prevention and treatment due to lack of knowledge | 66 | 65 | 64 |
| | -Limited access to market information and weak bargaining power | 54 | 60 | 63 |
| | ***Subtotal of accumulated percentage*** | ***220*** | ***225*** | ***227*** |
| **Total accumulated percentage** | | **413** | **445** | **477** |
| **Ranking level of reduction in return to family labor** | | **I** | **II** | **III** |

Source: Household survey, 2011

Note: The percentage value in Table 15 was presented as the percentage of households in each group who answered that each factor actually caused the reduction in return to family labor.

Investigation into the influence of credit and non-credit constraints on the reduction in return to family labor was also done for subgroup 2B with the mentioned steps above. The analysis of subgroup 2B yielded a similar finding from an analysis of subgroup 1B. The households in subgroup 2B were likewise influenced by non-credit constraints. The households with a higher level of credit constraints had a lower income from animal production than the households with a lower level of credit constraints (Table 15).

Briefly, the finding shows that animal production of both the animal-based group and the non animal-based group was influenced by credit and non-credit constraints. Within each group, the non-credit constraintshad a similar influence on income from animal production. Credit accessibility differed from one household to another. As a result, for a given production unit, households with credit constraints generated a lower income from animal production than households without credit constraints. In other words, better access to credit enabled the animal producers to make a higher input expenditure that generated higher income from animal production.

Since credit constrained households cannot optimize production, resulting in inefficient production, the task of the Vietnamese government is to develop the rural financial system to ensure that every household has access to credit and can maximize their production (Duong and Izumida 2002). Furthermore, the study finding suggests that non-credit constraints including strengthening of feed supply, capability of disease prevention, access to market information and bargaining power also should be improved to increase income for small animal producers.

### *3.5. Income of animal producing households*

It was found that the monthly income per capita was 1.68 mil.VND for the animal-based group and 1.02 mil.VND for the non-animal based group. Of surveyed household, the number of households who had 500,000 VND to 1,000,000 VND per month per capita occupied a main proportion (46%). According to the data from the Hai Duong Statistics Office (HDSO 2011), monthly income per capita for household in Hai Duong Province in 2010 was 1,300,000 VND. It reveals that about 50% of the surveyed households had the monthly income per capita was lower than the average monthly

income of households in Hai Duong Province. It can be concluded that as a whole the income from animal producing households on the study sites was still low compared to other households in the province. In terms of income structure, the share of income from crop production, animal production and non-farm income of all surveyed households in total income was 36%, 38% and 26%, respectively. These figures confirm that animal production contributes a considerable proportion to the total income of farmer households on the study sites.

**Table 16. Income from various sources by subgroup**

| | Total | Animal-based group | | Non animal-based group | | P values |
|---|---|---|---|---|---|---|
| | | Subgroup 1A Non-credit constrained | Subgroup 1B Credit constrained | Subgroup 2A Non-credit constrained | Subgroup 2B Credit constrained | |
| Cropproduction (mil. VND) | 15.1 | 13.9[a] | 14.8[a] | 22.2[b] | 14.5[a] | 0.00*** |
| | (5.8) | (4.9) | (4.8) | (8.6) | (4.9) | |
| Animal production (mil. VND) | 31.3 | 75.5[a] | 44.9[b] | 24.3[c] | 10.8[d] | 0.00*** |
| | (29.3) | (30.5) | (17.7) | (12.4) | (6.0) | |
| Non-farm activities (mil. VND) | 22.7 | 19.4[ab] | 14.4[b] | 32.9[c] | 25.2[a] | 0.00*** |
| | (13.9) | (13.4) | (9.5) | (18.7) | (12.6) | |
| Total income (mil. VND) | 69.1 | 108.8[a] | 74.1[b] | 79.4[b] | 50.5[c] | 0.00*** |
| | (32.6) | (36.3) | (24.4) | (20.8) | (16.9) | |
| Monthly income per capita (mil. VND/capita) | 1.29 | 2.07[a] | 1.36[b] | 1.51[b] | 0.92[c] | 0.00*** |
| | (0.6) | (0.7) | (0.5) | (0.5) | (0.3) | |

Source: Household survey, 2011.

Note: Value in rows of each source is mean and standard deviation, respectively; *** significant level at 1%; [abc]means in the same row without common letter are different at P < 5% by Ducan test.

Table 16 provides information on the income of the subgroups from various sources. Within the animal-based group, income from each source was considerably different between subgroup 1A and 1B, especially income from animal production. Animal production created 75.5 mil.VND for subgroup 1A and 44.9 mil.VND for subgroup 1B. The non-farm income of subgroup 1A was slightly higher than that of subgroup 1B. Both groups had a similar income from crop production. In 2010, the total income of subgroup 1A was relatively higher than that of subgroup 1B. Among four subgroups, monthly income per capita of subgroup 1A was the highest, followed by subgroup 2A, subgroup 1B and subgroup 2B. In other words,

subgroups 1A and 2A that were non-credit constrained households had a higher monthly income per capita than subgroups 1B and 2B, which were credit constrained households. P values and the Ducan test confirm that among the subgroups, total income and monthly income per capita were significantly different. This implies that better credit access, could increase income for animal producing households. In addition, of the total surveyed households, the number of non-credit constrained households in subgroups 1A and 2A accounted for 18% and 11% respectively, while the number of credit constrained households in subgroups 1B and 2B represented 22% and 49%, respectively. This situation requires solutions to increase the income of many animal producers on the study sites, especially subgroups 1B and 2B. Given the limited human, physical and financial capital, it was realized that subgroup 2B could increase its income by improving animal production rather than looking for new non-farm activities.

# 4. CONCLUSIONS

Resulting from the empirical analysis, some conclusions associated with the study objectives are presented as follows:

**Credit access constraints of animal producing households**

The surveyed households, including the animal-based group and the non animal-based group, need credit for both production and consumption. The interest rates of loans supplied by the formal sector were lower compared to that supplied by informal moneylenders. Therefore, many farmers prefer to obtain credit from the formal sector. However, the credit supply from the formal sector did not meet the credit needs of animal producers in Hai Duong Province. The farmers still depended on the informal sector.

VBSP mainly provided poor households with credit for education purposes. Therefore, the credit provided by commercial banks (VBARD and PCFs) were important for animal production. The formal sector allocated limited credit for agricultural production and did not provide sufficient information on the credit supply to farmers. Consequently, the credit constrained households accounted overall for 71% of the households surveyed. Concerning the behavior of the formal sector in response to the credit needs of households, the stronger credit needs of farmers were more rationed by VBARD and PCFs.

The findings confirmed that a large demand for credit by animal producing households exists in Hai Duong Province. Animal producing households faced some credit access constraints, leading to different credit accessibility among households, and were influenced by human and physical characteristics, social relationships of the households and weaknesses of the formal sector.

**Weakness in implementation of VBARD's no collateral requirement credit program**

The Decision No. 67/1999/QD-TTg, that permitted VBARD to provide loans of less than 10 mil.VND without requiring physical collateral, theoretically shows an ambition of the government for improvement of the credit supply in rural areas. Practically, it did not work well on the study sites and it was not up to the government's expectations. It

indicates that in the coming years, the implementation of Decision No. 41/2010/ND-CP, that permitted VBARD to provide loans of less than 50 mil.VND to household without requiring physical collateral, will likely be a challenge for VBARD. The farmers could have benefited from Decision No. 41/2010/ND-CP since the opportunity to provide much input on the part of VBARD, the local authorities and staff of local mass organizations has been created.

**The similar influence of non-credit constraints and the positive influence of credit accessibility on return to family labor from animal production**

Recently, animal disease, substantial increases in feed prices, credit access constraints, high volatility of output prices, limited access to relevant market information, lack of guidance for feed selection and weak bargaining power of farmers were main constraints to production and marketing of the animal producing households in Hai Duong Province.

The findings confirmed that the animal-based group and the non animal-based group were influenced by both credit and non-credit constraints. Within each group, the non-credit constraints had a similar influence on animal production income. Credit accessibility differed among households. As a result, given the production unit, the credit constrained group generated less income than the non-credit constrained group. In other words, better credit accessibility enabled the animal producer to invest a higher amount in variable production inputs and finally generated higher income from animal production. The improvement in both the credit supply and some non-credit factors could increase the income from animal production.

**Strengthening the credit supply from the formal sector for better access to credit by animal producing households**

For VBARD, information on the credit program without a collateral requirement should be effectively conveyed to farmers. The lending network between VBARD and mass organizations should be strengthened. Furthermore, VBARD also needs to enhance its role in the agricultural credit supply and increase the availability of lending capital to meet the credit needs of farmers. With transaction offices located in communes, PCFs should have more competitive strategies to increase their outreach to animal producers. In addition, VBSP's credit program for agricultural

production should be expanded to take on the poor. Better monitoring of VBSP's credit supply targeted to the poor is also recommended.

**Credit supply for input vouchers of animal producer groups**

Besides improving the credit supply to individual borrowers, credit for input vouchers of animal producer groups is suggested for the formal sector in Hai Duong Province. Animal producer groups, banks and animal feed factories should work together. The animal producers collaborate together within the group and thus take advantage of economies of scale and ensure a stable input supply for cooperative members. The study suggests that VBARD should supply the credit for input vouchers. The feed factories sell animal feed to the animal producer group without cash payment. Then, the animal producer groups submit their vouchers for feed purchased to VBARD to get loans. Finally, VBARD directly transfers money to the feed factories. The animal producing borrowers are responsible to payback their loans for VBARD.

The credit for input vouchers enables farmers to have an easy access to credit, reduce their cost of feed purchasing and purchase feed at a low price. It also enables VBARD to monitor the credit use of farmers more easily and reduce the bank's operational costs. The credit for input vouchers can be seen as an appropriate way to improve animal production because farmers who lack cash cannot purchase feed by deferred payment from the feed factories. VBARD having been assigned the responsibility for the credit supply to the agricultural sector should put forth more effort to supply credit via vouchers to animal producer groups.

**Strengthening the veterinary network and extension services and enhancing awareness of disease prevention of farmers**

The veterinary network and extension services should be enhanced to reduce the risks in animal production. Disease detection, surveillance and control by the veterinary network should be strengthened to limit outbreaks of animal disease. The illegal transportation of livestock from China must be eliminated. It will contribute to reducing of disease outbreaks and the volatility of livestock output prices. In addition, training in disease prevention for farmers should be given in a more timely and efficient manner. Furthermore, farmer awareness of disease prevention and treatment must be raised. Importantly, the extension services should

not provide overly technical training. Non-technical knowledge (on marketing and collective action linkages) should be supplied through the extension services.

**Establishment of animal producer groups oriented collective action**

In Hai Duong Province, the animal producing households faced many constraints of production and marketing, partly caused by each one working individually. It is suggested that the local authorities should support small animal producers to establish animal producer groups, based on the collective approach. The linkage within farmers, and linkage between farmer groups and other stakeholders (banks, input suppliers, extension institutions and other market actors) could provide more extensive opportunities for increasing farmer incomes. The collective production process is a vital factor because it allows the members to produce the same kinds of animal products of uniform quality to meet the market demand. The collective process also facilities the collective buying of inputs at low prices and leads to collective product selling. On the other hand, in the framework of collective action, the farmer group is entrusted with agricultural extension activities that will foster rapid technology transfer. In addition, linkage among members helps them access credit more easily. Concisely, the collective action of animal producer groups could reduce the transaction costs of input procurements, overcome other barriers to market participation, make farmers more able to access credit and increase their income.

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# APPENDIX

**Appendix 1. Cost and return analysis of chicken, fatling pig and fish production**

Unit: 1,000s VND

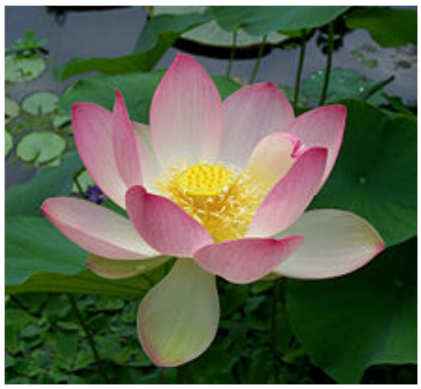
| Indicators | Animal-based group | | Non animal-based group | | P values |
|---|---|---|---|---|---|
| | **Subgroup 1A** Non-credit constrained | **Subgroup 1B** Credit constrained | **Subgroup 2A** Non-credit constrained | **Subgroup 2B** Credit constrained | |
| **Chicken (per 100 birds of chicken)** | | | | | |
| Gross output (GO) | 13,339$^{a}$ | 11,502$^{b}$ | 12,227$^{c}$ | 10,793$^{d}$ | 0.00$^{***}$ |
| Intermediate cost (IC) | 8,697 | 8,517 | 8,644 | 8,468 | 0.20 |
| - Breeding stock | 1,108$^{a}$ | 1,002$^{a}$ | 1,080$^{b}$ | 985$^{b}$ | 0.00$^{***}$ |
| - Feed | 6,930 | 6,893 | 6,972 | 6,917 | 0.97 |
| - Veterinary care and vaccination | 512$^{a}$ | 472$^{ab}$ | 447$^{b}$ | 417$^{b}$ | 0.04$^{**}$ |
| - Other | 149$^{ab}$ | 152$^{a}$ | 145$^{b}$ | 149$^{ab}$ | 0.08$^{*}$ |
| Value added (VA) | 4,641$^{a}$ | 2,984$^{b}$ | 3,583$^{b}$ | 2,325$^{c}$ | 0.00$^{***}$ |
| Interest payment | 253$^{a}$ | 186$^{ab}$ | 107$^{bc}$ | 60$^{c}$ | 0.00$^{***}$ |
| Depreciation | 177$^{a}$ | 158$^{b}$ | 141$^{c}$ | 100$^{d}$ | 0.00$^{***}$ |
| Return to familylabor | 4,210$^{a}$ | 2,639$^{c}$ | 3,335$^{b}$ | 2,164$^{c}$ | 0.00$^{***}$ |
| **Fatling pig (per 100 kg of live weigh)** | | | | | |
| Gross output (GO) | 4,754$^{a}$ | 4,161$^{b}$ | 3,936$^{c}$ | 3,869$^{c}$ | 0.00$^{***}$ |
| Intermediatecost (IC) | 3,730$^{a}$ | 3,357$^{b}$ | 3,083$^{c}$ | 3,127$^{c}$ | 0.00$^{***}$ |
| - Breeding stock | 742$^{a}$ | 691$^{b}$ | 701$^{a}$ | 684$^{b}$ | 0.12$^{*}$ |
| - Feed | 2,844$^{a}$ | 2,544$^{b}$ | 2,249$^{c}$ | 2,319$^{c}$ | 0.00$^{***}$ |
| - Veterinary care and vaccination | 91$^{a}$ | 71$^{c}$ | 81$^{b}$ | 69$^{c}$ | 0.00$^{***}$ |
| - Other | 53 | 51 | 52 | 54 | 0.38 |
| Value added (VA) | 1,023$^{a}$ | 804$^{b}$ | 853$^{b}$ | 743$^{c}$ | 0.00$^{***}$ |
| Interest payment | 59.3$^{a}$ | 42.9$^{ab}$ | 32.3$^{ab}$ | 20.4$^{b}$ | 0.01$^{***}$ |
| Depreciation | 49$^{a}$ | 21$^{c}$ | 28$^{b}$ | 22$^{c}$ | 0.00$^{***}$ |
| Return to familylabor | 915$^{a}$ | 739$^{b}$ | 792$^{ab}$ | 707$^{b}$ | 0.01$^{***}$ |
| **Fish (per 1 *sao*[1])** | | | | | |
| Gross output (GO) | 11,793$^{a}$ | 10,355$^{b}$ | 9,061$^{c}$ | 7,705$^{d}$ | 0.00$^{***}$ |
| Intermediate cost (IC) | 8,002$^{a}$ | 7,207$^{b}$ | 6,347$^{c}$ | 5,497$^{d}$ | 0.00$^{***}$ |
| - Breeding stock | 2,960$^{a}$ | 2,500$^{b}$ | 2,071$^{c}$ | 1,445$^{d}$ | 0.00$^{***}$ |
| - Feed | 4,698$^{a}$ | 4,385$^{ab}$ | 3,946$^{bc}$ | 3,820$^{c}$ | 0.00$^{***}$ |
| - Other | 344 | 321 | 329 | 232 | 0.00$^{***}$ |
| Value added (VA) | 3,791$^{a}$ | 3,148$^{b}$ | 2,714$^{bc}$ | 2,208$^{c}$ | 0.00$^{***}$ |
| Cost of pond renting | 61 | 77 | 22 | 23 | 0.47 |
| Interest payment | 174$^{a}$ | 135$^{a}$ | 136$^{a}$ | 71$^{b}$ | 0.00$^{***}$ |
| Depreciation | 634$^{a}$ | 427$^{b}$ | 200$^{c}$ | 173$^{c}$ | 0.00$^{***}$ |
| Return to familylabor | 2,920$^{a}$ | 2,507$^{ab}$ | 2,355$^{ab}$ | 1,938$^{b}$ | 0.00$^{***}$ |

Source: Household survey, 2011.

Note: ****, ** and * are significant levels at 1%, 5% and 10%, respectively; abcd means in the same row without common letter are different at P < 5% by Ducan test.

1“sao” is common unit used in the Red River Delta, including Hai Duong. 1 sao = 360 $m^2$

# GRAESE : Groupe de Recherches Asie de l'Est et du Sud Est



**Le GRAESE** (Groupe de Recherches sur l'Asie de l'Est et du Sud Est) regroupe des chercheurs concernés par les problèmes du développement en Asie Orientale et Sud Orientale. A son origine se trouvent des académiques et des chercheurs ayant participé à des projets de recherche, d'enseignement et de coopération dans cette région du monde depuis le milieu des années 1990. En Belgique, ces activités ont associé, dès le début, des chercheurs de l'UCL, des FUSAGx, et de l'ULg qui poursuivent une coopération régulière depuis une quinzaine d'années. En Asie ces activités ont concerné un grand nombre de chercheurs et d'académiques de diverses universités et institutions vietnamiennes, laotiennes, cambodgiennes, thaïlandaises et chinoises. L'Université Agronomique de Hanoi (UAH) est un partenaire privilégié depuis le début. Ces activités ont concerné particulièrement les projets de développement agricole, les composantes socio-économiques du développement rural, les rapports villes-campagnes et les politiques affectant ces différents domaines. En outre plusieurs thèses de doctorat ont été réalisées dans le cadre de ces activités, et sous diverses formes de partenariat entre les universités belges et asiatiques concernées. Le **GRAESE** vise à donner une meilleure visibilité à ces diverses activités, à faciliter la circulation de l'information entre les chercheurs et centres de recherches concernés, et à appuyer et soutenir l'intérêt en Belgique et en Europe pour les problèmes du développement asiatique dans un public plus large.

En pratique le **GRAESE** a pour objectif :

1) de stimuler la recherche interdisciplinaire concernant les problèmes et les enjeux du développement en Asie orientale et sud orientale ;
2) de publier sous forme de Working Papers (format papier ou online) des résultats de recherche liés aux projets en cours et aux questions concernant les diverses thématiques du développement appliquées à l'Asie orientale et sud-orientale, avec une attention particulière aux thèmes évoqués ci-dessus ;
3) de réaliser des publications scientifiques de divers types concernant ces problèmes et réalisées par des chercheurs des différents centres partenaires en Europe et en Asie ;
4) de fournir un lieu de rencontres entre chercheurs concernés par ces thèmes, particulièrement dans le cadre des doctorats en cours ;
5) d'organiser des activités d'enseignement et d'information sur les problèmes du développement de l'Asie de l'Est et du Sud Est, notamment à travers l'organisation de conférences et séminaires donnés par des académiques et chercheurs asiatiques de passage en Belgique.

En Belgique les activités du **GRAESE** sont coordonnées par Ph. Lebailly (UEDR-Gembloux-ULg) et J.Ph. Peemans (CED-UCL). Le secrétariat du **GRAESE** est assuré par l'UEDR.

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