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Constraints and potential of livestock insurance schemes - A case study from Vietnam

Thomas Dufhues*, Ute Lemke
and Isabel Fischer***

Department of Agricultural Development Theory
and Policy*, and Institute of Animal Production in the
Tropics and Subtropics, Animal Husbandry and Breeding
Section,** University of Hohenheim

Forschung zur Entwicklungsökonomie und Politik

Research in Development Economics and Policy

Center for Agriculture in the Tropics and Subtropics

**Institute of Agricultural Economics and Social Sciences
in the Tropics and Subtropics**

- **Department of Agricultural Development Theory and Policy (490a)**
- **Department of International Agricultural Trade and Food Security (490b)**
- **Department of Farming and Rural Systems (490c)**
- **Josef G. Knoll Visiting Professorship for Development Studies**

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Abstract

Livelihood systems of poor rural households are often so fragile that a small misfortune can destabilize households for years. Strategies for coping with risk include informal mutual aid agreements and/or formal microinsurance schemes. In developing countries, insurance markets are usually underdeveloped. Nevertheless, if the development path is supported by strong structures and institutions, anonymous markets will, over time, replace informal insurance networks as they are more efficient. In Vietnam, livestock is an important household income source and has additional non-economic functions in the households. For a long time, rural financial institutions in Vietnam financed only a small array of agricultural investments, but these frequently included livestock purchase. The absence of off-farm investment possibilities further promotes investment in livestock production. Failure of an investment, especially when loan-funded, can leave a household in an extremely vulnerable position. Livestock death is considered to be a major factor contributing to poverty. Farmers using credit to purchase livestock face two risks at once: (1) loss of the livestock due to disease and subsequently (2) failure of investment. Farmers would like to reduce the uncertainty, but a broad-based livestock insurance scheme does not exist in Vietnam. There are only a few formal and semi-formal schemes with very limited outreach. Thus, access to formal insurance is almost non-existent, and farm households have to rely mainly on informal mutual aid schemes within their social networks to reduce their risks. The objective of this paper is to contribute to the discussion on the general feasibility of a livestock insurance scheme in Vietnam. In this context, the demand for and supply of livestock insurance schemes is discussed. Quantitative (N=322) and qualitative data collection took place between 2001 and 2004. The quantitative data comprise cross-sectional household-level data from three different districts in Northern Vietnam. Four different types of insurance providers were selected for analyzing the supply side: 1. Insurance tied to credit within a state-owned company; 2. Insurance tied to credit within a development project; 3. A state-owned insurance company (which collapsed); 4. A private insurance company. By selecting these different insurance providers, the range of livestock insurance types offered in Vietnam was covered. The main result is that provision of sustainable livestock insurance is hampered principally by unreliable data on livestock mortality and by premia that are set politically at a low level.

Keywords: Vietnam, livestock insurance, microinsurance, rural finance

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- A case study from Vietnam

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1 Introduction[1]

Poor rural households are vulnerable.[2] Their livelihood systems are often so fragile and delicately balanced that a small misfortune can destabilize a household for many years. Crises and shocks which either require immediate outlays of cash or which diminish already low and irregular income, or both, can have long-term effects on livelihood strategies and welfare (World Bank and DFID 1999). Vulnerable households have developed sophisticated (*ex-ante*) risk-management and (*ex-post*) risk-coping strategies. These households may adopt production plans to reduce their exposure to the risk of adverse income shocks (*ex-ante*), even if this entails lower average income, or they may try to smooth consumption (*ex-post*) by creating buffer stocks.

Livelihood strategies will differ according to whether people have to deal with gradual changes or sudden shocks and crises. *Coping strategies* (e.g. sale of livestock) seek to minimize the impact of livelihood shocks and are a short-term response to sudden or periodic shocks (Carney et al. 1999; Korf 2002). Coping strategies, although providing some protection in the short run, limit the poor's long-run prospects of escaping poverty (Kanbur and Squire 2001). Households recover and, eventually, employ new adapting strategies to develop a new portfolio of livelihood activities. The revision and expansion of adapting strategies can include the adaptation of existing informal local mutual aid agreements and/or the development and adoption of formal or semi-formal microinsurance schemes for certain risks (Murray 2001). *Adaptive livelihood strategies* may seek to mitigate risks through livelihood adjustment (e.g. family planning or accessing insurance), or change and diversification of income-creating activities. However, Skees et al. (2002) state that as farming remains the dominant activity in many rural areas, diversification may not actually spread certain types of risk, a particular example being weather events that cause widespread loss of crops and grazing land. Moreover, the average household income in a diversified portfolio may be lower than in a specialized portfolio, but the variation in income is also normally less in a diversified portfolio. Thus, there is potential economic gain if households are offered policies that provide them with alternative mechanisms for reducing and managing risk, such as formal savings and insurance mechanisms (Dunn 1997).

Serageldin and Grootaert (1999) state that the gradual replacement of informal associations and networks with semi-formal and formal impersonal market mechanisms is a good example for development. In developing countries, financial markets, and particularly insurance markets, are usually underdeveloped (Dasgupta 1999; Zeller 2000;). Thus, formal and semi-formal insurance schemes appear to contribute only little to reducing income risk and its consequences in developing countries (Dercon 2002; Fafchamps 1999; Kanbur and Squire 2001). Nevertheless, if the development path is supported by strong structures and

[2] Vulnerability refers to "the relationship between poverty, risk and efforts to manage risk" (Alwang, Siegel, and Jorgensen 2001: 1).

institutions, anonymous markets will, over time, replace the 'named' transactions within networks such as informal insurance networks where the number of members in each network is small and where members know each other personally. In this situation, participating individuals stand to gain from formal insurance, as access to formal insurance services has the potential to substitute for some higher-cost informal insurance mechanisms (Stiglitz 1999; Zeller 1999). Moreover, no matter how good the informal insurance mechanisms are, members of those networks are unable to protect themselves from covariate risks (Kanbur and Squire 2001).[3] The poor especially have less access to informal sources of post-risk management if it requires time and in-kind investment (Putman 1993).

1.1 Problem statement and objectives

In developing countries, livestock is an important and, in some situations the only, cash-income source. If a family loses a cow, the result may be loss of income for a considerable period of time (Mustaffa-Babjee, Chang and Sopian 1987). This holds true for many households in Vietnam's northern provinces (World Bank and DFID 1999). Rural financial institutions in Vietnam for a long time financed only a relatively small array of agricultural investments, often including the purchase of water buffaloes or, even more frequently, the purchase of pigs for fattening. The absence of off-farm investment possibilities further promotes investment in livestock production in Northern Vietnam. There, about 60% of households currently invest credit in livestock production (Dufhues et al. 2002).[4] Duong and Izumida (2002) found in a survey conducted in 1997 covering parts of northern, central, and southern Vietnam that 54% of formal loans were invested in livestock. These findings reflect the fact that investment in livestock has been a popular trend in the Vietnamese rural community in recent years.

In the livestock dependent households of Northern Vietnam, too, failure of an investment, especially when funded by a loan, can leave a household in an extremely vulnerable position. Loss of livestock can have serious consequences for a rural household's livelihood, given the pivotal role played by livestock in the farming systems of Northern Vietnam. Livestock death and disease is considered to be one of the main factors contributing to poverty (World Bank and DFID 1999). Farmers deciding to use credit to purchase livestock face two risks at once, and both severely endanger their livelihood: (1) the risk of losing the livestock asset, and (2) failure of their investment. Because farmers are aware of these risks, they would like to reduce the uncertainty (Buchenrieder, Heidhues and Dung 2003). As a formal agricultural or more general rural insurance market hardly exists in Vietnam (although Decree No. 42 of 2001 calls for the development of more insurance instruments, particularly for rural areas), rural farm households have to rely mainly on informal mutual aid schemes within their social networks to reduce their risks (Vandeveer 2000). No broad-based livestock insurance scheme exists in Vietnam. There are only a few formal and semi-formal schemes with very limited outreach.[5]

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[3] If a risk becomes effective and creates a shock or crisis that affects just one person (one family/household), it is classified as an individual risk, or idiosyncratic. Covariance is the tendency for either i) many households to be affected by a risk at the same time or ii) several risks to consistently occur together. Covariant or mass risks differ crucially from individual risks: (1) they tend to be difficult or impossible to predict; (2) they affect many people at the same time, thus hampering the ability of risk-pooling mechanisms to protect against them; and (3) the cost associated with mass, covariant risks tends to be significantly greater than that resulting from other risks (Brown and Churchill 1999; Dercon 2002).

[4] Moreover, livestock sales are often used to repay interest and principal of loans. For instance, this research showed that 73% of the loans from the formal financial market in Vietnam are repaid with revenues from livestock production.

[5] The three existing schemes assessed have a total outreach of 4,000 households, which represents about 0.03% of the rural population in Vietnam. Assuming that a couple more local schemes exist, such as the Moc Chau

While the literature discusses crop insurance schemes and microinsurance for health and life in developing countries, little research has so far been conducted on livestock insurance schemes, and even less in relation to Vietnam. In global terms, the first livestock insurance scheme was established in Germany (Compensation Funds, 1909). Other developed countries have followed suit over time. In developing countries, animal insurance schemes have developed mainly in Asia, e.g. a fairly successful, credit-tied cattle insurance scheme in India (Otte, Nugent and McLeod 2004). The objective of this paper is to contribute to the discussion on the general feasibility of a livestock insurance scheme in Vietnam. Past and recent developments in rural insurance markets will give hints with regard to the design of livestock insurance schemes to solve typical insurance problems such as moral hazard and adverse selection. This literature review will serve as the basis for discussion of a few existing livestock insurance schemes in Vietnam. In this context, the demand for livestock insurance schemes will also be described. However, livestock insurance schemes need to be discussed within the framework of the underlying livestock sector and, most important, the veterinary/extension system, as setting insurance premia is highly dependent on the performance of this system. The veterinary/extension system of Vietnam is therefore described in detail. Particularly, the reliability of livestock risk data is discussed. At the end, a joint view of different disciplines is necessary to reveal the constraints to and potential for providing sustainable livestock insurance services in Vietnam.

1.2 Organization of the research paper

The second section describes the analytical methods used and the sample composition. In addition, the data limitations of the sample are discussed. Section three supplies the theoretical background for providing livestock insurance. In section four, the veterinary framework of Vietnam for supplying livestock insurance is analyzed. Section five first of all investigates the general demand for livestock insurance and then examines the supply of livestock insurance. The paper concludes with policy recommendation on supplying sustainable livestock insurance in Vietnam.

2 Methodology and data base

The following section starts with a description of the methodology used in this analysis. It then continues with a presentation of the survey sample, and concludes with some remarks on the limitations of the data.

2.1 Model and data analysis

Analytically, this contribution combines quantitative data from the household level and secondary and qualitative data from the supplier of livestock insurance. The main focus is on the supply side.

Quantitative data: The household database is a combination of quantitative data collected in the animal husbandry survey and the rural finance survey. It comprises cross-sectional household-level data from four different districts and different ethnicities. The quantitative data are analyzed with regard to the demand for livestock insurance using descriptive statistics and a multinomial logit regression model within the methodological framework of a Conjoint Analysis (CA).[6]

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dairy cattle enterprise, this figure might rise to 0.5%. However, this figure is still far from having any significant outreach to the rural population as a whole.

[6] Due to space limitations, and as the multinomial analysis represents only a small part of the total analysis, for details of the model specification please refer to Dufhues et al. (2003) and Dufhues, Heidhues, and Buchenrieder (2004), where the same model was used. In brief, Conjoint Analysis (CA) is a methodological approach to estimate consumer preferences and to design new products. Products are distinct in their attributes, whereby each

Qualitative data: Semi-structured and unstructured interviews with key persons such as officials of mass organizations or political cadres at the different administrative levels provided general information on the research region and on the livestock risk situation in general.[7] Semi-structured interviews were conducted with employees of different suppliers of livestock insurance at all hierarchical levels (field officer to manager). These data were analyzed from the point of view of information economics, with a special focus on the principles of moral hazard and adverse selection.[8] The results are then presented in four different key studies.

2.2 Sampling procedure

This research work is based on research conducted by three subprojects of one umbrella research program, the German-Thai-Vietnamese Collaborative Research Program (Sonderforschungsbereich 564) 'Sustainable land use and rural development in mountainous regions of Southeast Asia' or, in abbreviated form, the Uplands Program. Quantitative and qualitative data collection for the animal husbandry survey (subproject D2) and the rural finance survey (subproject F2) took place between in 2001 and 2003 (first phase of the Uplands Program), while the data collection for the vulnerability survey (subproject F2.2) is currently under way (2004). An overview of the complete research sample is given in Table 12 in the Annex. The quantitative analysis, which is interpreted mainly in the section on insurance demand, is based on two surveys from subprojects D2 and F2.

Four different types of insurance providers have been selected for analysis of the supply side: 1. Insurance tied to credit from a state-owned company (Moc Chau Dairy Cattle Enterprise), 2. Insurance tied to credit from a development project (Groupe de Recherche et d'Échanges Technologiques (GRET)), 3. a state-owned insurance company (BAOVIET) (which collapsed), and 4. a private insurance company (Groupama). The authors selected these insurance providers as being representative (to cover the range of livestock insurance offered in Vietnam) and instructive for other organizations seeking to establish or improve livestock insurance.

Animal husbandry survey (D2, first phase 6/2000-5/2003): The overall objectives of this subproject are (1) the description of smallholder livestock production systems, with a focus on pigs, (2) the identification of livestock genotypes that use the scarce local resources available for husbandry most efficiently and that are adequately integrated into current farming systems, and (3) the development of village breeding programs utilizing those genotypes. Four villages of ethnic Black Thai, located in the Son La and Mai Son districts of Son La province, were selected for the sample. The villages were selected on the basis of (1) the intensity levels of their production systems, (2) distance to the district capital, and (3) altitude. Due to the research approach, household sampling was stratified. Among the sow keepers in

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attribute may have different levels. The attributes/levels work as decision parameters for the potential consumer to purchase a product. In Conjoint Measurement, the respondents consider a product as a whole by the presented concepts. For further reading on CA we refer to Green and Srinivasan (1990).

[7] In Vietnam the so-called 'mass organizations' organize almost all people of a certain age and/or sex, e.g. Farmers' Union, Women's Union, Youth Union, and Veterans' Union. They are hierarchically structured according to the administrative levels. Some of these organizations offer small loans or organize training courses or saving groups at village level. The Fatherland Front is the holding organization of all other mass organizations and also has political influence on the local people's committees (Geppert, Buchenrieder, and Dang 2002).

[8] Opportunistic behavior is a central assumption in transaction costs economics. Williamson (1985: 47) defines opportunism as "self-interest seeking with guile". Opportunism may occur ex-ante, when it is called adverse selection, or ex-post, when it is called moral hazard. The assumption of opportunistic behavior could be considered an extension to the self-interested and utility-maximizing *homo economicus* of neo-classical economic theory (Buchenrieder 2002).

each of the four villages, households with sows in late pregnancy or with suckling piglets were selected. Altogether, the D2-sample comprises 64 rural households.

Rural finance survey (F2, first phase 6/2000-5/2003): The overall objective of this subproject is the development of client-adapted financial products and the assessment of credit impact on poverty. Two research sites were selected, namely Bac Kan (Ba Be district) and Son La province (Yen Chau district). Both provinces are located in the mountainous regions of Northern Vietnam and belong among the country's poorest provinces (World Bank 1999). The Ba Be district is a very remote area and has only recently (in 1999/2000) gained access to regional and interregional markets. Farmers produce mainly for subsistence. Due to the creation of the Ba Be National Park, huge resettlements took place and these have aggravated the problems in the region. The Yen Chau district has a much better regional market connection and is directly connected to greater Hanoi; it therefore provides a good contrast.

The communes and villages were selected in accordance with pre-defined selection criteria. These criteria are: located on a slope, different stages of market access, ecological zones, ethnic minorities, different phases of the land allocation process, and one village with a high proportion of non-farm activities.

The households in Ba Be and Yen Chau district were selected using a stratified sample according to the living standard of the population. Different wealth groups are of particular interest as far as their access to financial products and their preferences for financial products it concerns. Altogether, 260 rural households were interviewed in the two districts.

Risk management survey (F2.2, second phase 6/2003-5/2006): The overall objective of this subproject is to analyze the adaptive and coping strategies of vulnerable rural households regarding risks. The central hypothesis of this research is that insurance has the potential to reduce livelihood vulnerability of poor rural households. Topical primary data will be collected using the same sample as subproject F2.

2.3   Methodological constraints and data limitations

Both surveys (rural finance survey and animal husbandry survey) used similar criteria for the selection of the villages, except for one single criterion: ethnic minority. Due to the small sample size of the animal husbandry survey, the study refrained from varying the variable ethnic minority. Thus, the village selection process in the animal husbandry survey resulted in the selection of villages all belonging to the Thai minority (which represents the majority in the research area). Therefore, the sample contains a bias towards the Thai minority. This bias was taken into account during interpretation of the data.

The household selection differs in both surveys. The rural finance survey selected a cross sample from the village while the animal survey selected only households which kept certain genotypes of pig. Thus, a bias towards pig farmers could be assumed. However, according national data, 71% of all households in Vietnam keep pigs, compared to 73% in the sample (MARD and UNDP 2003). While there may still be a small bias in the sample concerning Northern Vietnam, it is rather representative as far as the whole country is concerned.

3 Theoretical issues of (micro) insurance

Many households borrow, more save, and all insure. Particularly poor households enter into various forms of informal self-insurance or co-insurance arrangements (Zeller 2000). Therefore, the demand for insurance schemes is vast (ADB 2000). The following section provides the theoretical background on rural and microinsurance and describes past and recent developments in the rural insurance market of developing countries.

3.1 The product triangle of rural finance

Evidence from microfinance institutions (MFIs) around the world indicates that, beyond credit and savings products, clients have an unserved need for products to insure against many of the risks that they are exposed to (Buchenrieder and Theesfeld 2001). While saving was recognized as the forgotten half of finance in the 1980s, in the 1990s, insurance was termed its forgotten third (Zeller et al. 1997).

Figure 1   Product triangle of rural finance
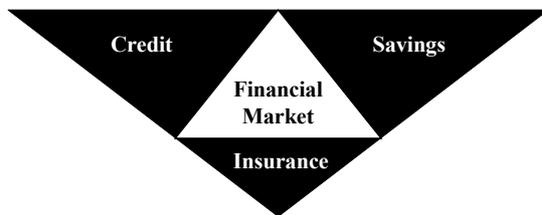
From the client's perspective, microfinance products are highly convertible into each other. Open-access savings products and emergency loans can act as a form of insurance, while insurance products can also be used for the accumulation of capital. In case of credits, the money is collected after the disbursal of the lump sum, in case of savings before, and in case of insurances continuously (Figure 1).

Savings, credits, and insurance products are closely related to each other, e.g. when loan defaults are tied to natural disasters, as in the agricultural sector, formal financial institutes (FFI) will either ration credit or build a credit premium to cover this risk (charging higher interest rates). Agricultural insurance increases clients' ability to repay their loans and therefore, has a positive impact on default rates in the sense of reducing them. Thus, farmers using insurance usually have also better access to credit with good conditions (Del Conte 2001; Skees 1999).

The fact that the absence of insurance possibilities limits households' ability to reduce consumption fluctuations does not necessarily imply that the most effective intervention would be to set up insurance programs (Alderman and Paxson 1992). Providing open access to savings and (emergency) loans may be a preferable method for helping clients to manage risk. Most people tend to use insurance as a last resort, after savings or credit, to protect themselves against risk. If potential clients of microfinance institutions (MFIs) do not yet have access to flexible savings and credit, providing insurance may be premature (Brown 2000b). However, as the size of loss increases relative to a household's expected future income, credit products become increasingly ineffective risk-management tools. Similarly, savings products offer only partial protection against risks causing large losses relative to household income. At this point, insurance becomes a more effective method of risk management (Brown and Churchill 1999). Microinsurance can be very useful in reducing the vulnerability of households. But to reduce vulnerability, it should be complemented by efforts to increase savings, build assets, and maintain strong social networks (CMF 2000b). Insurance cannot be the panacea for all risks faced by poor households. Some risks cannot be insured against and there are some risks where insurance is technically possible but may not be the most appropriate tool for clients to manage risk. Events that cause financial stress but occur with greater certainty, e.g. dowry, are better served by savings than insurance (Brown 2000a).

Moreover, insurance is not an appropriate tool to eradicate chronic poverty. Alleviating chronic poverty demands increases in the physical and human capital of the poor or in returns to their labor, while insurance and income-stabilization schemes are more appropriate for transient poverty (Kanbur and Squire 2001).

3.2 Idiosyncratic and covariate risks

According to Yates and Stone (1992), the critical elements of risks are potential losses, the significance of these losses, and the uncertainty of these losses. Risks can be divided into human, economic, and asset risks; some of them are associated to the idiosyncratic (individual) and some to the covariate risk category.[9] By pooling the risk over a large number of people, insurance products have the potential to offer more complete protection against those risks and can protect households against a significant loss (relative to average income) at an annual cost that is within the households' budget (Brown and Churchill 1999). However, not all types of risks can be insured against, i.e. only risks with a known probability of occurrence and a high degree of specificity are suitable for insurance (Litzka 2002). Losses that occur in some particular period cannot be insured against; one can only accumulate savings before the loss occurs or shift savings after the loss is suffered to restore the previous economic position. The insured losses must be probabilistic, either in terms of whether or not the losses will occur at all, or in terms of when losses certain to occur actually will occur (e.g., the moment of death). According to Vaughan (1989), an insurable risk must have the following four characteristics:

1. The likelihood of the event must be readily quantifiable;
2. The damage it causes must be easy to attribute and value;
3. The probability of occurrence should not be too high to make the insurance unaffordable;
4. Neither the occurrence of the event or the damage it causes should be affected by the insured's behavior (i.e. no moral hazard).[10]

While the traditional insurance literature lists a fifth characteristic (i.e., non-covariant risk), many catastrophic risks that are covariate are now insured by private markets (e.g. hurricanes, typhoons, earthquakes, floods) (Skees, Hazell and Miranda 1999). However, viable agricultural insurance plays only a limited role as indicated by the private sector. Private insurers provide health, life, and asset insurance for farmers in many countries, but they have been very reluctant to move into crop and livestock insurance as crop and livestock losses often do not fulfill the criteria above. Moreover, history has shown that government-supplied crop insurance schemes are a drain on public resources and need to be highly subsidized (Hazell 1992). Nevertheless, a similar reluctance was demonstrated by formal lending institutions as regards offering micro loans to peasant farmers, but this has proved to be viable when best practice techniques were applied.

The risks from idiosyncratic shocks can profitably be pooled locally, whereas those from covariate shocks cannot. From the macroeconomic perspective, the distinction is even sharper. Idiosyncratic risks, whether insured or not, net out at the aggregate level, whereas covariate risks accumulate and so have macroeconomic effects on consumption and savings. From the perspective of the macro economy, it is desirable to insure covariate shocks, whereas the insurance of idiosyncratic shocks is rather unimportant. However, farmers are far more likely to insure idiosyncratic shocks than covariate shocks. Idiosyncratic shocks are

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[9] Two sources of covariate risks are common: 1) market risks and 2) natural risks (Skees et al. 2002).

[10] Moral Hazard occurs when insurants change their behavior after they purchase insurance in that way that the change increases the likelihood that policyholders will collect insurance indemnities (Skees 1999).

more common, and local informal and even private formal insurance arrangements are more feasible (Collier 2001).

In covariate risks, the law of large numbers does not apply.[11] Aggregating such risks would be unproductive, because the reserves an insurer would have to maintain would equal, or perhaps exceed, the reserves that individuals would have to maintain if uninsured (Priest 2003). Annual losses for the insurance pool will be extremely variable. The loss in any given year may be large enough to threaten the solvency of the insurance pool. Two techniques for insuring correlated losses are reinsurance and geographical spreading so that exposure is limited in any given geographical market (Skees 1999).

MFIs in developing countries do not usually have the outreach to spread risks geographically. Therefore, Brown (2000a) strongly recommends not insuring covariate risk such as floods or droughts, as a single risk event can easily bankrupt the MFI. Nevertheless, private insurance, supplied by big insurance companies, does exists for covariate risk, e.g. for earthquakes and hurricanes in the US (Skees 1999).

3.3 Traditional multiple-peril versus area-based insurance[12]

Multi-peril insurance: Multiple-peril insurance schemes are usually all risk programs, meaning that insurance compensates all yield losses, regardless of the cause. Although insured risks are often enumerated, the lists of covered risks are so comprehensive that uninsured risks cannot be excluded in practice, including losses from bad management. One of the most important reasons for the failure of many traditional crop insurance schemes is that many risks covered by multiple-peril insurance are inherently uninsurable, leading to large actuarial losses for the insurer (Skees, Hazell and Miranda 1999). The uninsurability of many yield risks arises from moral hazard problems.[13] Farmers simply have a reduced incentive to pursue sound farming practices if they know that any serious losses will be compensated by the insurer. The problem is aggravated by the practice of many state-owned insurers that rarely incorporate sizeable deductibles into insurance contracts.[14] Thus, farmers do not bear any significant part of yield losses themselves. Moreover, state-owned insurers often assess the loss as the difference between actual and normal yields, whereby the latter tends to be set too high (Hazell 1992). Recent research by Turvey, Hoy and Islam (2002) showed that, theoretically at least, moral hazard costs can be controlled by *ex ante* regulations, e.g. by obliging farmers to use certain standards in farming practice. Nevertheless, such *ex ante* regulations require a strong monitoring system, which in itself will create costs.

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[11] With traditional insurance (idiosyncratic risks), pooling independent loss events creates a mean loss for the pool that has a variance that is less than the mean of the individual variances. This result is derived from the classic statistical property of the law of large numbers – the variance of the one aggregate number is lower than the variance of many numbers that sum together to make the one number. The law of large numbers implies that, as one increases the number of insured persons possessing independent and identically valued risks, one increases the accuracy of prediction of the risk generated by each individual (Priest 2003).

[12] Literature on livestock insurance, particularly in developing countries, is relatively scarce. However, experiences from crop insurance schemes can often be applied directly to livestock insurance schemes.

[13] In recent years, numerous studies have examined the causes of market failure of crop insurance programs and have concluded that failure stems entirely from asymmetric information problems (adverse selection and moral hazard.) However, these studies have not answered the question of whether the observed adverse selection and moral hazard are intrinsic to crop insurance, or whether they are consequences of program design. If covariate risk and not asymmetric information is the primary cause of market failure, then cost-efficient remedies for market failure may be available in the form of area/index based insurance or exchange-traded area yield options (Miranda and Glauber 1997).

[14] Deductibles are methods used by insurers to share risk with policy holders and reduce their tendency towards moral hazard behavior, whereby an amount is established that a policy holder agrees to pay, per claim or per accident, toward the total amount of an insured loss (Brown and Churchill 1999).

A situation with asymmetric information (leading to adverse selection and moral hazard) creates serious problems for any multiple-peril crop insurance (Skees 1999).[15] Adverse selection and moral hazard will ultimately result in prohibitively high insurance premia. The lesson to be drawn is clear: one must invest a great deal in monitoring before having a crop insurance program that will be actuarially sound (Skees, Hazell and Miranda 1999). Finally, due to the covariate character of the risk, there is the need to use international reinsurers to cover the risk, which again raises the premium (Skees et al. 2002). Thus, in government-supported insurance schemes, premia often became so high that farmers were unwilling to insure coverage. Here, many governments stepped in with huge subsidies, as it was, and still is, believed that multiple-risk crop insurance helps the rural population. Several governments tried to use multiple-risk crop insurance to transfer income to poor farmers and provide them with relief in times of need. However, both welfare objectives are called into question by the observation that crop insurance mostly benefits the larger-scale and more prosperous farmers, particularly when it is tied to agricultural credit (Hazell, Pomareda and Valdes 1986).[16] Furthermore, potential societal welfare gains from multiple-peril crop insurances are quickly swamped by the high transaction costs of monitoring the micro-level problems of adverse selection and moral hazard or, if extra sources are used by rent seekers, to obtain high subsidies (Skees 1999). The costs of multiple-risk crop insurance tend to be particularly high in developing countries. Large numbers of small farms and a wide diversity of agricultural practices greatly add to administration and inspection costs. Poor data on actuarial risks and a lack of skilled personal also hamper the writing and enforcing of sound contracts (Hazell, Pomareda and Valdes 1986).

Area-based insurance:[17] Considering the lessons learnt from the failure of past multiple-peril insurance programs, Hazell (2001) states that an insurance system is needed that meets the following requirements:
1. It avoids the moral hazard and adverse selection problems that have bedeviled most agricultural insurance programs.
2. It compensates for catastrophic income losses to protect consumption and debt repayment capacity.
3. It is affordable and accessible to all kinds of rural people, including the poor.
4. It is practical to implement given the limited kinds of data available in most developing countries.
5. It can be provided by the private sector with little or no government subsidies.

Area-based insurance schemes can meet all these requirements. These pay a pre-defined indemnity by occurrence of the event, e.g. a drought, irrespective of whether the insurant has suffered loss and irrespective of the amount of loss. On the one hand, there might be a problem in the fact that an individual can have a loss and not be paid because the major event trigging a payment has not occurred, e.g. a local rain hole in case of rain-index insurance. On

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[15] Adverse selection means that one party to a contract is unable to measure accurately certain valued human qualities or attributes of non-human resources that he or she seeks to acquire (Eggertsson 1990). This inability to measure important qualities to a contract, combined with wrong signals from a potential policy holder, may lead an insurer to accept a person as client with a higher-than-average chance of loss at standard (average) rates. This, if not controlled by underwriting, results in higher-than-expected loss levels (Brown and Churchill 1999). For instance, adverse selection arises when the potential policyholders are better informed about the distribution of their own losses than the possible insurer. Individuals who recognize that their expected indemnities exceed their premia are more likely to purchase coverage than those who recognize the opposite (Miranda and Glauber 1997). Therefore, it is important to pool large numbers of roughly homogenous, independent exposure units to give an accurate prediction of average future losses and to control adverse selection (Priest 2003; Skees 1999).

[16] Landless and other rural people are completely excluded from this scheme, even if they are also affected by the natural disaster.

[17] Area yield and area index insurance function according to the same principles. In the following sections, therefore, no distinction is made between these two types and both are referred to as area-based insurances.

the other hand, it is also possible for an individual to receive payment when he suffers no loss, and this special aspect makes index contracts very attractive. However, these two aspects require special education and awareness-raising among potential users concerning how the contracts work and how to reduce agricultural income risk (Hazell 2001; Skees 1999).[18]

Relevant information for area-based insurance, e.g. area yield, rainfall data, etc., is generally and publicly available and more reliable than information collected form the individual farm (usually yields).[19] Thus, insurers can more accurately assess the actuarial fairness of premia under an area-based policy and thereby significantly reduce adverse selection problems. Moreover, because the indemnities are based on area or aggregated data rather than on the individual producer's yield, a producer cannot significantly increase his indemnity by altering his production practices. The insured farmer still has the same economic incentives as the non-insured farmer. Thus, under an area-based insurance program, moral hazard is essentially eliminated, too. Administrative costs are substantially reduced, because claims do not need to be adjusted individually, and costly on-farm inspections and verification of individual production histories are no longer required (Skees 1999; Miranda 1991).

Area-based insurance provides effective risk management only in areas where risks are largely covariate. Individual risks cannot be covered through area-based insurance. Having a high covariate risk does improve the efficacy of an area-based contract, but the presence of high covariate risk is potentially troublesome for all insurance schemes. When a payment is due, then all those who have purchased area-based insurance must be paid at the same time. Moreover, if the insured risks in different regions are highly correlated, then the insurer faces the possibility of having to make huge payments in some years. To hedge against this risk, the insurer can either diversify regionally by selecting indices and sites that are not highly correlated, or sell part of the risk to the international financial markets through reinsurance (Skees, Black and Barnett 1997; Skees, Hazell and Miranda 1999). Prospects for diversifying risks across regions are feasible within some large countries, but are unlikely to be sufficient for most developing countries. International reinsurance is already available for some kinds of natural disaster risks. But despite significant growth in the international reinsurance markets in recent years, reinsurance markets are still thin, with few large international firms and limited capacity (Hazell 2001). Covariate risk undermines the insurer's ability to pool risks across individuals. Reinsurers, like all insurers, are essentially designed to address diversifiable, not covariate, risks. Despite their greater size and diversity, major reinsurers ultimately face the same structural limitations faced by smaller insurers: the cost of holding sufficient reserves to cover the huge losses that would accompany a widespread drought, for example, would render crop insurance prohibitively expensive. Options and futures markets offer a viable alternative to government reinsurance precisely because such markets are designed for the allocation of highly correlated risk (Gardner 1977; Miranda and Glauber 1997).

As area-based insurance is not bound to data from individual farms, not only small-scale farmers affected by a covariate risk in agriculture would be able to purchase area-based insurance contracts, but also agricultural traders. Area-based insurance could also be sold in small units that might appeal particularly to poor people (Hazell 2001).

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[18] Area-based contracts are not true insurance contracts, however, since payments to producers are not based on their own specific losses. Instead, area-based insurance may be more accurately described as a hedging instrument (Miranda 1991).

[19] Indexes are calculated on the basis of independent, measurable variables that are difficult to manipulate, e.g. rainfall, temperature, and soil moisture. Area-yield insurance schemes are calculated on the basis of e.g. district yields or animal mortality rates. If the area in question is big enough, then the aggregated yields cannot be influenced by a single farmer or a small group of farmers.

A number of studies have recognized that markets may more easily provide area-based insurance than traditional insurance schemes, e.g. multiple-risk crop yield schemes (Skees 1999; Skees et al. 2002; Skees, Hazell and Miranda 1999). But more importantly, once an area-based index removes much of the covariate risk, an insurer can wrap individual coverage around such a policy to handle independent risk (i.e., certain situations where the loss of an individual is not covered by the area-based insurance) (Hazell 2001).

3.4   Delivery of insurance in combination with credit

As mentioned before, agriculture is a risky business and farmers face a variety of risks related to weather, pests, disease, and markets. Given an uncertain income each year, farmers must worry about their ability to repay loans, or even meet the essential living costs of their families. These risks are also of concern to agricultural lending institutions. Confronted with risky borrowers, lenders must seek to reduce the possibility of poor loan recovery rates in unfavorable years, even if this means only modest levels of lending to agriculture (Hazell 1992; Skees, Hazell and Miranda 1999). Therefore, agricultural insurance has proved attractive to agricultural lending institutions, particularly when insurance is tied to farm credit on a compulsory basis. In the event of an insured disaster, the indemnity is paid directly to the lending institution to cancel the farmer's debt. From the institution's point of view, this is an effective way to reduce loan defaults and thus protect its capital assets. The farmer, however, often perceives compulsory insurance as another cost component attached to the loan, thus increasing the transaction costs on his borrowing and lowering demand for credit (Hazell 1992; Hazell, Pomareda and Valdes 1986). Often such compulsory schemes for borrowers are not accepted by households on a voluntary basis. After repayment of the loan, people usually drop the insurance and non-borrowing households do not join, as shown by evidence from Nepal, for example (CMF 2000a). Nevertheless, Mishra (1994) showed in an empirical study in India that a compulsory crop insurance/credit scheme has improved access to credit for peasants. The insurance has served as a (partial) substitute for collateral.

Protecting poor clients from risk, reducing lender's loan defaults, and earning additional income related to the loan portfolio are all objectives that have been cited for the recent flood of initiatives by MFIs to develop insurance products for the low-income market. However, the vast majority of MFIs lack the experience required to price the products; they do not have the resources (human and financial) to support an insurance product and are too small to achieve a sufficient level of risk pooling. The danger with MFIs offering insurance services is that losses in insurance operations can deplete depositors' assets and the MFI's loan capital in a single catastrophic event. Therefore, only sound and financially sustainable MFIs should offer microinsurance services. Nevertheless, few MFIs have reached financial sustainability (Brown 2000a). Moreover, there is also the potential danger of moral hazard with bank staff, which can lead to a serious loss of discipline in banking practice. Why, for example, should an MFI staff member try to collect loans from a tardy borrower if they can more easily obtain repayment from the insurer (Hazell 1992)?

Technical management of insurance services is different from credit and saving programs. It is therefore quite pertinent that microfinance providers should arrange insurance cover through a separate institution (Ali 2000). Partnering is a technique used by developed insurers when they are considering expanding into a new line of business. Partnering is also the best way for MFIs to gather all the necessary knowledge that is needed for the insurance business. For instance, managers need to be able to predict, with a reasonable degree of accuracy, what the size of the future claims will be. If predictions prove to be inaccurate, unexpectedly high insurance claims can decapitalize an institution. It is important to note that the level of complexity and the resources and skills required for each activity are much greater for health

and property insurance than for life insurance, as fraud and moral hazard are less prevalent in life insurance (Brown 2000a).

Transaction costs in the insurance market are undeniably high, and experience indicates that it is difficult to offer effective and sustainable insurance products to the rural population, and particularly poor people (Del Conte 2001). Existing MFIs can assist greatly in reducing transaction costs for setting up an insurance scheme as they already possess experience of serving low-income clients. For instance, the same borrowing groups established for microfinance (credit and savings) could be used as a conduit for selling insurance, either to the group as a whole, or to individuals who might wish to insure their loans (Hazell 2001).

4 The animal health system in Vietnam

While Section 3 provided the economic background information for the discussion of livestock insurance schemes, this section describes the animal health system of Vietnam. Premia need to be calculated based on a loss history (the frequency and the number of losses over time). In the field of animal production, the required information is provided by the animal health system of a given country and in particular by the country's disease surveillance system. In addition to the risk of diseases/epidemics, the amount of damage from a disease, as well as the behavior of animal keepers and veterinarians to prevent, treat and eradicate diseases, is not only influenced by the animal health system but also by the agricultural extension system of a country. In the following chapter, therefore, Vietnam's animal health and agricultural extension systems are introduced.

4.1 Organization and functionality of veterinary services in Vietnam

The Department of Animal Health (DAH) is responsible for the overall control of animal diseases and stipulates how disease control should be carried out at the different administrative levels. DAH is one department of the Ministry of Agriculture and Rural Development (MARD). The following institutions are under direct management of DAH (Lan 2000; Lan and Phuong 1999):

- three National Centers (disease diagnosis; quality control of drugs/vaccines; veterinary sanitary inspection),
- six Regional Centers (implementation of animal health measures, e.g. import/export regulations and sanitary inspection), each center covering eight to twelve provinces,
- six International Quarantine Stations (movement of animals for import/export, required animal health certificates issued by DAH).

The Provincial Veterinary Sub-Departments working under the Provincial Departments for Agriculture (DARD) form the basis of the state veterinary services. They receive technical advice, but very little financial support from DAH. The Provincial Sub-Departments direct their work mostly via the District Veterinary Stations (Lan 2000). They also manage the inland sanitary inspection stations along the main routes, controlling the movement of animals between provinces and issue the required animal health certificates (Lan and Phuong 1999).

Each District Veterinary Station is responsible for several communes, where it is in charge of surveillance, monitoring of disease outbreaks and organization of vaccination campaigns. It often provides further (income-earning) services including supplementary vaccination, selling drugs or artificial insemination in its respective catchment area (Lan 2000). Staff members at provincial and district levels are public servants, paid by the provincial government. At grass-root levels, veterinary 'fieldwork' is done by Commune and Village Animal Health workers (AHW), also called para-vets. These are private entrepreneurs earning their income from farmers' fees (Landon-Lane and Thao 2001). However, the activities of AHW are only loosely controlled, their training is very limited, and their total income is low. As a result,

animal diseases are often not detected, not reported in time, or reported inadequately and inaccurately (ASPS and ACI 2002; Lan 2000). In addition, producers are reluctant to report outbreaks, since they are unable or unwilling to pay for treatment and are afraid to have their animals culled. Often, producers react to animal diseases by selling or slaughtering the affected animals (ASPS and ACI 2002). The availability of a livestock insurance, and thus compensation for animal losses, would eventually improve farmers' motivation to report animal diseases and losses.

The diagnosis of animal diseases by village and commune animal health workers is based on the clinical symptoms of diseased animals (Lan 2000). Further diagnosis can be done at higher levels with improved laboratory facilities (Lan and Phuong 1999). Routine reporting is carried out on a monthly, quarterly and annual basis to DAH/Epidemiological Division; in addition, there are notification and monitoring reports on disease outbreaks. The surveillance system can build upon data from laboratory submissions, veterinary services at field level, national and international checkpoints/quarantine stations, and from population data from mass vaccination campaigns and livestock censuses (Lan and Phuong 1999). The animal health information system is organized from the field to the central level, ending at the Epidemiological Division of DAH (Lan 2000). In general, it is hampered by limited finances, technical skills and limitations in terms of computer equipment. Computers are often only available in offices at the national level. Data analysis and processing are still conducted manually; where available, computers are used for recording and storing data. Laboratory reports, field disease reports, livestock movement reports etc., are paper records (Lan and Phuong 1999).

Disease prevention measures: Vaccination campaigns are conducted twice per year in spring and autumn (Lan, 2000), with additional private vaccination initiatives by farmers. Each year, DAH promulgates a vaccination plan depending on the current animal disease situation, scheduling additional vaccinations if required. The Provincial Sub-Departments are responsible for the management and distribution of vaccine under the terms of that vaccination plan (Lan 2000; Lan and Phuong 1999).

Since liberalization, subsidies for vaccination have decreased considerably and are now mainly paid in areas with special conditions.[20] As a result, vaccination coverage has decreased from 70-80% in the 1980s to 40-50% in the 1990s (Thuy 1999). While official vaccination campaigns are compulsory, their efficiency is limited for example by a lack of, or inadequate, facilities for cold storage of the vaccine, or by failure to conduct vaccination in accordance with medical standards (Lan 2000; Thuy 2001). Due to ignorance or as a result of negative experiences, many producers consider vaccinations to be unnecessary, too expensive, not helpful, or even dangerous (Lemke et al. 2000; Thuy 2001).

Measures in the event of a disease outbreak: As mentioned above, the diagnosis of animal diseases by AHW is based on clinical disease symptoms (Lan 2000). Standard post-mortem inspection or sample-taking are rarely conducted. If a notifiable disease is reported, a preliminary diagnosis is made and preliminary control measures are ordered by the District Veterinary Station. The Provincial Veterinary Sub-Department is responsible for confirming the preliminary diagnosis and adapting the control measures. The Provincial Sub-Department will send samples to the above-mentioned regional or national laboratories if it is unable to make a definite diagnosis (Lan 2000). Due to a general lack of diagnostic facilities, reagents and tests, however, confirmatory diagnosis is often not carried out (Forman and Leslie 1997; Lan 2000). Weekly monitoring is carried out until the outbreak is controlled (Lan and Phuong 1999). Generally speaking, in many cases diseases are undiagnosed or wrongly diagnosed,

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[20] For instance, areas facing an outbreak/under risk of an outbreak, poor communes (Forman and Leslie 1997; Thuy 1999).

leading to insufficient or inappropriate treatment and creating a misleading picture of the epidemiological situation, and this may hamper or delay the appropriate treatment of bigger disease outbreaks.

Reasons for failure to detect diseases not only include incompetence on the part of AHW and the reluctance of producers to report outbreaks, but also the lax or absent implementation of policies and, in some areas, the lack of legislation, which hampers detection in the first place (ASPS and ACI 2002). As an example, control measures for foot-and-mouth disease (FMD), including vaccination, control of the movement of animals and slaughter inspection are not simultaneously coordinated and strictly implemented throughout Vietnam (Thuy 2001). FMD and other infectious diseases are often imported with illegal animal transports from neighboring countries without adequate control of movements of animals; reporting of diseased animals and application of quarantine measures are not conducted. Moreover, the marketing system, which is based on middlemen, results in considerable animal movements without appropriate controls, supporting transmission of FMD within the country (Forman 1996). For both reasons, most animal imports/movements in the country bypass checkpoints and are thus not detected (Forman and Leslie 1997).

At present, the government has no institutionalized system to compensate farmers for animal losses (Lan 2000). There is, however, occasional and irregular compensation for farmers in some outbreak regions. As an example, the provinces compensated farmers for birds culled in the highly pathogenic avian influenza outbreak (autumn 2003 to spring 2004). This compensation was equivalent to only a part of the birds' market value. Farmers were thus reluctant to have their birds culled and preferred to sell them (when that was still possible at the beginning of the outbreak), possibly leading to further distribution of the disease (AFP 2004).

Reliability of data on animal diseases: Animal disease prevalence data for Vietnam have to be looked at cautiously: systematic surveys on diseases are lacking, the surveillance system is not working properly and official (information) policy is restrictive (Werthmüller 2000).

The number of new incidences in the population per time unit (in short: disease incidence) is the most important epidemiological information for estimating disease costs or disease control costs (Stein and Leman 1982). However, incidence is only seldom assessed, since this requires panel data on a large scale (Harrison and Cameron 1999). Disease prevalence (number of diseased animals at a certain time as a percentage of the total animal population) is only a substitute for incidence information, especially for diseases with high mortality. This means that the most accurate and important epidemiological information for setting up insurance schemes is not available anyway, and that the (partly available and not always reliable) prevalence data are a substitute for any potential insurance company to deal with.

When thinking about a livestock insurance scheme, one would first consider the 'great epidemics'. In collaboration with FAO and WHO, the OIE (Office International des Epizooties) has established a three-tier disease classification system, including list A diseases, list B and other diseases. Both list A and list B diseases are transmissible diseases of socio-economic and public health importance and are significant in international trade. In contrast to list B diseases, list A diseases are capable of rapid spread irrespective of national boarders (Cameron, Baldock and Chamnanpood 1999). Table 1 and Table 2 document the occurrence of list A and list B diseases for Vietnam between 2000 and 2002.

Both, FMD and CSF are endemic in Vietnam, and outbreaks are observed more or less annually (Table 1). FMD causes a relatively low case fatality rate in ruminants (between 0.3 and 2.2%) but a considerable case fatality rate in pigs (between 10.5 and 17.7% are reported). However, even if fatality is low, the performance of diseased animals may be decreased temporarily or permanently, leading to production losses on the farm. As an example, in the

case of FMD, adult ruminants may suffer from a severe reduction of milk yield and draught performance (Thuy 2001). CSF in pigs comes with a very high case fatality rate of between 62.5 and 97.1% in the years 2000 to 2002.

Table 1 Reported outbreaks of list A diseases in Vietnam between 2000 and 2002, large ruminants and pigs

	2000			2001			2002		
	Out-breaks	Cases	Fatality* in %	Out-breaks	Cases	Fatality* in %	Out-breaks	Cases	Fatality* in %
FMD**, ruminants	n.a.	7,607	1.6	n.a.	648	2.2	20	1,529	0.3
FMD**, pigs	n.a.	2,009	10.5	0	/	/	1	136	17.7
CSF***	n.a.	18,106	97.1	n.a.	17,805	87.0	n.a.	19,891	62.5

Source: http://www.oie.int (data accessed 6/2/2004)
Note: n.a. = data not available
       *Fatality = number of deaths from a specified cause in a specified time period /total number cases of the same disease (Dohoo, Martin and Stryhn 2003)
       **FMD = Foot-and-Mouth Disease, ***CSF = Classical Swine Fever

Table 2 Reported outbreaks of list B diseases in Vietnam between 2000 and 2002, large ruminants and pigs

	2000			2001			2002		
	Out-breaks	Cases	Fatality* in %	Out-breaks	Cases	Fatality* in %	Out-breaks	Cases	Fatality* in %
Ruminants									
Anthrax	2	4	100.0	1	3	100.0	3	5	20.0
Rabies	0	/	/	7	17	100.0	0	/	/
Anaplasmosis	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
HS**	n.a.	5,5940	n.a.	n.a.	11,555	23.2	n.a.	9,860	5.4
Theileriosis	0	/	/	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Trypanosomosis	0	/	/	n.a.	4,778	5.9	n.a.	n.a.	n.a.
Pigs									
Rabies	0	/	/	0	/	/	0	/	/
Leptospirosis	n.a.	n.a.	n.a.	n.a.	1,030	4.7	n.a.	1,247	2.8
PRRS***	0	/	/	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: http://www.oie.int (data accessed 6/2/2004)
Note: n.a. = data not available
       *Fatality = number of deaths from a specified cause in a specified time period /total number cases of the same disease (Dohoo, Martin and Stryhn 2003)
       **HS = haemorrhagic septicaemia,
       ***PRRS = Porcine reproductive and respiratory syndrome

Among the list B diseases, some come with a high case fatality rate, but in fact seldom occur in farm animals (e.g. anthrax, rabies). Other diseases combine a low outbreak frequency with a low case fatality rate (e.g. trypanosomosis). An exception is HS, which occurs quite regularly with varying fatality, sometimes reaching considerable rates (e.g. 23% case fatality in 2001) (Table 2).

Beside list A/B diseases, other diseases occur and may cause production losses or death in animals. It is not possible to give a complete picture of disease prevalence and disease-specific mortality in Vietnam here. Instead, Table 3 shows figures for overall livestock

mortality in Vietnam.[21] Mortality varies across species and years. For ruminants, mortality rates of between zero and 25% (cattle) to 27% (buffaloes) have been reported. For pigs, the reported rate of overall mortality is higher, at 5-37%. Anecdotal reports give much higher mortality rates for all kinds of livestock.

Regarding the data shown on animal disease occurrence and fatality in Table 1 and Table 2, it must be said that the OIE reporting system depends on submissions from national veterinary authorities; in Vietnam the relevant authority is the Department of Animal Health. The absence of a report does not necessarily indicate the absence of disease, but may be due to weaknesses in the national disease surveillance system or inadequate diagnostic laboratory systems, resulting in failure to diagnose the disease (Cameron, Baldock and Chamnanpood 1999).

Table 3   Mortality in large ruminants and pigs in North Vietnam

Species	Mortality reported	Details on data collection*	Source
Cattle	25%	Vaccination trial (against Pasteurellosis), n = 12, period approx. 3 month, Nghe An province	(Gibson 1998)
	7%	Vaccination trial (control group), n = 194, period approx. 3 month, Nghe An province	(Gibson 1998)
	0%	Baseline survey, n = 40, period 12 months, Lang Son province	(SVSV 2000)
Buffaloes	27%	Baseline survey, n = 30, period approx. 3 month, Nghe An province	(Gibson 1998)
	4%	Baseline survey, n = 47, period 12 months, Lang Son province	(SVSV 2000)
Large ruminants	7%	Baseline survey, n = 138, period 5 years, Son La province	(Lemke et al. 2005)
Pigs	34%	Vaccination trial (against CSF + Pasteurellosis), n = 32, period approx. 1.5 month, Nghe An province	(Gibson 1998)
	26%	Vaccination trial (control group), n = 256, period approx. 1.5 month, Nghe An province	(Gibson 1998)
	5%	Baseline survey, n = 60, period 12 months, Lang Son province	(SVSV 2000)
	19%	Baseline survey, n = 1227, period 12 month, Son La province	(Lemke et al. 2005)
	21%	Baseline survey, n = 1196, period 12 month, Son La province	(Lemke et al. 2005)

Note: * n refers to number of observed animals; period refers to observation period

Besides the weaknesses in the animal disease surveillance systems discussed above, leading to poor reliability of epidemiological data, it is assumed that in fact more data on animal diseases have been recorded with a greater accuracy than is known to the public. Again, an example is the outbreak of highly pathogenic avian influenza (AI) in 2003/04: development aid projects working in the area reported outbreaks earlier and in greater number than was reported in the Vietnamese state media and confirmed by local authorities. When Vietnam declared itself finally free of AI by the end of March 2004, FAO and WHO repeatedly voiced concerns regarding Vietnam's information policy on and openness regarding the outbreak (www.promedmail.org, a program of the International Society for Infectious Diseases, postings e.g. on 30/3/2004).

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[21] Mortality = number of deaths from a specified cause in a specified time period/total population at risk (Dohoo, Martin, and Stryhn 2003).

One reason for underreporting of animal diseases may lie in the strong export orientation of Vietnam. Meat exports from Vietnam are still insignificant and hampered, among other things, by having a veterinary sanitary status that is unacceptable for most importers (Barwinek 2002). Countries free from major diseases tend to ban livestock imports from areas affected by animal diseases, with a focus on the OIE list A diseases. The desire to gain access to export markets is the driving force behind many animal disease eradication efforts, but possibly also behind the attempt to veil the actual epidemiological situation. Meeting the requirements for a country to enter export markets is costly (implementation of Sanitary and Phytosanitary measures (SPS).[22] National export-oriented disease control, meanwhile, might not necessarily benefit the poor (Otte, Nugent and McLeod 2004). Whether or not this consideration influences the Vietnamese way of handling epidemiological information remains hypothetical, however. Vietnam hopes to become a full WTO member by 2005 (Barwinek 2002).

4.2 Extension service

Before 1986, innovations and improvements in agriculture were disseminated via the Vietnamese cooperative and state farm system. As a result of *Doi Moi*, most cooperative/state farms were closed at the end of the 1980s or reorganized into self-managed cooperatives independent of the state (Landon-Lane and Thao 2001; Sabio and Ibus 1994). In 1993, Decree 13 'For establishment of a national agricultural extension network from central to local levels and encouragement of volunteer institutions for agricultural extension' established the legal basis for closure of the gap in the extension system. While today agricultural support services are in a state of transition for both public and private suppliers, public suppliers still dominate the field (Landon-Lane and Thao 2001).

The agricultural extension system is managed by the Department of Agriculture and Forestry Extension (under MARD) at the national level, and by the Agricultural Extension Centers (under the Departments of Agriculture and Rural Development DARD) at the provincial level. Subordinate structures include agricultural extension stations at district level, basic agricultural extension units at commune level and smaller structures like extension clubs at village level (Nham and Giang 2002). However, at district level and below, both the degree and the manner of implementation of extension structures vary widely between the provinces (Sabio and Ibus 1994; Siem, Nam and Hung 1997). It has been estimated that only 5-10% of all Vietnamese farmers have access to extension services (Eklöf 1995; SVSV 1998). Since then, the public extension system has gradually expanded. However in 2001, 20% of all districts were still without extension structures. Agricultural extension is predominately crop-oriented (Landon-Lane and Thao 2001). In 1999, 22.6% of the state budget for extension was spent on husbandry; the biggest share of the budget went into cropping (42.4%), the remaining budget spent on forestry, aquaculture, VAC system promotion,[23] development of the extension system, and information and training (MARD 1999). Anecdotally, extension services have been called "breed-distribution services" focusing on the provision of crop cultivars or − mostly exotic − animal breeds (MARD 1999; Siem, Nam and Hung 1997).

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[22] The Uruguay Round under the auspices of the WTO started an era of agricultural trade liberalization affecting both developed and developing countries. The SPS Agreement in 1995 aims to provide a framework for protecting human, animal, and plant health and life, while preventing unjustifiable barriers to trade. Countries are allowed to establish their preferred level of SPS protection, but the WTO convenes a panel to assess whether the measure conforms to the provisions of the Agreement. Developing countries sometimes believe that the reason they are unable to gain access to developed country markets is more due to restrictions arising out of consumer preferences/concerns than to justified SPS controls, which is difficult to disprove since the risk assessment process inside the SPS Agreement is not fully established (Otte, Nugent and McLeod 2004).

[23] VAC = vuon (Vn.)/garden, ao (Vn.)/fish pond, chuong (Vn.)/stable; abbreviation for one type of integrated production system.

Regarding the households covered by this research, as much as 50% of the total sample receives extension services related to animal husbandry.[24] Due to the great variation in extension services between the different districts and the sampling procedure of the two surveys, however, it is not certain that this figure is representative for all northern areas or even the whole country.

Extension services are intended to self-finance from users' fees with some additional budgets from the province and state. However, the budget allocated to the extension services is far from sufficient, and most farmers cannot afford to pay for extension service. Thus, extension services are chronically under-funded (SVSV 1998; Landon-Lane and Thao 2001). Extension services from private companies come with the risk that extension focuses on financially strong farmers.

The extension service is organized in top-down manner (Nham and Giang 2002). At the provincial level, DARD, together with district authorities and district extension staff, will select communes for implementation of extension measures, and commune authorities will then recommend farmers for participation in extension courses (Nho and Tung 2001). Extension topics are mainly communicated through lectures, and interactive teaching is not conducted. Extension material is severely limited in both quantity and quality. Extension often focuses on people who have good relations with the authorities, and farmers without such relations, indigenous people or poor farmers tend to be excluded. Mass media play an important role in disseminating extension topics. Private suppliers, state farms, drug or feed shops and mass organizations supply limited extension services in addition to the above (Landon-Lane and Thao 2001).

With a focus on the mountainous provinces, there is a serious shortage of extension staff and especially of extension officers experienced in working with ethnic minority communities, and possessing knowledge of their farming systems, society and culture, or even able to speak their languages. Furthermore, the mountain provinces suffer more than other provinces from an inadequate extension budget allocation (Siem, Nam and Hung 1997). National development approaches for the mountainous regions implemented so far have mostly attempted to apply lowland models and followed top-down planning approaches, ignoring local conditions and local knowledge, be it concerning agriculture, agricultural extension or other fields (Rambo 1997; van de Walle and Gunewardena 2001; World Bank and DFID 1999).

5   Livestock insurance schemes in Vietnam

This research aimed at assessing the demand for livestock insurance among farmers in two provinces in North Vietnam (Bac Kan, Son La), as well as factors influencing that demand. Due to data availability and the quality of the surveys conducted, only large ruminants (cattle, buffalos) and pigs were considered in the analysis.

5.1   Demand

Demand for livestock insurance was found to be affected by different socio-economic factors. The following section discusses the most important differences between households that demand and do not demand livestock insurance.

Overall, 77% of all households in the sample (n = 322) demand livestock insurance. 76% of the households in the sample keep large ruminants (buffaloes or cattle). Over 57% of all households demand livestock insurance for large ruminants and 75% of households keeping

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[24] Since 2002, subproject D2 has offered animal husbandry extension services on selected issues concerning pig raising for farmers participating in the project. The figure mentioned above relates only to the state-owned extension service.

large ruminants demand livestock insurance for them. If we consider households that keep only large ruminants and no pigs, this figure increases to 80%. 73% of all households in the sample keep pigs and 54% households with pigs demand livestock insurance for pigs. For households that keep only pigs and no large ruminants, the share of households demanding livestock insurance increases to 59%. However, as there is a bias in the sample towards pig-keeping households, these numbers may be overestimated if we consider the total population of Northern Vietnam.

5.1.1 Livestock insurance for large ruminants

Households that demand livestock insurance for large ruminants earn significantly less cash income than households where there is no demand, indicating that the latter may be more capable of self-financing losses than the first. Moreover, insurance demanders dwell in remoter areas (see Table 4). Therefore, it is reasonable to assume that households that demand livestock insurance for large ruminants are poorer than those who do not. The risk-averse behavior of the rural poor is well known.

Households demanding insurance for ruminants have bigger paddy plots than households where there is no demand, hinting at the importance of large ruminants for draught power on paddy fields. One surprising result is that households demanding insurance for large ruminants tend to have fewer animal losses. This would be a good start-up position for an insurance company offering an insurance policy. One explanation for this may be that households that do not demand insurance have set their production focus differently, e.g. off-farm or pig production, and thus care less about their cattle or buffaloes. Rural households in Vietnam are supposed to receive compensation for loss of large ruminants in certain cases, e.g. foot-and-mouth disease. However, it is reported that such compensation is paid out arbitrarily, leaving many farmers without any compensation. Farmers who did not receive compensation are very likely to reject a livestock insurance scheme, as they are likely to assume that they will not receive any indemnity in the event of an animal's death.[25]

Table 4   Characteristics of households keeping large ruminants and demanding livestock insurance (t-test of means)

Variable	Demanding insurance		Mean	Standard deviation	T-Test
Cash revenue/HH/year total in VND	No	(N=58)	12.7 mn	18.9 mn	2.091**
	Yes	(N=177)	7.4 mn	7.5 mn	
Distance to district capital in km	No	(N=58)	8.4 km	6.1 km	-2.946***
	Yes	(N=177)	11.2 km	7.4 km	
Area of paddy rice	No	(N=58)	1,462 m²	1,814 m²	-2.127**
	Yes	(N=176)	2,047 m²	1,817 m²	
Loss of buffaloes, cattle/HH/year in VND	No	(N=58)	378,621	804,495	2.604**
	Yes	(N=177)	90,415	438,679	

Note: N is different due to missing values and sub-samples. HH = household
     * Significant at 10% level, ** significant 5% level, *** significant at 1% level.
     The following variables were tested but did not show significant results: wealth group, cash income from animal production, percentage of livestock production from total cash revenue, numbers of market visits per month, years of schooling of household head and wife, total farm size with and without forest land, animal loss per animal kept, number of animals, veterinary costs, veterinary costs per animal, fodder costs, fodder cost per animal, total costs and total costs per animal.

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[25] Anecdotal evidence shows that farmers believe that an insurance scheme would be certain to have government involvement. Despite the negative experience of some farmers with compensation payments in general, private companies have a very bad image in Vietnam and many farmers stated that they would only take out insurance if the government were involved in the scheme.

Households that receive an extension service for animal husbandry exhibit more frequent demand for insurance for large ruminants. This could indicate that extension increases awareness of certain animal diseases (Table 5).

Table 5   Extension services for households demanding livestock insurance for large ruminants (Chi-square test)

		Demanding insurance		Chi-square	Sig.
		No	Yes		
Extension service for animal husbandry	No	37	37	12.884	0.000
	Yes	20	109		

Note: * Because of missing values, N can vary slightly.
The following variables were tested but did not show significant results: affiliation to ethnic minority and sex.

5.1.2   *Livestock insurance for pigs*

Households demanding livestock insurance produce pigs on a more intensive scale, as their production costs in total and per pig are significantly higher (Table 6). Interestingly, high fodder expenses are positively correlated to demand for insurance for pigs, but veterinary expenses are not. This may be explained by the statement made by many farmers: "I do not need insurance because I vaccinate my animals". As farmers who vaccinate their pigs are apparently more reluctant to insure their animals than the others, the insurers face a dilemma: those that vaccinate are a better insurance risk for them, but they may not readily participate in an insurance scheme, while those who do not vaccinate are a worse insurance risk but more likely to participate. The insurers must consider this behavior when pricing their premia. Otherwise, the insurers must be careful not to end up with bad insurance risks based on a selection policy that gives rise to adverse selection criteria.

Table 6   Characteristics of households keeping pigs and demanding livestock insurance (t-test of means)

Variable	Demanding insurance		Mean	Standard deviation	T-Test
Years of schooling of head's wife	No	(N=99)	3.7	3.4	-2.348**
	Yes	(N=121)	4.8	3.3	
Fodder cost/pig/HH/year in VND	No	(N=103)	253,000	397,000	-2.334**
	Yes	(N=125)	464,000	912,000	
Fodder cost/pig/HH/year in VND	No	(N=103)	29,800	45,800	-1.826*
	Yes	(N=125)	46,400	88,200	
Total (vet + fodder) cost/HH/year in VND	No	(N=103)	265,000	400,000	-2.409**
	Yes	(N=124)	486,000	924,000	
Total (vet + fodder) cost/pig/HH/year in VND	No	(N=102)	31,700	46,200	-1.989**
	Yes	(N=124)	50,200	31,700	

Note: N is different due to missing values and sub-samples.
 * Significant at 10% level, ** significant 5% level, *** significant at 1% level.
The following variables were tested but did not show significant results: wealth group, cash revenue total, cash revenue from livestock production, percentage of livestock production from total cash revenue, market visits per month, distance to district capital, total farm size with forest land, farm size without forest land, paddy rice area, loss of pigs in VND and per animals kept, years of schooling of household head, numbers of pigs, and veterinary cost total and per pig.

The wives of household heads in households that demand insurance for pigs are significantly better educated. Raising pigs is usually done by the female members of the household.

Therefore, more educated women might have a better understanding of the concept of insurance and might have fewer inhibitions about the formal character of such an insurance scheme.

As expected, households that have access to extension services related to animal husbandry demand insurance for pigs with significantly greater frequency. As with large ruminants, this could indicate that extension increases awareness of certain animal diseases (Table 7). It could also be explained by the fact that animal extension is likely to promote more intensive production. Therefore, insurance may be more attractive for these households as they invest more in their pigs. This finding is also supported by the analysis presented in Table 6.

Table 7   Extension services for households demanding livestock insurance for pigs (Chi-square test)

		Demanding insurance		Chi-square	Sig.
		No	Yes		
Extension service for animal husbandry	No	59	55	4.720	0.030
	Yes	39	66		
Extension service for animal husbandry or from D2	No	51	43	6.020	0.014
	Yes	47	78		

Note: * Because of missing values, N can vary slightly.
**   ** The subproject D2 'Efficiency of smallholder animal husbandry (Vietnam)' offers extension services on selected issues relating to pig raising for farmers participating in the project.
**   The following variables were tested but did not show significant results: extension general and affiliation to ethnic minority.

5.1.3   Demand for credit in combination with livestock insurance (CA)

Utility is a measure of relative desirability or worth. When computing utilities using logit, every attribute level is assigned a utility (also referred to as part-worth). The higher the utility, the more desirable the attribute level. The relative attractiveness of a concept can be assessed by adding up the utilities for its component attribute levels (total utility). Utilities cannot be compared directly between different attributes or between different market segments. Therefore, the relative importance of each attribute is calculated to enable comparisons between attributes.[26]

Cohen and Sebstad (1999) state that, in general, the rural population has a particularly pronounced desire to ensure debt-financed investments. However, empirical research in Northern Vietnam has shown that the most important credit attribute is still the interest rate. This strong focus on interest rates may be explained by the fact that rural Vietnam has gone through a decade of continuous reductions in real interest rates and a history of public announcements on the importance of low interest rates for rural development and improving rural living. Nevertheless, farmers are willing to pay an extra fee for special services, e.g. livestock insurance (Dufhues, Heidhues and Buchenrieder 2004).[27]

In Table 8, households are classified by their investment plans for the hypothetical credit product offered during the Conjoint Analysis interviews (for details on the concept and results of the Conjoint Analysis see (Dufhues et al. 2003) and (Dufhues, Heidhues and Buchenrieder

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[26] The relative importance describes the weight of each attribute within the purchasing decision relating to a service by referring to the difference between the highest and lowest part-worth utility of each attribute level.
[27] The attribute 'interest rate' has been excluded from further analysis, as the level '0.5% interest rate/month' was chosen in 100% of the cases.

2004).[28] Two categories were created: 1. loan purpose only for large ruminants and not for pigs, and 2. loan purpose only for pigs and not for large ruminants.[29]

Table 8   Attractiveness of livestock insurance in combination with credit - Logit estimation of average utility values for credit attributes, by investment purpose[1]

	Planed investment: ruminants only (N = 149)		Planed investment: pigs only (N = 55)		All[2] (N = 322)	
	Utility value	t-value	Utility value	t-value	Utility value	t-value
Livestock insurance						
Yes (5,000 VND per month and animal)	2.297	6.780***	0.997	4.669***	1.418	10.840***
No	-2.297	-6.780***	-0.997	-4.669***	-1.418	-10.840***
Relative importance in %		21%		8%		19%
Disbursal time						
Seven days	1.556	5.925***	7.796	0.157	2.058	8.038***
60 days	-1.556	-5.925***	-7.796	-0.157	-2.058	-8.038***
Relative importance in %		15%		60%		27%
Lending scheme						
Group lending	-1.635	-4.408***	-0.997	-2.735***	-1.191	-6.426***
Individual lending	1.635	4.408***	0.997	2.735***	1.191	6.426***
Relative importance in %		15%		8%		16%
Collateral requirement						
Land use rights	2.093	4.261***	-0.324	-0.833	1.097	5.998***
Durable consumer goods	-4.217	-5.143***	0.743	1.014	-1.988	-6.146***
No collateral	2.123	3.749***	-0.419	-0.901	0.891	3.879***
Relative importance in %		30%		4%		20%
Location of credit negotiation, disbursal						
District	-2.181	-4.342***	0.324	0.833	-1.151	-5.910***
Commune	0.219	0.443***	-2.736	-2.894***	-0.554	-1.891*
Village	1.962	5.381***	2.412	3.467***	1.705	7.494***
Relative importance in %		19%		20%		19%
None option	/	/	/	/	3.060	8.445***
Percentage of households choosing 'none' option		/		/		6.83%
Chi-square		528.164		146.354		892.662

Note: *Significant at 10% level. **Significant at 5% level. *** Significant at 1% level.
[1] Due to the small sample size or little variance, the default settings did not yield interpretable results for all attributes or the regression model did not converge. Therefore, the default settings were changed to a smaller step size between the iterations: 0.1 instead of one, and from 20 to a maximum of 150 iterations. The attribute 'interest rate' was excluded from the analysis, as the level '0.5% interest rate/month' was chosen in 100% of the cases.
[2] This category consists of the categories 'ruminants only' and 'pigs only', plus all other planned loan purposes, for instance households wanting to invest in pigs and ruminants or tree production.

Table 8 shows that, in case of investment into large ruminants, the attribute 'livestock insurance' is the third most important decision criteria within the household's decision matrix, whether or not to take credit ('relative importance' of 21%) after 'interest rate' and 'collateral requirement'. This is in contrast to households that want to invest only in pigs. Here, the attribute 'livestock insurance', with a 'relative importance' of eight percent, does not play an important role at all. This difference may be explained by the fact that investing in large

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[28] The different attributes and their levels are explained in more detail in Table 13 in the Annex.
[29] It is assumed that preferences concerning livestock insurance in combination with credit differ for different loan purposes. When more than one loan purpose is envisaged, it is no longer possible to distinguish the influence of the purpose on the preferences.

ruminants is a long-term investment and thus carries more risks over time than investment in pig production; in addition, the value per adult ruminant, at around 3.5 million VND, is roughly four times higher than for an adult pig.

5.2 Supply

The following section introduces different livestock insurance schemes that have existed to date in Vietnam, starting with a credit-based cattle and pig insurance scheme and then introducing two insurance companies operating in Vietnam and offering general livestock insurance.

5.2.1 Cattle livestock insurance scheme of the Moc Chau Dairy Cattle Enterprise[30]

The Moc Chau Dairy Cattle Enterprise is under the direct control of the Ministry of Agriculture and Rural Development and the Cattle Husbandry Company of Vietnam, and is therefore considered a state-owned enterprise. Its main activities are the supply of breeding cows and dairy cattle to contract farmers and the processing and trading of dairy products. The main product of the enterprise is pasteurized milk. On a smaller scale, condensed milk, cheese and yoghurt are also produced. The processing plant operates at 80% of its capacity. 50% of the products are delivered to Hanoi, while the rest is sold locally. In 2002, 429 farmers were members of the Dairy Cattle Enterprise, 316 of them providing milk on a permanent basis. Moc Chau is considered a favorable location for dairy cattle keeping in North Vietnam due to its relatively cool and dry climate. Today, the seventh generation of imported Black-and-White cattle is kept in Moc Chau and the breed is considered well adapted to local conditions. However, the established keeping system would in fact suggest keeping cattle genotypes that are better adapted to the hot and humid climate, as well as to the limited nutritional base, than Black-and-White cattle, or even higher yielding and more demanding Holstein Friesian cows. Thus, the enterprise carries a considerable production risk due to the selection of the cattle breed kept.

The enterprise is heavily promoted by the state. In the near future, it will play a special role in distribution programs of crossbreed dairy cattle (Holstein Friesian × (Red Sindhi × Yellow cattle)) for resettled farmers (in connection with the hydro power plant/dam construction in Muong La/Son La), and in general it is important as point of origin for extending dairy cattle keeping and milk production in North Vietnam.

The Dairy Cattle Enterprise implemented an initial livestock insurance scheme (LIS) in 1993 in cooperation with the state-owned insurance company Bao Viet. However, the scheme was terminated by the Cattle Enterprise in 1995, since the procedure to compensate farmers for losses was very 'complex', the indemnity was low, and the premium was high. However, statements from farmers paint a different picture (Figure 2). According to the statement presented in Figure 2, it is reasonable to assume that moral hazard and adverse selection went out of control and this resulted in the collapse of the scheme.

After the first LIS was terminated, however, it was perceived that an insurance scheme was still necessary. As Mr. Chien (the director) puts it, "Farmers who want to keep cattle must have capital. It takes a long time to get the required capital. Disasters may happen. There is a need for an insurance scheme." This statement shows the preference for credit in comparison to insurance. Insurance operations are seen rather as a means of facilitating access to loans and protecting one's credit portfolio.

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[30] The following section is based on an interview with the director of the Dairy Cattle Enterprise, Mr. Tran Cong Chien, and the technician, Mr. Minh, on August 8, 2002, and on interviews with the director on June 16 and 17, 2003, in Moc Chau. Information was also collected from three farmers, Mr. Duc, Mr. Nha, and Mr. Toan on June 17, 2003, in Moc Chau.

Figure 2   Farmers' experience with the first livestock insurance scheme of the Moc Chau Dairy Cattle Enterprise

"I took part in the first LIS from 1992/93. In that first period, I was compensated in three cases (two cows did not get pregnant and were sold for slaughter; one cow died). At that time, the Dairy Cattle Enterprise was an agent of Bao Viet. One person from the Enterprise and one from Bao Viet came to check the cases and to identify the reasons of death. They wrote a report, which was approved later on. An indemnity of 0.7 million VND/cow was paid after more than one month. The premium at that time was 100,000 VND/year/cow. The annual premium was calculated depending on the value of the cow and was equivalent to 10% of the animal's value."

"The regulations of Bao Viet for the first insurance scheme were not very strict, so the farmers were able to benefit a great deal from the LIS. For instance, farmers paid the premium only for old and sick animals. The experience of farmers with cattle production was also very limited, and farmers had little capital for investing in cattle keeping. As a result, output from cattle production was low and animal losses were high. In the end, the Enterprise could no longer afford the LIS and gave it up"

Source: Own data

A second, modified LIS has been implemented by the Enterprise since 2001 onwards. Farmers who finance their cows using a loan from the Enterprise are obliged to participate, while the few farmers who keep self-financed cows can participate on a voluntary basis. The insurance contract starts with the first year of keeping the cow and is then extended annually on the basis of mutual agreement.[31] About 97% of all cattle-keeping farmers in the area take part in the LIS.

The insurance product: The LIS regulations distinguish between 'normal' dairy cattle and dairy cattle in the 'Cow Breeding Program' (Table 9). The latter includes newly imported, high-value cattle in a sub-program financed by foreign donors. For dairy cattle in the 'Cow Breeding Program', the LIS is compulsory as these cows are all financed by loans. The staff of the Dairy Cattle Enterprise promote the LIS, trying to attract new clients outside the program.

In 2001 and 2002, a total of 51 claims relating to cows and heifers were brought forward by the farmers. However, according to the director, the claims included one heifer, 20 cows that had died (due to diseases treated without effect) and 30 cows sold for slaughter (due to accidents/broken legs). The death of cows is compensated regardless of the type of disease. Accidents are not compensated in cases where farmers keep the cows in areas not approved by the Enterprise (e.g. certain upland areas). In 2002, however, only two claims were rejected. One is inclined to assume that the normal replacement of an old cow (due to decreasing milk yield) is also compensated, although this was not stated explicitly. This would mean that farmers receive compensation for each cow. As the Dairy Enterprise is not running at full capacity, the insurance scheme may be used as a hidden subsidy to attract more farmers to rear cattle on a contract basis with the Enterprise.

The premium is collected once per year in cash, and it is calculated on the basis of the following figures: a) mortality of heifers: 2% p.a.; b) sale of heifers for slaughter: 3% p.a.; c) mortality of cows: 5% p.a.; and d) sale of cows for slaughter: 7% p.a. Additional explanations given by the director regarding the calculation of the premia were not clear. It seems that premia are based on the age of an animal and the estimated mortality at that age, but the figures are contradictory (same premium for 3 to 12 year age interval). The director further explained that the LIS had just started. There are therefore few data available as a basis for calculation (this is not convincing, since the production figures of the enterprise – value of the

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[31] The three farmers interviewed kept on their insurance contract even after repayment of the principal.

cow, longevity, and mortality – should be available on a long-term basis since the 1970s at least for Black-and-White cattle).

The new insurance scheme has been able to reduce the time required for approval of the claim, due to integration of the LIS into the Enterprise/its extension system. Thus, the employee checking the final claim already knows the case (e.g. if a cow has been sick over a certain period of time). The true reason for death/replacement is therefore easier to detect (Figure 3). Nevertheless, this can also have severe drawbacks for the impact of extension. The relationship between extension worker and farmer may be disrupted when the extension worker refuses a claim. So far, this has happed in only about 5% of all claims. However, this low figure may also be an indication that extension workers might turn a blind eye on the claim to maintain good relations with the farmers.

Table 9   Premia and indemnities under the LIS for dairy cattle in Moc Chau

	'Normal' dairy cattle	Cattle in the 'Cow breeding program'
Cow:		
Premium cow (3 to 12 years age) (VND/year)	100,000	400,000
Indemnity cow, in event of death (VND/year)*	1,200,000	4,000,000
Indemnity cow, sale for slaughter (VND)**	1,000,000	3,000,000
Heifer:		
Premium, > 5 month of age to 3 years (VND/year)***	70,000	250,000
Indemnity, in event of death (VND)*	900,000	2,500,000
Indemnity, sale for slaughter (VND)**	500,000	1,500,000

Source: Own data
Note: *Plus approximately two million VND from the butcher for a cow carcass.
         ** Plus approximately four million VND from the butcher for a cow still alive.
         *** There is no insurance for young stock ≤ five month of age, but the enterprise intends to sell insurance for this age group in the near future.

Figure 3   Claims procedure under the livestock insurance scheme of the Moc Chau Dairy Cattle Enterprise

A) Sale for slaughter:	B) In the event of death:
1. The farmer calls the vet to check the condition of the cow.	1. The farmer makes a claim (i.e. reports the death of the cow) to the enterprise.
2. The vet will check whether the cow can be treated or if treatment will be ineffective.	2. One of the agricultural engineers checks the claim (post-mortem examination).
3. The vet gives approval to sell the cow for slaughter.	3. After approval and a period of 15 days, compensation is paid (total time before indemnity is paid may be up to one month).
4. The farmer follows procedure B) – but no post-mortem examination!	

Source: Own data

Farmers buying the LIS get their animals vaccinated twice per year, and free of charge, against pasteurellosis, anthrax, FMD and tuberculosis. Annual vaccination costs are covered partly by the government and partly by the Enterprise. Veterinary treatment is paid for by the farmers and is not subsidized. Fees and mode of payment are regulated by the Enterprise; the veterinarian is an employee of the Enterprise.

Organization, administration, financial matters: A 'managing group' of five people is managing/administrating the LIS, consisting of staff members from the technical, organizational and financial departments of the Enterprise. The 'managing group' is responsible for the general and financial management of the LIS. One member of the group is

a veterinarian. Further support comes from eleven agricultural engineers working at commune level. It seems that each of these persons is responsible for 30 to 60 farms, in the fields of pasture management, feeding, and other aspects of dairy husbandry. They 'identify the critical points' and seem to be something like extension officers and insurance agents.

To date, the Enterprise has received no technical support from a professional insurer. However, the Enterprise has taken up contact with the Son La Insurance Company. The Enterprise has no reinsurance. If the total indemnity to be paid on a certain occasion/loss is higher than the available capital from premium payments (e.g. in case of an epidemic), the deficit will have to be covered out of capital from other branches of the enterprise (e.g. revenue from selling processed milk, heifers or breeding cattle, feed; or other services) or indirectly from government supplies.

5.2.2 GRET and its livestock support system

GRET (Groupe de Recherche et d'Échanges Technologiques) has been active in Vietnam since 1988. Since 1996, GRET has tested the creation of various kinds of farmers groups and associations aimed at solving technical and market challenges that individual farmers cannot deal with alone. As of June 2002, over 200 farmers groups of different forms had been created in Phu Tho and Vinh Phuc provinces in North Vietnam, including, among others, veterinary groups and pig breeder cooperative groups (Thinh and Geay 2002).

The livestock support system: The basic principles of the livestock support system are represented by a schematic view in Figure 4. Livestock husbandry, especially pig keeping, is supported by a combination of a financial support/funding system, establishment of 'medicine cabinet' farmers groups, introduction of improved management measures (including introduction of new breeds) and by training measures. Livestock insurance is integrated into the whole approach and can therefore not be described separately.

Figure 4   Rationale behind the term 'medicine cabinet' – schematic view
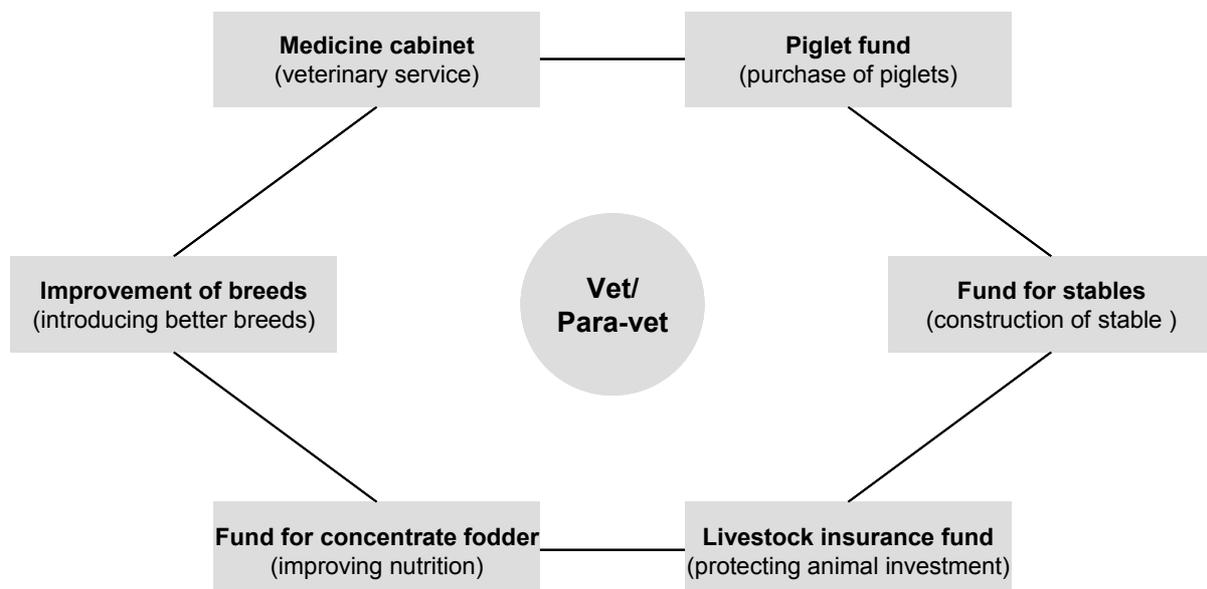
Source: (Lamballe 2003)

Medicine cabinets: The strong negative effect of pig diseases and losses on pig production, especially in poor households, poorly developed or non-existent local veterinary services, and lack of extension measures for pig/livestock production were the main reasons for the establishment of the medicine cabinets. Members of the farmers' union (FA) contribute a

certain amount of money to establish a medicine cabinet under the technical management of a vet or para-vet.[32] The veterinary staff play a major role by ensuring communication between farmers and project staff, managing the medicine cabinet (sale of veterinary medicines, vaccination, treatment of animals), recording data, collecting money, managing funds for small credits, and managing the insurance schemes at household level. Nevertheless, the management of medicine cabinets is always under the primary control of the commune authorities. Locally organized structures also carry a risk: for example, if decision makers of the insurance fund are not well trained or informed about the insurance scheme, or if ownership is weak, they may make decisions endangering the sustainability of the scheme, as evidence from Nepal has shown (CMF 2000a).

As of November 1998, there were 41 medicine cabinets with 2,536 members in the districts of Thanh Ba, Ha Hoa (Phu Tho province) and Tam Duong (Vinh Phuc province). Livestock insurance was implemented in some of the communes. By July 2001, 928 farm households had taken up this scheme, insuring a total of 1,275 pigs (Dung 2002).

The livestock insurance fund: The livestock insurance fund was initially subsidized by GRET at a rate of 50% (the other 50% was contributed by the farmers). Now, 100% of the capital is contributed by the farmers. The insurance fund is used to support piglet treatment, but especially to compensate for piglet losses. It helps the households to reduce production risks. Livestock insurance is a new activity, introduced for pigs from weaning (age two months) to sale (six-month fattening period = age eight months). As the insurance fund is part of the medicine cabinet, it is organized and controlled by the vet and the commune officials. The mode of operation of the piglet insurance scheme is described in Figure 5.

Figure 5   **The mode of operation of the piglet insurance scheme**

- Each farmer obtaining a credit from the piglet fund has to contribute 15,000 VND into the insurance fund. Twenty households with 20 piglets (the usual group size) thus amount to 300,000 VND.
- The vets use 7,000 to 8,000 VND from the piglet fund to finance vaccination of piglets against swine fever, pasteurellosis, leptospirosis, and salmonellosis (in affected areas).
- The insurance takes effect on day 21 after vaccination; death in the first 20 days is not fully compensated (only 50% of the value of the pig).
- Pigs will be insured for six months (one credit cycle).
- If one of the diseases occurs against which pigs have been vaccinated, all treatment costs are refunded. If another disease occurs, the insurance fund will refund 50% of treatment costs.
- If a pig dies due to one of the four diseases mentioned above, the farmer receives ten times the value of the premium (i.e. 150,000 VND/pig). The death must be certified by the vet. If a pig dies for another reason (except poor management), the farmer receives five times the value of the premium (75,000 VND/pig). 150,000 VND is sufficient to buy another piglet.
- If a pig dies after the first month of the credit cycle, the credit repayment can be postponed.
- Money from the insurance fund not used up in one cycle will be used in the following cycle. In that cycle, the premium remains the same for farmers. Premia can be reduced when sufficient capital has accumulated over a longer period.
- In the event of the compensation payments to farmers being higher than the collected premia, the solutions are a) to use capital from the previous cycle, b) use advance payments from the project, which will be repaid by premia of the following cycle, or c) use funds from the medicine cabinets funds.
- No compensation is paid in the event of death of a pig without clarification of the cause, theft, sale or burying without clarification of the reasons, and any loss not approved by vets or project staff. Likewise, no compensation is paid if death is due to poor management (e.g. poisoning by cassava or fertilizer, poor feeding, etc.), or in the case of death of pigs treated by a non-project vet. Pigs weighing less than eight kilograms, non-vaccinated pigs, lactating sows, pigs with chronic disease or malformation are excluded from the insurance scheme.

Source: (Lamballe 2003)

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[32] The FA gives further support on veterinary and other husbandry issues and supports a system of small credits to be invested in livestock.

The fund started to operate together with the fund for piglets (for poor households) within the medicine cabinet. Insurance is compulsory for all households financing piglets through the piglet fund to protect the capital of this fund. Households borrowing from the piglet fund are (according to the project requirements) poor by national standards, and it is assumed that they may not have the conditions for proper pig keeping. Poor households cannot invest in pig production due to scarce resources. This causes additional production risks, however, such as buying cheap piglets with a poor genetic background, without vaccination or deworming. In addition, poor households seldom invest in feed with a higher energy/protein content.

The livestock insurance fund also means safety for the para-vets and vets, many of whom have limited practical experience, because it assures them against the risk of not treating animals properly and thereby causing their death. However, this can result in moral hazard for vets supporting animal treatments that are performed quickly and badly. This again results in bigger losses for the insurance scheme, thus endangering its long-term sustainability. It also reduces the incentive for vets to obtain further training to improve their skills and performance.

Weak points can be summarized as follows:
- All calculations are based on an assumed mortality rate of 10%, which seems to be too low (see Table 3). Insurance premia need to be set high enough to cover future claims. Brown (2000a) states that when reasonable historical information is not available or where historical averages are no longer likely to reflect future losses, pricing should incorporate a sufficient margin of error to reflect the uncertainty in future claims. This seems not to be the case here.
- During the first and second cycles, the fund included 20 pigs. When the number of members/insured pigs increases, the quality of the vets' work may be negatively affected due to their non-veterinary related tasks.
- To date, no non-project farmers have joined the insurance fund, which may be an indication of the unattractiveness of the scheme.
- No money could be derived from the insurance fund to pay for the work of veterinary staff, which is a result of point one and may lead to decreasing performance of the vets and thereby increasing mortality of the pigs. Brown (2000a) argues that insurance premia should be set high enough to allow for the establishment of reserves. Reserves are funds set aside each year to protect the insurer against unexpectedly high claims. Obviously the premia are too low. The vets cannot even be paid, let alone establishing reserves.
- Until now, the medicine cabinet has not been expanded by additional veterinary staff and, up until now, no other vet has used the new insurance system (besides the medicine cabinets, where the system was introduced by the project).

5.2.3 BAOVIET[33]

The Vietnam Insurance Corporation, BAOVIET (formerly Vietnam Insurance Company), was established by a decision of the Prime Minister in 1964 and started operating on January 15, 1965, with its head office in Hanoi. After the reunification of the country in 1975, BAOVIET took over the business facilities of some insurance companies operating in the former South Vietnam, such as the South Vietnamese Assurance Company. Since 1980, BAOVIET has set up a nationwide network providing services throughout the country.

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[33] The following section is based on an interview with Mr. T.V. Cach, General Manager of the General Affairs & Legal Department of the Vietnam Insurance Corporation (BAOVIET) on October 21 2003, in Hanoi, Vietnam, and on the BAOVIET Annual Report 2002.

In 1982, BAOVIET launched a pilot livestock insurance scheme in three former provinces, which are currently divided into the following provinces: Ha Tay, Hoa Binh, Ha Nam, Nam Dinh, Ninh Binh and Thanh Hoa. BAOVIET was able to use the existing structures of the former cooperative system as agencies for its contracts. Through the support of the local officials of these cooperatives, it was possible to convince farmers of the advantages of livestock insurance. Furthermore, the local officials of the cooperatives supported BAOVIET by collecting the insurance premia from the farmers. This kept the transaction and marketing costs for BAOVIET low.

During the process of '*Doi Moi*', which started in 1986, policy and structural changes led to the restructuring of the whole agricultural sector. State farms and agricultural cooperatives were mostly split up into small-scale farms. Together with the collapse of the cooperatives, the established structures linking BAOVIET and the local authorities vanished. Thus, the full cost of selling insurance contracts and collecting premia had to be covered by BAOVIET and the demand for the insurance decreased, as BAOVIET raised the premia.

In 1998, the losses of BAOVIET's livestock insurance scheme increased drastically (indemnities that had to be paid to farmers were much higher than the sum of the premia collected). For this reason, although livestock insurance still exists, BAOVIET decreased its efforts to sell contracts and the importance of the livestock scheme for the company decreased further and further. Today, no livestock insurance contracts are active.

The main reasons for BAOVIET's losses were twofold: (1) after the collapse of its broad selling system, the pool of insured people became smaller and much riskier, as farmers with high production skills and less risky production methods dropped the insurance. This is a classic case of adverse selection from the point of view of BAOVIET. (2) The premia, previously calculated over a broad pool of clients, were not adjusted to the new situation, thus resulting in huge losses. Moreover, it was acknowledged that the agencies put in place after the breakdown possessed little knowledge of insurance performance and thus probably accepted more claims than was necessary.

In 1997/1998, BAOVIET, now located directly under the Ministry of Finance, made another attempt to offer agricultural insurance and signed a contract with ten provinces in the Red River and Mekong Delta to supply the farmers with crop insurance, especially for rice production. This insurance scheme did not succeed and was finally terminated two years later in 2000 because of massive losses (Dung 2002).

Nevertheless, a joint study by BAOVIET and FAO confirmed that insurance services, and in particular livestock insurance, are in high demand among the rural population. The director of BAOVIET states that the two most important preconditions for successful establishment of an insurance scheme in rural areas are the existence of a trustworthy organization acting as representative of the insurance scheme and guaranteeing the participation of farmers in rural areas, and the financial ability of the farmer to pay the premium.

5.2.4 Groupama[34]

Groupama is one of Europe's leading multi-line insurers and has specialized in agricultural insurance worldwide. In September 2002, Groupama started to offer livestock insurance in Vietnam and is currently working in 13 provinces of the Mekong Delta. For the future, the mainly agriculturally-oriented insurance company plans to extend its business to the center and north of Vietnam. Today, there are no livestock insurance companies working in the

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[34] The following section is based on interviews with Ms Nguyen Thi Bao Tran, leader of the Damage/Claims Department of Groupama, Mr. Nguyen Tri Thuc, Director of the Marketing Department of Groupama, and Ms Sophie Viard the Director of the Technical Department of Groupama at October 27 in Can Tho, Vietnam

north. Vietnam was chosen by Groupama as a test-market for Asia, which is considered to be the future market for Groupama, and the establishing of a foreign insurance company was easier than in other Asian countries, e.g. in China.[35] Furthermore, over 80% of the Vietnamese population is engaged in agriculture, so it offers a good market.

So far, there is a Groupama office in every one of the 13 provinces, each with one manager, one secretary, and up to ten agents responsible for selling the contracts to the clients. For each contract sold, the agents receive a commission, and the agent who sells 100 contracts will be given an extra bonus – a motorbike worth 30 million VND. All marketing and advertising is organized by the main office in Can Tho, which provides leaflets and other information material to the agents. In addition, seminars are held in the provinces, at which the agents try to establish direct contact with farmers and sell them insurance contracts. All in all, the whole information transfer is channeled through the agent to the clients and the main office in Can Tho respectively.

Farmers are the main target group, and since September 2002, Groupama has been able to win 2,600 clients, about 2,000 of whom are farmers in the livestock insurance scheme and another 600 are people with other insurances. Besides chickens, ducks, pigs, dairy and beef cattle, fish and shrimps, it is also possible to insure houses, machinery, liability, boats, as well as accidents. In case of livestock insurance, the loss of the animal due to accident and/or disease is insured against. Treatment of the animal is not covered. Both idiosyncratic and covariant risks (e.g. epidemics) are insured against. The main reasons for losses are diseases; fatal accidents seem to happen less frequently.

In August 2003, due to cheating by customers in the start-up phase and the poor quality of public veterinary services (see also section 4.1), Groupama set up its own team of veterinarians, who check the animals belonging to the farmer before a contract can be signed. The company's own veterinary service was thus established to control moral hazard among its clients. In order to fulfill the contract, the farmer has to follow a specific vaccination schedule, otherwise the insurance will expire. In the case of shrimp farming, technical equipment and water quality are also checked before the farmer can sign the contract. The company's own veterinary services will surely reduce the number of claims. However, it will also raise the operating costs of the company and probably reduce the demand for insurance as cheating is made more difficult. Nevertheless, this type of client, prone to moral hazard behavior, is better left out.

Groupama did not rely on data concerning animal mortality in Vietnam provided by official departments, which were considered unreliable. Instead, the premia were calculated based on mortality data collected during a survey carried out by Groupama itself. Within this survey, data on animal mortality were collected from vets in specific regions.[36]

The minimum premium per contract is 200,000 VND; the maximum premium is 500 million VND (if higher, Groupama has to check with its reinsurer).[37] The premia are calculated by a rate for the risks as well as the value of the animal. Table 10 and Table 11 give a rough overview of the different premia. The premia are collected in cash by the agent for each province. There are no subsidies from the government.

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[35] In the meantime, the China Insurance Regulatory Commission has granted a license to Groupama to conduct non-life insurance business in the area of Chengdu, Sichuan province.

[36] Vets are incorporated into the official hierarchy and thus are obliged to record all relevant data including data on animal mortality. Thus, every vet is collecting a small time series over the years. These time series plus the subjective view of the vets will most probably provide a much better view on animal mortalities in a specific region of Vietnam than the aggregated official data (see Section 4.1).

[37] In Vietnam, it's compulsory to have 20% of the premia reinsured with the Vietnamese Insurance Company (VINARE). Therefore, 20% of the premia are paid to VINARE and VINARE will take 20% of the claims. A second reinsurer of Groupama Vietnam is the mother company, Groupama in France.

Concerning the indemnity payment, the farmer has six hours to call Groupama after an animal has died. After that time-span, the Groupama agent responsible has another six hours to check the dead animal at the farm concerned. Payment will follow as quickly as possible (max. one month later).[38] Only a few cases were rejected. These cases occurred due to cheating by customers and damages that were excluded from the contract.

Table 10   Premia and indemnities of Groupama for pigs

	Contract duration	Premium	Indemnities
Piglets	Two months	66,000 VND/animal	12,000 VND/kg
Pigs for fattening	Five months	33,000 VND/animal	12,000 VND/kg
Sow and boar (group ≤20)	One year	63,000 VND/animal	800,000 per head or market price/kg
Sow and boar (group >20)	One year	42,000 VND/animal	800,000 per head or market price/kg

Source: Own data
Note: The maximum weight to be insured is 200kg. After checking of the carcass by Groupama it can be sold.

Table 11   Premia and indemnities of Groupama for cattle

	Dairy cattle	Beef cattle
Birth-6 months	165,000 VND/animal	110,000 VND/animal
6-18 months	187,000 VND/animal	82,500 VND/animal
18-30 months	220,000 VND/animal	110,000 VND/animal
> 30 months	264,000 VND/animal	165,000 VND/animal
Indemnity	25,000 VND/kg	20,000 VND/kg

Source: Own data
Note: The maximum age for dairy/beef cattle is ten years. The contract is signed for one year. After checking of the carcass by Groupama it can be sold.

From the beginning of their activities in Vietnam in September 2002 until the end of December 2002, Groupama had to provide compensation in 17 cases. The figure increased dramatically from January to October 2003, during which period 874 claims for damages were already submitted. It should be borne in mind here that the actual number of damages is even higher, as one contract often includes more than one animal, ultimately leading to a very high number of indemnities. The total amount of premia collected was two billion VND in 2003. In contrast, the total amount of indemnities was four billion VND. The director of the claims department explained these high losses as being due to the problems in the start-up phase of the company. Losses will probably be drastically reduced when new contracts, approved by the company's own veterinary service, will represent the majority of contracts.

6   Conclusions

Alderman and Paxson (1992) and Brown (2000b) state in general that the fact that the absence of insurance possibilities limits households' ability to reduce consumption fluctuations does not necessarily imply that the most effective intervention would be to set up insurance programs. Providing open access to savings and loans may be a preferable method for helping clients to manage risk. While formal credit coverage is immense, there is a vast unsatisfied demand among the rural population for accessible savings products (Dufhues 2003; Dufhues,

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[38] Standard claims-processing times for micro-property insurance have yet to be established; however, a standard of one to three weeks is likely to be a reasonable objective (Brown 2000a).

Heidhues and Buchenrieder 2004). Nevertheless, the literature as well as the authors' own data show that farmers have losses among their animals, hinting at the need for a risk-coping mechanism. As the size of the loss increases relative to a household's expected future income, credit products become increasingly ineffective risk-management tools. In addition, not all farmers have prompt access to credits to meet their demands, and thus credits as a 'risk-coping mechanism' are not necessarily available when required to compensate for animal losses (Dufhues et al. 2002). Similarly, savings products offer only partial protection against risks that cause large losses relative to household income. At this point, insurance becomes a more effective method of risk management (Brown and Churchill 1999). The stated demand for livestock insurance among farmers is high, encompassing 77% of all farmers in the sample underlying this research. However, the supply of insurance schemes in the market is sparse and relates mainly to small-scale schemes or very limited regions.

Although there is demand for insuring credit-financed livestock investments (particularly poorer households investing in cattle or buffaloes), and there are many advantages in offering (compulsory) livestock insurance for rural lending institutes in Vietnam (protecting poor clients from risk, protecting lender's loan portfolio, and earning additional income related to the loan portfolio), only sound and financially sustainable lenders should offer microinsurance services. The main rural lender in northern Vietnam (VBP) is financially not sustainable and is therefore not suitable for offering insurance products.[39] The VBARD, freed from policy lending and social objectives, might become financially sustainable in the near future and could expand its products to include livestock insurance (Dufhues 2003). Nevertheless, it is highly recommended to involve a professional insurer into this process by 'partnering'. The most successful partner would probably be a private or foreign insurance company with existing experience in agricultural insurance, as the state-owned company BAOVIET was not able to offer viable livestock insurance in the past.

The practice of selling carcasses to the butcher is still widespread in Northern Vietnam. On the one hand, the demand for every insurance scheme is negatively affected by this practice, as the potential loss for the farmer is much lower. The demand for insurance services would rise if this practice were effectively combated. On the other hand, offering livestock insurance schemes might reduce this practice as chances of selling live animals to the butcher increase due to previous controls by the insurance company's staff when a farmer make a claim on a animal that is still alive. Thus, the LIS could possibly contribute to improving meat quality and hygiene standards, but also to increasing farmers' income.

One problem plaguing all suppliers of livestock insurance in Vietnam is the limited availability and poor reliability of data concerning livestock mortality. Thus, all of the schemes investigated calculated their premia based on very limited data. This exposes the insurer to considerable risk of setting premia too low and thus endangering its financial sustainability. As long as no information is available on the real mortalities of farm animals, it is almost impossible to price an insurance product correctly. Conducting small surveys oneself (as was done by Groupama) may ease the problem, but this is not a full substitute for time-series data. Nevertheless, it is reasonable to assume that demand for the schemes will decrease drastically if premia reflecting the real mortality were charged.

While moral hazard and adverse selection seems to be under control within the investigated schemes through the implementation of a strong monitoring system, it is not clear whether the cost of monitoring can be covered without raising existing premia. In the theoretical section, some cost-reducing alternatives were suggested (e.g. area-based insurance schemes). Area-based insurance for animal production would insure against epidemics but not individual

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[39] The VBP was replaced by the Vietnam Bank for Social Policies, which will continue the policy of highly subsidized credits and will thus not be able to achieve financial sustainability (Dufhues 2003).

losses (e.g. accidents). Therefore, combining area-based insurance and insurance of individual risks would be the optimal solution. Moreover, a combination of traditional monitoring methods with group contracts (using peer pressure) and incentive techniques from MFIs seems to be most promising approach for reducing monitoring costs to a reasonable level: for instance, offering insurance to a group of people and reducing the premium after each year without a claim.

To reduce vulnerability, insurance should be complemented by efforts to increase savings, build assets, and maintain strong social networks. Here, the veterinary and extension system comes into play again. Some projects therefore combine insurance with extension and veterinary measures in order to tackle the problem from two sides, namely that of coping with risks once the animal is lost, and adaptation strategies (to prevent losses by sounder management of animal production). Nevertheless, these schemes easily lose their transparency (e.g. GRET) and usually have even more difficulties to cover their costs.

All schemes are still in an early phase of their development and it is to be expected that they will undergo radical redesigning, if they continue to exist. For instance, Groupama and the Dairy Cattle Enterprise also insure covariate risks such as animal epidemics. This, in combination with the unreliable data on animal mortality, expose the insurer to a very high financial risk. As Mosley (2001) puts it: "Many micro lending schemes which are now household names (e.g. Bank Rakyat Indonesia (BRI) units in Indonesia) only became viable through a drastic redesign halfway through the scheme's life, and it would be realistic to expect the same to be true of microinsurance."

At the moment there is no insurer in Vietnam offering an area-wide, sustainable animal insurance scheme. Farmers would probably not buy an insurance product with a premium reflecting the real mortality of domestic animals, the required reinsurance of the insurer and the monitoring costs.

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Annex

Table 12   Research areas and sample composition

Research project	Province	District	Commune	Village	Ethnic minority	No. of HHs per village	Selected HHs No.	Selected HHs %
F2	Ba Kan	Ba Be	Dia Linh	Pac Nghe 1	Tay	76	36	47
			Nghien Loan	Khau Nen	Nung/Hmong	36	19	53
			Xuan La	Thom Meo	Tay	84	43	51
				Khuoi Khi	Dao	40	20	50
F2	Son La	Yen Chau	Sap Vat	Sai	Thai	80	42	53
				Na Pa	Thai	64	33	52
				Dong	Thai	48	25	52
			Chieng Hac	Bo Kieng	Hmong	20	13	65
			Chieng Pan	Than	Kho Mu	38	20	53
				Tat Heo	Thai	16	9	56
D2	Son La	Son La Town	Chieng Coi	Ban Buon	Thai	75	17	23
			Chieng An	Ban Bo	Thai	205	16	8
		Mai Son	Hat Lot	Na Huong	Thai	105	16	15
				Bo Duoi	Thai	46	15	33
						Interviewed HHs in total:	324*	

Note: HH = household; * Later in the analysis the N number has been reduced due to missing values.

Table 13   Credit attributes and their levels

Attributes	Levels
1. Interest rate (percent/month)	*1) High (1.2%/month)* *2) Low (0.5%/month)*
2. Insurance of investment in livestock	*1) Insurance of livestock investment* (livestock that died due to accident or disease (buffaloes and pigs) will be replaced by their value at time of death; premium 5,000/month per animal) *2) No livestock insurance*
3. Disbursal time of the loan	Disbursal time of loan in days from the first day of action to receiving the loan (e.g. in the case of the Vietnam Bank for Agriculture and Rural Development, getting the application form; in the case of the Vietnam Bank for the Poor, creating the group) *1) Quick (7 days)* *2) Slow (60 days)*
4. Lending scheme	*1) Group lending scheme* During a group lending scheme, all negotiations with the bank and commune authorities will be conducted by the credit group leader. For instance, the application form will be filled in by the group leader or the interest will be collected by him. *2) Individual lending scheme*
5. Collateral	*1) Land use rights (Green and Red Books)** *2) Durable consumer goods* *3) No collateral required*
6. Place of credit negotiations and information	All necessary negotiations, credit disbursal, collecting of interest, collecting of principal will take place at one of these levels. *1) District* *2) Commune* *3) Village*

Note: * Land is owned by the state in Vietnam. Nevertheless, the government allocates land use certificates to farm households, the so-called 'Red Books' for agricultural land (valid for 20 years) and, 'Green Books' (valid for 30-50 years) for forest land. Farmers are allowed to sell, rent, or pass land on to children (Luibrand 2002).

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