

CHAPTER 5

DISCUSSION

5.1. Cattle production in northern Vietnam

5.1.1. Socio economic characteristics of study regions

The present study revealed that the average age of household heads was 45 years old in range from 28 years to 68 years. The average size of each is 5.2 persons per household, in range from two to eight persons per household. This is in agreement with a study of Tra (2003), who found an average size of five persons in each household in the northern uplands of Vietnam. However, study of Huyen et al 2010 in Son La showed higher sizes, ranging from 5.5 to 7.6 persons/ household. The percentage of adults accounted for 60% while the proportion of old people was less than 1%, indicating that good availability of manpower for production in all villages. It is in agreement with Tra (2003) that the small proportion of old persons might be explained by the replacement of the three-generation-family by two-generation-family.

Education is an important tool to bring fast and sustainable development and affect household income, demography, health, and the overall socio-economic status of the family. In the investigated villages, literacy rate was 86.6%, which considerably exceeds the proportion of illiterates (13.4%), the latter being mainly old people. None of household heads was illiterate and all children in the investigated villages went to school.

The rate of Kinh speakers was high, only some old people can not speak Kinh language.

The situation of education in the villages might be a good basis for the adoption potential of new technologies in the study area. The study of Setianingrum (2010) shows that the Thai farmers have a higher education level than H'mong people

The cattle keeping experience of farmers in the investigated villages on average was 15.4 years, in range from three to 36 years. It indicates that cattle keeping had been developed long time ago in the studied villages. The study of Setianingrum (2010) revealed that a higher age of the household head does not automatically correspond to more experience in cattle keeping. The same situation was observed in this study and also the higher experience in cattle keeping of households header does not correspond to a larger cattle herd.

Land tenure is very important for farmers to develop their production. In the study regions, the average total land owned of farmers is quite large. Even total land used with land use rights in Na Pan village is close to the maximum land use limitation which in general includes 2 ha for annual crops, or 10 ha for perennial crops and 5 ha for other farming activities (Drucker et al, 2006). But the land which can be used for agriculture is limited. It seem a similar situation as reported in the study of Tra (2003) in Mai Son and near Son La town where a large share of total land owned was forest land and from 20 - 50% of the investigated households had not been allocated forestland. Even though forest in the investigated villages was allocated to each household, they are forbidden to grow crop, and limited to leave cattle in the forest. This is particularly enforced in Nam village, where local government has a strict regulation about protecting the forest. The slope land area occupied around 78-88% of the total agricultural land (including rice

fields and slope land) in the investigated households. It is higher than observed by Tra (2003) with about 64 – 76%

5.1.2. Crop production

A mixed crop-livestock farming system was applied by all investigated households. In the study region, the largest share of agricultural income is from crop production. It is in agreement with the study of Setianingrum (2010) in this region that crops are more important than livestock. Maize and rice were the main crops in the study regions. The results of this interview were consistent with Huyen (2010) and Setianingrum (2010) that while rice is mainly kept for subsistence, revenue from selling maize is the main cash crop. Estimation from the farmers shows that they can earn 20-50 million VND per year with a good maize crop.

Cassava was planted in all investigated households in Nam village. About 90% of the cassava product was sold to a cassava starch factory (20 km far from the village). The remaining amount of fresh cassava was kept for pigs and poultry, only a small amount for cattle. It was contrastive with the study of Tra (2003) that most harvested cassava was used for animals and for alcohol making. In Chieng Ban, only one respondent planted cassava and it was difficult to sell cassava products to the market or the factory about 45 km far from the village. No drying cassava activity was reported in all villages. And in the study region, no activities to utilize cassava residues from cassava starch production were reported, while applying ensilaged cassava residue for cattle and pigs can reduce production cost and increase growth rate (Len, 2001, Thom and Tuan, 2006; Tuan, 2005, 2006, 2007)

5.2. Cattle production in the study region

5.2.1. Reasons for keeping cattle

Yellow cattle were the only breed remaining in the study area after a failure to introduce Laisindh cattle by some farmers. The Laisindh cattle were introduced to some households in the study region by a project aiming at renovating and improving the quality of local cattle by crossbreeding with Zebu (VIE-Cr2561). The Laisindh cattle are bigger in frame and fetch higher meat prices, but have a higher feed demand and were reported to be of difficult temperament by some farmers in the past. They were hard to adapt to the low nutrient conditions and prevailing extensive production systems in the study regions. Their growth rate was low and mortality rates were high in the winter season.

Similar in many developing countries, the cattle in Vietnam was kept for multiple functions, namely meat production, milk production, traditional ceremonies, income generation, saving money, draught power and production of manure (Mapiye et al., 2009a; Baset et al, 2002). Cattle manure was important for cattle keepers due to the increase in fertilizer prices. But manure was inefficiently used because of poor organized transfers and severely limited by the absence of means for transportation in this mountainous area. It is in agreement with Huyen et al, 2010 that cattle manure was used as fertilizer by most of the small farms in the lowlands, but by few farmers in the highlands. In particular, most manure from animals grazing in the forest is lost for use in cultivated fields. Cattle are kept as a saving mean (an inflation-free form of banking) and can be sold to meet family financial needs such as school fees, medical bills and

household expenses (Dovie et al., 2006; Simela et al., 2006, Huyen et al, 2010). Successful breeding animals were not sold. Lending cash from sold cattle for interests is not popular. It was reported in some households with a large herd of cattle and where selling of cattle occurred every year. The farmers feel more comfortable to deposit their surplus cash by lending to neighbours and relatives than the bank. However it is good for communal relationships because it saves much effort of other farmers who want to take loans. Socio-cultural functions of cattle include their use as bride price as also reported for South Africa (Chimonyo et al., 1999). Draught power was important even though small tractors were available, especially in Na Pan and Nam villages where the topography is sloper and harder to access. Animal are slaughtered in special ceremonial gatherings such as marriage feasts, weddings and funerals as reported for South Africa, Viet Nam (Mui and Binh, 2003; Bayer et al., 2004; Ndou et al, 2011). Cattle are given as gifts to relatives, and as starting capital for youth and a newly married daughter, similar to the situation described for South Africa (Musewa et al, 2008). The same as in the study of Eguienta et al, 2010 in Bac Kan (Vietnam), in the study area, people do not consume milk.

5.2.2. Feeding practices

Setianingrum 2010 reported that there are three major cattle feeding practices, i.e. namely free-grazing, semi-zero grazing and zero-grazing. However the zero-grazing system was not reported in the study area. Free grazing and semi-grazing were applied but these practices were changed from time to time following the crop season. In the rainy season when crops are growing, cattle were released to common pastures freely during the day

and they went back to the farms at night. If the cattle were kept in the forest far from the houses, a man always looked after the grazing animals. And at night animals were penned within a fence to protect them from wild animals. After harvest time, ruminants were allowed to graze the fields until the next crop and are housed at night like describing by Mui and Binh (2003) and Setianingrum (2010). In Nam village, the cattle were kept permanently in the forest. It is in agreement with Huyen (2010) that the farmers were jointly responsible for the security on outposts where their cattle were put together to reduce labor demand. But the cattle were considered as the property of individual farmers.

5.2.3. Some potential crop by-product resources used as alternative feed in the study region

In the study region, rice straw was the most popular crop by-product used by cattle keepers. Maize residue is also available in huge quantities but it is rarely used as animal feed (Ly, 1997). Other crop by-products like rice bran and sugar cane tops are used as alternative feeds for cattle by some respondents.

According to a case study of Trach (1998) carried out in Donganh, the countryside of Hanoi, on five rice varieties, 0.83 kg of straw is produced on average per kilogram of paddy rice. Based on this figure and taking into account the rice yields in the present study region, each household can produce from 1.3 - 2 tons rice straw per year. It may be a good feed source for small sized cattle in the dry season when other feeds are in short supply or exhausted. Rice straw is usually fed without supplements and treatments (Ly,

1992; Trach, 1998). The reduced availability and the poor quality of this feedstuff usually results in reproductive disorders and a loss of body condition of the animals. It can also be the cause for an increased mortality in the winter season (Trach, 1998).

Maize production is the main income source in investigated villages except in Nam village. After maize harvest, all maize stems and dry leaves are often left on the fields. Giang and Son (2001) estimated that maize residues account from 15 to 20 tons of green matter per ha. With a proper treatment method, it could be a good source of feed for cattle.

Sugar cane production in Vietnam is developing quickly and its by-products are becoming more important in ruminant feeding. Sugarcane tops have high fiber levels (40-42% of dry matter) but a high content of soluble sugars, which lead to a larger proportion of propionate in the rumen VFAs (Preston and Leng, 1987). At harvest time, the amount of sugar cane tops accounts for 10-12% of green matter of sugar cane (Gohl, 1981). In Vietnam, harvest time of sugarcane is from November to April in the next year. This is the dry season, forage sources are scarce. So, sugarcane tops can provide an important forage for ruminants in the dry period (Ly, 2002). With proper treatment, the sugarcane tops can have higher nutrient values. In the study area, sugarcane tops are sometimes supplied for cattle in some households. The present study agrees with the findings reported by Binh et al. (2005) that sugar cane tops are one of the most under-utilized resources even with seasonal harvest and lack of methods storage and preservation.

Molasses is the only "concentrated" source of fermentable carbohydrate that is widely available in the tropics and which is not a staple of the human diet (Preston and Leng, 1987). However, due to the lack of information about the usefulness of molasses and supply source, no investigated households supplement molasses to their cattle.

5.3. Feeding trials

5.3.1. Two frame size groups in the study regions

Significant breed type (size) x management interactions have been reported and these results emphasize the importance of matching the size and (or) breed of cattle to specific conditions and management systems (Buttram and Willham, 1989). At the beginning of feeding trials, even though both frame size groups were chosen in the same age, the LFS had higher weight than the SFS. This is consistent with the results from Vargas (2000) that weaning weights of calves from small FS cows were lower than those of calves out of medium and large FS cows. Up to date, no research has been undertaken to quantify differences between SFS and LFS Yellow cattle in the study region. The feeding trial also shows that LFS cattle have higher growth rate than SFS. However, another result from Vargas (2000) shows that LFS group got lower body condition score than SFS group, which indicated that the nutritional level in this experiment did not adequately meet their requirements. Kunkle et al. (1994) found that cows in lower body condition have significantly lower income from calves produced. So, keeping LFS cattle maybe not always give high profit and the frame size cattle needs to be matched with particular feeding condition.

5.3.2. Effects of husbandry and feeding management on two frame size groups

In the feeding trial, the control group showed on average lower growth rates than others groups. It is indicated that the nutrients from feed intake of the control groups was not fulfilling the demand. The main feed source of cattle in the study regions is natural grass. Setianingrum (2010) stated that the alternatives for native grass were not yet optimal. Trach 1998 stated that in the dry season, the cattle are fed almost exclusively on rice straw since the growth of the limitedly available grass is stunted. However, the amount of straw a ruminant can consume is not sufficient due to the low nutritive value and high lignin content. The reduced quality of feed usually results in reproductive disorders and loss of condition of the animals. It also is the main cause for many deaths of drafting animals in the winter working season. In Son La 7748 cattle and buffaloes died by starvation and cold weather during last winter (DARD, 2011).

The urea treatment showed good potential to application in the study area. Both groups show higher growth rates in comparison with control group (21.7% with SFS and 69.4% with LFS group). The results are similar to those reported by Trach and Thom (2004b), ADG of cattle fed with 1% urea-sprayed rice straw ad libitum, 2 kg wet brewers of grains/head/day and 4 hour roadside grazing per day was 67% higher than the control group. In the second experimental month, under the effect of cold weather, the ADG of cattle using UTRS was still higher than that of the control group. It indicated that applying the UTRS can reduce weight lost for cattle in the winter season. Sanh (2008) stated that 25-50% amount of grass in daily ration for buffaloes can be replaced by 4% urea treated

rice straw without negative effect to feed intake and growth rate. It not only protected cattle from risk of starvation and death, but also increased benefit for the farmers.

Leng et al (1991) stated that the urea molasses multinutrient (UMMB) provide primarily for the needs of the rumen, micro-organisms rich in sources of fermentable nitrogen, minerals, vitamins, amino-acids and peptides. When some by-pass protein is added (e.g. cottonseed meal, noug cake) there is a synergistic effect which further improves considerably the average daily gain of ruminants and they become much more efficient in using the available nutrients. In addition total nutrients are often increased because feed intake is increased. Multinutrient blocks are now finding ready acceptance in Africa by pastoralists as well as by small milk producers (Sansoucy, 1986; Sansoucy and Aarts, 1987). In the study area, molasses and UMMB have not been applied before. The UMMB increased the ADG of both frame size cattle about 45% over the control group. In the second month, the supplement of UMMB reduced the lost of weight in LFS group and remained gain of 105.0 g/ day in the SFS group. In this period, the main feed source of cattle is rice straw, grazing is limited. The application of UMMB can help the animal utilize more efficiently the low quality feed sources. A similar result was reported by Ünal et al (2005) from Turkey that UMMB were used to prevent weight losses of lambs in the winter season.

Cattle with fixed ration treatment were kept in confinement and fed the complete ration which is calculated to fulfil the demand of 1 year old Yellow cattle. The ADG of cattle in this treatment was significantly higher than that of other treatments ($P < 0.05$). However

the applicability of this treatment is questionable. The farmers in the study area have no tradition to keep their animal in confinement. It was the result for the failure of this experiment on the LFS group, because the farmers refused to follow the treatment.

The LFS required higher demand for maintenance and production. In the winter season, it is hard for them to find enough feed. The ADG of LFS cattle in the second month decreased due to shortage of feed and high energy demand to remain body temperature. While LFS lost weight, the SFS cattle still gained weight, even though slower than in the month before. The small size is their advantage to overcome the harsh conditions. So with the low quality and limited quantity of feed source, the SFS have higher change of survival. This is agreeing with a statement of Buttram and Willham, (1989) that matching body size and resources plays a major role in establishing a beef production system to optimize efficiency.

5.3.3. Economics of supplementation of the two frame size cattle fed UTRS, UMMB and fixed ration

Similarly, in Asia and other provinces in Vietnam, where by-crop products are commonly used as a ruminant feed, urea/ammonia treatment, UMMB was observed to have boosted productivity more economically than traditional husbandry management. But the applying urea treatment is questionable because of the rising of urea price. During the experiment time, the price for urea and maize was boosted up from 1.5 to 2 times as last year. It officially affect to the profit of beef cattle production.

The results of this study showed that the NB from cattle on SFS and LFS increased in all treatment, except SFS cattle using fixed ration. The fixed ration gave highest growth rates in both frame sizes but the NB is not highest because of high cost of feed. Thus, the NB of SFS group using fixed ration was lower than control group. High cost feed resources are not an option in the region.

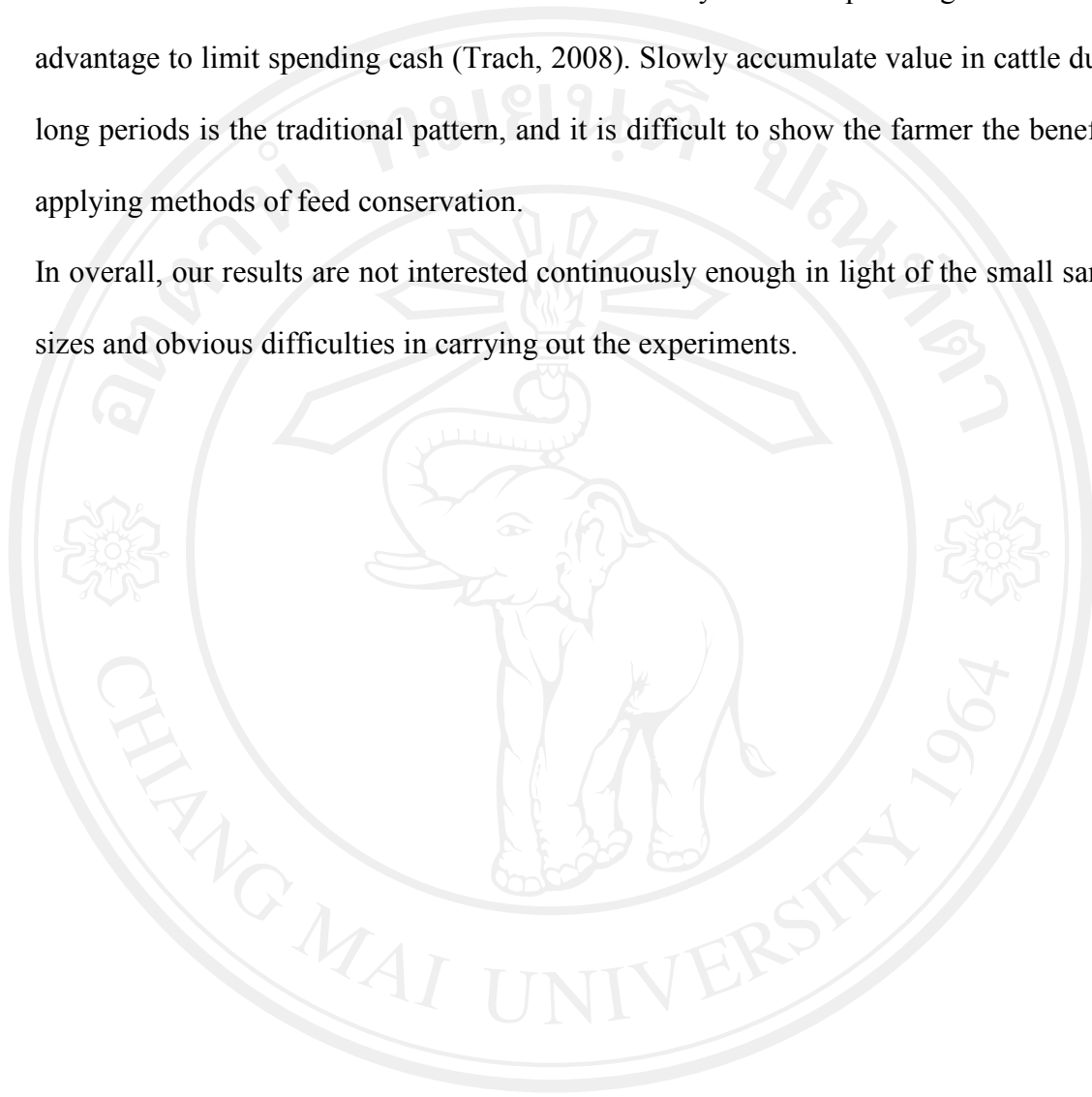
The results of the study showed that farmers can get higher NB by applying some of the treatments. However, it is hard to convince the farmers about the benefit of these treatments unless they sell the animal and compare the feed cost and revenue. This is not possible because fattening and selling cattle is not the tradition of farmers in study area. Similar to most provinces in the northern mountainous region of Vietnam, the livestock market is not developed. This is contrasted with a study of Tra (2007) who found that one of the key advantages for cattle production in Bac Kan is the prevalence of cattle markets. Available cattle markets with high demand from consumers results in a high and smooth flow of live cattle in these markets, which are considered convenient for trading of cattle in selected households.

5.3.4. Farmers' Perceptions

The quick assessment after feeding trial shows that even the farmers recognized the benefit from applying the treatments but the willingness to apply these methods of these farmers was questionable. It is in agreement with a report from Trach (2008) that applying treatments may be obstructed to streamline routine daily tasks. It is partly because raising small cattle herd is only a small part of the mixed economic activities of

the household. And the farmers tried to utilize family labor of spherding and feeding as advantage to limit spending cash (Trach, 2008). Slowly accumulate value in cattle during long periods is the traditional pattern, and it is difficult to show the farmer the benefit of applying methods of feed conservation.

In overall, our results are not interested continuously enough in light of the small sample sizes and obvious difficulties in carrying out the experiments.



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