Chapter 1

INTRODUCTION

1.1 Background

Vietnam is a country, with the current population about 84 million habitants (National Statistical Yearbook, 2005). More than 78% of populations in the country live in the rural area and their living depends on agricultural production. Agricultural system practiced in the country is traditional agricultural production system in which rice cultivation is integrated with animal husbandry. Livestock plays an important role in agricultural production systems of Vietnam and contributes about 22.5% in total agricultural production of the country (Tuyen, 2004).

Due to the improvement of income and living conditions of Vietnamese, the demand of foodstuffs and animal products consumption of the population have been increasing over time. Animal products are increasing faster than 7-8% every year to meet the requirement of higher living standards of the people. The average growth rate of cattle and buffalo herd in the period from 1990 to 2003 is 1.76% (Tuyen, 2004).

Cattle production in Vietnam is mostly dependent on the natural resources and agricultural by-products. Cattle population is mainly in the smallholder and it is strongly integrated to the paddy rice and other crop production. Cattle raising in Vietnam are mainly of the Yellow Cattle breed. It is an indigenous breed, long domesticated and trained for draught purpose, and particularly suited for sloping lands and light soils. However, a recent trend shifted towards breeding and fattening for meat production (Trach et al., 2001)

The Red Sindhi have been introduced around 1920 and its distinctive reddish coat can be seen throughout the country. Crossbreeding has been conducted for year and, possibly, the most common "breed" is the Laisind, usually some combination of Yellow Cattle and Red Sindhi blood. Mature Laisind will usually have an average of about 100 kg greater live weight than Yellow Cattle. They are often used by farmers as a first-cross when attempting to increase the size of their animals. Laisind are also used as recipients of Holstein-Friesian semen to produce the main lines for Vietnam's small, but growing, dairy herds [URL1].

1.2 Rationale of study

There are many programmes and projects that have shown interested in transferring advanced technologies in cattle-raising aimed at increasing the body size and growth rate ability of local cattle. Those programs will help farmers to improve the income for ethnic minority groups and people living in remote areas (NIAH, 2002).

Ly (2004) identifies that there is a lot of potential to develop beef cattle raising in the vicinity of Hue city. Potentialities are suitable climate and weather, good feed and natural grass growing conditions in hilly area. However, the productivity from cattle raising in this area is low and farmers' adoption of crossbred cattle is also slow. There are no specific studies about the reasons of slow adoption rate of crossbred cattle. This study aims to investigate the factors affecting the adoption and to compare profitability of local and crossbred cattle.

1.3 Literature review

1.3.1 Cattle production

In Vietnam, ruminant production is conducted by state farms, medium-sized private commercial farms and by small farms in rural and urban areas (Devendra and Thomas, 2002). However, small and family operated farms conduct predominantly

ruminant production in Vietnam (Tuyen et al., 1998) and with usually low number of ruminants per household. Cattle can make use of agricultural by-products and crop residues (Tuyen et al., 1998). Between 1990 and 2000, the number of cattle has increased with 3.2% annual growth due to the high local demand of dairy products and the new policy on dairy cattle and beef cattle development from the Government of Vietnam.

According to Noi (2002), the main source of fattening cattle is the local Vang breed which is small, average live weight of about 140-160 kg/head for female and 250-280 kg for male, with a killing out percentage of about 42 to 44. Pure Red Sindhi breed was imported in 1923; bulls of this breed crossed with Vang's breed improve body weight of the F1 female up to 35 to 40 percent and the carcass weight by 44 to 49 percent. With the use of F1 Sindhi female crossed with Charolais bull, F1 can be 300 kg and carcass percentage of meat can be increased from 53 to 54. Cattle are mainly raised in hilly or mountainous areas. Beef cattle are raised on small farms with 2 to 5 heads although there are some farms with 50 to 100 heads in some areas such as peri-urban of Hanoi, Bien Hoa, Ho Chi Minh City.

Most of the indigenous cattle in Vietnam are called the Vietnamese Yellow Cattle. It is the one and only one indigenous cattle breed, but different names have evolved based on locations where the animals were raised. The evolved names are: Thanh Hoa Yellow cattle, Nghe An Yellow cattle, Ha Tinh Yellow cattle and Phu Yen Yellow cattle. The Vietnamese Yellow cattle are mainly kept in the Central Coast of Northland and Central Coast of Southland (Thien, 2000).

Farmers raise cattle mainly for long-term saving and as draught animals (Rodriguez and Preston, 1997). Due to their small body size (adult body weight of 160 to 180 kg/head), and the low growth performance under the prevailing keeping conditions, the population of Yellow cattle could not meet the increasing demand for beef (Thuong, 1996). Dairy cattle and Zebu crossbreeding programs have been established to meet the beef and milk demand. Exotic breeds such as Holstein-Frisian and Red Sindhi have been imported. In 1996, Zebu and crossbred zebu cattle

represented about 14.5 % of the total cattle population. Crossbreds were mainly crossbreds between Red Sindhi and local Yellow cattle (Rodriguez and Preston, 1997; Tuyen et al., 1998). In 1996, about 0.5% of the total cattle population was dairy cattle, mainly crossbreds of Yellow cattle and Holstein-Friesian (Tuyen et al., 1998). The demand for milk has been increasing especially in Ho Chi Minh City and Hanoi for many years and has caused an increase in the number of private dairy farms (Thuong and Vang, 1996).

The crossbreeding programme in beef cattle production so far indicates that Chairolais bulls with Laisind cow are the best of crossbred calves. The body weight of Charolais crossbred calves at 24 months of age and their carcass percentage were 290-300kg and 53%, respectively. According to Thuong and Vang (2000), the body weight of Laisind calves at 24-27 months could reach 280-300kg and would have the carcass percentage of 47-48%.

Trach et al. (2001) investigated crossbreeding for better weight gain with Red Sindhi, Zebu, and Sahiwal has been promoted by the government and favored by more intensive farmers, but has not been widely introduced especially to remote parts of the country. Crossbreeding programs have made only slow progress because of the scarcity of breeder sires and the low artificial insemination (AI) coverage and acceptance. Heifers deliver their first calf at around 3 to 3.5 years of age and continue with one calf every 1.2 to 1.5 years. A breeding cow can reproduce 6 to 7 calves during its reproductive life and is then sold for some salvage value after 12 years of age.

Cattle are kept in the cropping area, are fed almost exclusively on fibrous crop residues and are allowed only strictly controlled access to grazing on road sides, fallow land and raised boundaries between rice fields and other cropping areas (Ogle and Phuc, 1997). However, free grazing is the most common way of keeping ruminants in smallholders, especially in mountainous area (Quan, 2000). The areas for free ranging are declining due to expansion of crop production, and the soil quality in grazing areas is low; therefore quality and quantity of available forage are limited

(Quan, 2000). Shortage of pasture will be the main constraint for ruminant keeping. By-products and crop residues (like rice straw, sugar cane top, green maize leaves) are also used for ruminants (Duong et al., 1996), but the amount, the quality, and the degree of processing are low (Quan, 2000). In the time of feed shortage, rice straw is often used for feeding at night, in cold and rainy weather when grazing is not possible (Ly, 1996).

1.3.2 Adoption

Feder et al. (1985) define adoption as the degree to which a new technology is used in long-run equilibrium when farmers have complete information about the technology and its potential. Therefore, the adoption at the farm level indicates farmers' decisions to use a new technology in the production process. On the other hand, aggregate adoption is defined as the process of diffusion of a new technology within the region.

Factors influencing adoption of new agricultural innovations sometimes are divided into three major categories: farm and farmers' associated attributes; technology attributes (Adesina and Zinnah, 1992); and the farming objective.

Adoption studies can supply information for improving the efficiency of agricultural research, extension services and food policy and drawing implications for government intervention. The research on adoption can reduce the cost of non-adoption and facilitating a rapid technological change. Several adoption studies have been conducted in numerous countries since Griliches (1957) pioneering work on the adoption of hybrid corn in the United States. For surveys of adoption studies in developing countries, refer to Feder et al (1985); Rauniyar and Goode (1992) and Kaliba et al. (1997)

Neupane et al. (2002) applied logistic regression model as an analysis tool to identify factors influencing the adoption of agro-forestry by subsistence farmers in the hill of Nepal. The results showed that male membership in local NGOs, female

education level, livestock population and farmer's positive perception towards agro forestry have significantly positive effects at 0.05, 0.01 and 0.10 significance level respectively.

Feleke and Zegeye (2006) used logistic regression analysis to identify factors that influence the decision behavior of farmers in adopting improved maize varieties. This study also assesses the impact of pure and mixed strategy options on the probability of adoption of improved maize varieties through simulation under different scenarios.

Sieng (2006) studied factors affecting adoption of hybrid maize using maximum likelihood estimation of a logistic regression model. The results show that four of the twelve variables influenced the adoption of hybrid maize. The most important factor was the tendency to follow their neighbors. Other factors were the cultivated maize area, access to irrigation and the distance to Vietnam border.

1.4 Objectives of study

This study aims to investigate the factors affecting the adoption of crossbred cattle, so the objectives of this study are as follows.

1. To understand and explain cattle raising systems of smallholder farmers, farmers' use of cattle, problems and potential of cattle production.
2. To assess profitability of local and crossbred cattle production.
3. To determine factors affecting the adoption of crossbred cattle.

1.5 Usefulness of study

This study will be useful for all working in the field of agricultural development from policy level to farmers level. It will be useful for extension workers to understand cattle based farming systems regarding their characteristics, related problems and potential production that are fundamental tools of extension workers. Furthermore, this study will provide information to the farmers about comparative

profitability and factors affecting the adoption of local and crossbred cattle breeds under their own conditions.

The extension policy and program design based on the characteristics of farming system, farmers problems, constraints and opportunities are pivotal to achieve the momentum for adoption amid the slow adoption process of model raising crossbred cattle.

For the researchers, this study will be helpful to design the adaptive research for development of suitable cattle breeds for the farmers' condition.