# Chapter I Introduction

Vietnam' economy is mainly based on agricultural production, wherein maize (*Zea mays*. L) is ranked as the second important crop after paddy rice among the annual crops. Maize plays an important role as the main food for minority peoples in the mountainous regions of the northern of Vietnam, as feed for livestock and raw material for feed animal processing industry.

During the last decade, maize uses as food source for peoples has been reduced because surplus of rice that has been fully met the food demand of people. However, the demand of maize in livestock and feed animal industrial sector has been increasing. In 1996, maize used for livestock was about 500.000 tons; it was increased to 560.000 tons in 1997. The estimated demand for period of 2000-2001 was approximately 1.000.000 tons of maize (Khiem *et al*., Online). At present, increasing of the demand of maize in feed industrial sector that made maize production increasing in the both area and yield in the whole country.

Comparison with the first years of the last decade, maize production in Vietnam remarkably increased that thanked to the development of hybrid maize program. Accounting for the whole country, in 1990, there were 431,800 ha of maize, the average yield obtained only 1.55 tons per hectare and the hybrid maize area covered 0 percent. In 1995, the area of maize was 556,800 ha of maize and the average yield increased to 2.20 tons per hectare. Up to 2001, total maize area reached to 723,200 ha, which occupied approximately 10 percent of total agricultural land, in which hybrid maize occupied about 70 percent of total maize area and the average yield increased to 2.90 tons per hectare.



Increasing in maize production significantly contributed to the successes of the target was 30.6 million tons of food in 2000 in Vietnam' Food Program Development. However, the amount of 2.1 million tons of maize was still not sufficient for the domestic market demand, because the maize requirement for feed animal industry was increased rapidly. This requirement for domestic market and feed animal industry

would increase to 10.6 million tons of maize in 2005 (Uy., 1998), however, produced total of maize in the whole country achieved only 2.1 million tons of maize at that time. As a result, annually Vietnam has imported a large amount of maize for feed industry. In 1990 total maize imported was 2,000 ton of grain, in 1995 was 26,000 tons of grain, and in 2000, this amount was 197,430 tons of grain from international market (FAO., Online)

In order to deal with the shortage of maize grain and the problem of low productivity, Ministry of Agricultural and Rural Development (MARD) of Vietnam has developed the Hybrid Maize Program at the National scale. This program aims at poverty reduction, to supply material for feed animal industry and to partly reduce the amount of imported maize from international market. This program so far significantly contributed to improve the maize production in the whole country (Uy., 1998)

However, the maize yield obtained within ecological zones, the yield gap was quite different among ecological zones. The average maize yield in the north mountainous and midland areas was obtained at 1.64 tons per hectare and Red River Delta about 2.75 tons per hectare. Northern central coast obtained at 1.8 tons per hectare, Southern central coast at 1.68 tons per hectare, Central highland at 2.3 tons per hectare, and Northeast south at 2.72 tons per hectare and the highest yield obtained in Mekong River Delta was 4.1 tons per hectare (Singh *et al*., 1996). The main reasons leading to the difference of maize yield among ecological zones were climatic characteristics, soil conditions, cultivation techniques and irrigation accessibility. Thus, in order to increase total maize production in the whole country, beside the high potential zones, such as the Red River Delta, Mekong River delta, decision makers should pay more attention to zones with the low yield in the north mountainous regions.



Son La, a northwest mountainous province, is located in Zone I. Maize is one of the major crops in the upland area. The growing season is the spring-summer starting from April to September. At present, total area of maize has 43,000 ha, of which hybrid maize varieties cover about 87 percent and the average yield obtains at 2.29 tons per hectare. In comparison with 1990, maize area has increased 18,700 ha and

the average yield has increased about 0.64 tons per hectare; however, the trend of yield was unstable from year to year. In 1990, the average yield was at 1.65 tons per hectare, then slightly increased up to 2.13 tons per hectare in 1993 while the average maize yield decreased to 1.73 tons per hectare in 1997, and the average yield obtained about 2.29 tons per hectare in 1999 (Statistic., 2000).

In general, the average maize yields in the north mountainous regions and in particular, in Son La province was still low as compare with other provinces. That is major concern by maize producers in this area. Therefore, applying the participatory approaches and quantitative assessment model in analyzing and evaluating the maize production system was necessary to answer the question what were constraints to maize productivity and estimate yield reduction due to these constraints. In addition, this work can help local peoples a better understanding of the situation of maize production. This may help making decisions by then for the maize future development in Son La province. The objectives of this study are:

1. To identify and prioritize the constraints in maize production

2. To identify possible solutions to production constraints