

CHAPTER 1

INTRODUCTION

Agriculture and forestry play an important role in economy in Hoa Binh province. The gross value of the agriculture sector of the province contributed to 78% of GDP of the province (Vietnam Statistical Office, 2001). Major cropping systems in Hoa Binh province include rice, corn, cassava, peanut, rubber, soybean, and fruit (Hoa Binh Statistical Office, 2000). In which, soybean is ranked as the second legume crop after peanut (Chinh *et al*, 2001). This is because soybean provides major sources of protein and vegetable oil for domestic consumption.

However, soybean-growing area has been declined gradually from 3.4 to 1.9 thousand hectares during period of 1995 – 1999. Also, it's yield decreased from 1.14 to 0.63 tons ha⁻¹ in the same period (Table 1.1). Results of the field survey were indicated that there were main reasons for this circumstance i.e., (1) unsuitable soybean variety in specific area, (2) poor farm management practices, and (3) low expense for material input.

Table 1.1 Soybean productions in Hoa Binh province (1995-1999).

Year	Area (‘000 ha)	Yield (ton ha ⁻¹)	Output (‘000 tons)
1995	3.40	1.14	3.90
1996	2.80	0.70	2.00
1997	2.20	1.18	2.60
1998	2.10	0.63	1.70
1999	1.90	0.84	1.60

Source: Hoa Binh Statistical Office, 2000.

In the past decades, Agriculture Genetics Institute (AGI) and Center of Legumes Crop in Vietnam Agricultural Science Institute (VASI) have introduced some improved soybean varieties into the area such as AK01, AK02, DT90, DT93, H103, and TN12. However, their average yield was still low. In Thanh Ha farm, average soybean yield was only 1.3 ton per ha as compared to yield obtained in other provinces (Daklak and Cao Bang provinces), where soybean average yield was 1.8 ton per ha (Hai *et al.*, 1997).

To have high yielding varieties that can adapt to specific growing area, soybean varietal selection is prioritized and encouraged by local authority. However, soybean varietal selection for this area meets many difficulties because there were high variability and uncertainty in environmental conditions such as weather and soil. The variability particularly weather also contributes to risk and uncertainty in the outcomes of new practice recommended by the government agencies to improve farm performance. To deal with this risk and uncertainty long terms evaluation of varieties' performance and management practice must be carry out.

In Vietnam, soybean variety selection methods have been practiced over 30 years through field experiments. In practice, this method must be experienced through several steps including on-farm experiments, demonstrations at small scale, national varietal standard registration, and then dissemination nationwide (Long *et al.*, 2000). Over the last 20 years, scientists have made considerable progress in development of computer models that simulate the interactive effects of weather, soil and management factors on the growth and yield of crop. In which, CROPGRO-soybean is known as a process - oriented dynamic and generic crop simulation model, having options such as simulating yield for cropping season, crop carbon balance, crop and soil N balance, and soil water balance, operated on daily times step, and simulating crop growth and development of soybean based accounting for the effects of the weather variables and the main limiting factors as water and nitrogen (Tsuji *et al.*, 1998). Therefore, it is more robust for use in other regions of the world where soils and climate differ with Florida, where model was developed (Jones, 1993). Moreover, agro-technology transfer through DSSATv.3.5 developed by IBSNAT project has

been widely used. This approach can reduce time and cost of research. During the last few years, skepticism has been slowly changing into widely accepted view that CROPGRO-soybean is highly useful tools for scientist with DSSAT package (IBSNAT, 1990).

Thus, Another approach for the selection of soybean varieties grown in specific site is the use of CROPGRO–Soybean models. This study was focus on the use of CROPGRO-model as tool for soybean varietal selection. Objectives of this study were:

1. To estimate the genetic coefficients of selected soybean varieties for CROPGRO-Soybean model.
2. To utilize the CROPGRO–Soybean model for soybean varietals selection.
3. To utilize the CROPGRO-Soybean model for soybean varietals selection in Hoa Binh Province, Vietnam