

Chapter 1

INTRODUCTION

The tomato (*Lycopersicon esculentum* M.) originated in South America. It is one of the most popular vegetables in the world and is becoming an important vegetable in the tropics. As good sources of vitamin A and C, tomatoes can help alleviate deficiencies of these vitamins in many developing countries. Production of tomatoes can be an especially profitable way to utilize limited land resources and abundant labor (Villareal, 1980). Tomatoes also top the list of canned vegetables.

Tomatoes can fit well into many cropping patterns and may bring in needed cash during periods when cereals as well as other staples cannot be grown and labor is in surplus. In Thailand, tomatoes are one of the important cash crops in the irrigated area, especially in the Northeast and the North where the crop pattern is rice-tomato. Most tomatoes are produced in the cool season for processing and seed production. Some fresh tomatoes are sold to local and export markets. There are also production areas for fresh markets only in the highlands of the North during the rainy season (Wivutvongvana and Lumyong, 1987).

The yield and total production of tomatoes in Thailand

greatly increased during the 1970's to 1980's, but no significant improvement has taken place since 1980 (Figure 1). The majority of tomato production occurred in the Northeast and the North of Thailand, accounting for 57.8% and 25.3% of the total production of the country from 1980 - 1986, respectively. The highest yield was obtained in the Northeast (Department of Agricultural Extension, 1987).

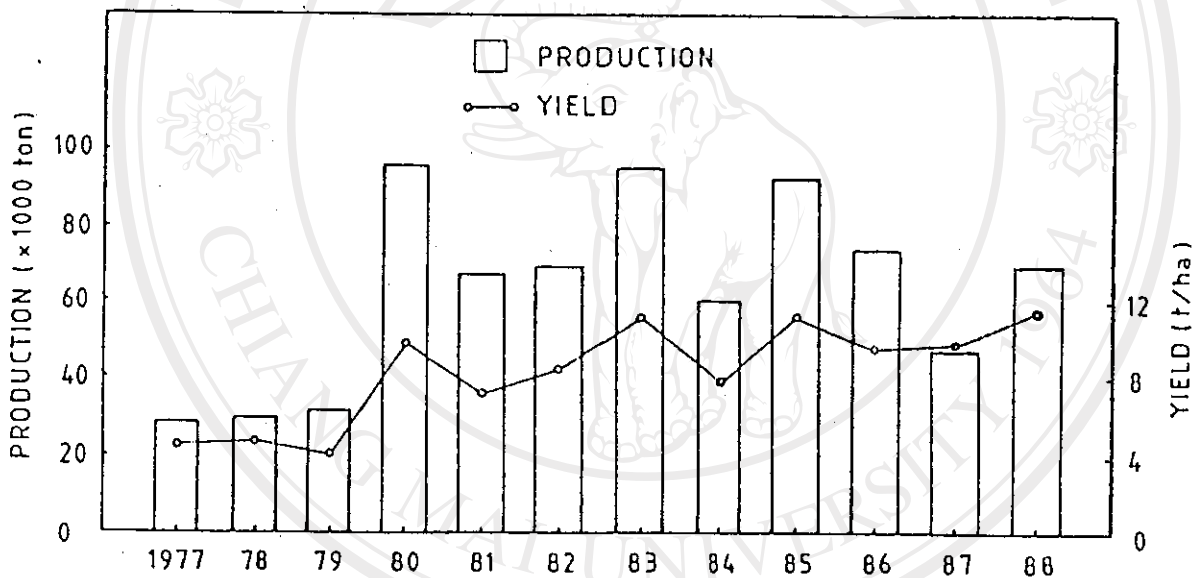


Figure 1. Total production and yield of tomatoes in Thailand, 1977-1988. (Source: Wivutvongvana and Department of Agricultural Extension, 1988).

In the North of Thailand, tomato production systems can be divided into highland and lowland systems. The highland production system is characterized by wet season planting and the products are mainly sold in the fresh market. The

lowland system is, however, the major production system in terms of quantity. Farmers grow tomatoes after rice if irrigated water is available; the growing period is from November to April. During this time, the temperature is cooler and air humidity is lower. Under these conditions, diseases are relatively slight, and as a result, tomatoes grow better and yield is high.

Tomatoes are one of the intensively managed crops. Their yield components are generally considered in terms of number of plants per unit area, number of fruits per plant, and the weight per fruit. According to previous researchers (Taha, 1984; Candilo, et. al. 1985; Shibli and Suwwan, 1989), plant population between 50,000 - 80,000 plants/ha resulted in favourable yield. Therefore, the potential to increase the yield by increasing the plant density seems great.

Fertilizer requirements of the tomato are determined by the agronomic response of the crop and the economic returns from fertilizer applications. Compared with the nutrient uptake and recommended rate elsewhere (Gallagher, 1972), the rates used by farmers in Northern Thailand are expected to be low. This study examines existing fertilizer types and amounts used by farmers. It also attempts to verify the high recommended rate of K fertilizer in Northern Thailand, and whether or not increases in yield and quality of tomatoes,

especially in fruit size, color and keeping quality can compensate for the marginal cost of K fertilizer added to tomato grown after paddy rice.

Staking is one kind of intensive cultural practice in tomato production. It is commonly used for fresh market tomato production, home garden, and off-season production, but rarely for processing tomato production. Higher yield and good quality fruit are expected to be obtained by using staking combined with other management practices. However, the low price of processing tomatoes may be the main obstacle to farmers' adoption of staking in processing tomato production. Consequently, analyses of production costs and the economic returns of staking in tomato production should be investigated.

In Chiang Mai Province, a tomato yield of 13.6 t/ha was recorded in 1987 (Department of Agricultural Extension, 1987). In a recent formal survey conducted by the author in 1990, the yields in San Sai and Chom Thong district were 33.0 t and 19.3 t/ha, respectively. They are relatively low when compared with the 64.6 t/ha recorded in Chiang Mai University experiment station. It also has been observed that tomato fruits often show a non-uniformity of color at maturity. Patches of yellow color on mature fruits increase when temperature is high. Potassium might be required to counteract such a symptom (Wivutvongvana, 1987). Therefore,

there is great potential for improvement of the existing system in terms of tomato yield and quality by understanding the cultivation practices.

Specifically, the objectives of this study are as follows:

1. To examine the existing practices of the farmers regarding cultivation of tomatoes after paddy rice;
2. To evaluate the contribution of spacing, potassium fertilizer and plant staking to the yield and quality of processing tomatoes;
3. To evaluate financial returns of the improved cultivation techniques, such as staking, plant spacing and different rates of K fertilizer application;
4. To study the interactions among plant density, K fertilizer and staking on yield and quality of tomatoes.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
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