CHAPTER I

INTRODUCTION

1.1 Background

Cambodia has emerged from decades of war and internal conflict and now faces the challenge of rebuilding it. However, the country remains one of the poorest in the world, ranked 130th out of 175 countries in 2003 by the Human Development Index and with a per capita GDP of US$ 270 (UNDP, 2003). Over one-third of the population lives below the poverty line, 90% of them in rural areas, and 32% have no access to safe drinking water (WBG and UNDP 2000). Agriculture is the mainstay of Cambodia's economy, contributing 45% of the GDP (1998 estimate) and employing 80% of the labor force in 1999 (CIA, 2000), when there were an estimated 1.2-1.3 million farming households among a 12 million population (O'Brien, 1999).

Vegetable production currently plays a major role in nutrition and income generation and directly, in the quality of life for million of humans (AVRDC, 1991). Vegetable production is a vital agricultural activity in many countries in South and Southeast Asia. Cambodia's vegetables are the second most important crops both in terms of production and consumption, next only to rice. It provides an important source of nutrition and income for farmers. The small quantities of vegetable produced by each farmer and the subsistence nature of production, the vegetable production decreased from year to year due to lack of improvement in traditional planting methods and lack of effective insect and disease controls (Cameron *et al.*, 1995). Moreover, intensification of production systems to meet the growing demand for fresh and processed vegetables has brought with it intensive use of chemical pesticides. This in turn has led to major problems of pesticide poisoning of farmers and farming families, environmental pollution, secondary pest outbreaks, and the development of resistance of some insect pests to a wide range of insecticides.

Dangerous pesticides, unwanted by the rest of the world, are posing serious threats to Cambodia's development targets. A large proportion of pesticides on sale in Cambodia are imported from Vietnam and Thailand and are thus labeled in a language and script incomprehensible to even the minority of farmers who are literate (Yang *et al.*, 2000). Inappropriate pesticide use, including the timing, frequency, concentration and type of chemical products used, is widespread. Safety measures are often ignored or misunderstood. Many farmers have relatively little experience and have not had the time to develop knowledge of the need for pesticides, or their impact on health and non-target species (Sodavy *et al.*, 2000). In many ways, pesticides are used in greater volumes on vegetables than rice (CEDAC, 2000). The high frequency of spraying-up to 25 times per season with up to 5 different pesticides mixed together per tank per spray operation in some cases-has serious implications on farmers' health and the environmental pollution (Kay, 2000, cited in EJF, 2002). Consumers are also at risk in some cases as vegetables are sprayed just before harvesting, thus reaching the market place soaked with chemicals (Nugent, 2000). The Cambodian Government, donor community, NGOs, agrochemical industry and Cambodia's neighbors, Thailand and Vietnam, all have roles to play in ameliorating the current situation (EJF, 2002).

The Ministry of Agriculture, Forestry and Fisheries established the Integrated Pest Management (IPM) program in 1993 for protecting the environment and human health from the overuse of agro-chemicals, especially pesticides, with support from the IDRC, FAO, IRRI, World Bank, UNDP, AusAID, EU, DANIDA and other NGOs. Food and Agriculture Organization (FAO), through its Inter-country program for development set up an international vegetable IPM training initiative involving Bangladesh, Cambodia, Indonesia, Lao PDR, the Philippines, Thailand and Vietnam to increase national capability to train vegetable farmers through the farmer field school (FFS) model in these countries (Ngin, 2002).

The program is founded on the farmer field school methodology, in which farmers are educated, through non-formal adult education methods, to analyze their own farm systems in a scientific way (observation, analysis, testing), and to make

informed decisions about management including the use of off-farm inputs such as pesticides and chemical fertilizers. Self-sustaining networks of IPM-skilled farmers, trainers, and government extension workers are an important product, promoted by farmer-to-farmer and international exchanges. There was also a great urgency to do vegetable IPM project, as increasing evidence has emerged of widespread uninformed use of highly toxic pesticides in vegetable production.

So, IPM program using farmer field school approach has potential to address the issue of vegetable production, thereby reducing the use of pesticides and explore for alternative methods to deal with pest problems (Pontius, 2002).

1.2 Rationale

Cambodia is one of the poorest countries in Southeast Asia and the rural population is poor, with its people depending on agriculture for their livelihood. Their agricultural systems are vulnerable to flooding and drought. Transport costs and poor road conditions are constraints to distribution of food and resources, resulting in areas of food deficit (McNaughton, 2002).

A rapidly expanding population does not offer relief in the future and production must increase to provide sufficient food to feed the growing population. Based on recent data collected by the World Food Program (WFP), low agricultural productivity has meant that food production is still categorized as inadequate (Hunter *et al.*, 1998).

Vegetable production remains minor, and thus most fruit and vegetables are imported from Thailand and Vietnam (60% of all market vegetables from Vietnam alone) (Roberts, 2003). While the products produced by local farmers are perceived to be poor in quality the quantity of vegetables supplied to the market in some period is not enough. Resource poor farmers have little realistic chance to shift from subsistence rice production to commercial cultivation of other more valuable crops. Farmers lack technical knowledge to manage their crops especially to effectively deal

with pest problems with good economic return. Due to this concern many farmers gave up growing vegetable and fruit crops to find other jobs to support their families.

Therefore, the National IPM farmers training program on rice was established in 1993 in Cambodia after a national workshop on "The Environment and Integrated Pest Management" at the Royal University of Agriculture, Phnom Penh, to ensure sustainable food production, security and human resources development. Farmer field school approach was introduced as a training and extension approach to promote IPM, farmers training program and reduce the use of pesticides and chemical fertilizers. By 1996, the farmer field school approach had been successfully applied to small scale rice farming in 11 Asian countries including Cambodia. The program was extended to IPM on vegetable in August 1997 (FAO, 2002). In collaboration with FAO, through its Inter-country program for development set up an international vegetable IPM training. This training project was initiated on vegetable by using the farmer field school model in Siem Reap province in 2000. The overall objectives of the project was to increase national capability to train vegetable farmers through the farmer field school model in Cambodia to empower farmers and enhance productivity to sustain food security, reduce environmental impact and enhance farmers' income.

With the completion of two years of project implementation it was timely to assess the effectiveness of farmer field school approach for IPM on cabbage production in Samraong Commune, Sotnikum District, Siem Reap province, to assist in reorientation and up scaling of the IPM program.

1.3 Objectives

The objectives of the study are:

1. To find out the effectiveness of IPM on cabbage production;
2. To determine the level of acceptability of IPM practice on cabbage production;
3. To find out the effectiveness of farmer field school approach for IPM program on cabbage production; and

4. To identify potential of IPM program diffusion among non-IPM cabbage growers.

1.4 Usefulness of the study

The study will generate information about farmers' adoption of IPM technologies for cabbage production and farmers' perceptions of pesticide application, pest control and strategies choosen for cope with pest problems on vegetable so that the technology can be modified to their needs and conditions. Since pest and disease on cabbage are complex mixture of socio-economic, physical and biological components of vegetable production systems, the above information will serve as guide for researchers to plan appropriate research and development programs.

The assessment of farmer field school approach for IPM practice on cabbage will generate current scenario and decision criteria for the program, which will fill the gap or incompetence between farmers and facilitators in order to fine-tune future strategies in development and transfer of technology to new areas in the context of Integrated Pest Management.