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Protected Vegetable Cultivation: Management Options and Economic Potential

CLARITA PAGADUAN AGANON
TEOTIMO MILLO AGANON

CENTRAL LUZON STATE UNIVERSITY
Science City of Muñoz, Nueva Ecija 3120
Philippines

BUREAU OF AGRICULTURAL RESEARCH
Department of Agriculture
Elliptical Road, Diliman, Quezon City
Philippines

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FOREWORD

In the Philippines, most of the vegetables produced by farmers come from open field cultivation. But, in the recent years, the issues on food safety and quality were brought to the fore, paving the way to alternative technology such as protected vegetable cultivation.

Protected vegetable cultivation, which has been practiced a long time ago in temperate countries, is an emerging technology in the Philippines. Vegetables are grown in a "protected" environment such as a greenhouse where environmental conditions are controlled.

Protected vegetable cultivation involves growing of vegetables by providing covering material that will protect the crop from either too much heat and rain or pest attack. The protected structure may vary from simple net house to sophisticated glass house as used in temperate countries. It also uses a growth medium which has no contaminating effect in soil or environment. Lastly, it promotes adoption of integrated pest management. As described in this book, protected vegetable cultivation uses any or a combination of these practices.

With protected vegetable cultivation, farmers can plan production cycles to overcome seasonality, water scarcity and severe infestation that are common in open field cultivation. In other words, farmers can grow high-value crops all-year round with better protection against unfavorable weather conditions, pests and diseases resulting in high quality produce.

Moreover, in the light of consumers becoming more educated and more demanding of organically-grown produce, protected vegetable cultivation provides unique opportunities in producing high quality vegetables using bio-fertilizers and botanical pesticides.

Protected vegetable cultivation is so different from open field production. It will take some time for farmers to acquire all the needed technical skills. Thus, this book, which is based on empirically tested and reliable information, attempts to respond to this concern. It will serve as an important resource material for the transfer of protected vegetable cultivation technology particularly in the country. It came at very fitting time when we are on the road of pushing modernization of the agriculture sector. For this, I commend the authors and endorse this book wholeheartedly.

NICOMEDES P. ELEAZAR
Director, DA-BAR

PREFACE

Vegetables are the second most important crop after rice in most Southeast Asian countries. In the Philippines alone, vegetable production area is estimated at about 60,000 ha with an annual production of 252,000 tons (BAS, 2005). Supplies during on-season is characterized by market glut but scarce and disappearing during off-season months.

Scarce and discontinuous supply is attributed to biotic and abiotic factors in open field which are frequently handled inadequately by growers. The most effective approach to handling the harsh effects of these factors is through protective cultivation which has been practiced long time ago in temperate countries.

In the Philippines, protected vegetable cultivation is not widely practiced. There are as many reasons for this occurrence, but one glaring reality is the lack of adequate knowledge or information about this technology. This prompted the authors to come up with this book on "Protected Vegetable Cultivation: Management Options and Economic Potential", a book about investing and engaging in protected vegetable cultivation.

It presents some facts from previous researches and publications including the experiences of the authors on protected vegetable production particularly on the operation of structures and appropriate cultural practices that spare the crop from biotic and abiotic factors commonly causing crop failure. Information contained herein consist of reviews from works done and actual experiences under Philippine and Canada conditions while one of the authors was on sabbatical leave at Delta, British Columbia, Canada. Although, temperature–wise Canada is far cooler than the Philippines, the culture and management of crop particularly vegetables can be adapted under Philippine setting.

The book is divided into seven chapters. Chapter 1 discusses about the concepts and types of structures for protected vegetable cultivation. It also presents a brief historical account of how protected cultivation started in the Philippines including the government and non-government initiatives to promote the technology. The indispensable considerations when planning to start, or just starting to go into commercial - scale protected vegetable cultivation business are also presented in this chapter.

Chapter 2 focuses on the technical requirements in starting or operating a protected vegetable business. The technical considerations include the selection of crops and cultivars based

on certain criteria; the proper siting or location for the structure; the size and orientation of structure for maximum light management and specific purpose; steps in the preparation of the house for planting; environmental control; and substrate consideration.

In Chapter 3, the choices for organic substrates intended for organic vegetable cultivation are presented. Some guidelines in organic vegetable cultivation inside protective structures are also included to satisfy the intent of protected cultivation which is safety for crops as well as consumers. Several formulations and their composition are described for specific use such as for seeds, seedlings and transplant purposes. Ingredients that are allowed for organic substrate production or formulation are discussed for reference purposes. A review of some researches done using several growing media and substrates for cucumbers. peppers. and tomato also forms part of this chapter.

The succeeding chapters present the most common crops for protected cultivation in the humid tropics and temperate climate and the specific management practices such as cultivars, planting, irrigation, fertilizer management using fertigation system or manual watering and fertilizer application as well as pest management. The crops include lettuce, broccoli, cucumber. watermelon and tomato. Specific topic on fertilizer solution preparation particularly for fertigation systems using bulk or injector systems though not very common in small scale protected cultivation is also included. Pest diagnosis as a preventive measure against pest upsurge and potential failure of the enterprise is emphasized in the second to the last chapter of the book.

Economic gain is the final indicator of any business enterprise. Starting a protected vegetable business entails cost much higher than open field system of production basically because of intensive capitalization for structure construction and equipment. The last chapter therefore. provides invaluable data on the cost and return analysis of protected vegetable production to serve as guide in deciding what type of structure and covering materials to use. It also discusses some limitations of the different protective structures particularly in the humid tropics.

While the information presented in this book may be far from complete, the authors hope that this initiative could provide the essential information useful in promoting the protected vegetable business particularly in the Philippines. May this book serve as easy reference and guide to entrepreneurs. development workers and researchers as they venture into protected agriculture.

CLARITA P. AGANON, Ph.D.
TEOTIMO M. AGANON, Ph.D.

TO OUR VALUED READERS

In the recent past, the University has conducted several researches to verify and fine-tune the protected vegetable cultivation technology in the region and in other parts of the country. The technology essentially involves growing crops under protective structures to shield plants from adverse environmental conditions at different stages of growth, making it possible for a farmer to grow off-season vegetables year-round.

As an institution of higher learning engaged in R and D, it is our responsibility as well as accountability to the various stakeholders engaged in vegetables research and development and the industry sector to share results of our research endeavors. For want of ready resource material on protected vegetable production, the authors have decided to come up with this book aptly titled **Protected Vegetable Cultivation: Management Options and Economic Potential** which documents their research and work experiences as well as comprehensive readings on the subject.

The authors, researchers and editorial staff must be commended for their enormous task in coming up with this publication. However, their efforts will only become truly significant if the ideas contained in this book are used to boost off-season vegetable cultivation in the country.

RUBEN C. SEVILLEJA, Ph.D.
President, CLSU

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