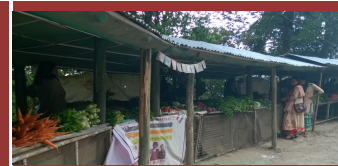


# Economic Analysis of Cost and Return of Off-Season Vegetables with Focus on Poly House Effect in Sikkim



**Kali Sankar Chattopadhyay  
Ranjan Kumar Biswas  
Ashok Sinha  
Debajit Roy  
Debanshu Majumder**



**Study sponsored by Ministry of Agriculture and Farmers Welfare  
Government of India, New Delhi**

**Agro-Economic Research Centre  
(For the States of West Bengal, Sikkim and Andaman & Nicobar Islands)  
Visva-Bharati, Santiniketan  
West Bengal**

**September-2017**



*Study Number - 185*

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## **Project Team:**

### **Team Leader**

Mr. Kali Sankar Chattopadhyay

### **Field Survey, Tabulation and Data Analysis**

Mr. Kali Sankar Chattopadhyay

Dr. Ranjan Kumar Biswas

Mr. Ashok Sinha

Mr. Vivekananda Datta

Dr. Debajit Roy

### **Typing and Secretarial Services**

Mr. Munshi Abdul Khaleque

Mr. Nityananda Maji.

Mr. D. Mondal

Mr. D.Das

Mr. P. Mitra

Mr. A.R. Patra

### **Drafting and Report Writing**

Mr. Kali Sankar Chattopadhyay

Dr. Ranjan Kumar Biswas

Dr. Debajit Roy

Mr. Debanshu Majumder

### **Coordinator**

Agro- Economic Research Centre (AERC), Himachal Pradesh, Shimla.

## Preface

The present Study entitled “Economic Analysis of Cost and Return of Off-Season Vegetables with Focus on Poly House Effect in Sikkim” is an All India Coordinated Study was undertaken at the instance of Directorate of Economics and Statistics, Ministry of Agriculture & Farmers’ Welfare, Government of India, New Delhi. The task of coordination has been entrusted to Agro-Economic Research Centre, Shimla, Himachal Pradesh..

Production of fresh vegetables before or after their normal growing season can provide higher income and employment to the farmers but also require highly specialized techniques and regular supervision. Risk of pest and disease infestation is also high. However, the benefits are much higher than the costs if it can be managed with modern production technologies. A large number of farmers in Sikkim are already engaged in the cultivation of off-season vegetables under polyhouse cover with organic cultivation technique. Such cultivation proved a remunerative proposition for the resource poor farmers besides generating greater employment opportunities, especially for the female family members. The findings of the study suggests greater emphasis on promoting off-season vegetable cultivation under polyhouse in Sikkim.

The task of completion of this Study was assigned to Kali Sankar Chattopadhyay, Deputy Director-in-charge, Ranjan Kumar Biswas, Dabajit Roy and Ashok Sinha. Drafting and analysis of the report was done by Kali Sankar Chattopadhyay, Ranjan Kumar Biswas, Debajit Roy and Debanshu Majumder. Primary information collected through field survey was done Kali Sankar Chattopadhyay, Ashok Sinha, Vivekananda Datta, Debajit Roy and Ranjan Biswas. The tedious work of data entries and tabulation were done by Debajit Roy, Ranjan Kumar Biswas and Debanshu Majumder. Also, Mr. Rishav Mukherjee voluntarily helped in data entry and tabulation. Typing of the report was done by Munshi Abdul Khaleque and Nityananda Maji. Secretarial assistance was provided by D. Mondal, D.Das, P. Mitra and A.R. Patra. B. Singh and S. Hansda helped in the office maintenances.

We convey our sincere gratitude to the Department of Horticulture & Cash Crop Development (FSOAD), Government of Sikkim, and particularly to Mr. Khorlo Bhutia, Principal Director cum Secretary, Mr. K.T. Bhutia, Addl. Director, Dr. P. Subba, Mr. D. K. Bhandari, Mr. M. B. Subba all Jt. Directors, Mr. Sherop Bhutia and Mr. D. Bhujel, Deputy Directors, and all research and administrative staff for their effective help and cooperation during field survey.

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**Prof. Amit Kumar Hazra  
Registrar (Acting)  
&  
Hony. Director  
Agro-Economic Research Centre  
Visva –Bharati,  
Santiniketan**

# Economic Analysis of Cost and Return of Off-Season Vegetables with Focus on Poly House Effect in Sikkim

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# Executive Summary

## Introduction

Horticultural sector, especially cultivation of off season vegetables in Sikkim is getting prominence for over the periods. However, despite significant contribution of horticulture sector to Sikkim, there is dearth of authentic data related to cost and returns off-season vegetables in the state. The present study deals with the costs and returns of off season vegetables in protected and unprotected cultivation with the following objectives-

- To analyze the trends in area and production of vegetables.
- To examine the costs and returns of various vegetables grown by farmers.
- To assess the marketing costs, margins and price spread of various vegetables
- To study the problems faced by vegetable growers in production and marketing of vegetables.
- To study the costs and returns of off season vegetables in polyhouses,
- To study the marketing system of polyhouse vegetable crops,
- To study the problems faced by polyhouse farmers in the State.

Sampling design for the study has been divided into two sections.

### a) Selection of Area

Keeping in view the objectives of the study, multistage stratified random sampling has been used to identify the sample for the study. In the first stage, two districts viz. East and South from the Sikkim state have been chosen based on highest area under vegetables. Next, one development block from each district, namely, Gangtok from East district and Namchi from South district, has been selected. In the third stage, two vegetable growing pockets/cluster (consisting of three villages) from each block have been identified with the help of officials of department of horticulture. Finally, thirty vegetable growers have been randomly selected from each cluster. These vegetable growers have been selected from each of the four selected clusters by Stratified Random Sampling (SRS) method, maintaining the Probability Proportionate to Size class (PPS). Thus, the samples become representative of the actual proportion of all the four strata of the vegetable growers in the respective

clusters. The study covers 120 vegetable growers for six vegetables, viz. peas, cabbage, cauliflower, French bean, tomato and capsicum. In case of farms growing vegetables under polyhouse cover, it should be noted that all farms belong to small category (less than 250 mt<sup>2</sup>).

### **Major Findings**

i) Area under pea's production is higher in North-Sikkim followed by cabbage, beans, tomato and cauliflower. Area under capsicum production in North-Sikkim is virtually negligible. In case of district level production, peas in East-Sikkim and tomato in South-Sikkim has definitely an edge over other crops.

ii) District wise productivity data shows barring tomato, productivity trend for all crops in other districts are more or less similar. Productivity of tomato in North-Sikkim is higher than State average. We find a general resemblance in trend in productivity of peas, cabbage, cauliflower, beans and capsicum also.

iii) The farmers are mostly engaged in agricultural activities and grabbed agriculture as the source of their livelihood, while only a negligible portion among marginal farmers (1.8 per cent) is engaged in other occupation. However, educational standards of farmers are good.

iv) Average family size of the farmers is more or less normal. The overall distribution of workforce of male and female within the age group 16-60 years in East-Sikkim is evenly poised, but in case of agricultural labour category, within small farmers the female dominates over the male labourers.

v) ST, SC and OBCs have dominated the sample pool respectively with their corresponding presence in relation to overall sample size. Only 10 per cent of sample households belong to the general category.

vi) Average holding of cultivated land stands at 1.69 acres per farm. The leased in or leased out phenomenon in both of the districts found among marginal category of farmers only.

vii) Irrigation works in these two districts are mainly done by stacked waters of small rivulets or streams and distributed through polythene pipes to the crop

fields. Approximate distance for carrying water for irrigation from source ranges from 1.22 km to 2.53 km.

viii) Cropping intensity among marginal farmers in South-Sikkim is 143.55. In East-Sikkim, the corresponding figure is 135.40. Besides vegetables, paddy and potato contribute a lot in the sowing calendar though figure of maize is very small.

ix) The relative costs on components like bullock labour, seed, manure, depreciation on farm machinery and interest on working capital reveal similar figure for both marginal and small farmers. It is important to note that imputed value of family labour for vegetable cultivation in general had been around two-third of total cost for all the vegetables.

x) Pattern of cost structure clearly indicates that the marginal farmers use more family labour for vegetable cultivation than small farmers do. Marginal farmers, being faced with resource crunch, generally are not in a position to employ more hired labour for crop enterprise in comparison with their small counterparts.

xi) Net return over total cost (Cost C) had also been higher among the marginal farmers in comparison with the small cultivators with variations across districts and farming classes.

xii) Input-output analysis revealed the fact that in terms of per acre returns from off-season vegetables remained a lucrative proposition. However, at the same time it has to be kept in mind that the data pertaining to all cost and return figures relate to per acre estimate. The small and marginal farmers, though reaping benefits of vegetable cultivation, might not be gaining fabulous amounts due to small scale of operation.

xiii) The growers generally try to reap maximum benefit from small piece of land. Hence, in cases there might have been over optimal use of cheap resources – mainly family labour – in course of the crop enterprise. Therefore, in cases the production process crosses the efficiency frontier.

xiv) A noteworthy feature of East as well as South-Sikkim is that to facilitate marketing of vegetables, FPO (Farmers-Producers-Organization) has been formed,

who take the major responsibility in marketing of output. The vegetable output of the sample farmers are mostly marketed through the FPOs.

xv) Vegetables are mostly marketed in the local markets only, as most farmers sell their output to FPO (Farmer Producers' Organization) to ensure efficient marketing mechanism, whereas the FPOs sell their output in the local markets. In the absence of any market fee or commission in the local markets or organic vegetable kiosks, the costs on account of marketing in nearby markets together account for 7.7 per cent and 7.83 per cent respective for capsicum and tomato.

xvi) Among all six vegetable crops selected for the study, tomato records the highest total loss as proportion to total production, followed by losses in capsicum. Total losses for cabbage and cauliflower come out to be 2.20 per cent and 2.41 per cent of production respectively, while that for peas and French beans stand at 2.01 percent and 1.51 per cent respectively.

xvii) On the part of the expenses incurred by the vegetable growers to bring their products up to the market, it comes out that costs relating to assembling, packing and grading are the highest ranging between 3 to 6.5 per cent varying from crop to crop. Other major expenses on the part of the farmers are carriage up to road head and transporting the product to the market, both ranging between 1 to 3.5 per cent of net price received by the vegetable growers. However, there is no market fee, commission, tax, octroi, etc. in case of marketing of their vegetables for the vegetable growers.

xviii) All the polyhouse structures have been constructed with 100 per cent subsidy by the government. Beneficiaries under the MIDH scheme had to provide land only for the polyhouse, while the contractors on behalf of the government do the rest.

xix) In case of costs of cultivation of capsicum (and tomato) in polyhouse, it can be observed that harvesting of capsicum (and tomato) involves greater costs as compared to other production costs, followed by intercultural practices and seedling/sapling. As Sikkim is the first organic state to be declared by the central government, and no chemical fertilizers or pesticides are being used, the major input

for soil health is application of manure, which is cheap and readily available with the farmers.

xx) As the vegetable growers small in size of operation (100m<sup>2</sup> and 200m<sup>2</sup> of polyhouse cover), the use of hired labour is extremely low. Costs of cultivation for both capsicum and tomato under polyhouse cover stand less than Rs.2500/- per polyhouse. In case of capsicum, net return stands quite high at Rs.23,619/- on the whole. Though a cost of production and marketing is higher for capsicum, a higher net return compensates the costs for capsicum cultivation as compared to cultivation of tomato.

xxi) As construction of polyhouse has been entirely sponsored and shouldered by the state government under provisions of benefit under MIDH scheme, the vegetable growers did not have to face any problem in the construction of polyhouse. The only problem as stated by the vegetable growers is that the contractor unduly delayed the construction of polyhouse. While the farmers do not complaint on non-availability but there is a strong objection regarding quality and price of inputs available.

xii ) Only a few of the sample farmers face problems in transport include higher charges of transport (19.1%) and non-availability of vehicles for transport on time (15.8%). As also, a majority of sample farmers do not have much problem with availability of packing material but there is no storage facility available for their vegetable output.

#### **Policy Implication:**

- As Sikkim has the favourable climatic conditions for growing vegetables, flowers and horticultural crops, policies like MIDH should be obviously help augment growth in agriculture, especially in hilly regions of Himalayan like Sikkim with proactive state cooperation. Hence, *the policy makers should consider allocating a higher budget* for these states or implement similar schemes in vegetables, floriculture and horticulture.
- Cultivation of vegetables under polyhouse cover in organic cultivation technique comes out to be a remunerative proposition for the resource poor



farmers also, generating greater employment opportunities for marginal farmers, especially for the female family members. As such, *steps to promote off-season vegetable cultivation under polyhouse cover should be taken up, so that the redundant labour force can be optimally utilized in agriculture at large.*

- *As in Sikkim, formation of Farmer Producers' Organizations should be encouraged so that the hurdles in post-harvest management and marketing are reduced to the minimum for the marginal and small vegetable producers. Under active state supervision, marketing through FPOs/SHGs can reduce middlemen's commission and keep off other market intermediaries. As members participants, the farmers can themselves act as retailers in government regulated markets and organic kiosks.*