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Income generation through low cost partial shade poly house

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Abstract

The soil and climatic condition of the NE India as well as Assam is very suitable for growing various horticultural crops like fruits, vegetables, spices etc. Production of all the horticultural crops is highly remunerative. But unlike fruits and spice crops, vegetable growers have to face lots of problems in selling seasonal vegetables due to market glut, high cost of production and labour intensive operations. Majority of the vegetable growers have to sell their produce at a distress price or they have to throw away their produces either due to lack of market or to avoid marketing cost. As a solution the farmers are advised for offseason vegetable production. Cultivation of high value offseason vegetables under low cost protected structures has been found to be a viable technology for growing vegetables throughout the year. The low cost polyhouse made of UV stabilized 200 micron polythene sheets supported on bamboos with sutli (ropes) and nails. It also act as rain shelter for crops during rainy season. Present study was undertaken during Feb, 2022- Jan, 2023 at Jorhat district of Assam with the objective to analyse the activities undertaken in polyhouses, cropping sequence followed, profitability and constraints of low cost polyhouses. 03 blocks of Jorhat district viz. Kaliapani, Dhekgorah and Selenghat were selected and from each block, 10 nos. of vegetable growers under low cost polyhouse were selected randomly for the final sample. The sample farmers had partial shade poly houses *i.e.* covering only the upper portion by 200 micron UV stabilized polythene sheet. It was observed that the average investment cost in construction of partial shade poly house was Rs. 14550.00 per 100m² area. The sample farmers undertook mainly two activities in the partial shade net houses viz. seedling preparation and offseason vegetable production. Cropping sequence followed were C₁: vegetable seedling production + leafy vegetable (Aug-Oct) - cucumber (Nov-Jan)-capsicum (Feb-July) and C₂: vegetable seedling production + leafy vegetable (Aug-Oct) - cucumber (Nov-Jan)- tomato (Feb-July). Average gross income and variable cost per unit were Rs 46,000.00, Rs. 48,900.00 and Rs. 12,500.00, Rs. 12,800.00 obtained by the sample farmers in C₁ and C₂ respectively. Thus higher B.C ratio over variable cost was found in C₂ (3.82) as compared to C₁ (3.68). The sample farmers reported that the major disadvantage faced for expanding crop area is high investment cost.

Keywords: Income generation, poly house, vegetable production

Introduction

The soil and climatic condition of the NE India as well as Assam is very suitable for growing various horticultural crops like fruits, vegetables, spices etc. Production of all the horticultural crops is highly remunerative. But unlike fruits and spice crops, vegetable growers have to face lots of problems in selling seasonal vegetables due to market glut, high cost of production and labour intensive operations. Majority of the vegetable growers have to sell their produce at a distress price or they have to throw away their produces either due to lack of market or to avoid marketing cost. As a solution the farmers are advised for offseason vegetable production. Cultivation of high value offseason vegetables under low cost protected structures has been found to be a viable technology for growing vegetables throughout the year. Moreover in Assam according to the third advance

estimates for 2021-22 area under vegetable is 306.24 thousand hectare with production of 3747.48 thousand tonnes and productivity of 12.24 ton/ha which is much lower than the all India average productivity (18.05 ton/ha) and productivity of other leading vegetable producing states like Uttar Pradesh (22.24 ton/ha), Madhya Pradesh (19.28 ton/ha), West Bengal (18.57 ton/ha) and Maharashtra (14.33 ton/ha). The major reason for low productivity of vegetables in Assam is excessive rainfall during April-October due to which farmers cannot go for early production or offseason vegetable production. Due to excessive rainfall the vegetable production is delayed and farmers have to face market glut and could fetch very low price for their produces. But to fetch a remunerative price the farmers have to grow vegetables before or after the peak season. As a solution farmers can grow vegetables successfully during

this period by protecting them from heavy rainfall and also from low temperature. Protected conditions for vegetable production are created locally by using different types of structures. These structures are designed as per the climatic condition requirement of the area. Therefore, in the present scenario of low price of vegetables during peak season of production and excessive rainfall during offseason, cultivation of vegetable crops in protected structures like polyhouse, green house is the best alternative for using land and other resources more efficiently. Cultivation of high value offseason vegetables under low cost protected structures has been found to be a viable technology for growing vegetables throughout the year. In Assam the duration of rainy season is also wide (April-October). During this period, growing of vegetables such as cabbage, cauliflower, broccoli, tomato, brinjal and French bean in open conditions is very difficult. Severe attacks of pest and diseases occur due to heavy rains. So, growing of vegetable crops in low cost polyhouse during this period is very profitable. Control of disease and pest in polyhouse is also easy. According to Agricultural Census 2010-11 out of the total agricultural landholdings of Assam 67.32 percent are marginal (below 1.0 hectare), whereas 18.25 percent are small holdings. Therefore the majority of the farmers who falls under small and marginal category can increase their income by producing high value crops in low volume in polyhouses during offseason.

Table 1: Area and production of vegetables in leading vegetable producing states of India during the year 2021-22 (3rd Advance Estimates)

State	Area ('000ha)	Production ('000MT)	Productivity (ton/ha)
West Bengal	1530.88	28433.88	18.57
Uttar Pradesh	1326.92	29940.09	22.56
Maharashtra	1171.50	16790.28	14.33
Madhya Pradesh	1136.94	21922.93	19.28
Bihar	904.56	17856.10	19.74
Gujarat	808.11	15994.82	19.79
Odisha	679.04	9577.65	14.10
Assam	306.24	3747.48	12.24
India	11347.68	204835.12	18.05

Source: Agricultural Statistics at a glance 2022, Government of India

Types of greenhouse/polyhouse

Low-cost greenhouse/polyhouse

The low cost polyhouse is a zero-energy chamber made of polythene sheet of 700 gauge supported on bamboos with sutli (ropes) and nails. It will be used for protecting the crop from high rainfall. Its size depends upon the purpose and availability of space. The structure depends on the sun for energy. The temperature within polyhouse increases by 6-100C more than outside. In UV stabilized plastic film covered pipe framed polyhouse, the day temperature is higher and night temperature is lower than the outside. The solar radiation entering the polyhouse is 30-40% lower than that reaching the soil surface outside.

Medium-cost greenhouse/polyhouse

With a slightly higher cost, a Quonset-shaped polyhouse (greenhouse) can be framed with GI pipe (class B) of 15 mm bore. This polyhouse will have a single layer covering

of UV-stabilized polythene of 800 gauge. The exhaust fans are used for ventilation. These are thermostatically controlled. Cooling pad is used for humidifying the air entering the polyhouse. The polyhouse frame and glazing material have a life span of about 20 years and 2 years, respectively.

High cost greenhouse/polyhouse

It is constructed on the structure (frame) made of iron/aluminum structure, designed domed shaped or cone shaped (as per choice). Temperature, humidity and the light are automatically controlled as per requirement of the users. Floor and a part of walls are made of concrete. It is highly durable, about 5-6 times costlier, required qualified operator, proper maintenance, care and precautions while operating. The low and medium-cost greenhouses have wide scope in production of domestic as well as export-oriented vegetables.

Other plant protection structures

1. Plastic low tunnels: Plastic low tunnels are miniature form of greenhouses to protect the plants from rains, winds, low temperature, frost and other vagaries of weather. The low tunnels are very simple structures requiring very limited skills to maintain are easy to constructs and offer multiple advantages. For construction of low tunnels, film of 100 micron would be sufficient. The cost of a 100-micron thick film would be about Rs.10/m².
2. Net houses: Net houses are used for raising vegetable crops in high rainfall regions. Roof of the structure is covered with suitable cladding material. Sides are made of wire mesh of different gauges.

Present study was undertaken during Feb, 2022- Jan, 2023 at Jorhat district of Assam with the objective

- a. To analyse the activities undertaken in polyhouses
- b. To find out the Cropping sequence followed by the vegetable growers in polyhouses
- c. To find out the Profitability of vegetable production in low cost polyhouses and
- d. To analyse the advantages and disadvantages of vegetable production in low cost polyhouses.

Methodology

For the present study 3 blocks of Jorhat district viz. Kaliapani, Dhekorgorah and Selenghat were selected purposefully and from each block, 10 nos. of vegetable growers under low cost polyhouse were selected randomly for the final sample. The requisite Information was collected through personal interview method with the help of pretested schedule.

Findings of the study

The sample farmers had partial shade poly houses i.e. covering only the upper portion by 200micron UV stabilized polythene sheet.

Activities undertaken in polyhouses

The sample farmers undertook mainly two activities in the partial shade net houses viz. nursery raising and offseason vegetable production. Almost all the sample farmers

undertook vegetable nursery raising activity in their polyhouses. Seedlings of tomato, chilli, capsicum, brinjal, cucumber, cabbage, cauliflower, broccoli, bhut jalakia etc. are grown by the sample farmers under the polyhouses by protecting them from heavy rains. The sample farmers use these seedlings for growing offseason vegetables in their polyhouses and also they sell these seedlings in market for extra income generation.

Cropping sequence followed

The sample farmers of the study area followed two major cropping sequences, viz.

C₁: vegetable seedling production + leafy vegetable (Aug-Oct) - cucumber (Nov-Jan)-capsicum (Feb-July) and

C₂: vegetable seedling production + leafy vegetable (Aug-Oct) - cucumber (Nov-Jan)- tomato (Feb-July).

Cropping sequence	No. of farmers undertaking	Percentage of farmers
C1	9	30
C2	21	70

Profitability

It was observed that the average investment cost in construction of partial shade poly house was Rs. 14550.00 per 100m² area. Investment cost included the cost of the 200micron polythene sheet, bamboo, nails, iron wires, labour for construction etc.

Average gross income obtained by the sample farmers were Rs 46,000.00, Rs. 48,900.00 respectively for C₁ and C₂, whereas, average variable cost per unit was Rs. 12,500.00, Rs. 12,800.00 respectively in C₁ and C₂. Thus higher B.C ratio over variable cost was found in C₂ (3.82) as compared to C₁ (3.68).

Profitability of production in sample farms

Cost items	C1	C2
Gross Income	Rs. 46000.00	Rs. 48900.00
Variable cost	Rs. 12500.00	Rs. 12800.00
Net Income Over variable cost	Rs. 33,500.00	Rs. 36,100.00
B:C ratio over variable cost	3.68	3.82

Advantages and disadvantages

The sample farmers reported the advantages like

1. Possibility of growing Offseason high value crops
2. Better productivity of the crops
3. Less pest and disease infestation
4. Less prone to adverse climatic conditions etc.

Major advantages perceived by the sample farmers

Sl. No.	Advantages	Percentage of farmers reporting	Rank
1	Possibility of growing Offseason high value crops	100	1
2	Better productivity of the crops	90	2
3	Less pest and disease infestation	86.66	3
4	Less prone to adverse climatic conditions like heavy rainfall, drought, hailstorm etc.	83.33	4

The sample farmers reported that the major disadvantage faced for expanding crop area is high investment cost. Out of the total 93.33 percent of the sample farmers reported the problem of high investment cost in construction of polyhouse for offseason vegetable production. The sample farmers also reported that these polyhouses are not suitable for large scale production (90%) and also require frequent monitoring of the crops (83.33%) under polyhouse for better performance.

Table: Major Disadvantages perceived by the sample farmers

Sl. No.	Disadvantages	Percentage of farmers reporting	Rank
1	High investment cost	93.33	1
2	Not suitable for large scale production	90.00	2
3	Require frequent monitoring of the crops under polyhouse	83.33	3



Low cost partial shade polyhouse



Leafy vegetable production



Tomato production



Lesser blight infestation under polyhouse compared to the outside crops

Summery and Conclusion

The small and marginal farmers of Assam can earn a considerable amount of income by growing vegetables in their small amount of land area in low cost polyhouses created locally by using locally available bamboo and the polythene sheet. Moreover, in the present scenario of low price of vegetables during peak season of production and excessive rainfall during offseason, cultivation of high value vegetable crops in low cost polyhouses during offseason is the best alternative for using land and other resources more efficiently.

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