

# **The State of Protected Cultivation in Punjab: A Survey Report**

## **Executive Summary**

Agriculture is a sector perpetually adopting new technologies that can impact the farmers livelihood. It has been a norm in the sector that technologies are identified and not only passed onto the end-users, but the end-users are trained to use the technology. One such technology that has reached the farmers is Controlled Environment Agriculture, popularly termed Protected Cultivation Technologies (PCTs) such as greenhouse, net house, poly house, glasshouse, etc.

Protected cultivation technology (PCTs) in India is about 30 years old. To promote PCTs in the State on a large scale, the Central Government and State Governments have come up with various programmes and policies. Because these are new technologies, the State Government has made a significant effort to promote these technologies. All the schemes for the promotion of PCTs, and several researchers have listed the advantages of the PCTs, esp. in increasing the yields and income of the farmers, but the actual status of adoption of these technologies on the ground needs to be ascertained. Also, this provides an opportunity to answer questions on the State Government's priority for benefiting the farmers given the limited financial and human resources. Therefore, there is a genuine need to study the State of protected cultivation technologies in the State. With this in view, this study was conducted with the following objectives:

- To analyze the extent of adoption of Protected Cultivation Technologies in the State.
- To study the constraints and challenges in the adoption of Protected Cultivation Technologies in the State.
- To study the reasons for the abandonment of Protected Cultivation Technologies in the State.

- To suggest measures for State Government interventions in introducing new capital intensive technologies for agriculture/horticulture.

## **Methodology**

A list of all the households who have adopted Protected Cultivation Technologies in the State was generated. Of the population, randomly 40 percent of the households spread across various districts of the State were selected for the detailed survey. The sample is classified into four classes based on the size of the area under protected cultivation structures. These are PC structures covering about 1000 square meters, 1000 square meters to 2000 square meters, 2000 square meters to 4000 square meters and more than 4000 square meters. These have been labelled as small, semi-medium, medium and large.

## **Results and Discussions**

- I. The real push for PCTs came with the launch of the National Horticulture Mission in the year 2005. Till 2019, 1421 different protected structures were installed in the State. The area under PCTs is approx. 3246371 sq. meters (324.64 ha.).
- II. Maximum adoption of the PCTs has been by farmers/entrepreneurs in the age bracket of 40-60 years. The average family size of the households who have adopted PCTs is 5.63, with high educational standards. The major primary occupation is farming.
- III. Farmers across the operational land holding sizes have adopted PCTs. More than one-fourth of the adopters have an operational land holding of 10-25 acres.
- IV. 44 percent of the PC structures are medium size (2000-4000 sq.m), and 35 percent of the structures are large-sized (>4000 sq.m).

- V. The maximum number of protected cultivation structures (53 percent) were installed in 2015-16 and 2016-17.
- VI. The majority of the PC Structures, 75 percent, are Naturally Ventilated Polyhouse (NVPH) type. The other major structures are Net-house and Shade house. The households owing the "Small" type of PC structures have established more varied types of PC structures compared to other size categories.
- VII. The significant sources of information for adoption of the PCT are fellow farmers, Department of Horticulture, Punjab, and the farmers' own inquisitiveness about the technology.
- VIII. Expectation of higher returns is the single most important reason for the adoption of PCTs.
- IX. Capital being the limiting factor, the amount of investment to be made is the main reason for determining the area to be brought under PCTs across all size categories. Advice by the dealer is also one of the factors in deciding the area to be brought under PCTs.
- X. The investment made by respondents is in sync with these cost norms fixed under MIDH. The average investment on a PC structure was Rs.39.67 lakh.
- XI. 63 percent of adopters of PCTs have availed loan for establishing PC Structures. There are differences among the adopters of PCTs across the various size categories in availing loans for establishing the PC structure. The adopters of "Small" PC structures size category relied more on their capital to establish structures compared to the "Large" and the "Medium" size category adopters.
- XII. The average own capital invested is Rs. 18.49 Lakh. However, the source of capital invested varies across the different category sizes. On average, it is Rs.6.80 lakh for the "Small" category, Rs.11.86 lakh for

"Semi-medium" category, Rs.17.42 lakh for the "Medium" category, and Rs. 34.78 lakh for the "Large" category.

- XIII. The average deployment of own capital is higher Rs. 26.76 lakh for those who have not availed loan compared to Rs. 13.55 lakh for those who have taken loan.
- XIV. It was observed that the total investment by the adopters who have availed of loan is higher than that of those who have deployed their capital.
- XV. Among those adopters who have availed of a loan for establishing the PC structure, on average, the loan constitutes 71 percent of the total investment.
- XVI. The adopters of "small" size PCT structures have the highest proportion of their capital in total investment and loan constitutes a lesser percentage of total investment implying that these adopters are more confident in the technology.
- XVII. The average rate of interest paid by those who have availed of loan was 12.5 percent. The higher the loan amount, the higher the interest amount on the loans.
- XVIII. Delay in release of subsidy by Government departments add extra burden of interest rates on the loanee, which has made the PCT projects un-profitable.
- XIX. It was observed that 17 percent of the adopters of PCTs who have availed of loan, had availed personal loan (at 14-18 percent interest rate) and the rest have availed of a project loan (at 8-10 percent interest rate). The loan amount, on average, was less under the personal category, Rs. 27.76 lakh, compared to the project category Rs. 35.20 lakh.
- XX. It was also observed that a more number of PCTs adopters who have installed the "small" size structures availed personal loans compared to other categories. This implies that "Small" size PC structure category is

disadvantaged, as they get a loan at a higher interest rate, which adversely impacts their profitability.

- XXI. 98 percent of the adopters of PCTs have availed subsidy from the Government for installation of the structures. As per the scheme design, the amount of subsidy increases with the size of the PC structure.
- XXII. However, variations have been observed across adopters who have availed of loans and those who have not. It was observed that the adopters who have availed of a loan have, on average, got a higher amount of subsidy Rs. 20.68 lakh per beneficiary compared to Rs. 12.08 lakh for those who have not taken a loan.
- XXIII. Only 20 percent of the structures are insured.
- XXIV. It was observed that 86 percent of the structures suffered damage after installation and the frequency of damage is 1-3 times. The damage to the structures is more than the average for the "Small" and the "Semi-medium" size category. Wind storms are the primary cause of damage to PC structures. The average expense on the repair of the structures per annum is Rs. 1.57 lakh.
- XXV. The enquiry into the reasons for the dismantling of PC structures revealed that 48 per cent of the respondents (who uprooted the structure) dismantled the structures due to damage caused to the PC structure by storm.
- XXVI. 84 percent of the structure owners have attended training before or after establishing the structure and majority of those who participated in the training found the training to be helpful. The owners found the training useful as it covered "knowledge of inputs", "marketing strategy" and "economics".
- XXVII. The percentage of owners who have attended training is less for "Small" size PC structure owners compared to others but a higher percentage of them found the training to be useful.

- XXVIII. The main agencies for providing training are Punjab Agricultural University, Ludhiana and the Centers of Excellence of the Department of Horticulture, Punjab.
- XXIX. The primary service expectation of the PCTs Structure owners met by the Department of Horticulture, Punjab was "supply of quality planting material". The other major ones are visits by technical persons, subsidies on planting material, and advice regarding what must be grown. However, most adopters were of the view that Department of Horticulture should be more proactive in providing extension services of protected cultivation.
- XXX. 25 per cent of the PCT structures have been dismantled. The maximum number of structures has been dismantled in the year 2015-16. The dismantling of the PC structures is more in case where the owners have availed loan than where a loan has not been availed.
- XXXI. The "medium" size PCTs structure owners is the most significant category among the owners of PCT structures who have dismantled the structure, whether loan is availed or not.
- XXXII. 44 percent of the owners do not intend to continue with the protected cultivation.
- XXXIII. Only 32 per cent of the PCTs structure owners would recommend PCT to other farmers. The primary reasons for not recommending it to other farmers are; non-profitability, labour intensive, marketing problems, difficulty managing, and high technical knowledge.

### **Policy Implications**

Based on the major findings of the present study, the following policy implications may be stated as under-

- The Protected Cultivation structures should be erected specifically as per the designs approved by Punjab Agriculture University. Concerned officials should release any benefit, whether financial or other, only if the structures are as per recommended design.
- Not only is the design of the structure important but the placement of structure in the field, its orientation, setting of windbreaks are important factors and Department should have fixed guide lines for this.
- The Department of Horticulture should handhold the farmer/entrepreneur who have availed financial assistance for a specific period.
- The training provided to the farmers/entrepreneurs on PCTs should be more rigorous and practical.
- The Department should enlist insurance companies for providing insurance to the PC structures and premium should be subsidized @ 50 percent of the cost of premium.
- There should be a higher level of coordination between the private sector, Punjab Agricultural University, Ludhiana and Department of Horticulture, Punjab to ensure