

Constraints Faced by Farmers in Adoption of Protected Cultivation Technologies in Kalyana Karnataka Region of Karnataka

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Received : August 2022

Accepted : September 2022

ABSTRACT

The study was conducted in Koppal and Ballari districts of Kalyana Karnataka region to study the extent of adoption of protected cultivation technology during the year 2020-21. Total sample of 120 farmers was selected by using simple random sampling procedure. The results indicated that scarcity of the water was the environmental constraints for 81.67 per cent of the respondents and majority (95.83%) of the respondents suggested for Increase in the financial support for drip and sprinkler irrigation. Hence, it is recommended to increase the financial assistance for establishing the irrigation structures. Lack of skilled labour was the major (93.33%) labour related constraint faced by the farmers hence, government may consider training the farmers on protected cultivation skills for skill development in protected cultivation. Lack of scientific knowledge was the major technical constraints for 90 per cent of the respondents hence, development departments, NGOs and other concerned departments may conduct the education activities on protected cultivation for the benefit of the farming community.

Keywords : Adoption constraints, Scientific knowledge, Protected cultivation

HORTICULTURE is one of the major drivers of growth to provide food, nutritional security along with improving the economic condition of the farmers in the agricultural sector. It provides employment opportunities to major portion of the farming community in India. Fruit crops are relatively resilient to changes in weather conditions and identified to be a major source of livelihood for the farmers in the country. Vegetables are grown mostly by small and marginal farmers which augments the major part of income of farmers. Further, horticulture sector enables the population to enjoy a diverse and balanced diet for healthy living. This sector has gained importance over the last decade as a major contributor to the growth of agriculture and allied sectors.

Several measures have been taken by the government for the development of the horticulture sector in the country. The improved technologies have been continuously introduced in the country such as High-

tech horticulture in general and protected cultivation in particular among the farming community with an intention to grow the horticultural crops in off-season also by reducing post-harvest losses. Protected cultivation has offered a new dimension to get more income in a limited area. A protected cultivation structure is a framed or an inflated structure covered with a transparent or translucent material in which crops could be grown under the conditions of at least partially controlled environment and which is large enough to permit supervisors and labour to work in carrying out cultural operations.

Indo-Israel project on greenhouse cultivation, initiated at the Indian Agricultural Research Institute (IARI) in 1998 was India's first effort to introduce hi-tech protected farming of high-value horticultural produce in the country. Later the project has been renamed as Centre for Protected Cultivation Technology (CPCT) and IARI continued to maintain the facility. The centre

has been instrumental in designing greenhouse structures, refine and upscale the system to reduce costs besides to suit local conditions.

Climate change is becoming an increasingly significant global problem that can no longer be ignored. The main underlying cause is anthropogenic, *i.e.*, unsustainable use of fossil fuels, forest degradation for industrialization, and rapid urbanization with an overpopulation (Mukherjee *et al.*, 2016).

In India, the area under protected cultivation is presently around 50,000 ha. (Amita, 2020), while the protected vegetable cultivation area is about 2,000 ha. (Chandan and Singh, 2015). Karnataka State is considered as Horticulture State in the country owing to its excellent soil and climatic conditions and multifaceted expertise in the sector. Total farming families in Karnataka are 78.2 lakh of which nearly 20 lakh farming families are dependent on horticulture sector. The production of vegetables mainly capsicum, European cucumber have increased by almost 5 times. Further, different flower crops such as gerbera, carnation, roses etc. are also grown resulting in higher productivity & supply of flowers throughout the year.

The state is promoting protected cultivation under Rashtriya Krishi Vikasa Yojane (RKVY), National Horticulture Mission (NHM) and Krishi Bhagya Scheme. The Government has come up with various programmes and policies providing 50 per cent subsidy to farmers practising protected cultivations like greenhouse, net house, poly house etc. In this context, there is a need to undertake a research study on various aspects related to growth and development of Protected Cultivation Technology in India, extent of adoption by farmers and its socio-economic impact including productivity and sustainability. In present condition agriculture constraints like fragmentation of cultivable land, water scarcity, rapid urbanization, declining crop production and productivity, crashing market prices, declining biodiversity and ever increasing population, demand for food, especially vegetables has increased manifold. 'Protected cultivation' has offered a new dimension to get more income in a limited area in a district.

Several studies have been conducted on horticulture crops in open field condition to know the Adoption, but very few research studies have been conducted on protected cultivation in this regard. Some of the studies shown that, there is a tremendous scope for development of technologies which is suitable for vegetable production under protected cultivation. With this background, the study was undertaken with the following objective to study the extent of adoption of Protected Cultivation Technology.

METHODOLOGY

The study was conducted in Koppal and Ballari districts of Kalyana Karnataka region in Karnataka during the year 2020-21. The districts were selected purposively due to maximum area under protected cultivation and also more scope for protected cultivation in these districts. From each district, 60 farmers who have adopted protected cultivation technology was selected for the study. Thus, the total sample of 120 farmers was selected by using simple random sampling procedure. A structured and pre-tested interview schedule prepared keeping in view the objectives of the study was used for the survey. The data were collected by personal interview and the focussed group discussion method wherever it was found suitable. The data collected for the study was tabulated, processed and analysed using the suitable statistical methods.

RESULTS AND DISCUSSION

Constraints as Perceived by Respondents in Adoption of Protected Cultivation Technologies

The analysis of data regarding the environment constraints as perceived by respondents in adoption of Protected Cultivation Technologies is projected in Table 1. The results indicated that regarding the environment constraints, Scarcity of water for irrigation was the major constraint for 81.67 per cent of the respondents and ranked I followed by Fluctuating weather conditions (74.17%) ranked II, Occurrence of pest and diseases (54.17%) ranked III, Poor drainage of soil (33.33%) ranked IV and Perishable nature of flowers / vegetables (26.67%) ranked V were the major constraints.

TABLE 1
Environmental constraints as perceived
by respondents in adoption of protected
cultivation technologies (n=120)

| Constraints | F | % | Rank |
|---|----|-------|------|
| A. Environmented constraints | | | |
| Incidence of pest and diseases and diseases | 65 | 54.17 | III |
| Perishable nature of flowers / vegetables | 32 | 26.67 | VI |
| Fluctuating weather conditions | 89 | 74.17 | II |
| Poor drainage of soil | 40 | 33.33 | IV |
| Scarcity of water for irrigation | 98 | 81.67 | I |

The probable reason for scarcity of water for irrigation could be in depletion of the ground water table. Adoption of drip irrigation and the micro irrigation techniques might be the solution for the constraint. The number farmers who have adopted drip and sprinkler irrigation is not s=up to the mark hence, there has to intensive efforts from the extension fuctionaries to improve the adoption of such technologies. Lack of technical guidance on regulation of the environmental factor in the protected cultivation might be reason for the farmers to feel occurrence of pest and diseases as constraint. Lack of adoption of suitable drainage techniques might be the reason for poor drainage in the structure. Perish ability of the fruits and vegetable is due to less keeping quality and through cold storage and rehydration it can be reduced if the farmers want to store the produce for more period of time.

The analysis of data regarding the Technical constraints as perceived by respondents in adoption of Protected Cultivation Technologies is projected in Table 2. Lack of scientific knowledge about crop production under PCT was the major technical constraints for the respondents which was ranked I followed by Non-availability of quality PCT equipments at local market (85.83%) ranked II, Limited and irregular power supply (82.5%) ranked III, Non-availability of quality inputs at right time (74.17%) ranked IV. Difficulties in following the recommended practices (69.17%) ranked V and Lack

of technical guidance about production techniques (62.5%) ranked VI. The results are in conformity with the findings of Mahadevappa and Mokshapathy (2015).

TABLE 2
Technical constraints as perceived by respondents
in adoption of protected cultivation
technologies (n=120)

| Constraints | F | % | Rank |
|--|-----|-------|------|
| Non-availability of quality inputs at right time | 89 | 74.17 | IV |
| Limited and irregular supply of power | 99 | 82.5 | III |
| Lack of technical guidance about production techniques | 75 | 62.5 | VI |
| Lack of scientific knowledge about crop production under PCT | 108 | 90 | I |
| Difficulties to follow recommended practices | 83 | 69.17 | V |
| Non-availability of quality PCT equipments in local market | 103 | 85.83 | II |

The probable reason for the lack of technical knowledge could be attributed to poor functioning of the gross root extension functionaries. The less frequent visits of the extension functionaries in the study area might have made farmers to feel the constraint. The irregularity in providing the power supply by concerned authority was major concern for the since the investment in other sources of power requires additional investment. The investment required for establishing the retail traders of inputs required for the protected cultivation might have made them to feel non availability of the inputs at right time as a constraint. Complexity of the information regarding the production practices in protected cultivation might have made farmers to have the opinion of difficulties in following the recommended practices. The poor functioning of the local extension system is the reason for the farmers to feel technical guidance as the concern.

The analysis of data regarding the labour related constraints as perceived by respondents in adoption of Protected Cultivation Technologies is projected in Table 3. Lack of availability of skilled labour was the major labour related constraint for 93.33 per cent of

the respondents which was ranked I followed by Scarcity of labour during peak seasons (90.00%) ranked II and High wages of skilled labour (80.00%) ranked III. The results are in line with the findings of Itigi *et al.* (2017).

TABLE 3

Labour related constraints as perceived by respondents in adoption of protected cultivation technologies (n=120)

| Constraints | F | % | Rank |
|--|-----|--------|------|
| Scarcity of labour during peak seasons | 108 | 90 | II |
| High wages of skilled labour | 96 | 80 | III |
| Lack of availability of skilled labour | 112 | 93.333 | I |

The protected cultivation requires the skilled labour since the availability of the labour is a constraint farmers expressed that lack of technical skilled labour as constraint. The availability of labour during the peak season such as harvesting. The sowing is less the protected cultivation also impacted by this. Hence farmers are of the opinion that lack of labour during the peak season. Since the labour demand is more the wages will automatically increase hence the labour cost is also more in the study area.

The analysis of data regarding the economic constraints as perceived by respondents in adoption

TABLE 4

Economic constraints as perceived by respondents in adoption of protected cultivation technologies (n=120)

| Constraints | F | % | Rank |
|---|-----|-------|------|
| High initial investment for construction of structure | 108 | 90 | II |
| Crop insurance is not covered for flowers / vegetables | 112 | 93.33 | I |
| Lack of awareness about credit and subsidy facilities | 85 | 70.83 | V |
| High cost of plant protection chemicals and planting material | 92 | 76.67 | IV |
| Lack of adequate and timely disbursement of loan | 65 | 54.17 | VI |
| High cost of transportation | 85 | 70.83 | V |
| High cost of planting material | 98 | 81.67 | III |

of Protected Cultivation Technologies is projected in Table 4. Crop insurance is not covered for flowers/vegetables was the major economic constraints for 93.33 per cent of the respondents ranked I followed by High initial investment in structure construction (90.00%) ranked II, High cost of planting material (81.67%) ranked III, High cost of plant protection chemicals and planting material (76.67%) ranked IV, High cost of transportation (70.83%) and Lack of awareness about credit and subsidy facilities (70.83%) both constraints ranked V and Lack of adequate and timely disbursement of loan (54.1%) ranked VI. The results are in line with the study conducted by Malik, K and Vinaykumar (2019) and Kumar *et al.* (2016).

The fruits and vegetables are not included in the crop insurance, hence most of the farmers considered it as a major economic constraint. The protected cultivated structure requires high initial investment. Hence, farmers considered it as economic constraint. Most of the Farmers are not aware of the credit and subsidy related information hence, they consider it as economic constraint. The procedural delay in the disbursement of loan might have made the farmers to consider timely disbursement of loan as constraint.

The analysis of data regarding the marketing constraints as perceived by respondents in adoption of Protected Cultivation Technologies is projected in Table 5. Market price fluctuation was the major

TABLE 5

Marketing constraints as perceived by respondents in adoption of protected cultivation technologies (n=120)

| Constraints | F | % | Rank |
|---|-----|-------|------|
| Market price fluctuation | 114 | 95 | I |
| Difficulty in grading the produce on the farm | 90 | 75 | IV |
| Lack of specialised markets for flowers / vegetable grown under protected condition | 112 | 93.33 | II |
| Lack of marketing facilities at local place | 81 | 67.50 | VI |
| Distress sale due to immediate need of money | 89 | 74.17 | V |
| Problems of transportation means | 92 | 76.67 | III |

marketing constraint for 95.00 per cent of the respondents and ranked I followed by Lack of specialised markets for flowers / vegetable grown under protected condition (93.33%) which was ranked II. Problems of transportation means (76.67%) ranked as III, Difficulty in grading the produce at the production level (75.00%) ranked as IV, Distress sale due to immediate need of money (74.17%) ranked as V and Lack of marketing facilities at local place (67.5%) ranked as VI. The findings are in line with the findings of Chandresh *et al.* (2015).

The volatility of the price in the market might be the possible reason for considering the price fluctuation as major marketing constraint. There are no exclusive markets for the trade of protected cultivation produces hence most of the farmers might have considered it as marketing constraint. Lack of transport was considered as constraints to poor quality roads in the study area hence farmers considered it as marketing constraint. Grading requires additional labour hence farmers might have considered it as a marketing constraint. Farmers require money to pay off the debt or to invest in the other resource hence they sell it immediately hence they considered it as constraint. The lack of marketing infrastructure in the local place might have made them feel it as marketing constraint. The results are in line with the findings of Pavithra (2019), Nordey *et al.* (2017) and Bishnoi *et al.* (2017).

Suggestions by Respondents for Improving the Adoption of Protected Cultivation Technologies

The suggestions for improving the adoption of Protected Cultivation Technologies are presented in Table 6.

The results indicated that Increase the financial support for drip and sprinkler irrigation was the major suggestion given by majority (95.83%) of the respondents which was ranked I, followed by Provide technical guidance about the protected cultivation (90.83) ranked II, Increase the subsidy or loan for protected cultivation (90.00%) ranked III, Subsidy for farm machinery in protected cultivation (84.17%) ranked IV, Supply of quality inputs at low price in right time (76.66%) ranked V, Promotion of low cost

TABLE 6
Suggestions as perceived by respondents in adoption of protected cultivation technologies (PCT) (n=120)

| Constraints | F | % | Rank |
|--|-----|-------|------|
| Increase the financial support for drip and sprinkler irrigation | 115 | 95.83 | I |
| Provide technical guidance about the protected cultivation | 109 | 90.83 | II |
| Increase the subsidy/loan amount for protected cultivation | 108 | 90.00 | III |
| Subsidy for farm machinery purchased for protected cultivation | 101 | 84.17 | IV |
| Promotion of low cost protected cultivation structures | 91 | 75.83 | VI |
| Supply of quality inputs at low price at right time | 91 | 76.66 | V |
| Regulation of marketing of protected cultivation produces | 86 | 71.67 | VII |
| Promotion of reasonable cost farm machinery | 84 | 70.00 | VIII |
| Creation of cold storage facility at taluk level | 77 | 64.17 | IX |
| Supply of PCT equipments at local market | 64 | 53.33 | X |

protected cultivation structures (75.83%) ranked VI, Regulation of marketing of protected cultivation produces (71.67%) ranked VII, Promotion of reasonable cost purchased for farm machinery (70.00%) ranked VIII, Creation of cold storage facility at taluk level (64.17%) ranked IX and Supply of PCT equipment's at local market (53.33%) is ranked as X.

The possible reasons for suggestions could be attributed to the reasons such as limited subsidy along with lack of technical guidance on the protected cultivation and higher cost in establishing the PCT structure might have made them to give above suggestions for the improvement of protected cultivation technology adoption.

Scarcity of the water was the environmental constraints for 81.67 per cent of the respondents and majority (95.83%) of the respondents suggested for Increase in the financial support for drip and sprinkler irrigation hence, it is recommended to increase the

financial assistance for establishing the irrigation structures. Lack of skilled labour was the major (93.33%) labour related constraint faced by the farmers hence, government may consider training the farmers on protected cultivation skills for skill development in protected cultivation. Lack of scientific knowledge was the major technical constraints for 90 per cent of the respondents hence, developmental departments, NGOs and other concerned department may conduct the educational activities on protected cultivation for the benefit of the farming community.

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