

EXECUTIVE SUMMARY

The Department of Horticulture (DoH), Government of Karnataka is entrusted with the responsibility of overall development of Horticulture in the State. With ever increasing population and decreasing availability of arable land for cultivation of horticulture crops the department has focussed its thrust areas to enhance productivity, quality to ensure higher generation of income for farmers. In this direction the Department of Horticulture considered protected cultivation, precision farming as thrust areas for comprehensive development of horticulture. With these objectives in view the department implemented two schemes namely National Horticulture Mission (NHM) and Rashtreeya Krishi Vikas Yojana (RKVY) that provided an investment incentives at 50 per cent of the cost of protected structures including drip irrigation system as per the norms to promote hitech cultivation under protected structures. These schemes also intend to ensure that the farmers are enabled to adopt capital intensive technologies, acquire skills of Good Agriculture Practices(GAP) to cultivate, preferably exotic crops with an ability to control elements within the micro-climate of structures.

The Department of Horticulture desired to evaluate the above two schemes in the study period in order to ascertain if the objectives of the schemes were met with an intention to refine the scheme for the benefit of the state and farming community and also to get a feedback from the field. This study was entrusted to the Institution of Agricultural Technologists, (IAT), Bangalore to study and suggest the suitable mid-course correction along with short, medium and long term recommendations to make the scheme more effective.

Complying with the Terms of Reference (ToR) and approved inception report 27 samples each from NHM and RKVY scheme were randomly selected from the 18 districts wherein these two schemes were implemented during study period. The ToR indicated the number of beneficiaries under RKVY as 148 and 48 respectively for the year 2012-13 and 2013-14. The number of beneficiaries of NHM scheme was not indicated. However, on concerted and sustained effort of Institution of Agricultural Technologists (IAT), the beneficiary list was collected and the total number of beneficiaries were arrived at 905 and 243 under NHM and RKVY schemes respectively. A sample size of 27 each for NHM and RKVY schemes as approved in the inception report was randomly drawn and the study was

undertaken by the collection of relevant information thorough pre-tested questionnaire. Likewise, information was also obtained from the private entrepreneurs who have established protected cultivation structures without availing Government assistance, for comparison. The information on the implementation of the schemes were also obtained from the office of the DoH through personal interactions.

The study indicated that the objectives of the scheme were accomplished to a large extent, especially in motivating the farmers towards cultivation of exotic flowers and vegetables under protected cultivation. The scheme promoted the exposure of farmers to hitech cultivation aspects and spurred them to learn and adopt new technologies.

The study clearly revealed that the first-generation units erected under NHM scheme as they were of a smaller size and uneconomical. These structures suffered a higher degree of structural damage as they were relatively inferior to structures constructed as per the RKVY specifications. The study also indicated there is a scope to review and revise eligibility criteria for selection of beneficiaries as well as the design and cost of structures keeping in view the agro-climatic conditions in mind to ensure efficient use of resources and accomplishment of the objectives.

Precision farming techniques of drip irrigation and fertigation which were integral part of the two schemes were understood and adopted by farmers. While, Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) systems have not been adopted to a desired level and are limited to self- learning process.

A comparison of these two schemes with the initiatives of farmers who have adopted protected cultivation without any financial support from the Government indicated that they have focused more on larger structures, sourcing cost effective materials, mostly second hand materials and cultivation of commercially viable exotic crops like Gerbera, Rose and Carnations as cut flowers and coloured Capsicums, English Cucumbers, Tomatoes and seed production. However, it is interesting to note that the cost of structures were comparatively lower over the scheme structures.

The study brought out that the preference for the type of protected structures mainly dependent on its location, economic factors, especially the risk bearing ability of farmers and the capacity to mobilize capital and the availability of market. In southern agroclimatic zones

preferred Naturally Ventilated Polyhouse structures, while northern agro-climatic zones preferred shadenet structures.

It is also observed that there were noticeable shortcoming in both the schemes in respect of capacity building efforts, particularly in the pre-development stage. Preparing farmers in technical aspects of structures, complete protocol for cultivation of exotic crops, post development linkages to technical consultants (not structural consultants) is essential and need of the hour. Water and power supply were the two critical factors found to impact the financial viability and the continuity of the project itself.

Since, the area under protected cultivation is expected to increase appreciably in the coming years, there is an immediate need to standardize the design specifications of the protected structures with cost. It would be desirable, if prestigious and concerned institutions like Indian Institute of Science (IISc) or Indian Institute of Technology (IIT) and the University of Agricultural Sciences, at Bangalore/ Dharwad and Raichur are entrusted to develop standards of structures in each of the agro-climatic zones. The study reveals that at small and marginal farmers level, the unit size is irrelevant, as long as farmer is able to find a suitable crop production and marketing. Introduction of special structures like low cost tunnels for introduction in vegetable seed producing districts of Haveri, Koppal, Chikkaballapura districts and for production of leafy vegetable production needs to be studied. .

Though the NHM and RKVY schemes have succeeded in nudging the farmers towards protected cultivation, there is a lag in transfer of technology, capacity building and development of a supply chain system. In order to ensure proper implementation of the scheme there is an urgent need to establish an independent monitoring unit comprising of crop specialists to provide the required technical knowhow.

The Department can take a leaf from the Spanish model in Almerimar, El Ejido, Balanegro and Roquetas Demar regions of Spain, where a cluster of farmers with around 46,000 hectares of greenhouses practice Good Agriculture Practices to dominate tomato market of entire Europe. It is possible to replicate such models in Karnataka and help farmers attain competitiveness in global markets, as the state is blessed with favourable agro-climatic condition for cultivation of crops round the year.

An attempt has been made to analyze the data systematically and inferences are drawn on each one of the issue flagged in the terms of reference. Having regards for subjects under evaluation and critical issues for midterm correction, issue based recommendations have been made. These comprises of short term, long term and policy related issues. Capacity building, selection of beneficiaries in advance, cluster approach, development of a comprehensive crop cultivation manual, technical information on design & specification of structures, financial assistance for replacement of covers, development of a workable marketing model, adoption of rain water harvesting systems and installation of solar power pumps and extension of benefits to leased lands are some of the major recommendations made to make the scheme more effective. The issue based recommendations are as follows:

Major Recommendations

1. Short Term Practicable Recommendations:

a) Capacity Building:

- i. In order to achieve the desirable levels of capacity building, it is recommended that a comprehensive training schedule be prepared and organized at institutes of State Agricultural Universities, Indian Council of Agriculture Research Institutes and Department of Horticulture and at recognized private Organisations.
- ii. The training needs of farmers should be a continuous process and training should be a pre-requisite to qualify as a beneficiary under scheme for protected cultivation.
- iii. Some beneficiaries have been a source of excellence in production of fruit, flower and vegetables recording sustainable productivity and revenues. Such farmers' units are to be recognized as "Learning centers" so that the new beneficiaries are trained and aided in self learning of techniques and skills needed for sustainable management of production under protected cultivation.
- iv. 10% of the budget of the scheme may be allocated to capacity building programme as this component is pivotal for accomplishment of the scheme objectives to a very large extent.

b) Beneficiary Selection

- (i) The department of horticulture should initiate action to develop procedure and design format for getting the application of prospective beneficiaries in advance to avail benefits.
- (ii) A seniority list shall be prepared and kept ready at taluka/ district levels before commencement of the year.
- (iii) Action may be taken to give wide publicity for the knowledge of prospective beneficiaries.
- (iv) Online registration of applicants may be introduced with all checks and balances.
- (v) The unsanctioned applications if any, of the previous year be considered in the subsequent years for sanction.

c) Cluster Approach for Marginal Holdings

- i. Irrigated Districts like Mandya, Mysore, Hassan and Davanagere have large number of very small holdings, it is recommended to evolve a pilot scheme to implement polyhouse based horticulture in single location/ Village Clusters which can have all logistics in place.
- ii. Similarly, Pilot schemes are necessary to try soil less cultivation techniques, like elevated cultivation under polyhouse in problematic soils like saline and alkaline soils.
- iii. Lastly the tunnel cultivation techniques appear to be highly suitable for short duration vegetable crops and seed production of short duration flowers and vegetable crops.
- iv. Similarly, there are Passive Solar Green/polyhouses that are sturdier, affordable that are suited for small farmers. These can be tried on pilot basis.

d) Crops and Cultivation Practices

- i. It is recommended that State Agriculture Universities and the IIHR may identify crops that are suitable and profitable for cultivation under all of the protected cultivation structures. However crops like Cabbage, Chilies, Spinach and Cauliflower may also be promoted apart from the present crops grown under protected cultivation viz., Capsicum, Gerbera, Rose, Carnation, Tomato, Cucumber etc.
- ii. It is recommended that an expert committee comprising of concerned experts from Agriculture/Horticulture universities, Indian Institute of Horticulture Research and officials of department be formed to develop a comprehensive crop cultivation manual covering all aspects.
- iii. Secondly, a technical unit consisting of crop specialists to provide specialized domain technical know-how to farmers has to be created. This technical unit may be located at two places, one at Bangalore and another at Belagavi, to cater to the needs of farmers. This set up would go a long way in implementation and monitoring of the programme in an effective manner. This may be coordinated through University of Horticulture Sciences.
- iv. A pool of experts be empaneled from the experts available with Institution of Agricultural Technologists or in the private sector who are agriculture technologists with special knowledge on protected cultivation, so that farmers can be provided with advisory services as and when required on the lines of Karnataka Milk Federation where fees of such professionals may be made as a part of capacity building component of the scheme.

2. Long Term Practicable Recommendation

a) Structure Related issues

- i. It is recommended to identify all the damaged structures and extend financial support for replacement of plastics and shade-nets and make them functional.
- ii. It is felt necessary to prepare structural design, specifications along with costs suitable for different agro-climatic zones. In this connection, it is suggested

that the ‘*experts services*’ available with Indian Institute of Science/ Indian Institute of Technology be taken advantage of. This helps to avoid all the shortcomings observed hitherto.

Marketing Issues

To adopt and identify area suitable for protected cultivation and design the scheme implementation in such a way that a pool of beneficiaries are located in clusters (not scattered) and provide integrated cluster marketing or on a farmer produce organisation model or even on KMF model of procurement, processing and marketing.

Hence, in order to study and develop a workable marketing model, it is suggested to constitute a committee of experts drawn from concerned institutions/ organizations and model be put into operation on priority.

3. Recommendations Requiring Change in Policy

- i. To amend the land reforms act to facilitate a long term leasing of lands for agriculture/ horticulture purposes with ease of process, for hi-tech cultivation practices/ protected horticulture with high investments. This encourages private investments and productivity in the sector.
- ii. The system of release of subsidy could be made similar to that of National Horticulture Board.
- iii. Interest subvention needs to be considered for the project undertaken by farmers with bank loans without availing scheme subsidy.
- iv. Adoption of rain water harvesting technology and installation of solar power generation units to argument power shortage be made part of the project and the investments other than structure and drip irrigation should also be considered for incentivizing.

a) Convergence of Other Schemes

Government of India and State Government have launched several programmes for development of agriculture, horticulture over years. Focused development of horticulture received attention only in recent years. The objectives

and scheme guidelines issued have shown variability so much so that the yardsticks/ parameters prescribed in different schemes often led to confusion and criticism at farmers level. It has also hampered implementation.

Multiplicity of the schemes to achieve the broad objectives would no way help in achieving set goals. In this direction, it is felt necessary to simplify the guidelines / procedures and rationalize cost norms and subsidies to be provided to beneficiaries.

Therefore, it is recommended to prepare a comprehensive horticulture development plan for Karnataka with an emphasis on protected cultivation by merging ongoing schemes and their components. In order to achieve this, it is suggested that a team of experts from development departments and other stake holders be constituted to study all the ongoing schemes and merge the components so as to have a comprehensive plan in place.

The Technical team of Institution of Agricultural Technologists, Bengaluru strongly feel that the scheme is very important to drive the rural economy and shall be continued with necessary mid-course corrections recommended in the report.