

## Protected Cultivation - A Success Story



**1. Situation Analysis/Problem Statement:** The Erstwhile Princely State of Chamba was merged with Himachal Pradesh as a separate administrative unit on 15<sup>th</sup> April 1948. The district is situated in the lap of the Himalayan mountains between north latitude  $32^{\circ} 11' 30''$  and  $33^{\circ} 13' 6''$ , and east longitude  $75^{\circ} 49' 0''$  and  $77^{\circ} 3' 30''$ . The boundary of the district touches Jammu & Kashmir state in the North West and on the West to Punjab, on the South and southeast to Kangra District and in the East to Lahul Spiti district of the state. Chamba district covers an area of 6,528 sq. km. in the Shivalik and the Central Himalayan region and is a typically rugged terrain with moderate to high cliffs. There are two important mountain ranges Pir Panjal Range and Dhauladhar Range, that traverse the district in a general NW-SE trend. The Pir Panjal range divides water for two major rivers i.e. the Chenab in the north and Ravi in the South. These rivers with their tributaries control the drainage of the area.

The District is wholly mountainous with altitude ranging from 559 meters to about 6,162 meters above mean sea level and climate is found varying from semi-tropical to semi-

arctic. The Scheduled Tribes, with interesting culture practice and way of life, constitute nearly 1/3<sup>rd</sup> of the total population. Among the scheduled tribes, the Gaddis, Gujjars and the Pangwalas are the main tribals of the area. Agriculture, Horticulture and Animal husbandry form the mainstay of the economy.

District headquarter	Chamba (HP)
Altitude	1006 meters
Location	North latitude 32 <sup>o</sup> 10'-33' 13
East longitude	75 <sup>o</sup> 45'-77' 33
Total population	5,19,080
Population of schedule caste	1,11,690 (21.52 %)
Population of Schedule tribe	1,32,907 (25.60%)
Total number of families	8,70,29
Density of population	80 person per sq. km.
Male : Female ratio	986
Average Literacy	72.17
Agricultural labourers	1,28,452
Contractual labourers	1,02,000
No of village	1591

#### **PROFILE OF DISTRICT CHAMBA**

Total Area	6,92,419 ha
Forest Area	2,72,008 ha
Total Agricultural land	66,728 ha
Pasture lands	3,52,594 ha
Total irrigated land	5511 ha
Total Population of district	5,19,080
<b>Total number of blocks</b>	<b>7</b>

<b>Name of blocks</b>	<b>No of Villages</b>
Chamba	307
Tissa	312
Salooni	258
Mehla	140
Bhatiyat	356
Pangi	106
Bharmour	112

**Average Rainfall                    1000-1200mm**

Chamba district enjoys the status of having area in all the four agro-climatic zones of Himachal Pradesh. The economy of the district is predominantly agrarian; population is engaged in agricultural activities. The farmers are small and marginal having average land holding of 0.5 hectare. This hilly and remote district forms the North – Western corner of the state and entire district is mountainous except few valleys lying between 600 mts and 6400 mts above mean sea level. The total geographical area of the district is 6, 528 Sq km (11.72% of HP) with a population of 4,60,887 persons. About 40% of total geographical

area is covered by forests/pastures /grass lands. Climatic conditions vary with elevation of the area, generally subtropical to temperate type climate prevails. Because of altitudinal variations climatic variations are considerable. The high lands of the district are under seasonal snow cover and the climate is cold to very cold during the winters, whereas, in the lower parts it is not so cold. A blanket plan for the development in hills is not possible mainly due to presence of varied agro climatic conditions even within a village. Hence niche based potentials of agriculture and horticulture need to be exploited. In this direction protected cultivation can play a pivotal role in protecting crops (vegetables and cut flowers) from adverse conditions.

2. **Plan, Implement and Support:** With the changing agricultural scenario in the state, protected cultivation of vegetables and flowers has become an important enterprise for the farming community because of its low volume and high value production system. Keeping this in view and the needs of the progressive farmers in the district, the Krishi Vigyan Kendra, Chamba has been continuously working on protected cultivation of crops as one of its priority thrust areas. The KVK has conducted several training programmes as well as demonstrations to update the knowledge of these specific farmers. OFTs and FLDs are conducted for the farmers and inputs in the forms of seeds, planting materials and fertilizers etc. are given to farmers to popularize the concept of protected cultivation. Farmers have been given technical support in terms of consultancies, advisories, trainings, exposure visits, farmers and scientists interactions etc. 30 Polyhouses are constructed exclusively by Krishi Vigyan Kendra Chamba under NICRA Project at Lagga for mitigating adverse climatic conditions.
  - i) **Activities implemented by KVKs to tackle the problem (s) with basket of technologies/alternatives:** The agro climatic conditions of the district are suitable for the cultivation of vegetables, medicinal plants and cut flowers mainly carnation, gladiolus, liliun and orchids. The main problem was the financial assistance, marketing channels and the technical know-how. For this the Parvatiya Gramin bank, KVK and the private company were identified for the assistance. The technical back up support was provided by the KVK to start the venture.
  - ii) **Step by step activities like OFTs, FLDs:** Frontline Demonstrations were executed on capsicum, tomato, integrated management in carnation using Bavistin and net returns of Rs. 20,454 and 45.4 % increase in yield was observed. On farm trials on disease management in tomato under protected conditions were laid out. Treatment Aliette 0.25 %

-Antracol 0.2 % -Quintal 0.25 % -Contaf 0.05 % -Ridomil MZ 0.25 % at nursery, planting, growth, flowering and fruiting stages respectively recorded fruit yield of 632 q/ha.

- iii) **Extension efforts/strategies:** With the onset and consequent fast increase in the construction of Polyhouses in the district, the training need of extension functionaries as well as of the farming community in relation to protected cultivation was soon realized and assessed by the Krishi Vigyan Kendra. Accordingly, officials/farmers representing all the blocks of the district were selected randomly for the specialized trainings in protected cultivation. The KVK organized 30 training programmes in which 614 beneficiaries were educated about protected farming.
- iv) **Facilitation in the form of critical inputs (quality seeds, planting material, livestock, bio-products etc. machinery, literature):** Seeds as well as planting materials and pamphlets highlighting the importance of improved production technologies of various vegetable crops under protected cultivation have been brought out and distributed amongst the farmers.
- v) **Technical support in terms of consultancy, advisories, training, exposure visits, farmer and scientist interfaces etc.:** Exposure visits of the farmers were conducted to the University headquarters at Solan. Off and on campus trainings on protected cultivation and diagnostic visits were conducted.

#### Horizontal Spread of Protected Cultivation Technology through various centrally Sponsored Schemes:

Year	Name of the Scheme					
	Hort. Technology Mission		Pt. Deen Dayal Upadhyay Kisan Bagwan Samridhi Yojna		National Initiatives on Climate Resilient Agriculture Project (NICRA)	
	No. of Polyhouses	Area	No. of Polyhouses	Area (sq.m)	No. of Polyhouses	Area (sq.m)
2009-10	146		239	27273		
<b>2016-17</b>	<b>146</b>	<b>24709</b>	<b>353</b>	<b>40711</b>	<b>30</b>	<b>1320</b>



Training on protected cultivation



Exposure visit of Tribal Farmers



Expert visit to the field



Protected cultivation of Rosemary



Protected cultivation of Capsicum



Protected cultivation in Chamba District



Training on protected cultivation



Exposure visit of Tribal Farmers

**3. Output: Results achieved among participating farmers:** Initially a group of 11 motivated farmers took up the cultivation of carnation in some villages falling in three panchayats. KVK assisted in the registration of the society which is now popularly known as Churah Valley Fruit, Vegetable and Flower Growers Association. Gradually more and

more farmers joined the society and adopted floriculture as an enterprise. The protected structures which were about 12-15 in 1995 proved to be a boon for the farmers and by the year 2004 already 60 polyhouses were constructed. Tissa and Charah valley in Chamba district have made their name on the international map of floriculture. Today more than 300 farmers are growing carnations and other cut flowers in the district under polyhouse conditions.

- i) Groups in terms of gain in knowledge and skills
- ii) Productivity in the demonstration field/enterprise
- iii) Reduction in problem in terms of pests and disease attacks
- iv) Increased economic benefits
- v) **Increase in volume of production:** The production of cut flowers has shown a quantum jump from a meager 4000-5000 sticks to 6.0 lac during 2016.
- vi) Processed products quantity and quality etc.

**4. Outcome: Horizontal spread of problem solving technology (ies) in the neighboring villages, blocks and districts in terms of area and number of farmers:** With the technical guidance of Krishi Vigyan Kendra Chamba, round the year cultivation of cut flowers and vegetable has been popularized in many villages of the district. The area under Churah valley under floriculture was nearly 2.5 hectares initially and under protected cultivation it was about 0.5 hectares. The data shows that the area under floriculture has increased to 26.45 hectares and under protected cultivation is 12.5 hectares.

Farmers of the district were also encouraged to cultivate/grow vegetables like capsicum, tomato, cucumber and beans etc. under protected cultivation. Krishi Vigyan Kendra Chamba has imparted many trainings to the farmer on protected cultivation. 30 polyhouses under NICRA project were constructed at Lagga. All inputs like knowledge, financial assistance was given by Krishi Vigyan Kendra Chamba.

- i) **Economic benefits accrued to secondary level beneficiaries:** The unemployed youth which had formed a small society and established 12-15 polyhouses grew fast and many members got affiliated with the society. Today another society has come up in the area which deals with the protected cultivation of flowers. Such is the enthusiasm in these societies that they have now got the capabilities for repairs as well as for the fabrication of new structure of polyhouses in their own area and outside the valley also and earn handsome amount of money which would have otherwise gone to outside agencies.
- ii) Reduction in use of chemical inputs like pesticides, fertilizers, concentrate feed
- iii) Improvement in quality of produce realized

iv) **Improvement in the family economic status etc.:** Farmers are earning handsome amount of money by producing flowers and vegetables under protected structures.

v) **Estimated outcome (in monetary value) of technology:** The cultivation of carnation in the area involved estimated expenditure of Rs 2,15,000/ha excluding the onetime cost of low cost naturally ventilated polyhouses with a gross income of Rs 10,00,000/ha and a net income of Rs. 7,85,000/ha during second and third year. Thus the B:C ratio comes out to be about 3.65. The cut flowers meet the international quality standards and are in great demand not only in Delhi market but are also being exported to other countries.

**5. Impact:** Large scale/macro level (district/state) evidences related to technological benefits (changes in area and cropping system, livestock number, use of farm machinery & tools, changes in production and productivity of the district/state)

i) Economic benefits (contribution to district/state GDP, district agricultural economy)

ii) **Social benefits (education of children, status in the society, house construction etc.):**  
The living standard of the people of this area has raised now. They have constructed good cemented houses and providing quality education to their children.

iii) Environmental benefits (tolerance to temperature, drought/dry spell etc.)

iv) Institutional developments like processing units, market system, storage structures, industries etc.

v) Number of private vehicles increased.

vi) Migration of local people to other areas in the search of work is almost negligible.

**Future Thrust:**

The Krishi Vigyan Kendra, Chamba envisages the technology transfer on protected cultivation with the major thrust areas being:

- Entrepreneurship development through protected cultivation
- Exotic vegetables cultivation under Polyhouses
- Development of fertigation and Integrated Nutrient Management Schedule
- Development of an Integrated Disease and Insect Pest Management Module for Polyhouse Crops.