

Protected cultivation of vegetables

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Protected cultivation of vegetables offers distinct advantages of quality, productivity and favourable market price to the growers. Vegetable growers can substantially increase their income by protected cultivation of vegetables in off-season as the vegetables produced during their normal season generally do not fetch good returns due to large availability of these vegetables in the market. Greenhouse technology is popular in countries such as Israel and the U.S. It allows precision farming and overcomes limitations of space and disadvantages of climate change. Vegetables are grown in protected polyhouses covered with UV polyethylene sheets. The technology uses less space and gives better yield. Protected cultivation can increase yield. Quality of the produce will be higher. Plants will have fewer diseases. Off-season cultivation of cucurbits under low plastic tunnels is one of the most profitable technologies under northern plains of India. Varieties of cabbage, cauliflower, tomatoes, amaranthus and bittergourd can be grown successfully in protected polyhouses. Promotion of protected cultivation will revolutionize vegetable cultivation. Walk-in tunnels are also suitable and effective to raise off-season nursery and off-season vegetable cultivation due to their low initial cost. Insect proof net houses can be used for virus-free cultivation of tomato, chilli, sweet pepper and other vegetables mainly during the rainy season. These low cost structures are also suitable for growing pesticide-free green vegetables. Low cost greenhouses can be used for high quality vegetable cultivation for long duration (6-10 months) mainly in peri-urban areas of the country to fetch commensurate price of produces. Poly trenches have proved extremely useful for growing vegetables under cold

desert conditions in upper reaches of Himalayas in the country.

Vegetable production in India before 1947 was only 15 million tones. Today, India is the second largest producer of vegetables in the world after China with an annual production of 101.43 million tones from an area of 6.75 million ha. Immediately after independence, growth rate in vegetable production was only 0.5% which remained for many decades and rose to 2.50% during the last decade. Technological advancements with improved gene pool and management practices have helped to achieve productivity of 15 t/ha in the country. India requires about 200 million tones of vegetables to meet the nutritional requirement of an estimated 1200 million people by 2015. Even though the productivity levels of our crops have increased, it will not be sufficient to feed the increasing population. (Sadhan Kumar *et al.*, 2009). The production of vegetable crops under protected conditions is increasing world wide. Protected agriculture or controlled environment agriculture is the modification of the natural environment to achieve optimum plant growth. In these systems various factors of the environment such as air, temperature, humidity, atmospheric gas composition, nutrient factors etc., are controlled. Protected cultivation in the forms of green houses, net houses, low tunnels, mulches etc. offers several advantages to grow crops of high quality and yields, thus using the land and other resources more efficiently.

Some of the major benefits under protected culture are as follows:

- Protected culture offers maximum productivity.
- Protected system requires less labour.
- Input usage, particularly fertilizers