



Off-Season Vegetable Production Technology: A Review

Milan Nepali Joseph^{1*}, Nisha Boudhacharya² and Kushum Nepali³

¹Social Development Forum, Arghakhanchi, Nepal

²Institute Of Agriculture and Animal Science, Rupandehi, Nepal

³Trichandra campus, Kathmandu Nepal

*Corresponding author. E-mail: milanjosheph@gmail.com

This is a review on the Off-Season vegetable production technology. Vegetables comes under daily diet of human beings. For year around availability of fresh vegetables off season vegetable production is necessary. Off-Season vegetable production means production of vegetables in other than regular season. Production of crops beyond the normal and regular crop calendar when demand is high, supply is low and prices are higher will provide better income. Off-season vegetable production can create dramatic income improvement. Off-Season vegetable production technology can create better environment of income improvement and motivates farmers toward commercial cultivation. It is performed by planting at different climatic zones, altering time, different structures, hormones etc.

Off-Season vegetable production means a type of agricultural technology in which vegetables are cultivated and produced fresh before or after their normal season. There may be delay or early production in terms of days, weeks and also months. This Off-Season vegetable production technology can be gained by using different agroclimatic regions, maintaining or adjusting planting time, selecting of varieties, creating artificial and controlled environment through use of tunnels, polythene house, glass houses, hot bed etc. Vegetable farming with its higher farm-gate values and productivity stand as an important sector in agribusiness (Mariyono, 2017). It has supported the livelihood of farmers through household subsistence farming to commercial scale (Van Veenhuizen & Danso, 2007).

Main objective of Off-Season vegetable production is to produce and supply vegetables to consumers at lean period of supply and best prices for products. This technology offers higher prices to farmers. Also this technology ensures food security during peak period to promote timely certain employment. Off-Season vegetable farming is the best sources of income from others and an effective means for the reduction of poverty, unemployment and malnutrition which is continually existing. Commercial vegetable farming has played a vital role contributing to enhancement of economic status of the farmer and provides regular employment and income to the marginal farmers and their family members throughout the year by bringing economic gains (Panta, 2001). Mainly major crops like tomato, cauliflower, cabbage, onion, green peas, radish, carrot, brinjal etc are grown as Off-Season vegetables. Previous studies have shown that the adoption of improved vegetable technologies can lead to dramatic improvements in economic well-being (Weinberger and Genova II, 2005). Altitudes from 400 m to 2000 meters are considered as fit and suitable for off-season vegetable production. According to the Nepal Agricultural Research Council (NARC), Off-Season production technologies for tomato, onion, cucumber, cabbage and cauliflower have been recommended to farmers (Shah *et. al.*, 2004).



Types / Techniques Of Off-Season vegetable production

1. Adjusting Planting Time

Some vegetables can be grown by altering the time of cultivation. e.g cucurbitaceous crops can be grown 2 months earlier in warmer region.

2. Using Different Agroclimatic Region

Many countries like Nepal have diverse range of climate and geographical variation. Through the utilisation of these variation (micro cliamtes) same vegetable can be grown as seasonal in one place and Off-Seasonal in another place within same country .

3. Selection of Varieties:

Many of hybrid varieties of vegetables are widely used for producing vegetables in early, late season. Use of these varieties has create the longer availabilty of vegetables production and year around production.

4. Creating controlled Environment

Main challenge for producing off season vegetable production is temperature , so to mainatain temperature different types of structures are used :

4.1 Plastic Tunnel

It is easiet, cheaper method of controlling environment small greenhouse-like structre, covering the plants along the row with the help of polythene sheet.It helps for early growth of plant by increasing temperature , also it provides protection from frost , rain etc Seed bed are raised about 1m width and also bamboo stakes are bent over it giving semicircular shape and polthene are tied over the structure.Generally this is practiced for raising seedling for summer time in winter season. The low cost plastic tunnels can be used to protect the crops from excessive rainfall and provide the favorable environment for the production of better quality crops over the period of time (<http://www.icimod.org>).e.g research workers (Popescu *et al.*, 1984; Gnatyuk *et al.*, 1987; Borrelli, 1983; Haupt, 1986; Buitelaar, 1987) also reported earliness in maturity, better quality and higher yield in various cultivars of tomato grown for protected culture.

4.2 Polythene House

Polythene house can be prepared in various sizes according to our requirement through the use of polythene sheets, bamboo stakes or galvanised iron pipes. In this type of structure mainly tall growing plants like cucurbits, tomatoes are grown.Many small and marginal farmers in hills are involving in the off-season plastic house tomato production (Chapagain et al 2011).

4.3 Glass House / Green House

A greenhouse is a structure with walls and roof made of transparent material, such as glass or plastic, in which plants requiring regulated climatic conditions are grown (Smitha et al., 2016). In simple it is type of structure specially designed for vegetable prouction, protection of Off-Season plants against cold or heat.Glass house is provided with the facility to manage temperature, humidity, soil moisture , light etc as per requirement of plants. It is expensive , prouction and yield in this structure is excellent quality. Greenhouse crop farming has the advantage of offering year-round production of crops, crop protection, increased yields, vegetable production in limited land sizes and superior quality product (Wachira et al., 2014; Nordey et al., 2017).

4.4 Hot Bed

Hot bed is a pile of organic manure which provides heat due to the metabolism of microorganisms. The principle on which the hot bed works is that fresh manure (cow dung/sheep yard manure and poultry manure) ready for fermentation generates heat which is actually utilized to quick the germination by providing suitable conditions for germination and faster growth of the seedlings which result in early maturity of the crop (Singh., 2012). It is practiced in cool seasons.



Beside these structures cold frame, plastic mulching, hormones, polytubs, thatches, net house etc also can be used.

Advantages & Benefits of Off- Season Vegetable Production

- Off-Season vegetable helps farmer to get higher prices for their products.
- Consumers can have fresh products throughout the whole year even in Off-Season also.
- If production will be qualitative and massive then there is chance of exports in foreign countries, providing year around employment opportunity and high earning.
- Farmers can built their knowledge, learn ideas and specific techniques, develop confidence so that they can start this technology in commercial scale.
- This technology may be suitable to small, marginalised, subsistence and commercial farmers.
- It also encourages farmers to make Off-Season vegetable production as their main profession, properly utilizes the farm and land.
- It helps to ensure food scarcity.
- Profit from Off-Season planting per unit cultivation is high.
- Seed production is suitable through this technology.

Although Off season vegetable production technology is best and provides higher prices of each product but requirement of technical knowledge, higher cost of production, riskier business all the farmers are not ready to adopt it.

Conclusion:

As per RDA- recommended dietary allowance which includes 375 gram vegetable for an adult daily (125g leafy vegetables, 125 g root and tuber, 75g legumes and 50g fruits vegetables). In order to meet the balance diet seasonal vegetables only are not enough, Off-Season vegetable production is necessary which provides year around fresh vegetables. Also there is great scope of Off-Seasonal products in international market which helps farmers to get best prices for their products, raise life, economic standard and also provides employment opportunity. Farmers must adopt this technology in small or large amount for their upliftment, better value for their product. This is only a possible way to meet the vegetable demand and also ensure food security. Government of each countries must prioritise on Off-Season vegetable production technology, launch programs to promote it. In near future demand of vegetables will be double from now to fulfill that demand, live a happy, sound and healthy life also Off-Season vegetable production technology is essential. Further more research, prioritisation, awareness, motivation, ensuring of availability of materials, resources, provision of fund should be provided in the field of Off-Season production from related and respective authorities.

References

- Asongwe, G. A., Yerima, B. P., & Tening, A. S. (2014). Vegetable production and the livelihood of farmers in Bamenda Municipality, Cameroon. *International Journal of Current Microbiology and Applied Science*, 3(12): 682-700.
- Borrelli, A. (1983). The adaptation of some cultivars of table tomatoes of green house culture. *Culture Protette*, 12: 31-36.
- Buitelaar, K. (1986). Better varieties of cherry tomatoes. *Goenten Fruit*, 42: 30-32.
- Chapagain, T.R., Khatri, B.B., & Mandal, J.L. (2011). Performance of tomato varieties during rainy season under plastic house condition. *Nepal Journal of Science and Technology*, 12
- Gautam, D.M. (2012). Commercialization in Agriculture: Prospects, Challenges and Strategies. *Nepal Horticulture Society*, Kathmandu, Nepal, *Nepalese Horticulture*. Vol. 7: 27-32.



- Haupt, G. (1985). Varietal trials with green house tomato. *Meddelelse Statens Planteavlfsforsag*, 87: 1846-1849.
- Mariyono, J. (2017). Profitability and determinants of smallholder commercial vegetable production. *International Journal of Vegetable Science*, 24(3): 274-288. <https://doi.org/10.1080/19315260.2017.1413698>
- Nair, R., & Barche, S. (2014). Protected cultivation of vegetables – present status and future prospects in India. *Indian J. Appl. Res.*, 4 (6) (2014), pp. 245-247
- Panta, S. (2001). Final Report on Commercial Off-Season Vegetable Production and Marketing Program (1997-2001). *Agro Enterprise Centre, FNCCI, Kathmandu, Nepal*
- Popescu, V., Costache, I., & D. Ghita, (1984). New hybrids for green house cultivation. *Horticultural*, 33: 10-12.
- Singh, P.K. (2012) Hot Bed & Cold Frame Construction and Use. *Asian Journal of Agriculture and Rural Development*, Vol. 2, No. 3, pp. 447-451
- Shanmugavela, K. G. (1993). Production Technology of Vegetable Crops. New Delhi: *Oxford and IBH Publishing Co. Pvt. Ltd.*
- Singh, S. P. (2003). Production Technology of Vegetable Crops. Karnal (Haryana): *Agricultural Communication Research Center.*
- Smitha, S., Parvathy, A., & Madhavan, M. (2016). Role of social and economical characteristics of farmers in adopting greenhouse technology. *Advances in Life Sciences* 5(5):1973-1978.
- Van, V. R., & Danso, G. (2007). Profitability and sustainability of urban and periurban agriculture (Vol. 19): *Food & Agriculture Organization*. Rome, Italy.
- Wachira, J.M., Mshenga, P.M., & Mwanarusi, S. (2014). Comparison of the profitability of small-scale greenhouse and open-field tomato production systems in Nakuru North District, Kenya. *Asian Journal of Agricultural Science* 6(2):54-63.
- Weinberger, K., Genova II, C.A., (2005). Vegetable production in Bangladesh: commercialization and rural livelihoods. Technical Bulletin No. 33 (AVRDC Publication # 05-621), AVRDC – The World Vegetable Center, Shanhua, Taiwan