

Impact of nursery raising technology on production and profitability of onion

Initiatives to introduce onion nursery raising technology and supply onion seedlings among farmers were taken during 20014-15 to 2018-19 (five years). A total of 538.08 quintals onion seedlings were produced which were grown in an area of 59.77 ha. The production obtained from this area was 20,004.30 quintals with income of ₹ 318.58 lacs. The introduction of high yielding variety, i.e. Agri Found Light Red and supply of its planting material to the farmers significantly increased the area, production, productivity, profitability and established onion as an enterprise, as more than 50 entrepreneurs have been developed who are raising nursery of Agri Found Light Red variety and supplying them to the farmers and earning about ₹ 2-3 lacs within 3 month of onion nursery season. According to an estimate, about 5456 farmers have been benefitted directly due to the supply of quality planting material of high yielding variety.

ONION is a commercially important vegetable crop grown all over the country. Onion is consumed by every family either as raw in the salad form or as cooked along with spices and vegetables. The major onion growing states are Maharashtra, Karnataka, Odisha, Tamil Nadu, Uttar Pradesh, Bihar and Gujarat. In India, onion is grown in an area of 1.62 million ha with a total production of 26.64 million tonnes and productivity of 16.40 tonnes/ha. India is the second largest producer of onion in the world after China. Our country is also one of the exporters of onion. Onion is rich in minerals like phosphorous, calcium and carbohydrates. It also has some useful medicinal properties. Realizing the significance of onion in daily diet of every family, Krishi Vigyan Kendra, Dehradun, Uttarakhand has taken initiatives to sensitize the farmers on nursery raising technology and supply of high yielding variety onion seedlings.

Keeping in view the poor availability of quality planting material of high yielding varieties, we have started raising nursery of high yielding variety i.e. Agri Found Light Red developed by National Horticultural Research and Development Foundation (NHRDF), Nasik, Maharashtra. This variety has very good productivity and keeping quality. The nursery raising technology adopted by us has helped the farmers in production of quality seedlings of onion and their supply among farming community in Dehradun and adjoining areas.

Before intervention

Majority of the farmers cultivating onion were using seeds of local varieties which resulted in low productivity and keeping quality. Owing to poor

adoption of nursery raising technology, germination of seed was low and incidence of damping off disease was very high. Knowledge among farming community about high yielding varieties of onion and their nursery raising technology was meagre. The studies carried out in different onion growing areas of Dehradun revealed that farmers hardly got 150-200 quintals production of onion per ha. The survey also indicated that farmers who grew onion could hardly consume onion 2-3 months due to poor keeping quality of onion varieties.

According to an estimate about 80,000 seedlings were recorded in one quintal. Sale price of onion seedling - ₹ 6000 per quintal. According to an estimate, 9 quintal



Exposure visit of farmers

Table 1. Onion seedlings produced, area covered, production recorded and revenue generated during 2014-15 to 2018-19

Year	Quantity of onion seedlings supplied to the farmers (q)	No. of onion seedling supplied to the farmers	Revenue generated from sale of onion seedlings (₹)	Area covered from supply of onion seedlings (ha)	Productivity of onion (Qt./ha)	Production obtained from supply of onion seedlings (q)	Income generated by the farmers from onion cultivation (₹)	No. of farmers benefitted
2014-15	53.34	42,67,200	3,20,040	5.92	326.40	1932.28	2318736	426
2015-16	74.27	59,41,600	4,45,620	8.25	318.64	2628.78	3680292	510
2016-17	111.52	89,21,600	6,69,120	12.39	334.08	4139.25	6622800	940
2017-18	146.09	116,87,200	8,76,540	16.23	342.22	5554.23	8886768	1450
2018-19	152.86	122,28,800	9,17,160	16.98	338.62	5749.76	10349568	2130
Total	538.08	43,046,400	32,28,480	59.77	331.99	20,004.30	31,858,164	5456

seedlings planted in one ha area. Sale price of onion was ₹ 1200/quintal during 2014-15, ₹ 1400/quintal during 2015-16, ₹ 1600/quintal during 2016-17, ₹. 1600/quintal during 2017-18 and ₹ 1800/ quintal during 2018-19

After intervention

During 2014-15, KVK, Dehradun produced 53.34 quintals seedlings which were planted in 5.92 ha area. A total of 1932.28 quintal onion was produced translating into income of ₹ 23.18 lacs. KVK, Dehradun supplied 74.27 quintals seedling which were cultivated in 8.25 ha area. The total production recorded was 2628.78 quintals and ₹ 36.80 lacs income was generated during 2015-16. Similarly, during 2016-17, we produced 111.52 quintals and income of ₹ 66. 22 lacs was recorded. We have produced 152.86 quintals seedling which covered 16.98 ha area during 2018-19. A total of 5749.76 quintals onion was produced and income of ₹ 103. 49 lacs was generated.

Demonstration of nursery raising technology

Nursery was raised in such a place where sunlight was available throughout the day. Raised nursery bed was prepared whose width and height were 1 m and 5 to 6 inches, respectively to avoid waterlogging. Site selection for raising nursery was changed every year to minimize incidence of damping off disease. Site of nursery was ploughed properly and leveling was done to prepare nursery bed. During land preparation, 100 quintals FYM or 60 quintals vermi-compost was applied and mixed thoroughly in the soil. Line sowing was done in the nursery bed in which distance from line to line was 8-10 cm

and seed was sown at a depth of 3-4 cm.

Every year, the nursery was raised in the first fortnight of October month and seedling was ready within 50-60 days after sowing the seed. For management of damping off disease in the nursery, carbendazim + mancozeb @ 1 g per litre of water was sprayed three times at weekly interval. For proper growth and development of the plants, NPK 19:19:19 @ 5 g + Sagarika 2 ml + Urea 2 g were mixed in one litre of water and sprayed three times at weekly interval 30 days after seed sowing. Now it has been realized that in place of urea, foliar application of nano urea is more effective. Regular monitoring was done to observe soil moisture, incidence of damping off disease, germination, growth of the plants, etc and accordingly measures were taken.

Impact

The Agri Found Light Red variety of *rabi* onion which was introduced became very popular not only in Dehradun district but in entire Uttarakhand state also. The State Department of Horticulture, NGOs and private nurserymen also started promoting it. From the last five years (2014-15 to 2018-19), KVK, Dehradun produced 538.08 quintals onion seedlings which occupied 59.77 ha area. The total production recorded in the five years was 20,004.30 quintals whereas income was ₹ 318.58 lacs and the average productivity of five years was 331.99 quintals/ha. However, before interventions, the average productivity was 175 quintals/ha. Thus, after interventions, increment of 89.70% in average productivity was recorded.



Bed preparation



Germination



Interaction with farmers

Table 2. Do's and Don'ts of onion nursery

Do's	Don'ts
Nursery site should be selected where proper sunlight is available throughout the day as it helps in germination and hardening of the plants.	Nursery site should not be selected in the shade places as it affects germination, growth and hardening of the plants and to avoid damping off disease.
High yielding varieties and hybrids should be selected having very good keeping quality like Agri Found Light Red and Gulmohar.	Local varieties should not be selected as it gives low yield and have poor keeping quality.
Nursery should be established on raised bed with size of 5-6 inches above from the ground. Line to line distance of nursery bed should be 8-10 cm, width should be 1 m.	Nursery should not be established on flat bed to avoid waterlogging and for proper germination of seed.
Line sowing should be done to enhance the germination of seed and to do intercultural operations in effective manner.	Sowing of seed should not be done by broadcasting methods as it affects germination and intercultural operations.
Sowing should be done at a depth of 3-4 cm in row and cover the seed after sowing with the dugout soil.	Deep and shallow sowing should be avoided because it affects germination.
In the initial phase (up to 25 days of sowing), light irrigation should be done with water cane (Hazara) to avoid damping off disease.	Avoid heavy irrigation in the beginning stage (up to 25 days of sowing) to prevent damping off disease.
Nutrients should be applied 30 days after sowing to accelerate proper growth and development of plants.	Nutrients should not be applied before 30 days after sowing as uptake of nutrients is not done by plants effectively during early stage due to poor establishment of root system.
Recommended fungicide for example Carbendazim+Mancozeb should be applied in the nursery for effective management of damping off disease.	Farmers should not apply any fungicide for management of damping off disease because in the initial phase of germination this disease causes enormous economic loss.
At least two intercultural operations should be done to promote proper growth and development of the plant in the nursery.	Farmers should not do any intercultural operation which hinder growth and development of the plants in the nursery.

**Uprooting of seedlings****Interaction with extension personnel**

The onion nursery raised by KVK, Dehradun and their supply among farmers encouraged more than 50 farmers who have now become entrepreneurs. These entrepreneurs raise onion nursery of Agri Found Light Red and supply them to the farmers. The entrepreneurs roughly earn ₹ 2-3 lacs from sale of onion seedlings within three months. Thus raising onion nursery has become very profitable enterprise particularly in Vikas Nagar block of Dehradun district to which KVK, Dhakrani, Dehradun belongs.

According to an estimate, about 60% farmers grow onion for their own consumption of which about 5% farmers cultivate onion commercially. Before intervention, hardly 20% farmers were growing onion for their own consumption but within five years percentage of the farmers increased to 60%. However, number of commercial farmers was almost negligible which also increased to about 5%.

Earlier the 20% farmers who grew onion for their own consumption, hardly consumed onion 2-3 month after harvesting but now after the introduction of Agri Found Light Red variety having very good productivity

and keeping quality, farmers consume onion for up to 7-8 months. Thus, about 60% families are not dependent on markets for onion for up to 7-8 months in a year.

Future prospects of onion nursery

Implementation of nursery technology will help the farmers in getting optimum plants from their onion nursery with no mortality. It will also help the farmers in reducing cost of onion nursery.

Establishment of modern onion nursery with adoption of recommended technologies shall mobilize the farmers towards entrepreneurship development in onion nursery. Nursery raising technology with high yielding varieties and hybrids will enhance the production, productivity, keeping quality and income of the farmers.

Farmers and their family will be able to consume onion throughout the year which will help them in nutritional security as onion is the richest source of many vitamins and minerals. Farmers will not depend on markets for onion consumption even during lean period when prices of onion are very high which will ultimately help the farmers in saving money. The execution and dissemination of nursery technology will attract the farmers towards onion cultivation at commercial level.

For further interaction, please write to:

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