

## Onion bulb production through bulblets for enhancing farmers' income

**Onion is one of the most important vegetable and spice crops grown throughout the country. It is consumed raw, cooked, fried, dried or roasted. Besides being used as food, onions have a variety of medicinal properties. It has high export potential also. The higher nutritive value, several medicinal properties and vast export potential have boosted the scope of the crop.**

**I**N India, onion is grown in three seasons, i.e. *kharif*, late *kharif* (Rangda) and *rabi*. The main crop is *rabi* which covers about 60% of production, whereas, 20% each from *kharif* and late *kharif*. Maharashtra, Karnataka, Gujarat, Bihar, Madhya Pradesh, Rajasthan, Andhra Pradesh, Telangana and Tamil Nadu are the major onion growing states of the country. In general, barring North-Eastern states and Kerala, all other states grow onion.

The cultivation of *kharif* onion is being practiced in few states like Maharashtra, Karnataka, Rajasthan, Haryana, Bihar and Tamil Nadu. *Kharif* cultivation of onion plays an important and crucial role in fulfilling the consumer's demand and stabilizing the prices. Onion production in this season is highly vulnerable to erratic monsoon, cloudy weather and continuous drizzling which aggravate the problem of foliar as well as soil borne diseases. There are two methods to take the *kharif* onion bulb production viz. through seedlings and through setts (bulblets).

In bulb production through seedlings, the seed is sown in nursery beds, and seedlings are raised and transplanted in the main field. However, in bulb production through setts, the small setts are raised in one season (summer season) and used for planting in the following *kharif* (rainy) season. The setts are produced in Mahuva and Talaza of Mewat Bhavnagar area (Gujarat), Alwar of Khairthal area (Rajasthan) and Kaithal in Haryana, and are used for planting in different parts of the country. The cost of these setts is very high and the quality is also not good in terms of acceptable size of setts (1.5 cm to 2.5 cm). The farmers can produce better quality setts at their own field at a cheaper cost.

### Varieties: Onion setts production

To have an early and sure crop during *kharif* season, the onion varieties recommended for *kharif* season viz. Agrifound Dark Red, Bheema Raj, L-883 and Arka Kalyan are used to produce small setts during summer season.



Agrifound Dark Red



Bheema Raj



Arka Kalyan

### Soil

The soil should be rich in humous with good drainage. Onion can be grown in light loam, sandy loam or clay loam, deep friable and fertile soil rich in organic matter.

### Field production

The nursery soil should be irrigated 15-20 days before seed sowing and covered with 250 gauge transparent polythene for soil solarization. The application of *Trichoderma vridi* @ 5 kg/ha mixed with 125 kg decomposed FYM or vermicompost is also recommended to manage the damping off. The nursery beds should be raised about 15-20 cm from soil surface and 3.0 m × 0.6 m in size. The distance between 2 beds should be 30 to 45 cm.



Raised bed for bulblets production



Soil solarization



Field preparation

### Seed rate

To produce small setts, 10–12 g seed per square meter is recommended. For planting of one hectare area, 10–12 kg onion seed is sufficient for setts production.

### Time of seed sowing

The best time of seed sowing is from mid-January to first week of February in which maximum quantity setts of desirable size (1.5 cm to 2.5 cm) are obtained.

### Seed sowing and raising of setts

The seeds are sown on raised or flat beds depending upon the soil. The seed used for sowing should be treated with thiram or captan fungicide @ 2 g/kg of seed. Similarly, the nursery bed soil should also be treated with thiram or captan @ 5 g/m<sup>2</sup> before seed sowing. After seed sowing, beds should be covered with fine powdered FYM or compost followed by light watering by water can / sprinkler / drip. After that, beds should be covered with dry straw or grass or sugarcane leaves to maintain required temperature and moisture.

After the seed germination, the mulching material should be removed immediately. The plants are allowed



Mulching of setts nursery after sowing of seeds

in nursery beds upto April-May till the desired size of setts i.e. above 1.5 cm is attained (about 60 – 65 days). Due care is taken to maintain sufficient soil moisture and control of pest and diseases. When desired size is obtained, the irrigation is stopped. Five to ten days before harvesting of setts, a foliar spray of carbendazim @ 0.1% reduces the rotting during storage.

When foliage dry up, harvesting is done alongwith the tops. The selected setts of size 1.5 to 2.5 cm are stored by hanging method or in plastic crates in well ventilated room / godown. The small size setts i.e. less than 1.5 cm do not establish well in the field due to high mortality, whereas large size setts i.e. more than 2.5 result in more doubles / bolters and thus, increase the cost of production.

### Bulblet requirement



Setts before harvest



Harvested setts



Measurement of setts size



Stored setts



Unacceptable size of bulblets (Undersize < 1.5 cm and oversize > 2.5 cm)

Acceptable size of bulblets (1.5 cm to 2.5 cm)

It is experienced that average weight of 100 bulblets of size < 1.5 cm, 1.5 – 2.0 cm and > 2.0 cm is about 310 g, 520 g and 920 g, respectively. The planting of more than 2 cm bulblets in one hectare will require five lakh bulblets (about 40 ha). However, then 26 q/ha bulblets will be required of 1.5-2.0 cm size.

### Planting method of setts

The setts are planted on raised beds or both sides (solders) of ridges in BBF (Broad Band Furrow) system for better bulb development and higher yield. Dipping of bulblets in carbendazim @ 0.1% and carbosulfon @ 0.2% solution before planting helps in better establishment of bulblets. The months of July and August are the best time of planting in Maharashtra and August in Northern states. The size of bed depends upon level of land, soil type and irrigation method. Planting of oversize bulblets increases bolting and reduce the quality of the produce. The planting is done at 10 cm from line-to-line and 10 cm from plant-to-plant distance.

### Nutrient management

The requirement of nutrient depends on soil type, region of growing varieties and removal of major nutrients by the crop. In general, application of 25 t/ha FYM or 2-3 t/ha vermicompost is recommended one month before planting of bulblets in the field. The application of NPKS @ 100:50:50:30 kg/ha is recommended for onion. Half quantity of nitrogen and full quantity of phosphorus, potash and sulphur are mixed thoroughly in the field before planting of bulblets. The remaining half dose of nitrogenous fertilizer is applied in 2 equal doses as top dressing in standing crop at 30 and 45 DAP (Days After Planting). In addition to fertilizer application, use of micronutrients is beneficial in improving the quality of bulblets. Application of zinc @ 3 ppm, copper @ 1 ppm and boron @ 0.5 ppm at 45 and 60 DAP enhances the yield and improves quality in *kharif* onion. Application of ethephon @ 250 ppm at 45 DAP enhances the yield. Application of speciality fertilizers i.e. NPK (19:19:19 + 6 TE) @ 1% at 15 and 30 DAP followed by NPK (13:0:45) @ 1% at 40 and 50 DAP gives higher quality bulb yield in *kharif* season.



Kharif onion raised by sets

### Water management

Onion is a shallow rooted crop; its root system is normally restricted to top 3 cm and roots seldom penetrate deeper than 15 cm. The water requirement in onion at initial growth period is lesser and higher during reproductive phase. In *kharif* crop grown by sets, depending upon the rains, 6 – 8 irrigations are enough. Use of sprinkler or drip system gives significant increase in yield, uniformity in crop growth and bulb size, less weed flora as well as insect pest & diseases.



Surface irrigation



Drip irrigation



Sprinkler irrigation



Application of weedicide

### Disease and insect pests

For the management of foliar diseases in onion, the foliar spray of fungicides such as mancozeb

@ 0.25% or chlorothalonil @ 0.2% or propineb @ 0.2% or copper oxychloride @ 0.3% at fortnightly interval reduces the diseases. For the management of thrips, the spray of insecticides like deltamethrin @ 0.095% or lambda cyhalothrin @ 0.05% or fipronil @ 0.1% or spinosad @ 0.1% or profenophos @ 0.5 at fortnightly interval have been found effective in controlling thrips. In the solution of either fungicide or insecticide, the sticker like triton or sandovit should be mixed @ 0.06% invariably.

### Harvesting

When bulbs are fully developed, colour of bulbs also develop and the tops of the leaves start yellowing, the irrigation should be stopped and crop is harvested.

### Drying and curing

The harvested bulbs are kept for proper drying and curing along with tops by 'windrow method' in the field which takes 10-15 days depending upon the temperature and moisture in atmosphere.

### Neck cutting

The tops are cut leaving the neck 2.5 cm above the bulb.

### Sorting and grading

After neck cutting, the sorting and grading of bulbs is done to fetch good price in market. The diseased, bolted, doubles and cut bulbs are removed, thereafter the bulbs are graded in 3 categories, i.e. 'A' grade (> 60 mm), 'B' grade (40 to 60 mm) and 'C' grade (< 40 mm).



Onion bulb sorting

### Yield

If proper care is taken, an yield of 250–300 q/ha can be realized from *kharif* crop.



Harvested onion bulbs

### Advantages of *kharif* onion bulb production through setts

- The setts planted crop is sure as in seedling method, the raising of seedling during rains is difficult, further high mortality occurs during nursery period as well as after planting in the field, resulting in reduced yield due to less population. In setts planted crop,

population is maintained due to better establishment.

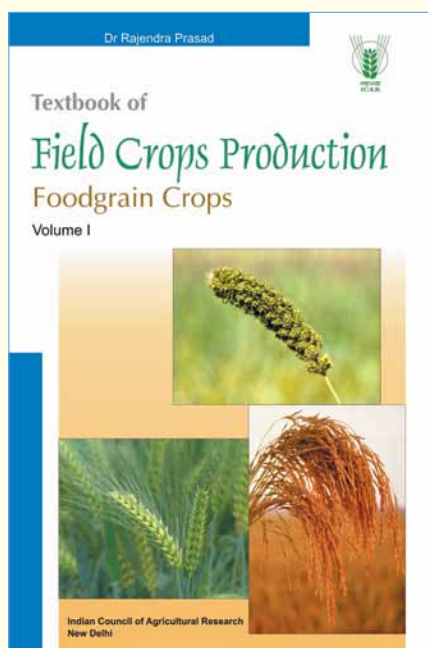
- The crop grown by setts attains early maturing (65 – 72 days) which is 30 – 50 days in advance as compared to seedling planted crop (90 – 100 days).
- Due to early maturity and early arrival in market, it fetches higher price and gives more profit to farmers.
- The availability of *kharif* onion bulb through setts can be manipulated for longer period by late planting.

However, there is need as well as wide scope to promote *kharif* onion cultivation through setts in different parts of the country which will benefit the farming community and help in doubling their income and improve their socio-economic status.

For further interaction, please write to:

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### TECHNICAL SPECIFICATIONS

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