Economics of onion (*Allium cepa* L.) production under organic condition

V.N. NANDESHWAR, A.B. MASTIHOLI AND M.G. KERUTAGI

**ABSTRACT**: An investigation was carried out to study the effect of FYM, as source of N, on the growth and yield of onion (*Allium cepa* L.) cv. Nasik Red under irrigated condition at Horticultural Research Station Hidkal Dam during Kharif 2011. Significantly highest bulb yield (195.39 q/ha), as well as bulb diameter (5.88 cm), fresh bulb weight (86.48 g/plant) was recorded in T₄ (poultry manure equivalent to 100 % RDN). Highest gross returns (Rs. 1,17,240 /ha) was also recorded in T₄ (poultry manure equivalent to 100 % RDN). On other hand application RDF (T₅) recorded significantly highest net returns of Rs. 54,243 per hectare and also significantly higher B: C ratio (2.03) followed by the application of poultry manure (equivalent to 100% RDN) (1.78). Net returns in T₄ (Rs. 51,452 /ha) and  T₅ were equally superior. Among the different organic manures applied, as a source of N, poultry manure application was found better in getting higher yield and profit from onion.

**KEY WORDS**: FYM, Onion, Poultry manure, Yield, Economics, Profitability


**INTRODUCTION**

Onion (*Allium cepa* L.) often called as “queen of the kitchen” belonging to the family Alliaceae is one of the most important commercial vegetable cum spice crops of India and widely cultivated throughout the world. Onion is mainly used as salad, cooked vegetable and in preparation of pickles both at mature and immature stages. It is also used by processing industries for dehydration, preparation of flour, flakes, paste etc. Onions are diuretic but, have low nutritional value (average nutritional value = 2.06). It is valued for its pungency which is due to sulphur containing compound (Allyl propyl disulphide). In India, it is grown in an area of 10.64 lakh hectares with an annual production of 151.18 lakh tonnes and productivity of 14.2 tonnes per hectare (Anonymous, 2011).

Indian contribution to the world trade of onion is 13.8 per cent, ranking first among all vegetable crops. India also ranks first in the export of fresh onion (33%).

In Karnataka, onion is cultivated in all the seasons (Kharif, Rabi and summer) with an area of 190.5 thousand hectares, production of 2592.2 thousand tonnes and productivity of 13.6 tonnes per hectare (Anonymous, 2011).

Among the various factors responsible for lower productivity of onion, declining soil productivity due to excess and continuous use of chemical fertilizers and lack of adequate supply of organic manures are the major factors. The escalating costs of chemical fertilizers also reduce the return per rupee of investment. Thus, production of good quality and residue free onion is equally important in addition to getting higher yield and returns.

**MATERIALS AND METHODS**

An experiment was conducted in red sandy loam soil during *Kharif* season of 2011 at Horticultural Research Station, Hidkal dam, Tal- Hukkeri, Dist-Belgaum, Karnataka. The
experimental land was uncultivated and fallow land. The texture of the experimental soil was red sandy loam. The available N, P₂O₅ and K₂O was 143, 8.63 and 131 kg/ha, respectively. The organic carbon content was 0.30 %, pH 7.24, EC 0.13 ds/m, BD 1.60 g/cm³ and maximum water holding capacity was 32.79 %. Experiment consisted of six treatment viz., T₁, FYM (equivalent to 100% RDN); i.e. (2.404 t/ha), T₂, vermicompost (equivalent to 100% RDN) i.e. (15.625 t/ha), T₃, neem cake (equivalent to 100% RDN) i.e. (2.404 t/ha), T₄, poultry manure (equivalent to 100% RDN) i.e. (4.167 t/ha), T₅, RDF (125:50:125 kg NPK/ha+30 t FYM/ha), T₆, Control (0:0:0 kg NPK/ha). Recommended FYM @ 30 t per hectare was applied to all the treatments except treatment number five. The experiment was laid out in Randomized Block Design (RBD) and replicated four times. Yield and yield contributing characters like bulb yield (q/ha), bulb diameter (cm) and fresh bulb weight (g) were recorded after harvesting of the bulbs. Data were recorded for quantitative traits on five randomly selected plants. The mean value of each character in each treatment was calculated and subjected to statistical analysis.

Cost of cultivation of organic production of onion:

Based on the prevailing prices of inputs at the time of their usage and market price of the produce at the time of their sale, the B: C ratio and net profit was worked out using the following formula:

\[ \text{Net return} = \text{Gross returns} - \text{Cost of cultivation} \]

Net profit per hectare (Rs./ha) = Gross returns (Rs./ha) - Cost of cultivation (Rs./ha)

\[ \text{Benefit : Cost ratio} = \frac{\text{Gross returns (Rs./ha)}}{\text{Total cost of cultivation (Rs./ha)}} \]

The data were subjected to analysis of standard deviation and variance following the procedure given by Sunderaraj et al. (1972).

**RESULTS AND DATA ANALYSIS**

The findings of the present study as well as relevant discussion have been presented under following heads:

**Yield parameters:**

Application of poultry manure equivalent to 100 per cent RDN (T₁), FYM (T₂) and application of RDF (T₅) recorded significantly higher onion bulb yield of 195.39, 176.52 and 178.63 q per hectare, respectively (Table 1). The per cent increase in bulb yield in T₁ (Poultry manure equivalent to 100% RDN) over

<table>
<thead>
<tr>
<th>Table 1 : Yield and yield contributing parameters in onion cv. Nasik Red as influenced by different organic manures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatments</strong></td>
</tr>
<tr>
<td>T₁: FYM (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₂: Vermicompost (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₃: Neem cake (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₄: Poultry manure (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₅: RDF (125:50:125 kg NPK/ha+30 t FYM/ha)</td>
</tr>
<tr>
<td>T₆: Control (0:0:0 kg NPK/ha)</td>
</tr>
</tbody>
</table>

S.Em ± 0.11 2.02 4.16
C.D. (P=0.05) 0.31 6.08 12.53
CV (%) 3.65 5.17 4.91

**RDN:** Recommended dose of nitrogen  
**RDF:** Recommended dose of fertilizer

<table>
<thead>
<tr>
<th>Table 2 : Economics of cultivation of onion cv. Nasik Red as influenced by different organic manures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatments</strong></td>
</tr>
<tr>
<td>T₁: FYM (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₂: Vermicompost (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₃: Neem cake (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₄: Poultry manure (equivalent to 100% RDN)</td>
</tr>
<tr>
<td>T₅: RDF (125:50:125 kg NPK/ha+30 t FYM/ha)</td>
</tr>
<tr>
<td>T₆: Control (0:0:0 kg NPK/ha)</td>
</tr>
</tbody>
</table>

S.Em ± – – – – 2,491.74 2,491.74 0.04
C.D. (P=0.05) – – – – 7,510.9 7,510.9 0.13
CV (%) – – – – 4.9 13.67 5.34

**RDN:** Recommended dose of nitrogen  
**RDF:** Recommended dose of fertilizer
T_5 and T_7 was 9.3 and 8.9 per cent, respectively. But, the yield obtained in the treatment where poultry manure was applied (T_3) was 43.44 per cent higher than T_5 (control). The higher bulb yield of onion in the above treatments was due to higher application of poultry manure and FYM that contained higher nutrients in the form that can easily be taken up by plants over a longer period of time. The results are in line with the findings of Magdi et al. (2009). Application of organic manure was reported to increase the uptake of N, P, K and also their contents in the soil and therefore, organic manures are considered to be a good source for improving soil fertility. Poultry manure is rich in essential plant nutrients such as P and K yet also contains noticeable amounts of some micronutrients (Zn, Cu and Fe) which help in enhancing growth and yield of plants by increasing the plant metabolic activity (Abou El-Magd et al., 2012 in garlic and Anburani and Manivannan, 2002 in brinjal).

The favourable effects of poultry manure on onion plant productivity might be due to continuous supply of nutrients which improved physical properties of soil and increased water retention. The structural improvement can encourage the plant to have a good root development by improving the aeration in the soil which resulted in higher plant growth. Similar observation was made by Khalil et al. (2002); Filippini et al. (2012) and Yassen and Khalid (2009) in onion.

Different organic manures influenced the bulb characters significantly. Higher bulb diameter was recorded in T_4 (5.88 cm) (Table 1), which was 3.89 and 16.44 per cent higher than T_3 (RDF) and T_5 (control), respectively. However, T_5, T_1 and T_3 were found at par with T_5.

Similarly, significantly higher fresh bulb weight was recorded in the application of poultry manure (T_3) (86.48 g) which was 6.73 and 34.33 per cent higher than T_5 (RDF) and T_5 (control), respectively. The effect of FYM (T_1) and RDF (T_3) was also similar to that of poultry manure (Table 1). The increase in the bulb diameter and fresh bulb weight in onion might be attributed to the application of poultry and animal manure which improved the soil structure and in turn resulted in better root growth, nutrient absorption and better bulb development. The increase in bulb diameter and fresh bulb weight was the result of better performance of plant with respect to growth parameters like plant height, number of leaves, leaf area, leaf area index, neck girth at higher levels of organics. Similar finding was observed by Magdi et al. (2009); Yassen and Khalid (2009) and Bagali et al. (2012) in onion and Abou El-Magd et al. (2012) in garlic.

**Economics:**

Different organic manures influenced the cost of cultivation significantly. Application of vermicompost (equivalent to 100% RDN) (T_2) recorded highest cost of cultivation (Rs. 95,995 /ha) (Table 2). Whereas, the lowest cost of cultivation (Rs. 48,620 /ha) was in T_5 (control).

Organic manures, applied as a source of N, influenced the growth and yield of onion. Economics of onion cultivation under organic system also differed significantly. Significantly highest gross profit of Rs. 1,17,240 per hectare was in T_4 (poultry manure applied equivalent to 100% RDN). But, significantly higher net returns (Rs. 54, 243/ha) and B: C ratio (2.03) was recorded in T_2 (RDF) (Table 2). However, net return recorded in T_4 (Rs. 51, 452 /ha) was on par with T_5. The higher net return in T_4 and T_5 was mainly due to higher bulb yield and lower cost of cultivation. Though the gross profit in T_4 was higher than T_5, higher net return and B: C ratio was due to lower cost of cultivation which might be due to the lower cost of inputs compared to poultry manure. The results are in line with the findings of Jayathilake et al. (2003); Krishnamurthy and Sharnappa (2005); Basvaraja et al. (2007) and Bendegumbal et al. (2008) in onion.

**Conclusion:**

From the above study it can be inferred that among the different organic manures applied, as a source of N, poultry manure application (equivalent to 100 % RDN) was found good in increasing the growth and yield of onion, and also getting higher profits in addition to reducing 50 per cent of the cost of mineral fertilizers in onion cultivation.

**Authors’ affiliations:**

V.N. NANDESHWAR, Department of Horticulture (Vegetable Science) Dr. Panjabrao Deshmukh Krishi Vidyapeeth, AKOLA (M.S.) INDIA

M.G. KERUTAGI, Department of Agricultural Economics, K.R.C. College of Horticulture, Arabhavi, BELGAUM (KARNATAKA) INDIA

**LITERATURE CITED**


