A study on the adoption behaviour of small farmers on recommended onion cultivation technologies in Trichy district, Tamil Nadu

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ABSTRACT

The study was conducted in Manachanullur block of Trichy district, Tamil Nadu. Four villages were identified from the selected block for the study. Totally, 120 respondents were interviewed. The data were collected through a pre-tested interview schedule and analyzed by using percentage analysis. The study revealed that majority of the farmers (98.33%) adopted the spacing and irrigation schedule for onion cultivation. Further, most of the onion growers (87.50%) used NPK fertilizers in split doses followed by the weedicide application used by 85.83 per cent of the farmers. The major constraints expressed by the farmers were high cost of fertilizers (98.33%), fluctuations in market price (94.16%), high cost of pesticides (88.33%), high cost of storage structures (87.50%) and non-availability of labour (85.83%).

Keywords: Adoption level; constraints; onion; technologies

INTRODUCTION

Onion (*Allium cepa* L) is an inevitable vegetable in Indian diet. India is the second largest onion growing country in the world. The Indian onions are famous for their pungency and are available round the year.The major onion producing states are Maharashtra, Karnataka, Madhya Pradesh, Gujarat, Bihar, Andhra Pradesh, Rajasthan, Haryana and Telangana. There is a lot of demand for Indian onion in the world; the country has exported 1,537,496.89 MT of fresh onion to the world for worth Rs 3,432.14 crores during the year 2021-22 (https://www.apeda.gov.in/apedawebsite/SubHead_Products/Onions.htm).

Tamil Nadu has been the state which always acquired the tenth position as a largest onion producing states in India. Tamil Nadu has 37.7 (000' hectares) area of land under the cultivation of onion and it has production marginality of about 429.72 (000 tonnes). The state is yielding about 11,398 kg/ha onion every year (Anon 2017). Dhivya and Karthikeyan (2019) reported that in Tamil Nadu, the districts Tiruchirappalli, Dindigul, Namakkal, Coimbatore, Erode, Virudhu Nagar, Tirunelveli, Thoothukudi and Salem were the major onion cultivation areas. They occupied nearly 75 per cent of the total onion production in Tamil Nadu with a productivity of 12 tonnes per hectare. According to the trade sources, nearly 70 per cent of area was occupied by small onion and remaining 30 per cent was by Bellary onion. CO1, CO2, CO3, CO4, CO (On) 5, MDU 1 and Bangalore Rose were important small onion varieties raised by the farmers.

Adoption of improved technologies and agricultural practices are pre-requisites for increased farm productivity. Assessing the appropriateness of potential new technologies or practices, increases the likelihood of adoption or modification to suit farmers' needs; however, low farm output still persists among smallholders, attributable to several factors including poor and low adoption of modern production practices.

Dhivya and Karthikeyan (2019) observed that farmers do not adopt the entire package of practices recommended for a particular crop. An understanding about the various characteristics of the onion growers

would provide valuable guidelines in formulating programmes for different clientele. Knowledge about the cultivation technologies in onion would enable extension workers to develop appropriate strategies to educate the farmers and to inculcate the required knowledge to improve their adoption. So, findings of the research on adoption of onion cultivation will help the extension workers to launch special schemes to popularize such practices which are found to be less in adoption.

Trichy district is located in the central part of Tamil Nadu. Major horticultural crops cultivated in this district are fruit crops like mango, banana, guava and acid lime; vegetables like tomato, onion, brinjal and tapioca; spices like chillies, coriander, tamarind and turmeric; plantation crops like betel vine and flower crops like jasmine, marigold, crossandra and rose.

The district has horticultural crop area of 28,011 hectares in which fruits (37%) occupy major area followed by vegetable (34%), plantation (20%), spice (4%), flower (3%) and medicinal (0.2%) crops. Banana is the major crop of the region consisting of 6,166 ha followed by coconut (5,115 ha), tapioca (4,038 ha), onion (3,246 ha), mango (2,004 ha), acid lime (1,179 ha) and chillies (1,114 ha) (https://tiruchirappalli.nic.in/departments/horticulture/).

The production of onion in the district is low as compared to other parts of India or Tamil Nadu. The main reasons for low productivity of onion in the district are traditional cultivation methods and use of local varieties. Fluctuation of market prices and not getting remunerative prices of onion, make its cultivation unprofitable. Sometimes the market rate is as low as less than one rupee per kilogram. This situation generally creates discontentment among the farmers who agitate for fair market price.

The present study on the adoption behaviour of small farmers on recommended cultivation technologies of onion in Trichy district, Tamil Nadu was undertaken to find out the adoption behavior of small farmers towards the recommended cultivation technologies in onion cultivation and identify the constraints faced by the farmers in growing onion.

METHODOLOGY

Trichy district was purposively selected. There are fourteen blocks in the district of which one block ie Manachanullur was selected based on the major area under onion cultivation. From the block, four villages viz Senamangalam, Edumalai, Perahambai and Vazhaiyur were selected by adopting simple random technique. From each village, 30 onion growers were selected randomly making a sample size of 120. The data were collected through pre-tested interview schedule. The data were analyzed using statistical tools such as frequency and percentage analysis (Panse and Sukhatme 1985).

RESULTS and DISCUSSION

Adoption level of the farmers of onion cultivation technologies

The distribution of respondents according to their adoption level on recommended cultivation of onion is shown in Table 1.

Table 1. Distribution of respondents according to their adoption level of onion cultivation

Level	Respondents (n= 120)	
	Number	Percentage
Low	23	19.16
Medium	54	45.00
High	43	35.83

Perusal of the data indicates that less than half of the respondents (45.00%) possessed medium level of adoption of onion cultivation technologies followed by high level of adoption (35.83%). About one-fifth of the respondents (19.16%) had low level of adoption.

Extent of adoption of recommended onion cultivation technologies

Data in Table 2 reveal that all the onion growers adopted the recommended season of planting (April-May and October-November) and weed management and harvesting at proper stage. Most of the farmers (98.33%) adopted recommended spacing and irrigation schedule for onion cultivation followed by application of NPK fertilizers (87.50%), chemical weeding (85.83%), use of chemicals for disease control (61.66%) and seed rate (60.00%).

More than half of the farmers (56.66%) adopted measures to control pests such as thrips and onion fly. Just less than half of the farmers (48.33%) grew

recommended onion varieties. However, only 35.00 per cent farmers adopted IPM practices of onion cultivation and just 20.83 per cent raised seedlings and did transplanting.

In a study on adoption of TNAU released small onion variety CO (On) 5 among farmers of Perambalur district, Tamil Nadu, Bharath et al (2022) reported that most of the farmers (65.83%) had medium level of adoption of CO (On) 5. Exactly half (50.00%) of the farmers did not follow the recommended time of harvest. Since they had previous experience of how to harvest and when to harvest, they followed their own practice. Jadav and Munshi (2004) determined the extent of adoption of recommended onion production technology and its relationship with selected characteristics of the onion growers in Bhavnagar district of Gujarat and reflected that more than one-half (56.67%) of the onion growers had medium level adoption about recommended onion production technology.

Bhise et al (2014), in a study in Akola district of Maharashtra, revealed that over half (61.00%) of the farmers had medium level of adoption of recommended cultivation practices of onion crop followed by 22.00 per cent and 17.00 per cent of the farmers who had low and high level of adoption. The authors implied that the information regarding recommended cultivation practices should be disseminated to the farmers by extension functionaries, KVKs, NGOs etc through demonstrations, workshops, distributing printed material like leaflets, folders etc which would lead to increased adoption, perception, knowledge and ultimately the yield level of onion crop.

Jadav et al (2003) reported that the low yield of onion might be due to poor knowledge about recommended onion production technologies apprehended by the farmers. More than half of the onion growers had moderate knowledge about onion production technology. They stated that it was essential to increase level of knowledge to promote adoption of improved technology of onion production. They indicated that more than one-half of the onion growers possessed moderate knowledge about recommended onion production technology followed by 20.83 and 18.33 per cent of the respondents belonging to high and low categories of knowledge level respectively. With respect to the practice-wise knowledge of recommended onion production technology, respondents possessed knowledge in respect of seed treatment, disease control, FYM application and sowing distance of onion cultivation practices. More than 60 per cent respondents possessed knowledge about use of improved variety, proper sowing time, transplanting, irrigation and insect pests. They were of the opinion that with a view to promote adoption of improved technology of onion production, it was essential to increase level of knowledge.

Mailumo and Onuwa (2022) studied the adoption of recommended onion production practices among smallholder farmers in Dambatta, Kano state, Nigeria and revealed that the prevalent practices adopted by the farmers included improved onion varieties (78%), plant spacing (69%), planting method (55%), weed management (50%) and fertilizer application (44%). They recommended subsidizing cost of adoption of recommended onion production practices, improving access to modern production practices/technologies, agricultural credit/farm capital, extension services, adequate labour supply and tenure policy modification to ameliorate adoption constraints.

Sahu et al (2021) examined the status of onion farmers' knowledge and the level of adoption of the recommended pre-harvest and post-harvest management practices in Junnar and Dindori blocks of Pune and Nashik districts, Maharashtra respectively. The study revealed that 40 per cent of the respondents were clustered under the high knowledge category and 41.67 per cent respondents displayed medium level of adoption. Majority of the respondents were knowledgeable and adopted practices like harvesting at the optimum time and correct stage of maturity, proper handling, curing, sorting, grading and packaging at field level. However, they overlooked the adoption of certain essential practices, for instance, selection of suitable cultivars, nursery management, application of bio-fertilizers, bio-fungicides, market intelligence and secondary processing. They emphasized to devise a mix of appropriate extension strategies to narrow down the knowledge-practice gap faced by the onion farmers.

Dhivya and Karthikeyan (2019) reported that cent per cent of the onion growers were having knowledge about season of planting followed by 69.16 per cent having knowledge about the recommended varieties. They found that 100 per cent of the farmers were having knowledge about ploughing the main field followed by 86.66 per cent who were knowledgeable about preparation of field by making ridges and

furrows. Most of the farmers (94.16%) were having knowledge about medium size bulb for onion cultivation followed by 88.33 per cent raising seedlings and transplanting for onion cultivation and only 38.33 per cent having knowledge about recommended seed rate. Irrigation schedule was known to all the farmers followed by 84.19 per cent of the farmers having knowledgeabout recommended spacing. In total, 77.50 per cent of the farmers were having knowledge about FYM application followed by 66.16 per cent knowledgeable about their NPK fertilizer in split doses. Most of the farmers (77.50%) were knowledgeable about applying weedicides to control weeds and 90 per cent doing practices like hoeing, hand weeding and earthing up to control weeds. Out of total, 76.66 per cent of the farmers were knowledgeable about control measures for thrips and onion fly; 85.83 per cent of the farmers had knowledge about control measures for leaf spot followed by 84.16 per cent knowing about the control measures for basal rot and 65.00 per cent about IPM practices.

Constraints faced by the farmers in onion cultivation

It can be observed from Table 3 that majority of the respondents (98.33%) expressed that high cost of fertilizers was the major constraint faced by them followed by fluctuation in market price (94.16%), high cost of pesticides (88.33%) and storage structures (87.50%) and non-availability of labour (85.83%). Just more that half of the farmers (53.33%) faced difficulty in identifying pests and diseases followed by lack of knowledge about curing and drying of onion (48.33%), lack of awareness about improved cultivation practices (46.66%) and lack of technical guidance (43.33%).

Kumar et al (2020), in Nuh district of Haryana, found that the major problems faced by the onion farmers in production were high cost of pesticides (93.33%), lack of knowledge about recommended fertilizer doses (86.67%), high cost of fertilizers (83.33%), lack of knowledge about the control measures for various pests and diseases (83.33%), difficulty in identifying the pests and diseases (80.00%) and lack of knowledge about seed/seedling treatment (76.67%). As for as marketing of onion is concerned, 83.33 per cent of respondents opined that high cost of transportation, absence of minimum support prices (83.33%), existence of large number of intermediaries in marketing process (83.33%) and too much fluctuation in prices (80.00%) were the major constraints. Among the problems related to processing expressed by onion growers, 80.00 per cent of the respondents reported the problem of technical manpower, higher charges of power and fuels (73.33%), fluctuation in raw material and procurement (73.33%) and lack of good quality packaging material (66.67%).

In a study conducted in Gadag district of Karnataka, Baraker et al (2020) reported that major production related constraints expressed by onion growers were lack of knowledge about improved varieties, their seed/planting material, higher cost of fertilizers and pesticides, expensive labour wages and their non-availability, inadequate irrigation facilities, lack of suitable storage facilities and lack of capital. Major marketing related constraints expressed were low price/lack of remunerative prices, higher price fluctuation, involvement of middlemen and commission agents, high commission charges, NAFED not purchasing onion regularly and lack of credit facilities. Major suggestions offered by onion growers were fixed rate/support price based on production cost, export of onion to foreign countries, crop demonstrations about improved varieties and on recent production technologies and subsidy on inputs.

It was found in the present study, that majority of the respondents belonged to medium level of adoption of improved cultivation practices of onion. This indicates a vast scope for the developmental departments and SAUs/ICAR institutes/commodity boards etc to intervene and improve the adoption level of farmers of improved cultivation practices of onion. Onion being a short duration crop, the farmers had been taking it as a sole crop. They were not aware of improved cultivation practices and scientific storage structures. The government intervention to reduce the adoption gap may be in the form of timely supply of all critical inputs to the farmers and directing the farm scientists to develop the skill of labour having techniques as labour was a major problem for all categories of farmers.

Fluctuation in the market price and high transportation cost were also the major problems expressed by the farmers. This could be mitigated by intervention of the government, developmental departments, marketing boards and other agencies by way of providing timely market information and strengthening the market infrastructure at Taluk and district levels to ensure efficient marketing system for

Table 2. Distribution of respondents according to extent of adoption of recommended onion cultivation technologies

Practice	Respondents (n = 120)	
	Number	Percentage
Season (April-May and October-November)	120	100.00
Varieties (CO1, CO2, CO3, CO4. MDU1, CO (On) 5	58	48.33
Seed rate (8 kg/ha)	72	60.00
Raising seedlings and transplanting	25	20.83
Spacing and irrigation (ridges and furrows at a spacing of 45 cm) and irrigation schedule (once daily, once in three days, once in a week)	118	98.33
Application of NPK fertilizers	105	87.50
Weed management (hoeing, hand weeding, earthing up)	120	100.00
Chemical weeding (use of atrazine)	103	85.83
Disease control (for leaf spot– mancozeb 2 g/l, for blast rot– carbendazim, hexaconazole 0.1%, 1 g/l)	74	61.66
Pest control (thrips and onion fly– acephate 70 SP @ 500 ml/ha)	68	56.66
Recommended IPM practices	42	35.00
Harvesting stage (when leafy green tops begin to turn yellow)	120	100.00

Muliple responses

Table 3. Constraints faced by the farmers in adoption of onion cultivation technologies

Constraint	Respondents (n = 120)	
	Number	Percentage
Fluctuation in market price	113	94.16
Difficulty in identifying the pests and diseases	64	53.33
High cost of storage structures	105	87.50
Non-availability of labour	103	85.83
Lack of awareness about improved cultivation practices	56	46.66
Lack of knowledge about curing and drying of onion	58	48.33
High cost of fertilizers	118	98.33
High cost of pesticides	106	88.33
Lack of technical guidance	52	43.33

Multiple responses

the produce and also timely intervention by the government agencies by way of extending/announcing government support price in case of price fluctuation. Moreover, government should provide subsidies for storage structures to the farmers for increasing the self life of onion which would help the farmers to sell their produce at higher price.

REFERENCE

Anonymous 2017. Top 10 largest onion producing states of India. World Blaze, 7 January 2017.

Baraker SK, Lalitha KC, Manjunath KV and Reddy DA 2020. Constraints and suggestions in production and marketing of onion in Gadag district of Karnataka, India. International Journal of Current Microbiology and Applied Sciences **9(9):** 3155-3161.

Bharath S, Premavathi R, Balasubramaniam P and Selvi RG 2022. A study on adoption of TNAU released small onion variety CO (On) 5 among farmers of Perambalur district, Tamil Nadu. Asian Journal of Agricultural Extension, Economics and Sociology **40(9):** 352-356.

Bhise RN, Kale NM and Waghmode YJ 2014. Adoption of recommended cultivation practices for the onion (*Allium cepa*) growers. Advance Research Journal of Social Science **5(2):** 233-237.

Dhivya S and Karthikeyan C 2019. An assessment of knowledge and adoption level of farmers on onion production technologies. International Journal of Agricultural Science and Research **9(4):** 191-197

https://tiruchirappalli.nic.in/departments/horticulture/ (Retrieved: 08.08.2022)

https://www.apeda.gov.in/apedawebsite/SubHead_Products/Onions.htm (Retrieved: 10.08.2022)

Jadav NB and Munshi MA 2004. Adoption of recommended onion production technology. Gujarat Journal of Extension Education **15:** 44-46.

Jadav NB, Munshi MA and Kanani PR 2003. Correlates of knowledge of growers about onion production technology. Gujarat Journal of Extension Education **14:** 5-7.

Kumar R, Bishnoi DK, Sumit and Singh A 2020. Constraints in production, marketing and processing of onion (*Allium Cepa* L) in Nuh district of Haryana. Economic Affairs **65(4):** 653-657.

Mailumo SS and Onuwa GC 2022. Adoption index of recommended onion production practices and correlation of multivariate factors among smallholder farmers. Turkish Journal of Agriculture – Food Science and Technology **10(Special Issue 2):** 2926-2930.

Panse VG and Sukhatme PV 1985. Statistical methods for agricultural workers. Indian Council of Agricultural Research, New Delhi, India, 359p.

Sahu S, Sharma JP, Burman RR, Sharma RR, Kumar P and Varghese E 2021. Assessment of knowledge and adoption pattern of post-harvest management practices by Maharashtrian onion farmers. Indian Journal of Agricultural Sciences **91(12):** 1763-1767.